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for the

In-Service Examination



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Section 1: Comprehensive

1. A 17-year-old boy undergoes excision of a congenital nevus of the scalp. Prior to excision, he underwent placement of a subgaleal tissue expander. Which of the following growth factors is most likely to be upregulated during ischemia in this patient?
 - A) Epidermal
 - B) Keratinocyte
 - C) Platelet-derived
 - D) Transforming
 - E) Vascular endothelial

The correct response is Option E.

Vascular endothelial growth factor (VEGF) is an important mediator of wound healing and is necessary for angiogenesis. It was originally discovered as a protein secreted by tumor cells to increase the permeability of local blood vessels to circulating macromolecules. It has been shown to increase endothelial growth and migration and enhance glucose transport in the endothelial cell, which is needed to match the increased energy required during angiogenesis. Hypoxia has been shown to be a potent stimulus for the expression of VEGF, and current research has been directed at utilizing VEGF to augment healing and viability in situations of tissue ischemia.

The remaining growth factors are all important in the wound-healing process, relating primarily to reepithelialization and wound contraction, but are not directly involved in angiogenesis.

References

1. Richter GT, Bowen T III, Boerma M, et al. Impact of vascular endothelial growth factor on skin graft survival in irradiated rats. *Arch Facial Plast Surg*. 2009 Mar-Apr;11(2):110-113.
2. Taub PJ, Silver L, Weinberg H. Plastic surgical perspectives on vascular endothelial growth factor as gene therapy for angiogenesis. *Plast Reconstr Surg*. 2000 Mar;105(3):1034-1042.

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2. An otherwise healthy 47-year-old man comes to the office because of the recurrent ventral hernia shown. He does not smoke cigarettes. Physical examination shows "Swiss cheese–type" defects, which are confirmed by CT scan. He desires reconstruction. Which of the following is the most appropriate surgical treatment?
- A) Component separation with mesh placement
 - B) Laparoscopic hernia repair with mesh placement
 - C) Open hernia reduction with bridging mesh placement
 - D) Open reduction with free tensor fascia lata flap
 - E) Total autologous component separation

The correct response is Option A.

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Given the size and history of the defect, the patient described has a significant chance of recurrence of his hernia. To optimize the chances of a functional recovery that is durable and has the lowest chance of recurrence, the component separation technique with mesh reinforcement (synthetic or biologic) is indicated. The component separation technique, originally described by Ramirez et al. in 1990, allows for recruitment of the rectus complex towards the midline to facilitate primary reapproximation (in the best-case scenario) or at least decrease the size of the residual defect. Studies have shown that reinforcement of hernia repairs with mesh decreases recurrence rates by 50 to 75%, even in secondary repairs. It is not clear, however, whether the mesh should be placed as an overlay or underlay. Nonetheless, mesh reinforcement leads to lower recurrence rates, especially if combined with component separation. Specifically, component separation allows for reduction of the hernia defect size after hernia reduction, and leads to lower recurrence rates versus hernia reduction and bridging mesh repair alone.

Laparoscopic repair is a useful technique in hernia repairs. However, the complex, large “Swiss cheese–type” defect described lends itself more to open repair in terms of facilitation of reduction, optimization of safety (avoidance of unrecognized bowel injury), and decrease in operative time.

A tensor fascia lata flap, originally described for large hernia repairs because it allows transfer of fascia to the abdomen, does not demonstrate superior results compared to available meshes. It also incurs donor site morbidity versus the mesh reinforcement techniques.

References

1. Luijendijk RW, Hop WC, van den Tol MP, et al. A comparison of suture repair with mesh repair for incisional hernia. *N Engl J Med*. 2000 Aug 10;343(6):392-398.
2. Burger JW, Luijendijk RW, Hop WC, et al. Long-term follow-up of a randomized controlled trial of suture versus mesh repair of incisional hernia. *Ann Surg*. 2004 Oct;240(4):578-583.
3. Ramirez OM, Ruas E, Dellon AL. "Components separation" method for closure of abdominal-wall defects: an anatomic and clinical study. *Plast Reconstr Surg*. 1990 Sep;86(3):519-526.
4. Espinosa-de-los-Monteros A, de la Torre JI, Marrero I, et al. Utilization of human cadaveric acellular dermis for abdominal hernia reconstruction. *Ann Plast Surg*. 2007 Mar;58(3):264-267.
5. Williams JK, Carlson GW, deChalain T, et al. Role of tensor fasciae latae in abdominal wall reconstruction. *Plast Reconstr Surg*. 1998 Mar;101(3):713-718.
6. Pham CT, Perera CL, Watkin DS, et al. Laparoscopic ventral hernia repair: a systematic review. *Surg Endosc*. 2009 Jan;23(1):4-15. Epub 2008 Oct 15.

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3. A 38-year-old man who is HIV positive comes for evaluation of a “buffalo hump” on the back of his neck. He says that the hump has been present for 2 years and has progressively increased in size during that time. He began highly active antiretroviral therapy (HAART) 3 years ago and has been adherent to his regimen. Physical examination shows a dorsocervical fat pad. The most likely cause of this patient’s condition is a drug that inhibits which of the following?
- A) Chemokine coreceptor
 - B) Fusion
 - C) Integrase
 - D) Protease

The correct response is Option D.

Highly active antiretroviral therapy (HAART) has, in many cases, transformed HIV from a rapidly fatal disease to a chronic illness controlled with long-term therapy. Mortality and morbidity rates with antiretroviral therapy have declined markedly, improving prognosis and leading to a major reduction in opportunistic infections and disease related to outward signs of HIV infection.

HAART refers to triple-combination antiretroviral therapy with two nucleoside reverse transcriptase inhibitors (NRTI) plus either a protease inhibitor (PI), a non-nucleoside reverse transcriptase inhibitor (NNRTI), or a third nucleoside reverse transcriptase inhibitor.

Long-term adverse events include lipodystrophy, dyslipidemia, and impaired glucose tolerance. Lipodystrophy includes lipohypertrophy of the anterior and dorsocervical fat, breasts, and abdominal visceral fat and lipoatrophy of the face, arms, legs, and buttocks. This has been strongly linked to regimens including a PI and NRTI. Specifically, lipohypertrophy has been associated primarily with PI therapy. The lipodystrophy experienced by these patients carries a social stigma that may pose a barrier to treatment and reduce compliance. The etiology of the altered fat redistribution remains unclear, and the effects are not entirely reversible.

The most common adverse effect of NNRTIs is a rash, which usually resolves with continued treatment. More recent data demonstrate that fat redistribution changes may be associated with NNRTIs, but this occurs less commonly and to a lesser extent than with PIs.

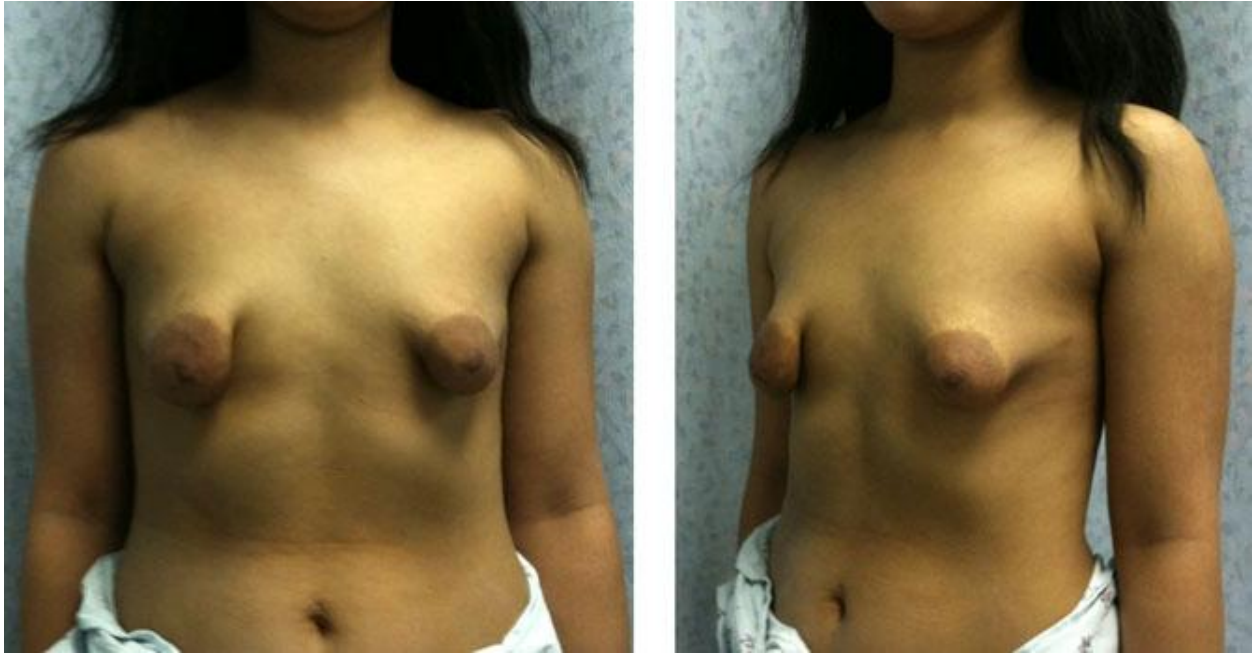
Integrase inhibitors, fusion inhibitors, and chemokine coreceptor antagonists are other classes of antiretroviral agents that target a different step in the viral life cycle as it infects a CD4+ T lymphocyte or other target cell. These agents do not appear to cause lipodystrophy.

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References

1. Walmsley S, Cheung AM, Fantus G, et al. A prospective study of body fat redistribution, lipid, and glucose parameters in HIV-infected patients initiating combination antiretroviral therapy. *HIV Clin Trials*. 2008 Sep-Oct;9(5):314-323.
2. Waters L, Nelson M. Long-term complications of antiretroviral therapy: lipoatrophy. *Int J Clin Pract*. 2007 Jun;61(6):999-1014.
3. Hawkins T. Appearance-related side effects of HIV-1 treatment. *AIDS Patient Care STDS*. 2006 Jan;20(1):6-18.

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4. A 24-year-old woman is scheduled to undergo correction of the defect shown in the photographs. Physical examination shows an elevated inframammary fold and herniation of breast tissue through the areolar complex. Which of the following is the most appropriate operative plan?
- A) Latissimus dorsi musculocutaneous flaps and placement of silicone gel prostheses
 - B) Subfascial placement of silicone gel prostheses with mastopexy
 - C) Subglandular placement of silicone gel prostheses
 - D) Submuscular placement of silicone gel prostheses
 - E) Submuscular placement of silicone gel prostheses with mastopexy and scoring of the gland

The correct response is Option E.

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Tuberous breast deformity is a rare congenital condition that results in aberrant breast shape due to a constricting ring at the breast base. Abnormal development results in breast tissue deficiency, herniation of breast tissue into the nipple-areola complex, areolar enlargement, and breast asymmetry.

Although latissimus flaps could be used for severe primary cases or reoperative secondary cases, such an aggressive intervention would not be warranted in the patient described. Surgical correction is challenging, but it can be achieved in a single-stage operation. This procedure should include submuscular placement of silicone or saline prostheses, mastopexy with areolar reduction, and scoring of the gland to relieve the constricting tissue. Postoperative results are depicted in the photograph shown.



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References

1. Bach AD, Kneser U, Beier JP, et al. Aesthetic correction of tuberous breast deformity: lessons learned with a single-stage procedure. *Breast J.* 2009 May-Jun;15(3):279-286.
2. Panchapakesan V, Brown MH. Management of tuberous breast deformity with anatomic cohesive silicone gel breast implants. *Aesthetic Plast Surg.* 2009 Jan;33(1):49-53. Epub 2008 Aug 28.
3. Elwood E, Hultman CS. Reconstruction of congenital and traumatic breast defects. *Breast Dis.* 2002;16:129-139.

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5. A 25-year-old woman with burns on 85% of the total body surface area undergoes staged wound excision but shows limited donor sites for skin grafting. Cultured epidermal autografts (CEAs) are prepared to help resurface the wounds. Which of the following properties is the primary advantage of the use of CEAs over split-thickness skin grafts?
- A) Cultivation period of 1 week
 - B) Expansion of donor keratinocytes
 - C) Negligible production cost
 - D) Stable coverage of the lesion
 - E) Use of autologous materials during cell culture

The correct response is Option B.

Theoretically, cultured epidermal autografts (CEAs), also known as cultured keratinocytes, are an attractive option to help resurface large wounds, such as in the massively burned patient with limited donor sites. After obtaining a small skin biopsy, tissue is then processed ex-vivo by a commercial tissue-engineering laboratory. Within 3 weeks, keratinocytes can be expanded 10,000-fold and are ready for grafting. CEAs, however, must be grown with murine fibroblasts and fetal calf serum, both of which contain xenogeneic proteins that survive at the time of transplantation and may account for “rejection” of these autografts. Furthermore, CEAs lack a dermal component and are extremely fragile, susceptible even to mild shear forces. Finally, CEAs are very expensive, costing as much as \$13,000 for every 1% of the total body surface area that is ultimately covered.

References

1. Rue LW III, Cioffi WG, McManus WF, et al. Wound closure and outcome in extensively burned patients treated with cultured autologous keratinocytes. *J Trauma*. 1993 May;34(5):662-667.
2. Hultman CS, Brinson GM, Siltharm S, et al. Allogeneic fibroblasts used to grow cultured epidermal autografts persist in vivo and sensitize the graft recipient for accelerated second-set rejection. *J Trauma*. 1996 Jul;41(1):51-58.
3. Cairns BA, deSerres S, Brady LA, et al. Xenogeneic mouse fibroblasts persist in human cultured epidermal grafts: a possible mechanism of graft loss. *J Trauma*. 1995 Jul;39(1):75-79.

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6. A 15-year-old girl comes to the office 2 months after undergoing unsuccessful scalp replantation following an avulsion injury. The resulting defect is treated with negative pressure wound therapy. Physical examination shows a clean, granulating lesion that encompasses approximately 50% of the total area of the scalp (shown). Which of the following is the most appropriate method for reconstruction?
- A) Coverage with bilateral temporo-parieto-occipital (Juri) flaps
 - B) Coverage with a free latissimus muscle flap with immediate split-thickness skin grafting
 - C) Orticochea procedure (three-flap technique) with skin grafting of the secondary defect
 - D) Serial excision and closure
 - E) Split-thickness skin grafting and staged tissue expansion

The correct response is Option E.

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No other tissue or donor site in the body will approximate the hair-bearing qualities of scalp tissue. Simply, the best replacement for scalp tissue is scalp tissue. In addition to calvarial coverage and wound closure, the reconstructive surgeon should strive for a cosmetically pleasing outcome. In patients with nearly 50% scalp loss, tissue expansion will provide the optimal functional and aesthetic outcome. Tissue expansion should be considered when local tissue rearrangements are inadequate because of defect size, trauma, or unacceptable rearrangement or distortion of the hairline. Tissue expansion increases the amount of locally available tissue, preserves sensation, and maintains hair follicles and adnexal structures.

Approximately 50% of the scalp can be reconstructed with expanded tissue, resulting in minimal change in hair density. Serial expansions can be performed if needed for ultimate closure. When performing expansion, the largest tolerated expander(s) should be placed in the subgaleal plane. Rectangular and crescent-shaped prostheses provide more expansion than circular devices. To account for tissue recoil, expansion should continue until the expanded flap is approximately 20% larger than the expected defect. Disadvantages of tissue expansion include prolonged time to complete the expansion process (up to 3 months is not uncommon), need for at least two operations, and a high rate of complication (6 to 48%). Common problems include infection, prosthesis exposure or extrusion, hematoma, flap necrosis, skull erosion, alopecia, and wide scars.

The Orticochea and temporo-parieto-occipital (Juri) flaps are ill-suited for large defects (greater than 30% of the scalp) or in the location described (vertex). Juri flaps are useful for frontal or frontoparietal defects. The flap is based on the parietal branch of the superficial temporal artery and is best used after surgical delay of the distal aspect. The Orticochea procedure (three-flap technique) was classically described for reconstruction of acquired defects of the occiput. Each flap in the design must include a vascular pedicle, and the technique can be used to cover up to 30% of the scalp. The cosmetic outcome using Orticochea flaps is often inferior to what can be obtained using tissue expansion because of unnatural resultant hair orientation. For this reason, tissue expansion should be considered rather than Orticochea flaps, if possible.

Free tissue transfer is best utilized for reconstruction of total or near total scalp defects, particularly in the setting of irradiation or oncologic reconstruction. The latissimus dorsi muscle free flap is one of the best choices in such cases because of its large area and long pedicle. With time, the muscle will atrophy and conform to the underlying bone well. Other appropriate options include the radial forearm, anterolateral thigh, or parascapular flaps.

Serial excisions are useful for smaller defects. The amount of scar and deformity is much less when using tissue expanders versus serial reductions and complex rotation flaps. In the patient described, a stable closure was obtained in two operations, a result that would be impossible with serial excision. Photographs are shown.

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References

1. Leedy JE, Janis JE, Rohrich RJ. Reconstruction of acquired scalp defects: an algorithmic approach. *Plast Reconstr Surg*. 2005 Sep 15;116(4):54e-72e.
2. Wells MD. Scalp reconstruction. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:615-620.
3. Argenta LC, Marks MW. Principles of tissue expansion. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:548-551.
4. Huang C, Evans GRD. Scalp reconstruction. In: Evans GRD, ed. *Operative Plastic Surgery*. New York: McGraw-Hill Professional; 2000:317-319.

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7. A 40-year-old woman says she has a burning pain in the thigh with movement the day after undergoing abdominoplasty. Which of the following nerves was most likely injured during the procedure?

- A) Genitofemoral
- B) Iliohypogastric
- C) Ilioinguinal
- D) Lateral femoral cutaneous
- E) Saphenous

The correct response is Option D.

In several studies of complications of abdominoplasty, the most common nerve injury was to the lateral femoral cutaneous nerve. Symptoms include anterior and lateral thigh burning, tingling, and/or numbness, all of which increase with standing, walking, or hip extension. Injury or entrapment of the lateral femoral cutaneous nerve is also known as meralgia paresthetica.

The genitofemoral nerve supplies the proximal portion of the thigh about the femoral triangle just lateral to the skin that is innervated by the ilioinguinal nerve. Nerve injury may result from hernia repair, but injury to this nerve is rare.

The iliohypogastric nerve arises primarily from L1. The distribution of the cutaneous sensation of the iliohypogastric nerve is most commonly a small region just superior to the pubis. The iliohypogastric nerve is rarely injured in isolation. Symptoms include burning pain into the inguinal and suprapubic region.

The ilioinguinal nerve arises from the fusion of the T12 and L1 nerve roots and pierces the transversus abdominis and internal oblique muscles. The nerve then supplies sensory branches to the pubic symphysis, the superior and medial aspect of the femoral triangle, and either the root of the penis and anterior scrotum in men or the mons pubis and labia majora in women. The nerve can be injured in abdominoplasty and other lower abdominal incisions. Symptoms include paresthesia of the skin along the inguinal ligament. The sensation may radiate to the lower abdomen. Pain may be localized to the medial groin, the labia majora or scrotum, and the inner thigh.

Saphenous nerve symptoms of entrapment may include a deep aching sensation in the thigh, knee pain, and paresthesias in the cutaneous distribution of the nerve in the leg and foot.

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References

1. al-Qattan MM. Abdominoplasty in multiparous women with severe musculoaponeurotic laxity. *Br J Plast Surg*. 1997 Sep;50(6):450-455.
2. Friedland JA, Maffi TR. MOC-PS(SM) CME article: abdominoplasty. *Plast Reconstr Surg*. 2008 Apr;121(4 Suppl):1-11.
3. Floros C, Davis PK. Complications and long-term results following abdominoplasty: a retrospective study. *Br J Plast Surg*. 1991 Apr;44(3):190-194.
4. Rab M, Ebmer And J, Dellon AL. Anatomic variability of the ilioinguinal and genitofemoral nerve: implications for the treatment of groin pain. *Plast Reconstr Surg*. 2001 Nov;108(6):1618-1623.
5. van Uchelen JH, Werker PM, Kon M. Complications of abdominoplasty in 86 patients. *Plast Reconstr Surg*. 2001 Jun;107(7):1869-1873.

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8. A 67-year-old man comes to the office with biopsy-proven Merkel cell carcinoma of the forehead. In addition to wide resection, which of the following is the optimal treatment?
- A) Administration of interferon
 - B) Injection of 5-fluorouracil
 - C) Neoadjuvant chemotherapy
 - D) Radiation therapy

The correct response is Option D.

Merkel cell carcinoma is a rare tumor that usually consists of smooth, painless, indurated, solitary dermal nodules approximately 2 to 4 mm in size. It occurs more frequently in patients older than age 65 years. Merkel cell carcinoma appears most often at sun-exposed sites on white skin; 50% occur on the head and neck, and 40% on the trunk. Merkel cell carcinoma is an aggressive tumor; metastases to regional lymph nodes are noted on initial diagnosis in 12 to 15% of patients. Regional metastasis eventually occurs in one half to two thirds of patients. Local recurrence following primary excision develops in 24 to 44% of patients. Time from diagnosis of the primary tumor to clinically apparent regional nodal metastases is approximately 7 to 8 months. Distant metastases occur ultimately in one third of patients; in order of frequency, metastases occur in the lymph, liver, bone, brain, lung, and skin. The mean time from diagnosis to systemic involvement is 18 months, with death occurring 6 months later. The 5-year survival rate has been reported as 30 to 64%. Two thirds or more of patients with local or regionally recurrent disease ultimately die. Surgical excision is the treatment of choice for primary tumors. The prevailing opinion regarding Merkel cell cancers is that they should be excised with margins similar to those for melanoma.

Sentinel lymph node biopsy is used in clinically node-negative patients with Merkel cell carcinoma.

Radiation should be considered for all patients with Merkel cell carcinoma, as it is radiosensitive. Injection of 5-fluorouracil and administration of interferon have never been shown to be effective in Merkel cell treatment.

In Merkel cell carcinoma, tumor width dictates surgical excision, not tumor depth of invasion (as in melanoma).

Mohs micrographic surgery has been advocated for resection of Merkel cell carcinoma, not only to obtain clear margins, but also to preserve the most amount of tissue.

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References

1. National Comprehensive Cancer Network. *NCCN Clinical Practice Guidelines in Oncology, Version 1 2009*. Fort Washington, PA; National Comprehensive Cancer Network: 2009.
2. Pan D, Narayan D, Ariyan S. Merkel cell carcinoma: five case reports using sentinel lymph node biopsy and a review of 110 new cases. *Plast Reconstr Surg*. 2002 Oct;110(5):1259-1265.
3. Barton RM. Malignant tumors of the skin. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 5. 2nd ed. Philadelphia: WB Saunders; 2006:295-296.

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9. A 50-year-old man is referred for consultation regarding surgical treatment of panniculus morbidus (abdominal elephantiasis). History includes a recent infection of the panniculus morbidus, resulting in protracted treatment in the intensive care unit. Current examination shows abdominal lipodystrophy with lymphedema and ulcerations. The patient has extreme difficulty with ambulation and is unable to care for his personal hygiene. Which of the following is the most appropriate surgical management?
- A) Abdominoplasty
 - B) Liposuction of the panniculus
 - C) Lymphaticovenous anastomosis
 - D) Panniculectomy and leaving the wound open for future skin grafting
 - E) Panniculectomy with primary closure

The correct response is Option E.

Panniculus morbidus is a severe form of abdominal lipodystrophy with profound consequences. The condition prevents weight loss, as the patient cannot exercise. It prevents hygiene, leading to a profound odor, and ultimately results in intertrigo, cellulitis, and/or abdominal ulceration.

The correct procedure to perform in the scenario described is a conservative panniculectomy with primary closure, although some authors have recently advocated using a negative pressure wound dressing in addition to partial primary closure. Skin grafting and radical abdominal wall resections are unnecessary. A liposuction device, whether ultrasonic or traditional, would probably be dangerous in this situation, given the caliber of some of the blood vessels that can be present, as well as the occasional hernia that can be encountered. Performing more extensive procedures, such as rectus muscle plication, undermining of the flaps, and umbilical transposition, would be unnecessary and lead to more complications.

References

1. Friedrich JB, Petrov RV, Askay SA, et al. Resection of panniculus morbidus: a salvage procedure with a steep learning curve. *Plast Reconstr Surg*. 2008 Jan;121(1):108-114.
2. Petty P, Manson PN, Black R, et al. Panniculus morbidus. *Ann Plast Surg*. 1992 May;28(5):442-452.

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10. A 1-month-old male newborn is evaluated because of a proliferating 3-cm red lesion on the right cheek. The lesion was noticed 1 week after birth and has enlarged rapidly. No herald patches were seen at birth. No other abnormalities are noted. Which of the following findings is more suggestive of a hemangioma than a vascular malformation in this patient?
- A) Absence of herald patch
 - B) Absence of neurologic findings
 - C) Gender
 - D) Location on cheek
 - E) Rate of growth

The correct response is Option E.

Hemangiomas are vascular tumors characterized by increased cellular proliferation. Classically, they exhibit rapid growth and slow regression. Vascular malformations are present at birth and grow slowly. Hemangiomas are the most common tumor of infancy. They occur at an incidence that is five times more common in girls and are more common in premature infants. Vascular malformations have an equal sex ratio. Multiple cutaneous hemangiomas may be present with extracutaneous sites, most commonly involving the parotid glands or the liver; nervous system involvement is rare. In 30 to 50% of cases, hemangiomas are preceded by a premonitory mark, such as a telangiectasis or a bruise-like patch (herald patch).

References

1. Beck DO, Gosain AK. The presentation and management of hemangiomas. *Plast Reconstr Surg*. 2009 Jun;123(6):181e-191e.
2. Marler JJ, Mulliken JB. Current management of hemangiomas and vascular malformations. *Clin Plast Surg*. 2005 Jan;32(1):99-116, ix.

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11. A 42-year-old woman comes to the office because of a 1-year history of a mass in the upper abdominal wall that has enlarged gradually. Examination of a specimen obtained on excision biopsy shows a desmoid tumor. Which of the following is the most appropriate next step in management?
- A) Cryoablation
 - B) Enucleation
 - C) Excision with a 1-mm margin
 - D) Excision with a 1-cm margin
 - E) Observation

The correct response is Option D.

Desmoid tumors are relatively rare, technically benign fibrous tumors that may arise in the musculoaponeurotic abdominal wall. These lesions exhibit local invasion and a high rate of recurrence. Wide local excision is regarded as the most effective treatment for these lesions, and intraoperative frozen section is often helpful. Observation will likely result in recurrence, and cryoablation has not been reported as a treatment option for desmoid tumors. Enucleation is not appropriate because the tumor will recur. Excision with a 1-mm margin is not appropriate because wide margins are necessary.

References

1. Vasconez LO, De La Torre JJ. Abdominoplasty. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:87-117.
2. Méndez-Fernández MA, Gard DA. The desmoid tumor: "benign" neoplasm, not a benign disease. *Plast Reconstr Surg*. 1991 May;87(5):956-960.

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12. A 10-year-old girl is referred to the office because of a large, full-thickness cranial defect after sustaining a traumatic injury. Reconstruction with a split cranial bone graft is performed. Which of the following is the most likely mechanism by which the bone graft heals?
- A) Dural ossification
 - B) Osteoconduction
 - C) Osteogenesis
 - D) Osteoinduction
 - E) Vasculogenesis

The correct response is Option B.

The most likely mechanism of split cranial bone graft healing is osteoconduction. The split cranial bone graft is primarily cortical. After it is separated from its blood supply, it serves as a nonviable scaffold for the ingrowth of blood vessels and osteoprogenitor cells from the recipient site. This process of osteoconduction, or “creeping substitution,” eventually leads to resorption and replacement of most of the graft with new bone. The graft becomes fully osseointegrated with the recipient site.

Spontaneous dural ossification can heal full-thickness cranial defects in infancy. After 12 to 18 months of age, the dura will not spontaneously ossify.

Osteogenesis is the primary mechanism of bone graft healing for cancellous or vascularized bone grafts. Because these grafts are revascularized rapidly, osteoblasts survive the transplantation and produce new bone at the recipient site.

Osteoinduction involves the stimulation of mesenchymal cells at the recipient site to differentiate into bone-producing cells. Demineralized bone and bone morphogenetic protein produce new bone primarily by osteoinduction.

Vasculogenesis, the de novo formation of blood vessels from precursor cells, occurs during embryogenesis. Revascularization of split cranial bone graft occurs by angiogenesis, the production of new vessels from preexisting vasculature.

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References

1. Phemister DB. The fate of transplanted bone and regenerative power of its various constituents. *Surg Gynecol Obstet.* 1914 Sep;19:303-333.
2. Motoki DS, Mulliken JB. The healing of bone and cartilage. *Clin Plast Surg.* 1990 Jul;17(3):527-544.

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(Please note that this pictorial appears in color in the online examination)

13. An otherwise healthy 2-year-old girl is brought to the office because her parents are concerned about the appearance of her upper lip (shown). They say that her lip was slightly overgrown at birth and that it has enlarged slowly. Physical examination shows a soft, painless, bluish lesion of the upper lip. Which of the following is the most likely diagnosis?
- A) Congenital hemangioma
 - B) Infantile hemangioma
 - C) Kaposiform hemangioendothelioma
 - D) Pyogenic granuloma
 - E) Venous malformation

The correct response is Option E.

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The most likely diagnosis is venous malformation. Venous malformation is a congenital lesion that enlarges slowly over time. Treatment involves either sclerotherapy or resection.

Congenital hemangioma is fully grown at birth. There are two types: rapidly involuting congenital hemangioma (RICH) and noninvoluting congenital hemangioma (NICH). RICH rapidly involutes postnatally and is usually fully regressed by age 12 months. Treatment is rarely necessary. NICH does not undergo involution; it remains the same size over the course of the patient's lifetime and would not be enlarging at age 2 years. NICH is rarely problematic, but may be resected if it is causing a significant deformity.

Infantile hemangioma is usually noted 2 weeks after birth and enlarges rapidly over the first few months of life. By age 1 year, the tumor begins to regress and would be decreasing in size at age 2 years. Problematic lesions are treated with intralesional corticosteroid, oral prednisolone, or resection.

Kaposiform hemangioendothelioma is present at birth and does not increase in size. It is often large, superficial, and diffuse. It typically involves the trunk and extremities. Patients commonly have Kasabach-Merritt phenomenon (thrombocytopenia, bruising, and bleeding) as well. First-line treatment is administration of vincristine.

Pyogenic granuloma usually appears in early childhood as a rapidly growing, red lesion. Lesions are commonly small (less than 1 cm) and complicated by bleeding. Definitive treatment is excision.

References

1. Mulliken JB, Glowacki J. Hemangiomas and vascular malformations in infants and children: a classification based on endothelial characteristics. *Plast Reconstr Surg*. 1982 Mar;69(3):412-422.
2. Finn MC, Glowacki J, Mulliken JB. Congenital vascular lesions: clinical application of a new classification. *J Pediatr Surg*. 1983 Dec;18(6):894-900.

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14. An 18-year-old woman comes to the office because of a small area of titanium extruding through the skin overlying the sacrum 12 months after undergoing a successful posterior spinal fusion and an autologous bone graft for myelodysplasia and lumbosacral kyphotic deformity. Physical examination shows a midline scar with a 2 × 2-cm wound at the level of the fourth lumbar vertebra with a visible screw. Which of the following is the most appropriate next step in management?
- A) Bilateral skin advancement flaps
 - B) Free rectus abdominis muscle flap
 - C) Gluteus maximus muscle flap
 - D) Negative pressure wound therapy and skin graft
 - E) Removal of the hardware

The correct response is Option E.

The most appropriate next step in management of the exposed titanium is removal of the hardware. The titanium rod or one of the screws likely loosened and subsequently migrated to extrude through the skin. The vertebral column is adequately fused 1 year following the procedure. The orthopedics team should be consulted regarding removal of the hardware. Once the hardware is removed, the wound is easily repaired using delayed primary closure or by allowing it to heal secondarily.

Although local skin flaps, skin grafts, regional muscle transfer, and free flaps will provide vascularized soft-tissue coverage over the exposed hardware, these options ultimately will fail. The exposed hardware is much stronger than any soft-tissue coverage and will extrude through a flap, especially when the patient is supine. Definitive management requires eliminating the cause of the problem, which is malpositioned hardware, and not inadequate soft-tissue coverage.

References

1. Few JW, Nahai F. Reconstruction of the back. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:441-456.
2. Ramasastry SS, Criswell KK, Cohen M, et al. Congenital back deformities. In: Bentz ML, Bauer BS, Zuker RM, eds. *Principles and Practice of Pediatric Plastic Surgery*. St. Louis: Quality Medical Publishing; 2008:1571-1598.

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15. A 24-year-old woman comes to the office because of painful nodules in both buttocks. She underwent buttock augmentation with injections of liquid silicone by an unlicensed practitioner 4 years ago. Excision of the affected area is performed. Histology of a specimen obtained from the excised tissue is most likely to show which of the following?
- A) Acellularity
 - B) Calcification
 - C) Granuloma
 - D) Necrosis
 - E) Thrombosis

The correct response is Option C.

Free silicone liquid has a long history of use for soft-tissue augmentation. Little regulation of the practice and variable degrees of purity of the silicone have resulted in many disastrous complications, often occurring years after the initial injections. Potential adverse sequelae following silicone injection include migration, chronic induration and pigmentary changes, painful subcutaneous nodules, chronic infection, and ulceration. Many of the treated areas require radical resection and reconstruction.

Histologic study of postsilicone injection nodules typically shows granulomas which develop after initial inflammation and fibrosis. Histologic evaluation of typical capsule formation around solid alloplastic prostheses, including breast prostheses, shows acellularity and organized layers of collagen. In the breast, free silicone injection may result in ductal obstruction, which may appear as calcification on mammography. Necrosis may be noted in ulcerative-type complications seen in intradermal injection. Intravascular injection can result in thrombosis and, rarely, embolism, resulting in death.

References

1. Chasan PE. The history of injectable silicone fluids for soft-tissue augmentation. *Plast Reconstr Surg.* 2007 Dec;120(7):2034-2040.
2. Chiu ES, Sharma S, Siebert JW. Salvage of silicone-treated facial deformities using autogenous free tissue transfer. *Plast Reconstr Surg.* 2005 Oct;116(5):1195-1203.

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16. A 15-year-old boy undergoes negative pressure wound therapy (NPWT) of a traumatic abdominal wound. Which of the following is the most likely mechanism by which NPWT expedites the healing of this wound?

- A) Decrease in bacterial burden
- B) Deformation of the wound
- C) Desiccation of the wound
- D) Increase in matrix metalloproteinase activity
- E) Maintenance of exudate from the wound

Please note: Upon further review, this item was not scored as part of the examination.

The correct response is Option B.

The most likely mechanism by which NPWT expedites healing is deformation of the wound. NPWT causes both macrodeformation and microdeformation of a wound. Macrodeformation maintains approximation of the tissues, preventing loss of domain and facilitating earlier closure by delayed primary or secondary intention. Microdeformation at the interface of the sponge and wound bed changes cell shape, which then affects gene transcription via the cytoskeleton (mechanotransduction). These microdeformational forces, for example, stimulate cellular proliferation and angiogenesis in the wound.

The effect of NPWT on bacterial burden is unclear. Some studies have suggested that NPWT reduces bacterial counts in the wound, possibly by direct removal or by increasing blood flow. Other studies have found that NPWT may increase certain bacterial levels.

NPWT prevents desiccation of the wound. The semiocclusive polyurethane drape limits permeability to gases and water vapor and thus maintains a favorable, moist wound environment.

NPWT decreases matrix metalloproteinase activity in the wound. Elevated matrix metalloproteinases inhibit wound healing as well as neovascularization.

NPWT decreases exudate of the wound by removing excess fluid through suction. The reduction in exudate may facilitate wound healing by removing toxic inflammatory mediators and proteinases. Minimizing wound edema also may improve the diffusion of oxygen and nutrients to the wound.

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References

1. Morykwas MJ, Argenta LC, Shelton-Brown EI, et al. Vacuum-assisted closure: a new method for wound control and treatment: animal studies and basic foundation. *Ann Plast Surg.* 1997 Jun;38(6):553-562.
2. Saxena V, Hwang CW, Huang S, et al. Vacuum-assisted closure: microdeformations of wounds and cell proliferation. *Plast Reconstr Surg.* 2004 Oct;114(5):1086-1096.
3. Greene AK, Puder M, Roy R, et al. Microdeformational wound therapy: effects on angiogenesis and matrix metalloproteinases in chronic wounds of 3 debilitated patients. *Ann Plast Surg.* 2006 Apr;56(4):418-422.
4. Orgill DP, Manders EK, Sumpio BE, et al. The mechanisms of action of vacuum assisted closure: more to learn. *Surgery.* 2009 Jul;146(1):40-51. Epub 2009 Apr 19.

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17. A 79-year-old man has a rapidly growing lesion on the left side of his forehead. Physical examination shows a 2-cm, raised, fungating lesion of the left temple with intact facial nerve function and no lymphadenopathy. Examination of a specimen obtained on biopsy is suspicious for squamous cell carcinoma. Four weeks later, the lesion has disappeared, leaving a small circular scar. Excision is performed, and pathologic study shows no evidence of malignancy. Which of the following is the most likely diagnosis?
- A) Amelanotic melanoma
 - B) Cutaneous horn
 - C) Keratoacanthoma
 - D) Merkel cell carcinoma
 - E) Squamous cell carcinoma

The correct response is Option C.

The most likely diagnosis is keratoacanthoma, a low-grade malignancy that resembles squamous cell carcinoma both clinically and pathologically. The most common natural course of the disease is that of rapid growth followed by spontaneous regression over several months, which is not seen in squamous cell carcinoma. Keratoacanthoma can progress to squamous cell carcinoma with metastasis. Amelanotic melanoma is an uncommon (less than 5%) form of melanoma characterized by nonpigmented lesions that appear pink or tan and can mimic basal cell or squamous cell carcinoma. It can also occur in the context of cutaneous metastatic melanoma, when cells lack the differentiation required to synthesize melanin. It does not usually ulcerate or regress. A cutaneous horn is a conical projection of hyperkeratosis overlying a hyperproliferative skin lesion such as a seborrheic keratosis or actinic keratosis. Less commonly, it can form from a squamous cell carcinoma or other skin cancer. Ulceration and regression are not characteristic. Merkel cell carcinoma is a rare and aggressive form of skin cancer that shows neuroendocrine features and is prone to metastasis if left untreated.

References

1. Zbar RIS. Skin tumors I: basal cell and squamous cell carcinoma. *Selected Readings in Plastic Surgery*. 2004;10(3).
2. Scheinfeld NS, Zimble MS, Javaheri S. Skin malignancies, Merkel cell carcinoma and rare appendageal tumors. eMedicine Web site. Available at: <http://emedicine.medscape.com/article/1295325-overview>. Updated April 2, 2010.

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18. A 58-year-old man has a 1.7-cm-diameter defect of the nasal tip and ala after undergoing Mohs micrographic surgery for resection of basal cell carcinoma. There is exposed cartilage with no perichondrium. A photograph of the nose is shown. Which of the following is most appropriate for this defect?

- A) Closure by secondary intention
- B) Composite graft
- C) Locoregional flap
- D) Primary closure
- E) Split-thickness skin graft

The correct response is Option C.

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A locoregional flap is the most appropriate option, with preferences dependent on the surgeon. In general, however, nasolabial flaps are useful for reconstructions of small- to medium-sized defects of the nasal tip, ala, and lateral nose. They can be superiorly or inferiorly based and usually require at least two stages, with the second stage being the division and inset. When placed close to the alar margin, they are frequently combined with a nonanatomically placed conchal cartilage graft to prevent notching. Paramedian forehead flaps also are commonly used for nasal lobular defects, especially larger ones.

A dorsal nasal flap is used for defects in the lower half of the nose that are less than 2 cm in diameter, are at least 1 cm from the alar rim, and lie above the tip defining points. This defect lies directly adjacent to the alar rim and is below the tip defining points. Bilobed flaps generally are used for defects less than 1.5 cm in the thicker skin zones of the nasal tip/ala.

The defect described is too large for primary closure and would yield a suboptimal aesthetic outcome if allowed to heal by secondary intention.

There is no need for a composite graft in this location with intact lower lateral cartilage. Split-thickness skin grafting, with its thickness discrepancy versus the thicker nasal lobular skin and higher intrinsic secondary contracture, is not the most appropriate option. Furthermore, there is exposed cartilage without perichondrium, which would not lend itself to skin grafting.

References

1. Elliot RA Jr. Rotation flaps of the nose. *Plast Reconstr Surg.* 1969;44:147.
2. Zitelli JA. The bilobed flap for nasal reconstruction. *Arch Dermatol.* 1989;125:957-959.
3. Rohrich RJ, Muzaffar AR, Adams WP Jr, et al. The aesthetic unit dorsal nasal flap: rationale for avoiding a glabellar incision. *Plast Reconstr Surg.* 1999;104:1289-1294.
4. Guerrerosantos J, Dicksheet S. Nasolabial flap with simultaneous cartilage graft in nasal alar reconstruction. *Clin Plast Surg.* 1981;8:599-602.

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19. An otherwise healthy 52-year-old woman is scheduled to undergo bilateral breast reconstruction with abdominal perforator flaps. She does not smoke cigarettes. Which of the following is the most appropriate antibiotic prophylaxis regimen?

- A) Preoperative antibiotics
- B) Preoperative chlorhexidine bath
- C) Preoperative and intraoperative antibiotics
- D) Preoperative, intraoperative, and postoperative antibiotics for 7 days
- E) Preoperative, intraoperative, and postoperative antibiotics until all drains are removed

The correct response is Option C.

For a healthy patient undergoing a lengthy autologous breast reconstruction, the most appropriate regimen of antibiotic prophylaxis consists of a preoperative dose of intravenous antibiotic and intraoperative antibiotics to “maintain therapeutic levels during operation and, at most, a few hours after closure” (Mangram, et al). Although preoperative chlorhexidine bathing is supported by some studies and strong theoretical rationale, it is not nearly as effective as antibiotic prophylaxis on its own. A single dose of preoperative antibiotic intravenously is appropriate for short procedures; however, therapeutic levels of antibiotic should be maintained throughout the lengthy surgery described. Continued administration of prophylactic antibiotics for 7 days following surgery or until drains are removed has not been proven to reduce the incidence of surgical site infections. This regimen also promotes drug resistance and adverse patient reactions.

References

1. Mangram AJ, Horan TC, Pearson ML, et al. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol.* 1999 Apr;20(4):250-278.
2. Hunter JG. Appropriate prophylactic antibiotic use in plastic surgery: the time has come. *Plast Reconstr Surg.* 2007 Nov;120(6):1732-1734.

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20. A 28-year-old man is brought to the emergency department after sustaining a dog bite to the face. Physical examination shows subtotal loss of the nose and glabella. Staged reconstruction with a forearm flap is performed, with initial elevation of the flap, placement of cartilage grafts, and creation of nostrils. Thinning and refinement are performed during a second procedure with additional cartilage grafting. The flap is microsurgically transferred to reconstruct the nose in a third procedure. Which of the following is the most appropriate description of this flap?
- A) Delayed
 - B) Freestyle
 - C) Prefabricated
 - D) Prelaminated
 - E) Tubularized

The correct response is Option D.

The flap described in this scenario is a prelaminated flap. A prelaminated flap is an axial flap that is modified with the addition of various grafts (e.g., skin, mucosa, cartilage, bone), re-creating the missing tissues at the donor site prior to flap transfer.

A delayed flap is one that undergoes one or more vascular insults prior to final flap elevation to induce increased circulation and maximize flap perfusion. A freestyle flap is a nonaxial flap harvested by locating a cutaneous Doppler signal in a chosen donor site, identifying the vessels supplying that tissue, and dissecting them down to a pedicle of sufficient length and/or diameter. The anatomy is not known ahead of time, and thus harvest is performed “freestyle.” A prefabricated flap is created by transferring a vascular pedicle into an area of tissue that is ideal for transfer to induce angiogenesis from the pedicle into that tissue, which can then be harvested for transfer. A tubularized flap is one that is sewn to itself to create a tube or passive conduit, such as an anterolateral thigh flap used for pharyngoesophageal reconstruction.

References

1. Taghinia AH, Pribaz JJ. Complex nasal reconstruction. *Plast Reconstr Surg.* 2008 Feb;121(2):15e-27e.
2. Parrett BM, Pomahac B, Orgill DP, et al. The role of free-tissue transfer for head and neck burn reconstruction. *Plast Reconstr Surg.* 2007 Dec;120(7):1871-1878.
3. Ghali S, Butler PE, Tepper OM, et al. Vascular delay revisited. *Plast Reconstr Surg.* 2007 May;119(6):1735-1744.

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4. Micali G. The Italian contribution to plastic surgery. *Ann Plast Surg.* 1993 Dec;31(6):566-571.
5. Wallace CG, Kao HK, Jeng SF, et al. Free-style flaps: a further step forward for perforator flap surgery. *Plast Reconstr Surg.* 2009 Dec;124(6 Suppl):419e-426e.

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21. Consultation is requested for a 7-year-old girl because of intravenous infiltration of a chemotherapeutic agent in the dorsal forearm. Physical examination shows firmness and swelling of the forearm and pain on passive flexion of the wrist. Which of the following is the most appropriate initial management?

- A) Administration of an antidote
- B) Doppler sonography of the forearm
- C) Liposuction and saline flush of the affected area
- D) Measurement of compartment pressures
- E) Surgical excision and grafting

The correct response is Option D.

Extravasation usually remains localized, yet some patients develop necrotic problem wounds. Often initially underestimated, the extent of injury can declare itself widely with time. Compartment syndrome in an extremity extravasation should be initially ruled out either by clinical assessment or direct measurement of compartment pressures. Tissue loss can include skin, muscle, tendon, nerve, vasculature, and/or joint.

Given the variable amount of soft-tissue involvement, early conservative therapy is recommended. Immediate discontinuation of the infusion at the affected site is paramount and should not be overlooked. Aspiration, liposuction, wound excision, debridement, grafts, flaps, and antidote administration have all been described in the management of extravasation injury.

References

1. Yilmaz M, Demirdover C, Mola F. Treatment options in extravasation injury: an experimental study in rats. *Plast Reconstr Surg*. 2002 Jun;109(7):2418-2423.
2. Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006.

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22. A 55-year-old woman comes to the office because she is dissatisfied with the appearance of her nose (shown), specifically the scars left by acne as a young adult. She has undergone scar revision by punch biopsy and closure as well as dermabrasion by four different physicians but has never been satisfied with the results. She spends approximately 1.5 hours per day putting makeup on her face before leaving the house. She has never married and feels embarrassed to be seen in public because she feels that everyone is staring at her nose. Which of the following most accurately represents the prevalence of this diagnosis in patients who undergo plastic surgery?
- A) Less than 1%
 - B) 2 to 4%
 - C) 7 to 15%
 - D) 22 to 25%

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The correct response is Option C.

The patient described has body dysmorphic disorder (BDD), which affects 7 to 15% of all plastic surgery patients. In this disorder, the patient's degree of concern is far greater than the degree of actual deformity. This perception may involve the entire body or just one area. The patient is generally unaware that his or her concerns are excessive. BDD can be associated with other diagnoses, including depression, substance abuse, social phobia, and/or obsessive-compulsive disorder. The patient is preoccupied with his or her appearance so much that a significant amount of time is spent trying to camouflage or change the outward appearance with makeup. Most patients with BDD are single (70% never married), and up to 50% have suicidal ideation. Treatment involves referral to a psychiatrist where psychotherapy and pharmacotherapy are useful. Operating on these patients almost never leads to a satisfied patient; therefore, preoperative diagnosis is essential.

The prevalence of BDD has been shown to be significantly higher in the plastic surgery population than in the general population (1 to 3%). It does not appear to have a gender or cultural predilection.

References

1. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (Text Revision)*, 4th ed. Washington, DC: American Psychiatric Association; 2000.
2. Sarwer DB, Wadden TA, Pertschuk MJ, et al. Body image dissatisfaction and body dysmorphic disorder in 100 cosmetic surgery patients. *Plast Reconstr Surg*. 1998 May;101(6):1644-1649.
3. Sarwer DB, Whitaker LA, Pertschuk MJ, et al. Body image concerns of reconstructive surgery patients: an underrecognized problem. *Ann Plast Surg*. 1998 Apr;40(4):403-407.
4. Sarwer DB. Awareness and identification of body dysmorphic disorder by aesthetic surgeons: Results of a survey of American Society for Aesthetic Plastic Surgery members. *Aesthetic Surg J*. 2002;22:531.
5. Jakubietz M, Jakubietz RJ, Kloss DF, et al. Body dysmorphic disorder: diagnosis and approach. *Plast Reconstr Surg*. 2007 May;119(6):1924-1930.

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23. A 52-year-old man is brought to the emergency department after sustaining injuries in a motor vehicle collision. Physical examination shows a traumatic degloving injury to the dorsum of the right hand with exposed, intact extensor tendons. Reconstruction with a fascial free flap and full-thickness skin grafting are planned. Which of the following arteries supplies blood to the most appropriate choice of flap?
- A) Posterior auricular
 - B) Superficial temporal
 - C) Superior thyroid
 - D) Supratrochlear
 - E) Transverse facial

The correct response is Option B.

The temporoparietal fascial flap is supplied by the superficial temporal artery. This thin fascial free flap is useful in reconstruction of traumatic injuries that are not amenable to reconstruction with a skin graft alone. This flap is particularly useful in reconstruction of gliding surfaces with denuded tendons or exposed joints.

The posterior auricular artery is a branch of the external carotid artery and supplies the posterior ear. The superior thyroid artery arises from the external carotid artery and supplies the thyroid gland. The supratrochlear artery supplies the forehead and scalp. The transverse facial artery is a branch of the superficial temporal artery and supplies the parotid gland. None of these vessels is involved in the vascular supply of the temporoparietal fascial flap.

References

1. Strauch B, Liu HY. *Atlas of Microvascular Surgery: Anatomy and Operative Approaches*. New York: Thieme; 2006:631-636.
2. Carty MJ, Taghinia A, Upton J. Fascial flap reconstruction of the hand: a single surgeon's 30-year experience. *Plast Reconstr Surg*. 2010 Mar;125(3):953-962.

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24. A 40-year-old man has second- and third-degree burns involving 55% of the total body surface area. Which of the following immunologic responses is most likely in this patient during the first week after injury?

- A) Downregulation of integrins
- B) Downregulation of cytokines tumor necrosis factor (TNF)- α and interleukins 1 and 8
- C) Increased B-lymphocyte function
- D) Increased levels of circulating immunoglobulins
- E) Increased T-suppressor lymphocyte function

The correct response is Option E.

Nearly all aspects of immune function are affected by thermal injury, and the effect is directly related to the extent of the injury. Burns that are on greater than 30% of the total body surface area result in a greater systemic inflammatory response because of circulating cytokines and immune mediators.

Both humoral and cellular-mediated immunity are impaired by thermal injury and are manifested by diminished activation of complement and depressed levels of circulating immunoglobulins; upregulation of integrins and the cytokines TNF- α and interleukins 1 and 8 (IL-1, IL-8); decreased B-lymphocyte, natural killer cell, and T-helper lymphocyte function; and an increased number and activity of T-suppressor lymphocytes. These changes normalize during the ensuing 2 to 3 weeks in patients whose course is uncomplicated.

TNF- α and IL-1 and IL-8 increase neutrophil chemotaxis into the wound as well as the upregulation of cell surface integrin receptors. These migrating neutrophils can degranulate, releasing proteases and oxygen-free radical species, leading to further tissue damage. Experimental studies using monoclonal antibodies directed against cell surface receptors have shown diminished tissue necrosis and a subsequent decrease in the surface area of burn.

Diminished phagocytosis and reduced activation of complement result in diminished antibody-presenting complexes and membrane-attacking complexes. Along with diminished T-helper lymphocyte function, this results in decreased B-lymphocyte numbers, lymphocyte function, and levels of circulating immunoglobulins, especially immunoglobulin G. In addition to decreased production, circulating antibodies are also lost due to increased protein turnover and plasma leakage resulting from increased capillary permeability. Serum immunoglobulin levels gradually return to normal during the ensuing 2 to 4 weeks as the patient recovers.

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Impairment of cell-mediated immunity resulting from alterations in T-lymphocyte function is evidenced by a decrease in T-cell function and number, reduced T-helper and natural killer cell activity, and increased T-suppressor function and number. Impairment in T-cell mediated immunity is demonstrated by delayed rejection of allograft skin, suppression of graft-versus-host response, and skin hypersensitivity reactions. Better understanding of altered T-helper lymphocyte activity and the associated cytokine profiles may allow for immune-directed therapies that may decrease morbidity and mortality.

References

1. Kao CC, Garner WL. Acute Burns. *Plast Reconstr Surg*. 2000 Jun;101(7):2482-2493.
2. Miller AC, Rashid RM, Elamin EM. The "T" in trauma: the helper T-cell response and the role of immunomodulation in trauma and burn patients. *J Trauma*. 2007 Dec;63(6):1407-1417.
3. Dehne MG, Sablotzki A, Hoffmann A, et al. Alterations of acute phase reaction and cytokine production in patients following severe burn injury. *Burns*. 2002 Sep;28(6):535-542.
4. Murphey ED, Sherwood ER, Toliver-Kinsky T. The immunological response and strategies for intervention. In: Herndon DN, ed. *Total Burn Care*. 3rd ed. Philadelphia: Saunders; 2007:310-325.
5. Smith JW, Gamelli RL, Shankar R. Hematologic, hematopoietic, and acute phase response. In: Herndon DN, ed. *Total Burn Care*. 3rd edition. Philadelphia: Saunders; 2007:325-343.
6. Mozingo DW, Ciofi WG, Pruitt BA. Burns. In: Bongard FS, Sue DY, eds. *Current Critical Care Diagnosis and Treatment*. New York: Appleton and Lange; 1994:360-361.

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25. A 50-year-old man comes to the office for revision of a bony defect in the skull 1 year after undergoing cranioplasty. Physical examination shows a 4 × 4-cm depression in the skull. Reconstruction with methyl methacrylate is planned. Which of the following properties is the primary advantage of the use of methyl methacrylate over other biomaterials?

- A) Bony ingrowth
- B) Easy prefabrication
- C) Endothermic
- D) High strength
- E) Resistance to infection

Please note: Upon further review, this item was not scored as part of the examination.

The correct response is Option D.

Methyl methacrylate has a high compression strength.

This biomaterial has been used extensively for reconstruction of traumatic skull defects. The material is formed by mixing powdered polymer with liquid monomer. The reaction is highly exothermic. Advantages to its use include low cost, increased strength (relative to surrounding bone), and ready availability. Methyl methacrylate does not demonstrate bony incorporation or ingrowth. This property makes it susceptible to infection throughout the duration of the reconstruction. Although it is an appropriate choice for reconstruction of defects in adults, the product is inert and fixed; therefore, it does not adapt with growth in children. Methyl methacrylate can be prefabricated, but it requires complex planning.

References

1. Gosain AK; Plastic Surgery Educational Foundation DATA Committee. Biomaterials for reconstruction of the cranial vault. *Plast Reconstr Surg*. 2005 Aug;116(2):663-666.
2. Rubin JP, Yaremchuk MJ. Complications and toxicities of implantable biomaterials used in facial reconstructive and aesthetic surgery: a comprehensive review of the literature. *Plast Reconstr Surg*. 1997 Oct;100(5):1336-1353.
3. Manson PN, Crawley WA, Hoopes JE. Frontal cranioplasty: risk factors and choice of cranial vault reconstructive material. *Plast Reconstr Surg*. 1986 Jun;77(6):888-904.

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26. A 59-year-old postal worker comes to the emergency department because of numbness and discoloration of the right thumb. He says he was outdoors for 8 hours in a temperature of -15°F (-26°C) and had taken ibuprofen before arrival. Physical examination shows distal bluish skin without capillary refill. A photograph of the thumb is shown. Which of the following is the most appropriate initial management?
- A) Debridement or amputation of dead tissue, if necessary, to avoid infection
 - B) Debridement of any hemorrhagic blisters
 - C) Discontinue antiprostaglandins
 - D) Observe and allow the tissue to fully demarcate
 - E) Rapid rewarming with radiant heat

The correct response is Option D.

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The decision to allow tissue to fully demarcate is essential in the scenario described because it is difficult to determine which tissue may survive in the immediate postinjury period. This period may be 6 months.

Clear blisters are debrided because they contain high concentrations of inflammatory mediators. Inflammatory mediators lead to greater tissue injury. Hemorrhagic blisters are not debrided because this may cause exposure of deep structures and increase the risk of desiccation and subsequent necrosis.

Early debridement and amputation are necessary if soft-tissue infection develops during the waiting period; otherwise, they are not indicated. Premature amputation risks sacrifice of potentially salvageable tissue.

Antiprostaglandins, either topical (such as 70% aloe cream) or oral (ibuprofen 12 mg/kg), are beneficial to block the cascade of arachidonic acid by cyclooxygenase and the inflammatory process. Beneficial effects of antiprostaglandins include vasodilatation and antiplatelet aggregation.

Rapid rewarming decreases further tissue damage as it halts both direct injury and continued release of secondary mediators. Submersion of the injured part in 104°F (40°C) water for 15 to 30 minutes is ideal. This maneuver stops ice crystal formation and reverses the deleterious effects of vasoconstriction. Use of radiant heat sources in frostbite can lead to iatrogenic injury due to uneven thawing and, in unusual cases, secondary thermal burn to insensate tissue. Before and after photographs are shown.



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References

1. Klein M. Cold injury. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007:147.
2. Zbar R, Canady J. Cold injuries. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 1. 2nd ed. Philadelphia: WB Saunders; 2006:855-862.

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27. A 45-year-old woman with rectal cancer is scheduled to undergo abdominoperineal resection and posterior vaginectomy following neoadjuvant chemotherapy and radiation therapy. Which of the following is the most appropriate method of reconstruction of the posterior vaginal defect?
- A) Free anterolateral thigh fasciocutaneous flap
 - B) Primary repair of the perineal and vaginal defects
 - C) Pudendal thigh (Singapore) flap
 - D) Skin grafting
 - E) Vertical rectus abdominis myocutaneous flap

The correct response is Option E.

Options for reconstruction of this irradiated, complex, three-dimensional defect include various flaps, but the best choice is the vertical rectus abdominis myocutaneous (VRAM) flap, due to its ease of harvest, minimal donor-site morbidity, large skin paddle (which can resurface both the perineum and the vagina), reliable blood supply, and favorable arc of rotation. Although the pedicled ALT flap has recently been described for vaginoperineal defects, the VRAM flap remains the gold standard. Primary repair, even if technically possible, would be associated with unacceptable risk of wound-healing problems.

References

1. Ng RW, Chan JY, Mok V, et al. Clinical use of a pedicled anterolateral thigh flap. *Plast Reconstr Aesthet Surg*. 2008;61(2):158-164.
2. Wang X, Qiao Q, Burd A, et al. A new technique of vaginal reconstruction with the deep inferior epigastric perforator flap: A preliminary report. *Plast Reconstr Surg*. 2007 May;119(6):1785-1790.

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28. A 60-year-old man comes to the office because of a 2-cm pigmented lesion on the right lower back (shown) that has enlarged progressively for 3 years. No lymph nodes are palpable. Examination of a specimen obtained on punch biopsy shows a Clark Level IV malignant melanoma with a Breslow thickness of 1.2 mm and ulceration. Which of the following is the most appropriate management?
- A) Excision with 2-cm margins
 - B) Preoperative lymphoscintigraphy, sentinel lymph node biopsy, and excision with 1-cm margins
 - C) Preoperative lymphoscintigraphy, sentinel lymph node biopsy, and excision with 2-cm margins
 - D) Excision with 1-cm margins, followed by lymphoscintigraphy and sentinel lymph node biopsy at a later date
 - E) Excision with 3-cm margins, split-thickness skin grafting, and right axillary lymph node dissection

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The correct response is Option C.

A melanoma 1.2 mm in thickness on the lower back would best be excised with 2-cm margins and a concurrent sentinel lymph node biopsy.

Although a few studies cite the adequacy of a 1-cm margin for tumors less than 2 mm in thickness, a punch biopsy was performed in the scenario described, and the final pathology of the complete lesion could show a thicker lesion. In a location where there is sufficient tissue, a 2-cm margin is more appropriate for a lesion that is over 1 mm in thickness. Most authors cite resection margins of 5 mm for melanoma in situ, 1 cm for melanoma less than 0.8 mm, and 2 cm for melanoma between 0.8 and 4 mm.

Patients with intermediate thickness lesions of 0.8 mm to 4 mm have a 20 to 25% incidence of microscopic regional disease. Sentinel lymphadenectomy serves to identify patients at high risk who may be candidates for adjuvant treatment. At this time, sentinel lymph node biopsy is a diagnostic, but not yet proven, therapeutic procedure.

In patients with melanomas greater than or equal to 1 mm in thickness and no clinical evidence of regional lymph node metastases, lymphoscintigraphy is performed preoperatively to define the lymphatic drainage and demonstrate sentinel lymph node location. Sentinel lymphadenectomy is performed most accurately at the time of wide and deep excision of the primary lesion. Later, sentinel lymph node localization may be impaired if the primary lesion has been excised deeply, as the drainage patterns may have been altered by the previous procedure.

It is imperative to obtain preoperative lymphoscintigraphy in areas with a high likelihood of aberrant drainage patterns. In the trunk, unpredictable drainage patterns can occur in 20 to 35% of cases.

References

1. Balch CM, ed. *Cutaneous Melanoma*. 5th edition. St. Louis: Quality Medical Publishing; 2009.
2. Dzwierzynski W. Cutaneous Melanoma. Preface. *Clin Plast Surg*. 2010 Jan;37(1):xi.
3. Hussussian CJ. Malignant melanoma. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007:124-131.
4. Shapiro R, Culliford A. Malignant cutaneous neoplasms. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2006:45-50.

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29. A 40-year-old ambulatory man comes to the office because of a Stage IV pressure sore over the left ischium. He has no history of pressure sores, adheres to a nutritional diet, and does not smoke cigarettes. He is motivated to avoid recurrence. The most appropriate treatment is debridement followed by coverage with which of the following?

- A) Gluteal fasciocutaneous flap
- B) Gracilis muscle flap
- C) Posterior thigh musculocutaneous flap
- D) Split-thickness skin graft
- E) Tensor fascia lata flap

The correct response is Option A.

The gluteal fasciocutaneous flap is the most appropriate choice because it spares muscle in this ambulatory patient.

Musculocutaneous flaps provide blood supply and bulky padding and are effective in treating infected wounds. Fasciocutaneous flaps offer an adequate blood supply, durable coverage, and minimal potential for a functional deformity. They more closely reconstruct the normal anatomic arrangement over bony prominences. The surgeon should consider the need for subsequent surgical procedures.

Skin grafting only has a 30% success rate in the scenario described, as grafting tends to provide unstable coverage.

The tensor fascia lata flap is the best first choice for trochanteric pressure sores. The tensor fascia lata flap typically is too thin to offer adequate padding in the scenario described.

References

1. Bauer JD, Mancoll HS, Phillips LG. Pressure sores. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007.
2. Culliford AT, Levine JP. Pressure sores. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2006.

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30. A 52-year-old woman with breast cancer undergoes right mastectomy and reconstruction with a free transverse rectus abdominis musculocutaneous (TRAM) flap. The procedure is uneventful. In the recovery room, the patient's husband says that she has been smoking one pack of cigarettes daily up to the day of surgery. Which of the following postoperative complications is most likely to occur?
- A) Flap hematoma
 - B) Mastectomy skin loss
 - C) Microvascular thrombosis
 - D) Partial flap loss
 - E) Superficial infection

The correct response is Option B.

Patients who smoke cigarettes and who undergo breast reconstruction with a free flap have a higher rate of mastectomy skin loss. In addition, they have a high rate of donor site abdominal flap necrosis, umbilical necrosis, and hernias. There is no increase in microsurgical complications, flap-related complications (partial flap loss or fat necrosis), infections, or hematomas.

Current recommendations are for patients to stop smoking at least 4 weeks prior to breast reconstruction. Patients who quit smoking prior to this period have a lower risk of perioperative complications when compared to active smokers.

References

1. Chang DW, Reece GP, Wang B, et al. Effect of smoking on complications in patients undergoing free TRAM flap breast reconstruction. *Plast Reconstr Surg*. 2000 Jun;105(7):2374-2380.
2. Krueger JK, Rohrich RJ. Clearing the smoke: the scientific rationale for tobacco abstinence with plastic surgery. *Plast Reconstr Surg*. 2001 Sep 15;108(4):1063-1073.

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31. A 23-year-old woman is scheduled to undergo augmentation mammoplasty with intravenous administration of a sedative and local injection of 1% lidocaine with 1:100,000 epinephrine. Weight is 110 lb (50 kg). Which of the following is the maximum dose of lidocaine with epinephrine that can be administered to this patient?
- A) 20 mL
 - B) 25 mL
 - C) 30 mL
 - D) 35 mL
 - E) 40 mL

The correct response is Option D.

The maximum dose of lidocaine with 1:100,000 epinephrine recommended for nontumescent injection is 7 mg/kg. In the 110-lb (50-kg) patient described, the maximum dose is 350 mg. One percent lidocaine with 1:100,000 epinephrine contains 10 mg per 1 mL; therefore, the maximum dosage for injection is 35 mL.

References

1. White PF, Waddle JP. Anesthesia for plastic surgery. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:167-207.
2. de Jong RH. Lidocaine dosing duality in liposuction: "safe" only when highly diluted. *Plast Reconstr Surg*. 2004 Apr 15;113(5):1513-1514; author reply 1514-1515.

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32. A 38-year-old man with paraplegia and a Stage IV ischial pressure sore undergoes complete debridement of the soft tissue and bone and coverage with a gluteal rotation flap. Which of the following is the earliest postoperative time to allow sitting in order to promote flap healing and rehabilitation?

- A) Limited sitting at 48 hours
- B) Limited sitting at 1 week
- C) Limited sitting at 3 weeks
- D) Unlimited sitting at 4 weeks
- E) Unlimited sitting at 6 weeks

The correct response is Option C.

Prevention of pressure sore recurrence following flap coverage requires careful attention at every stage of care – from patient selection and preoperative preparation to intraoperative technique and postoperative care. Postoperative bed rest in a pressure-relieving mattress, such as a fluid-air bed, is essential to allow for proper healing of the flap. Standard regimens have suggested avoidance of sitting for 3 weeks, though one small study demonstrated equal outcomes at 2 weeks for patients with no complications during the procedure. Recurrence rates are high despite the best of care, and allowing patients to place pressure on the suture line prior to a period of 2 to 3 weeks is likely to result in dehiscence. Unlimited sitting may never be possible in many patients. Frequent position changes and inspection for skin breakdown will always be required for proper ulcer prevention.

References

1. Isik FF, Engrav LH, Rand RP, et al. Reducing the period of immobilization following pressure sore surgery: a prospective, randomized trial. *Plast Reconstr Surg*. 1997 Aug;100(2):350-354.
2. Foster R. Pressure sores. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:1351.

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33. A 50-year-old woman comes to the emergency department because of an itchy skin rash 2 weeks after administration of trimethoprim-sulfamethoxazole for treatment of a urinary tract infection. Temperature is 99.5°F (37.5°C), pulse rate is 110 bpm, respiratory rate is 28/min, and blood pressure is 95/60 mmHg. Oxygen saturation on pulse oximetry is 96%. Physical examination shows an exfoliating skin rash on 35% of the total body surface area. Which of the following is the most appropriate next step in management?

- A) Administration of systemic corticosteroids
- B) Full-thickness skin biopsy
- C) Intravenous administration of immune globulin
- D) Topical application of silver sulfadiazine
- E) Transfer to a burn center

The correct response is Option E.

A patient who develops an exfoliating rash 1 to 3 weeks after starting a specific medication, such as trimethoprim-sulfamethoxazole (Bactrim), allopurinol, or phenytoin (Dilantin), has toxic epidermal necrolysis syndrome (TENS, also known as Stevens-Johnson syndrome) until proven otherwise. Patients with TENS often have several days' worth of indolent and nonspecific symptoms, such as malaise, fever, and dysphagia. These symptoms progress rapidly to hemodynamic collapse, skin exfoliation, and mucosal sloughing.

Mortality for patients with TENS is 30%. The proposed mechanism is an acute autoimmune response to the basement membrane of epithelial structures, induced by drug exposure. Incidence is one case per million.

Skin biopsy is pathognomonic but should not delay treatment. Administration of intravenous immune globulin and systemic corticosteroids are both controversial and may have negative effects. Application of topical silver sulfadiazine as a wound care cream is contraindicated because of the potential for exacerbation of the immune response from the sulfa moiety of this agent. Although many modalities of treatment have been proposed, only transfer to a burn center has been universally accepted as a priority because of the critical care and wound care necessary to impact survival.

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References

1. Dorafshar AH, Dickie SR, Cohn AB, et al. Antishear therapy for toxic epidermal necrolysis: an alternative treatment approach. *Plast Reconstr Surg*. 2008 Jul;122(1):154-160.
2. Stella M, Clemente A, Bollero D, et al. Toxic epidermal necrolysis (TEN) and Stevens-Johnson syndrome (SJS): experience with high-dose intravenous immunoglobulins and topical conservative approach. A retrospective analysis. *Burns*. 2007 Jun;33(4):452-459. Epub 2007 May 1.
3. Ducic I, Shalom A, Rising W, et al. Outcome of patients with toxic epidermal necrolysis syndrome revisited. *Plast Reconstr Surg*. 2002 Sep 1;110(3):768-773.

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34. A 65-year-old woman is evaluated because of multiple ulcerative, nonhealing wounds on the left shoulder 8 years after undergoing left modified radical mastectomy and subsequent radiation therapy to the chest wall. She has a 5-year history of chronic lymphedema. Which of the following is the most appropriate next step?
- A) Brachytherapy
 - B) Hyperbaric oxygen therapy
 - C) Incisional biopsy
 - D) Isolated limb perfusion with chemotherapy
 - E) Skin resection only with 5-mm margins

The correct response is Option C.

Stewart-Treves syndrome is an aggressive but rare upper extremity lymphangiosarcoma that occurs in postmastectomy patients. Although plastic surgeons typically do not manage these patients, plastic surgeons should be familiar with their diagnostic workup. These patients may be referred to a plastic surgeon for management of a chronic wound, which can be confused with radionecrosis. Initial tissue diagnosis, via incisional biopsy, is the critical first step in management.

Despite a historical 5-year survival of less than 1%, cure rates may be improving, caused in part by refinement of the resection techniques and adjuvant therapies used to treat the original breast cancer. Therapeutic options for lymphangiosarcoma are not standardized but include radical ablative surgery and isolated limb perfusion with tumor necrosis factor and melphalan.

Hyperbaric oxygen may accelerate growth and is contraindicated. Excision of skin only may be indicated, but this approach would require margins greater than or equal to 1 cm.

References

1. Lans TE, de Wilt JH, van Geel AN, et al. Isolated limb perfusion with tumor necrosis factor and melphalan for nonresectable Stewart-Treves lymphangiosarcoma. *Ann Surg Oncol*. 2002 Dec;9(10):1004-1009.
2. Chung KC, Kim HJ, Jeffers LL. Lymphangiosarcoma (Stewart-Treves syndrome) in postmastectomy patients. *J Hand Surg [Am]*. 2000 Nov;25(6):1163-1168.
3. Heitmann C, Ingianni G. Stewart-Treves syndrome: lymphangiosarcoma following mastectomy. *Ann Plast Surg*. 2000 Jan;44(1):72-75.

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35. A 34-year-old man comes to the emergency department after sustaining electrical burns to the right upper extremity while working on high-voltage power lines. Physical examination shows full-thickness burns on the right volar forearm involving 3% of the total body surface area. Poikilothermia and pallor are noted over the affected area. Pulses are not palpable. Supplemental oxygen is administered, and fluid resuscitation is initiated. Which of the following is the most appropriate next step in management?
- A) Elevation of the arm
 - B) Escharotomy of the volar forearm
 - C) Fasciotomy of the volar forearm only
 - D) Fasciotomy of the volar forearm and carpal tunnel release only
 - E) Fasciotomy of the volar forearm, including decompression of the pronator quadratus, and carpal tunnel release

The correct response is Option E.

Following high-voltage injury with full-thickness or partial-thickness skin loss, patients may develop compartment syndrome. In such cases, immediate decompression is mandated. Patients typically show the pentad of pain, paresthesias, pallor, poikilothermia, and pulselessness. In addition to releasing the eschar and the fascia of the forearm, carpal tunnel release is important to decompress both the palmar arch and median nerve. Exploration of the deep compartment of the forearm, including the pronator quadratus, is essential, as tissue injury may increase in proximity to the radius and ulna due to the heat generated by passage of the electrical current. The other options are helpful but not sufficient.

References

1. Handschin AE, Vetter S, Jung FJ, et al. A case-matched controlled study on high-voltage electrical injuries vs thermal burns. *J Burn Care Res.* 2009 May-Jun;30(3):400-407.
2. Cancio LC, Jimenez-Reyna JF, Barillo DJ, et al. One hundred ninety-five cases of high-voltage electric injury. *J Burn Care Rehabil.* 2005 Jul-Aug;26(4):331-340.

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36. A 48-year-old man has infected hardware 4 weeks after undergoing spinal fusion. The neurosurgeon washes out the wound and requests consultation for coverage of the defect. In the operating room, the plastic surgeon notes that coverage with a paraspinous muscle flap is not possible, as the muscle has been heavily debrided by the neurosurgeon. Use of a reverse latissimus dorsi flap is planned. These two flaps share an arterial blood supply from which of the following arteries?
- A) Circumflex scapular
 - B) Posterior intercostal
 - C) Superior gluteal
 - D) Thoracodorsal
 - E) Transverse cervical

The correct response is Option B.

The paraspinous muscle is supplied by the posterior intercostal artery; this is the same vessel that supplies the reverse latissimus dorsi flap. For a midline spinal defect, it is unlikely that these vessels are damaged; however, this is possible in large oncologic resections or traumatic injuries.

The circumflex scapular artery supplies multiple flaps that are used for reconstruction, including the scapular and parascapular flaps. The transverse cervical artery supplies the trapezius muscle flap. The superior gluteal artery supplies the gluteus maximus muscle. The thoracodorsal artery is the main arterial supply of the latissimus muscle.

References

1. Mathes DW, Thornton JF, Rohrich RJ. Management of posterior trunk defects. *Plast Reconstr Surg*. 2006 Sep;118(3):73e-83e.
2. Wilhelmi BJ, Snyder N, Colquhoun T, et al. Bipedicle paraspinous muscle flaps for spinal wound closure: an anatomic and clinical study. *Plast Reconstr Surg*. 2000 Nov;106(6):1305-1311.
3. Hultman CS, Jones GE, Losken A, et al. Salvage of infected spinal hardware with paraspinous muscle flaps: anatomic considerations with clinical correlation. *Ann Plast Surg*. 2006 Nov;57(5):521-528.
4. Bostwick J III, Schefflan M, Nahai F, et al. The "reverse" latissimus dorsi muscle and musculocutaneous flap: anatomical and clinical considerations. *Plast Reconstr Surg*. 1980 Apr;65(4):395-399.

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5. Stevenson TR, Rohrich RJ, Pollock RA, et al. More experience with the "reverse" latissimus dorsi musculocutaneous flap: precise location of blood supply. *Plast Reconstr Surg*. 1984 Aug;74(2):237-243.

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37. A 46-year-old woman undergoes breast reconstruction with a pedicled transverse rectus abdominis musculocutaneous (TRAM) flap. Weight is 185 lb (84 kg); BMI is 32 kg/m². The donor site is reconstructed with mesh. Six months postoperatively, the patient develops a bulge at the donor site. Which of the following best represents the deepest layer of the anterior rectus sheath when it is harvested caudal to the arcuate line?
- A) External oblique aponeurosis
 - B) Internal oblique aponeurosis
 - C) Rectus abdominis fascia
 - D) Transversalis fascia
 - E) Transversus abdominis aponeurosis

The correct response is Option E.

The rectus sheath is the semifibrous compartment that encompasses the rectus abdominis muscle and consists of an anterior and posterior sheath created by the aponeurotic extensions of the external oblique, internal oblique, and transversus abdominis muscles.

Proximal to the arcuate line, which is located approximately at the level of the anterior superior iliac spine, the anterior rectus sheath comprises the aponeuroses of the external oblique and the anterior leaf of the internal oblique. The internal oblique has two leaves, the deeper of which contributes to the posterior rectus sheath along with the transversus abdominis and transversalis fascia.

At the level of the arcuate line, the posterior leaf of the internal oblique aponeurosis and the transversus abdominis aponeurosis travel superficially to the rectus abdominis, making the posterior sheath very weak. When the anterior rectus sheath is defective at this level, the likelihood for bulging or hernia is high.

The level of the arcuate line is not always clear from topographical landmarks, which can make the planning of a transverse rectus abdominis musculocutaneous (TRAM) flap more difficult and increase the risk for a hernia complication.

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References

1. Netter FH. *Atlas of Human Anatomy*. 4th ed. Philadelphia: Saunders; 2006:248-267.
2. Cunningham SC, Rosson GD, Lee RH, et al. Localization of the arcuate line from surface anatomic landmarks: a cadaveric study. *Ann Plast Surg*. 2004 Aug;53(2):129-131.
3. Mwachaka PM, Saidi HS, Odula PO, et al. Locating the arcuate line of Douglas: is it of surgical relevance? *Clin Anat*. 2010 Jan;23(1):84-86.

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(Please note that this pictorial appears in color in the online examination)

38. A 63-year-old man comes for evaluation of a dehiscent surgical incision 3 weeks after undergoing open reduction of the right ankle. He has a history of coronary artery disease, hypertension, hypercholesterolemia, and poorly controlled type 2 diabetes mellitus. He had a myocardial infarction 2 years ago. Physical examination shows a dehiscent surgical incision with exposed tibialis anterior tendon without paratenon. A photograph is shown. The patient refuses free tissue transfer. Which of the following is the most appropriate skin substitute for the wound?
- A) Biodegradable bilaminar neodermal matrix (Integra)
 - B) Biosynthetic wound dressing (Biobrane)
 - C) Cryopreserved neonatal fibroblast-derived dermal substitute (Dermagraft)
 - D) Human fibroblast-derived composite skin substitute (TransCyte)
 - E) Living bilayered skin substitute (Apligraf)

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The correct response is Option A.

Integra is a bilaminate neodermal replacement product that is composed of a biodegradable bovine collagen-glycosaminoglycan (collagen-GAG) matrix underlayer with a silicone outer layer. Although its “on-label” indication is for burn reconstruction, it also has utility in reconstruction of wounds of exposed bone without periosteum, exposed cartilage without perichondrium, and exposed tendon without paratenon, such as in the scenario described. The collagen-GAG matrix serves as scaffolding for the ingrowth of cells and neovascularization. After regeneration, which takes between 2 to 4 weeks, the silicone outer layer is removed and a thin split-thickness skin graft completes the reconstruction by providing epithelial cells over the neovascularized dermal replacement.

Biobrane is a temporary, rather than permanent, bilaminar skin substitute that is constructed of an inner layer, composed of nylon and collagen, which is covered by an outer silicone film. Biobrane serves as a temporary wound dressing, usually in burn patients, where it helps prevent evaporative loss (due to the silicone outer layer) and subsequent wound desiccation. It decreases wound pain and provides a barrier to bacterial infection. Biobrane is removed either before permanent grafting or after epithelialization of the wound has occurred.

Dermagraft is a dermal substitute composed of neonatal foreskin fibroblasts cultured on a polyglactin mesh, and it is generally used in the treatment of diabetic foot ulcers, where it often is combined with meshed skin grafts.

TransCyte is also a temporary wound dressing. It is similar to Biobrane but has an added biologic layer derived from neonatal fibroblasts that are seeded onto the nylon matrix to produce type I collagen, fibronectin, and glycosaminoglycans. TransCyte is removed either before skin grafting or after epithelialization of the wound. It has been shown to significantly decrease pain and time to epithelialization.

Apligraf, another permanent replacement product, is constructed of type I bovine collagen and cultured neonatal human fibroblasts and keratinocytes. After construction of the dermal matrix equivalent, cultured keratinocytes are applied. It is generally used in the treatment of venous ulcers and diabetic foot ulcers (may take more than one application). Its long-term durability, however, makes it an inappropriate choice in situations with a full-thickness defect with exposed vital structures.

A follow-up photograph of the ankle is shown.



(Please note that this pictorial appears in color in the online examination)

References

1. Demling RH, DeSanti L. Management of partial thickness facial burns (comparison of topical antibiotics and bio-engineered skin substitutes). *Burns*. 1999 May;25(3):256-261.
2. Balasubramani M, Kumar TR, Babu M. Skin substitutes: a review. *Burns*. 2001 Aug;27(5):534-544.
3. Grey JE, Lowe G, Bale S, et al. The use of cultured dermis in the treatment of diabetic foot ulcers. *J Wound Care*. 1998 Jul;7(7):324-325.
4. Garfein ES, Orgill DP, Pribaz JJ. Clinical applications of tissue engineered constructs. *Clin Plast Surg*. 2003 Oct;30(4):485-498.
5. Saffle JR. Closure of the excised burn wound: temporary skin substitutes. *Clin Plast Surg*. 2009 Oct;36(4):627-641.

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39. A 72-year-old man is brought to the emergency department after he sustained injuries in a high-speed motor vehicle collision as an unrestrained backseat passenger. He has chronic obstructive pulmonary disease and a 40-pack-year history of smoking. The following measurements are obtained:

Heart rate	88 bpm
Respirations	18/min
Blood pressure	115/70 mmHg
Oxygen saturation	98% on 6 L by face mask

Physical examination shows severe swelling in the face. He is coughing blood and mucus from his mouth and nose. Gross malocclusion is noted, but full dentition is present with no dental caries. CT scan shows a naso-orbital-ethmoid fracture, Le Fort III fracture, palatal fracture, and comminuted mandibular body and angle fractures. Which of the following is the most appropriate method of airway management during surgical repair of this patient's fractures?

- A) Cricothyroidotomy
- B) Nasotracheal intubation
- C) Placement of an orotracheal tube
- D) Tracheostomy
- E) Use of a laryngeal mask airway

The correct response is Option D.

The method of airway management in patients with facial fractures can be controversial and should be individualized. The patient described has complex facial fractures involving both the midface and the lower face. He also has a significant history of smoking. This particular patient is likely to have continued respiratory issues postoperatively, making pulmonary management challenging. The placement of a tracheostomy at the time of surgery will allow the surgical team full access to all of the patient's facial fractures and will facilitate the patient's pulmonary care postoperatively.

Cricothyroidotomy is indicated occasionally as an emergency procedure when there is concern for acute control of the patient's airway. The patient described is hemodynamically stable and is not in respiratory distress.

Nasotracheal intubation is contraindicated in a patient with a naso-orbital-ethmoid fracture because the presence of a tube can complicate fracture reduction.

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Generally, placement of an orotracheal tube is feasible and successful in most facial fracture patients. However, given the complex nature of fractures in the scenario described, the patient will need to be placed into mandibular-maxillary fixation during surgery to obtain normal occlusion and possibly for an indefinite period of time after surgery. Although the tube can occasionally be placed behind the last molar or through a gap where there is a missing tooth, an orotracheal tube can make it difficult to obtain normal occlusion. It is not as beneficial as tracheostomy in providing the postoperative pulmonary care that will likely be required in the patient described.

A laryngeal mask airway does not provide as secure an airway as either orotracheal intubation or tracheostomy. During a complex facial fracture surgery, the head may need to be manipulated or turned, which could potentially dislodge a laryngeal mask airway.

References

1. Manson P. Facial Fractures. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 3. 2nd ed. Philadelphia: WB Saunders; 2006.
2. Mohan R, Iyer R, Thaller S. Airway management in patients with facial trauma. *J Craniofac Surg*. 2009 Jan;20(1):21-23.

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40. A 17-year-old boy undergoes resection of the right distal femur to treat osteosarcoma. A large allogeneic corticocancellous bone graft is used for skeletal reconstruction of the 10-cm bony defect. An intramedullary vascularized fibular free flap is also placed in the construct. Which of the following is the most likely purpose of this additional procedure?
- A) Decrease the immunogenicity of the allograft
 - B) Decrease the rate of infection
 - C) Increase creeping substitution in the allograft
 - D) Increase the immediate strength of the construct
 - E) Shorten union time

The correct response is Option E.

The most likely reason to place an intramedullary fibular free flap in the allogeneic bone graft is to shorten union time. Free fibular flaps contain an intrinsic blood supply and osteogenic cells. These offer an alternative to the allograft and the capability of osteogenesis through osteoinduction. Thus, the biologic advantage of fibular free flaps is a shortened union time compared with the allograft, which solely depends upon creeping substitution for healing. Union times may be as short as 3 to 5 months. The healing of massive allografts is generally slow, superficial, and incomplete. The union times for allograft healing have been reported at 14 to 23 months for intercalary defects.

Nonvascularized massive allografts provide a biologic spacer with strong cortical bone. These grafts give great strength to the construct; however, despite this advantage they have many disadvantages, including their lack of blood supply, lack of osteogenic cells, and potential for immunologic reaction. The fibula may add some strength to the overall construct but this is not the primary reason for its use in the scenario described. It also does not mitigate any potential antigenicity that the graft may have. The graft heals by creeping substitution and as such is only osteoconductive, unlike vascularized bone. This process in the allograft remains unchanged by the presence of the fibular flap; however, it does provide the additional process of osteoinduction as described above, which helps in healing. It is the avascular status of the allograft that predisposes these reconstructions to infection, not the dead space in the medullary canal.

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References

1. Moran SL, Shin AY, Bishop AT. The use of massive bone allograft with intramedullary free fibular flap for limb salvage in a pediatric and adolescent population. *Plast Reconstr Surg*. 2006 Aug;118(2):413-419.
2. Chen CM, Disa JJ, Lee, HY, et al. Reconstruction of extremity long bone defects after sarcoma resection with vascularized fibula flaps: a 10-year review. *Plast Reconstr Surg*. 2007 Mar;119(3):915-924.
3. Capanna R, Bufalini C, Campanacci M. A new technique for reconstructions of large metadiaphyseal bone defects: A combined graft (Allograft shell plus vascularized fibula). *Orthop Traumatol*. 1993 Sep;2(3):159-177.

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41. A 40-year-old man comes to the office because of a 12-year history of recurrent painful nodules in his groin, buttocks, and perineum. Physical examination shows deep subcutaneous abscesses. Some have ruptured and formed multiple discharging sinus tracts. In addition to meticulous hygiene, which of the following is the most appropriate management?
- A) Antiandrogen therapy
 - B) Anti-tumor necrosis factor- α therapy
 - C) Excision
 - D) Radiotherapy
 - E) Regular chlorhexidine baths

The correct response is Option C.

The patient has hidradenitis suppurativa. The disease presents with tender subcutaneous nodules beginning around puberty. The nodules may spontaneously rupture or coalesce, forming deep, painful dermal abscesses. Eventually, fibrosis and the formation of extensive sinus tracts result. The location of the lesions may lead to social embarrassment.

Due to the multiple interconnected sinus tracts and abscesses throughout an entire region, the patient described has such a debilitating disease that only surgery can adequately address his symptoms. Wide excision of all affected tissue and the underlying sinus tracts is the most effective treatment. It is also advisable to stage the process, preferably with the use of allograft.

For patients with abscesses but no cicatrization or sinuses, hygienic measures and antibiotics are an appropriate first-line therapy. The disease primarily involves the follicular epithelium, which is colonized secondarily and infected by bacteria. Clindamycin and tetracycline have shown benefit in clinical trials. Smaller studies using dapsone and minocycline have shown useful short-term benefit.

Several trials using antiandrogen therapy have been conducted. In a randomized trial comparing ethinyl estradiol 50 mg/cyproterone acetate 50 mg to ethinyl estradiol 50 mg/norgestrel 500 mg in 24 women, both regimens produced improvement in disease activity. The tumor necrosis factor- α inhibitors infliximab and etanercept have also produced favorable outcomes.

Limited lesions can be injected with corticosteroids, and flares can be addressed with short courses of oral or intramuscular corticosteroids. Patients with one or more widely separated, recurrent abscesses with sinus tract formation and scars or patients who have failed the first-line

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therapies may need more aggressive treatment than those with early stage lesions. Treatments that carry more risk may be worth trying depending on the severity of the patient's disease course. Long-term immunosuppressive therapy or surgical therapies, such as limited excisions or the laying open of sinus tracts, may be helpful.

Radiation therapy for hidradenitis suppurativa was used extensively in the past. Techniques and responses have varied widely, but poor tissue healing was noted.

References

1. Alikhan A, Lynch PJ, Eisen DB. Hidradenitis suppurativa: a comprehensive review. *J Am Acad Dermatol*. 2009 Apr;60(4):539-561.
2. Slade DE, Powell BW, Mortimer PS. Hidradenitis suppurativa: pathogenesis and management. *Br J Plast Surg*. 2003 Jul;56(5):451-461.

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42. A 65-year-old woman undergoes breast reconstruction with a free transverse rectus abdominis musculocutaneous (TRAM) flap. Zones I and II of the flap are used, and part of Zone III and all of Zone IV are excised. The cartilaginous portion of the third rib is removed to expose the internal mammary vessels. Microvascular anastomosis with the aid of a microscope is performed between the flap pedicle and the internal mammary vessels. Which of the following Current Procedural Terminology (CPT) codes is most appropriate in this scenario?
- A) Breast reconstruction with free flap (19364) and excision of rib, partial (21600)
 - B) Breast reconstruction with free flap (19364) and microsurgical techniques, requiring the use of operating microscope (69990)
 - C) Breast reconstruction with free flap (19364); excision of rib, partial (21600); and debridement; skin and subcutaneous tissue (11042)
 - D) Breast reconstruction with free flap (19364) only
 - E) Breast reconstruction with TRAM flap, single pedicle, including closure at donor site; with microvascular anastomosis (supercharging) (19368)

The correct response is Option D.

The scenario describes a breast reconstruction using a free DIEP flap. According to Current Procedural Terminology (CPT), the correct code is 19364, which is “breast reconstruction with free flap.” This code does not distinguish between the type of flap that is used, nor does it distinguish among free TRAM flaps, muscle-sparing TRAM flaps, DIEP flaps, superficial inferior epigastric artery (SIEA) flaps, and so on. Included in this code is the harvest of the flap, the inset and shaping of the breast reconstruction, the microvascular anastomosis, the use of the operating room microscope, and the closure of the donor site.

The use of code 21600, partial rib resection, is also considered bundled within the code for breast reconstruction with a free flap (19364).

It is not appropriate to enter the code for using the operating room microscope (69990) because this part of the procedure is bundled within the code for breast reconstruction with a free flap (19364). Using codes that are bundled within another CPT code is referred to as “unbundling” and is inappropriate.

The use of a debridement code (11042) would not be appropriate. For the purpose of breast reconstruction and shaping, trimming of the flap is part of the harvest and inset of the flap.

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The code 19368 would not be appropriate because it describes a single pedicled TRAM flap that is supercharged. Supercharging typically involves an additional microvascular anastomosis between the deep inferior epigastric vessels and, usually, the thoracodorsal vessels to augment the flap's blood supply.

References

1. American Medical Association. *CPT 2010 Professional Edition*. American Medical Association; 2009.
2. Janevicius R. Breast reconstruction coding: everything (almost) you need to know. *Plastic Surgery News: CPT Corner*. American Society of Plastic Surgeons; June 2009.

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(Please note that this pictorial appears in color in the online examination)

43. A 19-year-old woman comes to the office for a follow-up examination 18 months after skin grafting for burns over 25% of her total body surface area that includes the face, neck, chest, and shoulders. Physical examination shows persistent restriction of neck excursion and lateral range of motion. A photograph is shown. Which of the following is the most appropriate management?
- A) Compression therapy
 - B) Corticosteroid injection
 - C) Silicone sheeting
 - D) Skin grafting
 - E) Z-plasty tissue rearrangement

The correct response is Option E.

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The patient described has a condition that is common among burn patients with significant burns to the neck area; that is, contracture band formation, even after primary attempts at skin grafting. Contractures are produced not only by absolute skin loss and/or skin contraction along a straight line scar, but also by the differential growth rate between the burn scar and the rest of the adjacent normal skin and tissues, especially in younger patients.

There are various techniques used to release contractures. Management depends on both the location of the contracture as well as the availability of unaffected adjacent skin. Methods of release include tissue expansion, local and distant flaps, “alphabet plasties” (Z, W, V-Y, etc.), and skin grafting. The most appropriate option for the patient described is a Z-plasty, especially as she has failed a prior attempt at skin grafting. Through soft-tissue rotation, Z-plasty accomplishes three things: (1) lengthens a contracted scar, (2) breaks up a straight line, and (3) shifts soft-tissue contour.

Compression therapy/splinting is useful as an adjunct therapy but not as a primary treatment of this deformity. The patient described does not have a hypertrophic or keloid scar – it is a contracture band. Therefore, the injection of corticosteroids and silicone sheeting are not indicated in the treatment of this deformity.

The advantage of skin grafts, in general, is the transfer of new skin from a previously uninjured area of the body to the area in need with low donor site morbidity, though full-thickness grafts generally have larger donor site morbidity than split grafts. The disadvantage of skin grafts is that they tend to recontracture, necessitating further release through reoperation, as in the scenario described. Prolonged periods of postoperative physiotherapy and splinting are required to maximize aesthetic and functional results.

References

1. McGregor IA. The theoretical basis of the Z-plasty. *Br J Plast Surg*. 1957 Jan;9(4):256-259.
2. Furnas DW, Fischer GW. The Z-plasty: biomechanics and mathematics. *Br J Plast Surg*. 1971 Apr;24(2):144-160.
3. Sawhney CP. Contracture of skin grafts and its relation to cleavage lines of skin. *Br J Plast Surg*. 1971 Jul;24(3):233-237.
4. Ward RS. Pressure therapy for the control of hypertrophic scar formation after burn injury. A history and review. *J Burn Care Rehabil*. 1991 May-Jun;12(3):257-262.
5. Stanton RA, Billmire DA. Skin resurfacing for the burned patient. *Clin Plast Surg*. 2002 Jan;29(1):29-51.
6. Rohrich RJ, Zbar RI. A simplified algorithm for the use of Z-plasty. *Plast Reconstr Surg*. 1999 Apr;103(5):1513-1517.

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44. An otherwise healthy 45-year-old woman undergoes excisional biopsy of a skin lesion on the chest under local anesthesia with 30 mL of 1% lidocaine with 1:100,000 epinephrine. Weight is 176 lb (80 kg). The patient says she has light-headedness, headache, and palpitations 5 minutes into the case after administration of anesthesia. Cyanosis and tachycardia are noted. Oxygen saturation is 90%, and supplemental oxygen is administered. Methemoglobinemia is suspected. Administration of which of the following antidotes is the most appropriate next step?
- A) Dantrolene
 - B) Glucagon
 - C) Insulin
 - D) Methylene blue
 - E) Propranolol

The correct response is Option D.

The most appropriate next step in management is the administration of methylene blue as an antidote for methemoglobinemia. Methemoglobinemia is a clinical condition in which hemoglobin is unable to carry oxygen to end organs due to the formation of methemoglobin. Red blood cells contain four hemoglobin chains. Each hemoglobin molecule is composed of four polypeptide chains associated with four heme groups. The heme group contains an iron molecule in the reduced or ferrous form (Fe^{2+}). By sharing an electron in this form, iron can combine with oxygen to form oxyhemoglobin. Hemoglobin can accept and transport oxygen only when the iron atom is in its ferrous form. When hemoglobin loses an electron and becomes oxidized, it is converted to the ferric state (Fe^{3+}), or methemoglobin. Methemoglobin lacks the electron that is needed to form a bond with oxygen and, thus, is incapable of oxygen transport. Local anesthetics can act as oxidizing agents for the ferrous form of iron. Oxygenated blood is red, deoxygenated blood is blue, and blood containing methemoglobin is a dark, reddish brown color. This dark hue imparts clinical cyanosis when methemoglobin levels are at 1.5 g/dL (approximately 10 to 15% methemoglobin concentration); however, a level of 5 g/dL of deoxygenated blood is required for similar effects. Therefore, when methemoglobin levels are relatively low, cyanosis may be observed without cardiopulmonary symptoms. Normal methemoglobin concentrations are 1% (range of 0 to 3%). At concentrations of 3 to 15%, a slight discoloration (i.e., pale, gray, or blue) of the skin may be present. At concentrations of 15 to 20%, the patient may be relatively asymptomatic, but cyanosis is likely to be present. Signs and symptoms at concentrations of 25 to 50% include headache, dyspnea, light-headedness, weakness, confusion, palpitations, and chest pain. Cardiac arrhythmias, delirium, seizures, profound acidosis, coma, and death can

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occur at concentrations of 50 to 70%. Administration of supplemental oxygen, removal of the offending oxidizing agent, and the administration of the antidote methylene blue are the mainstays of therapy. Methylene blue acts to reduce the heme group from methemoglobin to hemoglobin. Most patients require only one dose. Resolution of toxicity should be seen within 1 hour, often within 20 minutes. The most appropriate dosage for adults is 1 to 2 mg/kg (0.1 to 0.2 mL/kg) intravenously over 3 to 5 minutes; the dose is repeated in 1 hour if continued symptomatology or significant methemoglobinemia is noted. The total dose should not exceed 7 mg/kg. Although there are reports of successful usage in neonates and infants, administration of methylene blue is not recommended for pediatric patients younger than age 6 years. For patients older than age 6 years, dosage is individualized; most cases reported in medical literature have utilized starting doses of 1 mg/kg either intravenously, intramuscularly, or intraosseously over a period of 5 minutes.

Most cases of local anesthetic-related methemoglobinemia have been associated with topical benzocaine (1 in 7000 bronchoscopies in one study). However, there are cases of lidocaine associated with this potentially fatal reaction in the literature, and knowledge of this is vitally important given the frequency with which plastic surgeons use this drug.

Glucagon is an antidote for beta-blocker overdose, propranolol is a beta-blocker utilized in cardiac arrhythmias, insulin is used to decrease glucose levels or in scenarios of hyperkalemia, and dantrolene would be used in malignant hyperthermia.

References

1. Lee DC, Ferguson KL. Methemoglobinemia: treatment and medication. eMedicine Web site. Available at: <http://emedicine.medscape.com/article/815613-treatment>. Updated July 15, 2009.
2. Moore TJ, Walsh CS, Cohen MR. Reported adverse event cases of methemoglobinemia associated with benzocaine products. *Arch Intern Med*. 2004 Jun 14;164(11):1192-1196.
3. Umbreit J. Methemoglobin—it's not just blue: a concise review. *Am J Hematol*. 2007 Feb;82(2):134-144.

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45. A 3-month-old boy is referred for evaluation of a rapidly enlarging parotid tumor. Physical examination shows a large, ulcerated, 10-cm infantile hemangioma involving the left parotid gland with destruction of the ear. Which of the following is the most appropriate treatment?

- A) Interferon
- B) Prednisolone
- C) Propranolol
- D) Pulsed-dye laser therapy
- E) Resection

The correct response is Option B.

First-line treatment for a large, problematic infantile hemangioma is prednisolone, a corticosteroid. Almost all infantile hemangiomas will respond to oral prednisolone as long as the correct dose is given (3 mg/kg/day). Response is considered either stabilization (the tumor no longer enlarges) or accelerated regression (the lesion becomes smaller). Corticosteroids are very safe; no long-term adverse effects have been reported for children treated for infantile hemangioma. Unlike patients who receive chronic, high-dose corticosteroids for transplants or autoimmune disorders, infants with infantile hemangioma are only treated for a few months, and the dose is rapidly weaned as they gain weight and the physician lowers the dose.

Interferon is no longer used for patients with infantile hemangioma because it causes spastic diplegia. Propranolol, a beta blocker, recently has been shown to have activity against infantile hemangioma. However, its efficacy and safety compared to corticosteroids have not been studied. Complications such as hypotension and hypoglycemia have been reported, and infants require close monitoring after the initiation of therapy.

Pulsed-dye laser treatment for a cutaneous, proliferating infantile hemangioma is contraindicated. The laser cannot penetrate into the deep dermis or subcutaneous tissue and thus has minimal efficacy. In addition, the laser delivers a thermal injury to the already compromised skin and has been shown to increase the risk of ulceration, pain, and scarring.

Resection of a large, proliferating parotid hemangioma is contraindicated. During infancy, the tumor is highly vascular and the patient is at risk for major blood loss and facial nerve injury.

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References

1. Greene AK, Rogers GF, Mulliken JB. Management of parotid hemangioma in 100 children. *Plast Reconstr Surg*. 2004 Jan;113(1):53-60.
2. Lawley LP, Siegfried E, Todd JL. Propranolol treatment for hemangioma of infancy: risks and recommendations. *Pediatr Dermatol*. 2009 Sep-Oct;26(5):610-614.
3. Frieden IJ, Drolet BA. Propranolol for infantile hemangiomas: promise, peril, pathogenesis. *Pediatr Dermatol*. 2009 Sep-Oct;26(5):642-644.
4. Greene AK. Systemic corticosteroid is effective and safe treatment for problematic infantile hemangioma. *Pediatr Dermatol*. 2010 May-Jun;27(3):322-323.

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46. A 21-year-old woman comes to the office because of difficulty breathing through the right nostril and dissatisfaction with the appearance of a “bump” in her nose and a wide tip. History includes three untreated nasal fractures and intermittent seasonal allergic symptoms. Functional septorhinoplasty with spreader grafts and a reduction of the nasal tip and dorsum are performed. One week postoperatively, a fluid collection that tests positive for MRSA infection is noted along the nasal dorsum. Drainage is performed, and oral antibiotics are administered. The patient comes to the office for follow-up 4 weeks postoperatively, and she says she is dissatisfied with the appearance of her nose despite significant functional and cosmetic improvement. Which of the following is the most appropriate strategy to avoid further patient dissatisfaction?
- A) Ask the patient to return weekly for the next 6 weeks
 - B) Explain to the patient that this is a normal postoperative course and ask her to return in 4 months
 - C) Offer to revise her surgery, explaining that she will have to pay the facility and anesthesia charges
 - D) Transfer care to another surgeon

The correct response is Option A.

Patient dissatisfaction following aesthetic surgery has many origins, including unrealistic patient expectations, inappropriate motivation for surgery, poor patient choice on behalf of the surgeon, and underlying psychopathology. Patients whose primary motivation for surgery is to resolve conflicts in interpersonal relationships and whose chief expectation is that others will change their attitudes and behavior toward them have the highest incidence of postoperative dissatisfaction.

Aesthetic septorhinoplasty cases comprise a very large portion of the dissatisfied patient population. The most common reasons include unsatisfactory results, visible irregularities or scars, continued breathing difficulty, asymmetry, “emotional distress,” and the cost of revision surgery. Of all the operations performed by aesthetic plastic surgeons, septorhinoplasty has the highest degree of unpredictability. This problem is aggravated greatly by unrealistic patient expectations, underlying psychiatric issues, and inappropriate patient selection.

Two fundamental principles must be considered when selecting the appropriate candidate for cosmetic surgery. First, the patient’s motivation for surgery must be determined. Second, the surgeon’s own motivation must be examined. Several groups of patients with certain characteristics should be avoided. These include patients with unrealistic or overly idealized

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expectations, excessively demanding patients, indecisive patients, immature patients, secretive patients, patients motivated to seek surgery by others, patients with unstable personalities, patients with body dysmorphic disorder, patients you simply do not like, and “surgiholics,” or “doctor shoppers.”

The key to dealing with the dissatisfied patient postoperatively is proper communication and frequent contact with the patient. This is most important in patients who exhibit early decompensation and express dissatisfaction with the result. Successful communication requires empathy, compassion, and reflective listening to make sure the patients understand that their concerns are valid and important. The common denominator of litigation in plastic surgery is poor communication. Underlying the patient’s dissatisfaction is a breakdown in rapport between the patient and surgeon. Left unaddressed, this can develop into a vicious cycle of disappointment, anger, frustration, hostility, physician defensiveness and arrogance, further patient anger, and, ultimately, a visit to an attorney.

In the scenario described, a period of 4 months would be too long to wait before seeing the patient again. She may feel that the surgeon is avoiding her situation, which may cause further frustration and anger. After a reasonable “waiting period,” it may be prudent to offer the patient further surgery at a reduced or waived surgical fee. It is important to establish a revision fee structure prior to embarking on the initial surgery. Since most patient dissatisfaction is transitory and related to perioperative psychological changes, it would not be prudent to offer surgery at this point. For the same reason, it is too soon to transfer care to another surgeon. A referral would be appropriate after 3 to 4 months, provided that a good relationship is in place with that surgeon.

References

1. Stevens L, McGrath MH. Psychological aspects of plastic surgery. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:75-88.
2. Goode RL. The unhappy patient following facial plastic surgery: what to do? *Facial Plast Surg Clin North Am*. 2008 May;16(2):183-186, vi.
3. Sykes JM. Patient selection in facial plastic surgery. *Facial Plast Surg Clin North Am*. 2008 May;16(2):173-176, v.
4. Gorney M. Claims prevention for the aesthetic surgeon: preparing for the less-than-perfect outcome. *Facial Plast Surg*. 2002 May;18(2):135-142.
5. Gorney M. Plastic surgery pitfalls. *Clin Plast Surg*. 1999 Jan;26(1):149-159, ix.
6. Gorney M. Recognition of the patient unsuitable for aesthetic surgery. *Aesthet Surg J*. 2007 Nov-Dec;27(6):626-629.

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47. A 58-year-old man comes to the office because of a 3-month history of multiple light-red, scaly lesions of the scalp and forehead. Physical examination shows extensive sun damage to the face and scalp, including multiple flat lesions measuring between 3 and 10 mm in diameter. Examination of a specimen obtained on shave biopsy shows actinic keratosis without invasive malignancy. In addition to daily application of sunscreen and wearing protective garments, which of the following is the most appropriate management?
- A) Application of topical 5-fluorouracil
 - B) Excision of the lesions with 2-mm margins
 - C) Repeat biopsy in 6 months
 - D) Shave excision of the lesions
 - E) Observation only

The correct response is Option A.

Actinic keratosis is a common, premalignant lesion that is a direct result of sun damage. These lesions typically occur in fair-skinned patients who have an extensive history of solar injury. Lesions are flat or slightly raised, red, and scaly. They can be isolated or diffuse. Over time, they can progress to squamous cell carcinoma or other precancer lesions, such as Bowen disease (in situ squamous cell), cutaneous horns, and keratoacanthomas.

All patients must be counseled on sun protection measures, such as daily sunscreen application and wearing protective garments. Observation alone may be applicable for very small lesions or in certain infirm or elderly patients, but it is not appropriate in most circumstances because of the potential for malignancy. The rate of transformation is not clear but has been reported to be 1 to 25% per year per lesion.

Ideal treatment involves topical destructive measures, such as application of 5-fluorouracil cream. Typically, it is applied twice daily for 2 to 4 weeks. Other common treatments include imiquimod cream (Aldara), cryotherapy with liquid nitrogen, and photodynamic therapy with 5-aminolevulinic acid (Levulan). These topical treatments are preferable to excision of the superficial lesions described because they can typically treat multiple and diffuse lesions without extensive scarring. Local redness and irritation does occur and resolves over a period of weeks. Subclinical lesions can also be treated, preventing growth of new lesions. Excision or repeat biopsy should be reserved for isolated lesions that are refractory to less invasive measures. Chemical peels and laser resurfacing have also been described as treatment options.

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References

1. Henry GI, Grevious MA, Morton TA, et al. Skin, benign skin lesions. eMedicine Web site. Available at: <http://emedicine.medscape.com/article/1294801-overview>. Updated May 19, 2009.
2. Leon P. Benign tumors of the skin. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:266-268.
3. Jorizzo JL, Carney PS, Ko WT, et al. Treatment options in the management of actinic keratosis. *Cutis*. 2004 Dec;74(6 Suppl):9-17.

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48. A 47-year-old woman with a history of excision of a giant nevus of the scalp and skin grafting as a child desires removal of the skin graft and primary closure. Tissue expanders are placed, and weekly expansions are initiated. Which of the following is the most likely mechanism by which the surface area of this patient's tissue is increased?

- A) Apoptosis and cellular replacement
- B) Cell division
- C) Cell proliferation in the adjacent nonexpanded tissue
- D) Expansion of intracellular cytoskeleton
- E) Stretch-induced cell volume expansion

The correct response is Option B.

Tissue expansion results in increased cell division through stretch-induced signal transduction pathways involving growth factors, the cytoskeleton, and protein kinases. The net result is an increase in protein synthesis, keratinocyte growth, and new skin production to restore resting tension. Although cell morphology changes, it is not the mechanism by which new tissue is recruited. Cells in adjacent, nonexpanded areas are not affected, expanded cells do not undergo apoptosis followed by cellular replacement, and expansion of the intracellular cytoskeleton alone does not result in increased tissue generation.

References

1. Takei T, Mills I, Arai K, et al. Molecular basis for tissue expansion: clinical implications for the surgeon. *Plast Reconstr Surg*. 1998 Jul;102(1):247-258.
2. De Filippo RE, Atala A. Stretch and growth: the molecular and physiologic influences of tissue expansion. *Plast Reconstr Surg*. 2002 Jun;109(7):2450-2462.

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49. A 40-year-old woman is scheduled to undergo exploration and repair of an isolated tendon laceration. An infusion of 1% lidocaine with 1:100,000 epinephrine is administered from the mid palm to the middle phalangeal area. No tourniquet or additional anesthesia is planned. Which of the following conditions is the surgeon most likely to encounter during surgery?

- A) Critical digital ischemia
- B) Enhanced tendon mobility
- C) Excessive patient anxiety
- D) Optimal surgical field
- E) Poor hemostasis

Please note: Upon further review, this item was not scored as part of the examination.

The correct response is Option D.

Generations of physicians, beginning in medical school, have been trained to avoid epinephrine use in fingers due to the fear of inducing ischemic necrosis. However, comprehensive literature reviews and large clinical outcome studies have failed to show any harmful effects resulting from the appropriate use of standard, current preparations of lidocaine with 1:100,000 epinephrine. The few cases of digital necrosis reported in the literature employed agents such as cocaine and procaine with undisclosed volumes of injection or concentrations of epinephrine.

Large case series of common hand procedures, such as carpal tunnel surgery and tendon repair, support the safety of a local anesthesia-only, tourniquet-free approach. Tourniquets and upper extremity blocks, while generally very safe, are not without morbidity or complication.

In patients who demonstrate excessive intraoperative blanching or concerning symptoms of ischemia, phentolamine can safely reverse the vasoconstrictive effects of epinephrine. In one study of over 3000 patients, not a single case required phentolamine reversal.

Study authors recommend direct volar digital injections of 2 mL of local anesthesia. Up to 30 mL may be used in the wrist and hand and more in the forearm, if needed. The tumescent effect provides a fully anesthetic, bloodless field for optimal visualization.

The use of local anesthesia should not impact tendon mobility. Intraoperative patient anxiety can occur in any awake patient, whether they receive local or regional anesthesia. In the numerous

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studies of local anesthesia hand surgery, patients appear to tolerate the procedure well. Avoiding tourniquet pain is particularly advantageous in patients who do not receive general anesthesia. The local anesthesia tumescent block technique should provide excellent analgesia and should not increase patient discomfort.

References

1. Denkler K. A comprehensive review of epinephrine in the finger: to do or not to do. *Plast Reconstr Surg*. 2001 Jul;108(1):114-124.
2. Lalonde D, Bell M, Benoit P, et al. A multicenter prospective study of 3,110 consecutive cases of elective epinephrine use in the fingers and hand: the Dalhousie Project clinical phase. *J Hand Surg Am*. 2005 Sep;30(5):1061-1067.
3. Lalonde DH, Thomson CJ, Denkler K, et al. Reply to: Mandrekas AD, Zambacos, GJ. Epinephrine use in the fingers. *Plast Reconstr Surg*. 2007;120(5):1437.
4. Thomson CJ, Lalonde DH, Denkler KA, et al. A critical look at the evidence for and against elective epinephrine use in the finger. *Plast Reconstr Surg*. 2007 Jan;119(1):260-266.
5. Lalonde DH. Wide-awake flexor tendon repair. *Plast Reconstr Surg*. 2009 Feb;123(2):623-625. (Video, Supplemental Digital Content 1, <http://links.lww.com/A657>).

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50. A 2-year-old boy is brought to the office because of an 18-month history of a subcutaneous mass near his left preauricular region. It has not increased in size. Physical examination shows a 2-cm nontender mass located in the area over the parotid gland. There is no facial nerve deficit. MRI confirms a lesion in the left superficial lobe of the parotid gland. Which of the following is the most likely diagnosis?
- A) Adenocystic carcinoma
 - B) Hemangioma
 - C) Mucoepidermoid carcinoma
 - D) Pleomorphic adenoma
 - E) Warthin tumor

The correct response is Option B.

Salivary gland tumors frequently occur within the parotid gland, and the vast majority (75%) of parotid tumors are benign. In older children, however, parotid tumors are much more likely to be malignant (50%). In young children, the most common diagnosis is hemangioma. As in the scenario described, the lesion appears to be benign, and, in this age group, malignancy is rare. In older children, mucoepidermoid carcinoma is most common, as in adults.

Adenocystic carcinoma, or cylindroma, is infrequent in the parotid gland (7%) but quite common in the minor salivary glands (35%). It is a slow-growing mass, often associated with pain and facial palsy. These tumors are aggressive, with one third to one half of affected patients developing metastatic disease.

Adenocarcinomas comprise 10% of malignant parotid gland tumors. These tumors vary according to grade and histologic appearance. They occur most frequently after the fifth decade of life and commonly involve the minor salivary glands. In the parotid gland, they manifest as fixed masses characterized by occasional pain or facial palsy.

Mucoepidermoid carcinoma is the most common malignancy of the parotid gland. It is rarely bilateral. It may be low-grade or high-grade. Low-grade tumors are slow-growing and indolent; high-grade tumors are much more aggressive. The recurrence rate of high-grade tumors is increased, and the facial nerve is frequently affected.

Pleomorphic adenomas, or benign mixed tumors, are the most common salivary gland neoplasms, comprising about 60% of all salivary gland tumors and 80% of benign tumors.

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They occur as painless salivary masses that are firm and well circumscribed. Facial weakness is not found. Bilateral tumors are rare. This tumor is treated by resection, and in rare cases (recurrence), can transform into a malignant mixed tumor.

Warthin tumor is a common neoplasm of the parotid gland, accounting for 10% of all parotid tumors. These tumors are usually painless and tend to grow slowly, oftentimes over a period of several years. They are more common in older men and are frequently bilateral. Warthin tumors are usually treated with superficial parotidectomy with only minimal margins needed. Recurrence is common.

References

1. Ariyan S, Narayan D, Ariyan C. Salivary gland tumors. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2005:74-90.
2. Granick M, Solomon M. Salivary gland tumors. In: Aston SJ, Beasley RW, Thorne CHM, et al, eds. *Grabb and Smith's Plastic Surgery*. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 1997:453-457.
3. Polayes IM. Surgical treatment of disease of the salivary glands. In: McCarthy JG, ed. *Plastic Surgery*. Vol 5. Philadelphia: WB Saunders; 1990:3275.

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Section 2: Hand and Lower Extremity

51. A 24-year-old man comes to the office because of numbness and difficulty moving his ring and little fingers 5 months after cutting his upper arm on broken glass. Current physical examination shows inability to abduct and adduct the ring and little fingers. Sensation to light touch is diminished. Following exploration and resection of a painful, traumatic neuroma, there is a 5-cm gap in the ulnar nerve proximal to the elbow. Which of the following is the most appropriate management to restore intrinsic muscle function?
- A) Cadaveric nerve allografting
 - B) Nerve transfer
 - C) Sural nerve grafting
 - D) Use of nerve conduit
 - E) Vascularized nerve grafting

The correct response is Option B.

The most appropriate management for restoration of intrinsic muscle function is nerve transfer.

In nerve injuries resulting in complete transection of the nerve, wallerian degeneration occurs at the site of transection, and Schwann cells in the distal nerve segment undergo apoptosis. With prolonged denervation, decreased regenerative ability with limitation in motor recovery is noted. Optimal functional recovery is dependent upon adequate reinnervation of the motor end plates and target muscles by regenerating motor axons. Over time, loss of target motor end plates via degeneration and fibrosis and replacement of muscle fibers by fat cells occur.

Nerve regeneration occurs at a rate of approximately 1 mm daily or 1 inch monthly. In a high injury to the ulnar nerve, the distance from the proximal motor axons to the intrinsic musculature precludes timely reinnervation, and intrinsic recovery is generally poor. Reinnervation of the muscle ideally should be completed within 12 to 18 months following injury to allow for recovery.

In the patient who has had the delayed symptoms and high ulnar nerve injury described, the time to recovery of intrinsic function will be greater than 2 years if the injury is reconstructed directly. This estimate is based on the elapsed time and distance to the target muscles.

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Nerve transfer involves the use of a noncritical or expendable donor motor nerve to reinnervate a missing function. The selection of an available motor nerve donor that is closer to the target muscle can decrease the time needed for reinnervation of the muscle and help to ensure recovery before irreversible changes occur. In the scenario described, the distal portion of the anterior interosseous nerve can be used as a donor nerve to reinnervate the ulnar motor branch. Transfer of the distal anterior interosseous nerve to the motor branch of the ulnar nerve will provide motor neurons in a more distal location to reinnervate the intrinsic muscles in the desired time frame.

Nerve grafting is the most appropriate management to bridge a nerve gap when direct repair is not possible. This would be indicated if the circumstances dictated that muscle reinnervation could occur in an adequate or timely fashion, such as in a more recent injury or in a nerve gap that is closer to the target muscles. Nerve grafting may be performed for sensory recovery, but motor reinnervation is unlikely to occur in the scenario described. The sural nerve provides a good source of nerve autograft that is long (up to 40 cm) and of reasonable diameter (2 to 3 mm), with minimal donor site morbidity.

A variety of artificial nerve conduits have been developed to avoid the need to harvest nerve grafts. Nerve conduits of polyglycolic acid and collagen have been developed to bridge nerve gaps; however, recovery is not as effective as compared with autogenous nerve grafts. Typically, conduits are used for sensory nerves in noncritical areas. Gaps of up to 2 to 3 cm can be bridged.

There has been recent interest in processed preserved nerve allografts which are obtained from cadaveric sources. Studies suggest that allograft nerves may regenerate motor neurons better than nerve conduits, but autologous nerve grafting remains the gold standard. Typically, nerve allografts are more useful for short segmental nerve gaps.

A vascularized nerve graft allows transfer of the blood supply along with the nerve. This decreases the need for revascularization from the surrounding tissues and may be useful for grafting long nerve gaps with badly scarred or irradiated beds.

References

1. Birch R. Nerve repair. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:1075-1112.
2. Cederna P, Chung C. Nerve repair and nerve grafting. In: Guyuron B, Eriksson E, Persing JA, eds. *Plastic Surgery: Indications and Practice*. Philadelphia: WB Saunders; 2009:1191-1199.
3. Tung TH, Mackinnon SE. Nerve transfers: indications, techniques, and outcomes. *J Hand Surg Am*. 2010 Feb;35(2):332-341.

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52. A 6-year-old boy is brought to the office by his mother because she is concerned about a deformity of the little finger of his right hand. She says the deformity has been present for approximately 3 years but has become progressively pronounced during the past year. On examination, the patient can flex the proximal interphalangeal joint but cannot extend it beyond the position shown in the x-ray. The little finger of his left hand is similarly affected, but the condition is less severe. Which of the following is the most likely diagnosis?

- A) Camptodactyly
- B) Delta phalanx
- C) Kirner deformity
- D) Symphalangism
- E) Trigger finger

The correct response is Option A.

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Camptodactyly is a congenital abnormality accounting for 5% of congenital hand anomalies. There is a flexion deformity that is often noted within the first year of life, but a second, “noncongenital” group occurs around age 10 years. It generally appears at the proximal interphalangeal (PIP) joint. It may occur as part of a syndrome but is often an individual defect. It is classified by the International Federation as Type II (failure of differentiation). It may be accompanied by subtle radiographic changes seen on the lateral view of the PIP joint with flattening of the circular surface of the proximal phalanx and an indentation in the neck of the proximal phalanx; dorsal positioning of the head of the proximal phalanx into the articulation of the base of the middle phalanx is also present.

A delta phalanx (or bracketed epiphysis) will result in clinodactyly. Clinodactyly is an excessive radial or ulnar angulation of the digit. Involvement of the little finger is common and often inherited as a dominant trait. It may be associated with a delta middle phalanx. If the deformity is severe enough, it may require surgical correction.

Kirner deformity is a progressive palmar and radial curvature of the distal phalanx of the little finger that presents in preadolescence. It is caused by an idiopathic, nontraumatic disruption of the epiphysis of the distal phalanx. It may be caused by cold exposure and frostbite and would affect multiple digits.

Symphalangism describes a congenital clinical stiffness of the PIP joints of the fingers. It is also included in the failure of differentiation classification category. Flexion creases are absent, and the fingers may be longitudinally foreshortened. Multiple digits are affected most commonly.

Trigger digits may occur in children but most commonly affect the thumb with a flexion deformity of the interphalangeal joint. They may occur with a flexion deformity of the PIP joints of the fingers, but the fingers are much less commonly affected than the thumb.

References

1. Upton J. Failure of differentiation and overgrowth. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 8. 2nd ed. Philadelphia: WB Saunders; 2006:265-322.
2. Foucher G, Loréa P, Khouri RK, et al. Camptodactyly as a spectrum of congenital deficiencies: a treatment algorithm based on clinical examination. *Plast Reconstr Surg*. 2006 May;117(6):1897-1905.

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53. A 38-year-old man comes to the office because of central wrist pain 7 months after falling on his outstretched right hand. He did not seek treatment at the time of his original injury. An anteroposterior x-ray study is shown. In a lateral x-ray study view, the scapholunate angle is most likely to be which of the following?
- A) Less than 20 degrees
 - B) 20 to 40 degrees
 - C) 41 to 60 degrees
 - D) Greater than 60 degrees

The correct response is Option D.

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The patient described has scapholunate separation that results not only in widening of the gap between the scaphoid and the lunate, as depicted in the x-ray study shown (Terry-Thomas sign), but also in flexion of the scaphoid. This is seen on the anteroposterior x-ray study as a “ring sign” as a result of the distal pole of the scaphoid moving relatively closer to the proximal scaphoid cortex and being viewed end-on.

Carpal bone malalignment is also determined by angles on lateral x-ray studies. As the scaphoid flexes progressively, the lunate (still tethered to the triquetrum) goes into an extension dorsal intercalated segment instability deformity.

In a patient with rotary subluxation at the scaphoid, the scapholunate angle is expected to be increased on lateral x-ray study. Normal values range from 30 to 60 degrees. Angles greater than 80 degrees are considered a definite indication of scapholunate dissociation.

References

1. Neumeister MW, Deune EG, Mowladi A. Diagnostic imaging of the hand and wrist. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 7. 2nd ed. Philadelphia: WB Saunders; 2006:55-85.
2. Yin Y, Mann FA, Hadge JC, et al. A roentgenographic interpretation of ligamentous instabilities of the wrist. In: Gilula LA, Yin Y, eds. *Imaging of the Wrist and Hand*. Philadelphia: WB Saunders; 1996:203-224.
3. Garcia-Elias M. Carpal instabilities and dislocations. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 4th ed. Philadelphia: Churchill Livingstone; 1999:865-928.

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54. A 65-year-old man is referred for treatment of biopsy-proven subungual verrucous carcinomas of the index and long fingers of the dominant right hand. Physical examination shows deformed, raised nail beds. X-ray study shows no bony involvement of the distal phalanx with tumor. Which of the following is the most appropriate management?
- A) Amputation through the distal interphalangeal joint
 - B) Amputation through the proximal interphalangeal joint
 - C) Mohs micrographic excision with graft coverage
 - D) Ray amputation
 - E) Topical application of 5-fluorouracil

The correct response is Option C.

Verrucous-type squamous cell carcinoma of the fingernails commonly affects the index, long, and ring fingers. Significant studies have shown that the etiology is related to strains of human papillomavirus (HPV).

The presence of HPV in these tumors suggests the possibility of genital-digital spread as a mechanism of tumor genesis. HPV-associated digital squamous cell carcinoma is more likely to recur following surgical treatment than previously reported. This rate of recurrence greatly exceeds that for cutaneous squamous cell carcinomas in general and may be caused by residual postsurgical HPV. Mohs micrographic excision appears to improve tumor-free excision rates compared with standard excision and may preserve more uninvolved tissue. The rate of metastasis in verrucous squamous cell carcinoma, however, appears to be low.

Because there is no evidence of bony involvement, amputation is likely premature. Amputation would be a reasonable alternative in recurrent disease or if positive margins were to continue during Mohs micrographic resection. Topical treatment with 5-fluorouracil (5-FU, Efudex) is not an adequate treatment for this lesion.

References

1. Alam M, Caldwell JB, Eliezri YD. Human papillomavirus-associated digital squamous cell carcinoma: literature review and report of 21 new cases. *J Am Acad Dermatol*. 2003 Mar;48(3):385-393.
2. Bragg JW, Ratner D. Human papillomavirus type 2 in a squamous cell carcinoma of the finger. *Dermatol Surg*. 2003 Jul;29(7):766-768.

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3. Moy RL, Eliezri YD, Nuovo GJ, et al. Human papillomavirus type 16 DNA in periungual squamous cell carcinomas. *JAMA*. 1989 May 12;261(18):2669-2673.

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55. A 22-year-old man comes to the emergency department 30 minutes after he sustained an amputation injury to the tip of the little finger of the left hand while using a circular saw. The patient was unable to locate the amputated part. Physical examination shows amputation of the tip of the finger at a level distal to the insertion of the profundus. The distal phalanx is exposed and protruding. Which of the following surgical interventions is most appropriate to preserve the grip strength of the hand?
- A) Excision of the profundus tendon
 - B) Healing by secondary intention
 - C) Local flap coverage
 - D) Revision to the middle phalanx head
 - E) Suturing of the profundus tendon to the extensor tendon

The correct response is Option C.

Local flap coverage is indicated when there is exposed bone or tendon. The flexor profundus tendon attaches to the base of the distal phalanx. Loss of the profundus tendon results in a significant loss of grip strength. Therefore, the profundus should be preserved if possible. Wounds on the fingertip that are smaller than 1 cm are allowed to heal by secondary intention, which provides better return of sensation and an even smaller scarred area. Larger areas, particularly those with an exposed distal phalanx, require coverage. Skin grafting may be indicated for large wounds that are not expected to heal in a reasonable amount of time. The profundus tendon should not be sutured to the extensor tendon, because this could result in a quadriga effect and a loss of grip strength.

References

1. Louis DS, Jebson PJJ, Graham TJ. Amputations. In: Green DP, Hotchkiss RN, Pederson WC, eds. *Green's Operative Hand Surgery*. 4th ed. Philadelphia: Churchill Livingstone; 1999:49.
2. Lille S, Mowlavi A, Russell RC. Management of fingertip injuries. In: Russell RC, ed. *Plastic Surgery*. St. Louis: Mosby; 2000:1775.

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(Please note that this pictorial appears in color in the online examination)

56. A 2-year-old boy with VATER syndrome is brought to the office for evaluation because his parents are concerned that the thumb of the right hand appears small and weak. Physical examination shows weakness of intrinsic function of the right thumb. The flexor pollicis longus flexion crease is absent and the thenar eminence is flat. The left hand, including the thumb, appears normal. The patient uses a pincer-type motion between the right index and long fingers to pick up small objects. The ulnar collateral ligament at the metacarpophalangeal joint of the right thumb is lax. There is no gross dislocation at the carpometacarpal joint of the right thumb, but 6 mm of passive dorsoradial mobility is noted. An x-ray study and photograph are shown. Which of the following is the most appropriate management?
- A) Amputation of the thumb and pollicization of the index finger
 - B) Flexor digitorum sublimis opponensplasty and ulnar collateral ligament stabilization
 - C) Huber transfer and ulnar collateral ligament stabilization
 - D) Tendon graft reconstruction of the flexor pollicis longus and ligament stabilization
 - E) Observation and occupational therapy until the child is age 4 to 5 years, followed by reassessment of function

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The correct response is Option A.

The child described has a classic Blauth Type IIIB hypoplastic thumb. Although the carpometacarpal (CMC) joint does not dislocate, the subluxation described is consistent with the instability noted in Blauth Type IIIB thumbs. The photograph shows a thumb with a broad base, which is distracting to the examinee who is not familiar with this disorder. However, the thumb described has significant hypoplasia and pollex abductus. The x-ray study shows the classic finding of a narrowed and underdeveloped metacarpal base, the hallmark of CMC instability. X-ray study is essentially diagnostic of the Blauth Type IIIB thumb. The most accepted treatment for this type of thumb is ablation/amputation of the existing thumb and replacement with the index finger in the thumb position (pollicization).

In the scenario described, the patient has no significant cortical representation or intentional control of the right thumb. The child picks up objects between the index and long finger, ignoring the thumb. No matter what maneuvers are undertaken to power and stabilize the existing thumb with tendon transfers, the child will still have little to no natural predilection to actually use the thumb. Although opponensplasty and ulnar collateral ligament stabilization are common solutions for Types II and IIIA thumbs, they would not be appropriate. These treatments are often combined with first web space deepening.

Treatment is recommended earlier than age 4 or 5 years to avoid resistance to the thumb ablation and pollicization, which can occur with time on the part of the parents and the child. The younger child will accommodate the pollicized digit better. Treatment of the hypoplastic thumb should be decisive and performed at the appropriate age, if possible.

Flexor pollicis longus reconstruction with a tendon graft will not improve thumb function in the scenario described. This type of surgery is not a standard therapy for hypoplastic thumbs in general. Ulnar collateral ligament stabilization is not recommended because the thumb requires pollicization.

References

1. Schecker LR, Cendales LC. Correcting congenital thumb anomalies in children: opponensplasty and pollicization. In: Gupta A, Kay SPJ, Schecker LR, eds. *The Growing Hand: Diagnosis and Management of the Upper Extremity in Children*. Philadelphia: Mosby; 2000:171-182.
2. Hostin R, James MA. Reconstruction of the hypoplastic thumb. *J Hand Surg Am*. 2004 Nov;4(4):275-290.

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57. An otherwise healthy 40-year-old woman comes to the office because of an 8-month history of pain and discomfort in the ring finger of the nondominant left hand. She describes the pain as sharp and localized to the volar aspect of the distal finger. It occurs at various times during the day, including at her desk at work, and sometimes awakens her from sleep. It resolves within a few minutes regardless of position or maneuver. Physical examination shows point tenderness of the pulp of the digit. Motor and sensory examinations and an x-ray study suggest no abnormalities. Which of the following is the most appropriate next step to establish a diagnosis?

- A) Allen test
- B) Ice bath immersion
- C) Nerve conduction studies
- D) Tinel test

The correct response is Option B.

The patient described shows classic symptoms of a glomus tumor of the ring finger. Provocative tests such as cold stimulation or spraying the lesion with ethyl chloride will provoke symptoms. If this type of examination were to be negative, other tests would be recommended. However, a cold provocation test is a logical next step in the scenario described.

Glomus tumors, painful benign lesions that arise from the arteriovenous thermoregulatory glomus body, occur in the fingertip 65% of the time. Classically, they are solitary lesions from within the nail bed (50%). They also occur commonly within the soft tissues of the fingertip and present with no visible or palpable mass or discoloration, as in the scenario described. The pain tends to worsen progressively.

Nerve conduction studies are useful when the practitioner suspects either peripheral nerve compression or other peripheral nerve injury. The vignette specifically states that position is not a factor in pain relief, which would be a sign that the pain could be related to nerve compression. Also, the vignette states that motor and sensory exams of the hand are normal. Nothing above is significantly suggestive of nerve compression, and therefore nerve conduction studies is not the best answer.

The digital Allen test is appropriate when finger pain is thought to be caused by ischemia from embolic disease, thrombotic disease, vasospasm, or trauma. Nothing in the scenario described suggests these conditions.

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Tinel and Phalen tests are effective provocative tests for compression neuropathies, particularly carpal tunnel. These tests are appropriate to perform in any hand examination, especially when compression neuropathy is suspected. However, this is not the best choice in the scenario described because the vignette does not suggest compression neuropathy. Negative Tinel and Phalen tests could be useful to establish a diagnosis, but only as a negative.

References

1. Koman LA, Ruch DS, Smith BP, et al. Vascular disorders. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:414-415, 2312.
2. Tomak Y, Akcay I, Dabak N, et al. Subungual glomus tumours of the hand: diagnosis and treatment of 14 cases. *Scand J Plast Reconstr Surg Hand Surg*. 2003;37(2):121-124.

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58. A 67-year-old woman comes to the office for follow-up examination 6 months after debridement of a chronic nondiabetic wound to the lower leg. Following the procedure, the patient was treated with moist dressings. Physical examination shows that the wound is healing less than 15% weekly. Persistent bacteria are suspected. Application of which of the following is the most appropriate nonsurgical management at this time?

- A) Alginate dressings
- B) Collagenase
- C) Film or transparent dressings
- D) Hydrogel dressings
- E) Silver ion-impregnated dressings

The correct response is Option E.

Silver ions kill a broad spectrum of bacteria. No resistant organisms have been identified, and it is nontoxic to human cells. Alginates absorb up to 20 times their weight and are used to exudate wounds. Films and transparent dressings are waterproof and would be impermeable to bacterial contamination. Hydrogels are generally waterproof and would prevent bacterial contamination.

References

1. Mustoe TA, O'Shaughnessy K, Kloeters O. Chronic wound pathogenesis and current treatment strategies: a unifying hypothesis. *Plast Reconstr Surg*. 2006 Jun;117(7 Suppl):35S-41S.
2. Attinger CE, Janis JE, Steinberg J, et al. Clinical approach to wounds: débridement and wound bed preparation including the use of dressings and wound-healing adjuvants. *Plast Reconstr Surg*. 2006 Jun;117(7 Suppl):72S-109S.
3. Argenta LC, Morykwas MJ, Marks MW, et al. Vacuum-assisted closure: state of clinic art. *Plast Reconstr Surg*. 2006 Jun;117(7 Suppl):127S-142S.

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59. A 21-year-old cargo handler is brought to the emergency department after sustaining a crush-avulsion injury to the thumb of his dominant right hand while moving large boxes. Physical examination shows a 2.5 × 3-cm full-thickness defect on the volar aspect of the thumb distal to the interphalangeal joint. No tendon or bone is exposed. Which of the following is the most appropriate management for this patient?
- A) Cross-finger flap
 - B) Free toe-pulp transfer
 - C) Neurovascular island flap from ring finger
 - D) Palmar advancement flap
 - E) Secondary healing

Please note: Upon further review, this item was not scored as part of the examination.

The correct response is Option A.

The ideal reconstruction of soft-tissue defects of the thumb is to “replace like with like.” The two major goals are restoring sensation and opposition. Sensation includes freedom from pain and adequate sensibility for the thumb to protect itself from the external environment. Opposition includes maintaining adequate length, stability, strength, and mobility to be of functional use.

In the scenario described, the patient has acceptable length with poor soft-tissue coverage. The defect is too large to be suitable for healing by secondary intention. This method provides acceptable results for defects less than 1 cm in diameter. The palmar advancement flap, or Moberg flap, is a good reconstructive option for defects up to 2 cm. The addition of a proximal releasing incision provides another 0.5 cm in advancement. Attempting to apply this reconstruction to bigger defects risks distal necrosis and flexion joint contraction at the interphalangeal joint of the thumb. For intermediate-sized defects such as this, the cross-finger flap from the index or long finger is a safe, reliable flap with excellent durability. There are several modifications of this flap, most notably the innervated cross-finger flap, which includes a branch of the dorsal sensory radial nerve and a dorsal branch of the palmar radial digital nerve. However, in young patients, protective sensation and two-point discrimination following standard reconstruction with cross-finger flaps return predictably to satisfactory levels. The heterodigital neurovascular island pedicle flap requires sacrifice of palmar sensation along the ulnar aspect of another digit and should not be first-line surgical treatment. Free tissue transfer is not indicated for the defect described because it exposes the patient to unwarranted morbidity.

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References

1. Woon CY, Lee JY, Teoh LC. Resurfacing hemipulp losses of the thumb: the cross finger flap revisited: indications, technical refinements, outcomes, and long-term neurosensory recovery. *Ann Plast Surg.* 2008 Oct;61(4):385-391.
2. Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery.* 5th ed. Philadelphia: Churchill Livingstone; 2005:1865-1911.

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60. A 67-year-old man comes to the office because of an open wound of the right groin and exposed distal anastomosis of a vascular graft 3 weeks after aortofemoral bypass grafting. Reconstruction with a sartorius muscle flap is planned to cover the graft. The blood supply of the sartorius muscle flap originates directly from which of the following arteries?

- A) Deep circumflex iliac
- B) Lateral circumflex femoral
- C) Medial circumflex femoral
- D) Profunda femoris
- E) Superficial femoral

The correct response is Option E.

The sartorius muscle has a Type IV vascularization pattern consisting of 8 to 10 pedicles from the superficial femoral vessel, which enter the muscle medially. The other arteries do not contribute to the blood supply of the sartorius muscle.

References

1. Hill HL, Hester TR, Nahai F. Groin and perineum. In: Mathes SJ, Nahai F, eds. *Clinical Applications for Muscle and Musculocutaneous Flaps*. St. Louis: Mosby; 1982:402-422.
2. Nahai F, Love TR. Lower extremity reconstruction: management of soft tissue defects. In: Cohen M, ed. *Mastery of Plastic and Reconstructive Surgery*. Lippincott Williams & Wilkins; 1994:1773-1799.

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61. A 22-year-old man comes to the emergency department after falling onto his outstretched left hand. An x-ray study and a clinical photograph are shown. Attempted reduction is unsuccessful. Reduction is most likely blocked by which of the following anatomical structures?
- A) Central slip
 - B) Dorsal capsule and collateral ligaments
 - C) Flexor tendons and intrinsic muscles
 - D) Lateral bands
 - E) Sagittal bands

The correct response is Option C.

Dorsal metacarpophalangeal joint (MCP) dislocations are relatively uncommon. They occur with forced hyperextension injuries. The digit involved most commonly is the index finger, followed by the little finger.

With complete dislocation, the volar plate ruptures in the membranous proximal portion and becomes interposed in the joint. If this were the only structure blocking reduction, traction on the joint would be sufficient to draw the proximal edge of the volar plate over the metacarpophalangeal head. This is not possible in an irreducible MCP dislocation because additional taut medial and lateral structures are drawn around the narrow metacarpophalangeal neck. At the index finger, the structures include the lumbrical on the radial side and the flexor tendons on the ulnar side. At the little finger, the structures are the common tendon of the abductor digiti minimi and flexor digiti minimi on the ulnar side and the lumbrical and flexor

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tendons on the radial side. Central slip remains dorsal at the proximal interphalangeal joint and is not associated with the metacarpophalangeal joint. The other structures at the MCP joint would not result in a noose around the metacarpal neck and block reduction.

References

1. Blazar P. Fingers, instabilities, and ligamentous injuries. In: Guyuron B, Eriksson E, Persing JA. *Plastic Surgery: Indications and Practice*. China: Saunders/Elsevier; 2009:1033-1043.
2. Araki S, Uchiyama M, Nishimura T, et al. Irreducible open dislocation of the metacarpophalangeal joint of the small finger. *J Hand Surg Am*. 1992 Nov;17(6):1146-1147.



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62. A 70-year-old man undergoes open reduction and internal fixation of an open fracture of the ankle. Debridement of nonviable tissue results in the exposure of the joint and hardware. Coverage with a reverse sural artery flap is planned. A photograph is shown. Which of the following is the most likely adverse outcome associated with the use of this flap?
- A) Infection
 - B) Insufficient bulk
 - C) Insufficient flap coverage
 - D) Partial flap loss
 - E) Wound dehiscence

The correct response is Option D.

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The utility of the flap has been proven in both healthy and compromised wounds; neither peripheral arterial disease nor diabetes has precluded its success. Of the possible complications, partial flap loss has occurred most commonly. As a result, numerous modifications to the flap have been proposed. These include maintaining a narrow (2 cm wide) pedicle, including a cutaneous “tail” along the length of the pedicle and maintaining a mesentery between the sural nerve and the deep fascia.

Infection rates have been low, ranging from 0 to 2.5%. The fasciocutaneous variety of the reverse sural flap is often malleable enough to conform to most defects. When a deeper defect exists, a fasciomusculocutaneous variation of the flap has been designed to carry a portion of the gastrocnemius muscle via one of the larger proximal perforators typically found deep to the cutaneous paddle in the proximal leg.

Cutaneous paddles have been harvested with dimensions of up to 12 × 15 cm, allowing coverage of most ankle and heel wounds.

Reconstruction of larger donor defects with split-thickness skin grafts makes dehiscence unlikely.

References

1. Afifi AM, Mahboub TA, Losee JE, et al. The reverse sural flap: modifications to improve efficacy in foot and ankle reconstruction. *Ann Plast Surg.* 2008 Oct;61(4):430-436.
2. Akhtar S, Hameed A. Versatility of the sural fasciocutaneous flap in the coverage of lower third leg and hind foot defects. *J Plast Reconstr Aesthet Surg.* 2006;59(8):839-845. Epub 2006 Mar 9.
3. Chang SM, Zhang F, Xu DC, et al. Lateral retromalleolar perforator-based flap: anatomical study and preliminary clinical report for heel coverage. *Plast Reconstr Surg.* 2007 Sep;120(3):697-704.

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63. A 53-year-old tire mechanic comes to the office because of a 6-month history of a painful mass on the ulnar side of the palm, cold intolerance in the ring and little fingers, and numbness of the little finger of the right hand. Physical examination shows an ulcer on the tip of the little finger. Range of motion of the fingers is full. Doppler signals in the superficial palmar arch disappear with radial artery occlusion. Which of the following is the most likely diagnosis?

- A) Fracture of the hook of the hamate
- B) Ganglion cyst of the Guyon canal
- C) Hypothenar hammer syndrome
- D) Persistent median artery
- E) Systemic sclerosis (scleroderma)

The correct response is Option C.

Hypothenar hammer syndrome occurs following repetitive blunt trauma to the hypothenar eminence. It is associated with cold intolerance, pain near the distal aspect of the Guyon canal, ulnar sensory dysfunction, and sometimes a mass near the hypothenar eminence. In severe cases, ulceration can occur in the ring and little fingers. The underlying pathology is thrombosis of the ulnar artery at the level of the Guyon canal.

Surgical treatment of hypothenar hammer syndrome consists of excision of the thrombosed arterial segment, usually followed by vascular reconstruction with primary repair or construction of a vein graft.

Fracture of the hook of the hamate, or hamulus, is seen more often in athletes who use rackets (ie, golfers, hockey players) or have direct trauma to the palm (ie, baseball catchers). An injury with acute pain is often noted, and tendon rupture may follow months later. Masses and fingertip ulceration are not seen with this condition. Treatment consists of excision of the fracture fragment.

Ganglion cysts of the Guyon canal usually present with motor dysfunction, sensory dysfunction, or both. Cold intolerance, fingertip ulceration, and a mass are not usually found.

Persistent median artery may present as a cause of carpal tunnel syndrome but would not cause a mass or ulceration.

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Systemic sclerosis is a relatively rare connective tissue disorder. Its hallmark is calcium deposits within the skin and progressive skin tightening. While skin ulcerations are found in systemic sclerosis, masses in the ulnar palm are not.

References

1. Lifchez SD, Higgins JP. Long-term results of surgical treatment for hypothenar hammer syndrome. *Plast Reconstr Surg*. 2009 Jul;124(1):210-216.
2. Sweet S, Weiss LE. Ulnar nerve compression at the wrist. In: Berger RA, Weiss A-P C, eds. *Hand Surgery*. Vol 1. Philadelphia: Lippincott Williams & Wilkins; 2004:909-915.

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64. A 33-year-old woman is brought to the emergency department after sustaining a 6 × 8-cm soft-tissue defect over the tibial tuberosity after being hit by a motor vehicle while riding her bicycle. Physical examination shows exposed bone at the proximal third of the leg. Which of the following muscle flaps is most appropriate for this patient?
- A) Lateral gastrocnemius
 - B) Lateral soleus
 - C) Medial gastrocnemius
 - D) Medial soleus
 - E) Sartorius

The correct response is Option C.

The gastrocnemius is a powerful muscle in the superficial posterior compartment of the leg that acts to plantar flex the foot at the ankle joint and flex the leg at the knee joint. It is involved in standing, walking, running, and jumping.

The lateral head originates from the lateral condyle of the femur, while the medial head originates from the medial condyle of the femur. Its other end forms a common tendon with the soleus muscle; this tendon is known as the calcaneal tendon or “Achilles tendon” and inserts onto the posterior surface of the calcaneus.

The medial head is longer, and its muscular fibers extend more inferiorly. The gastrocnemius can be harvested as a muscular or musculocutaneous flap if the soleus is intact and plantar flexion of the foot will be preserved. Medial and lateral heads may be used independently based on the tissue defect present. Footdrop is possible with the use of the lateral muscle belly.

The soleus is the other powerful muscle of the superficial posterior compartment of the leg. With the gastrocnemius, it acts to plantar flex the foot at the ankle joint. Specifically, the soleus plays an important role in standing; if not for its constant pull, the body would fall forward. The muscle originates from the posterior surfaces of the head of the fibula and its upper quarter, as well as the middle third of the medial border of the tibia. Its other end forms a common calcaneal tendon with the gastrocnemius muscle.

The soleus muscle, when freed from its insertion on the Achilles tendon and based proximally, covers defects in the middle third of the tibia. It may also be used as a hemisoleus to cover distal third tibia defects as well.

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The sartorius flap may be raised as a muscle or myocutaneous flap based on segmental branches of the superficial femoral artery and vein. Because it has a Type IV segmental blood supply, the arc of rotation both superiorly and inferiorly is limited. Its best indication is for coverage of the femoral vessels.

References

1. Spina AA. The plantaris muscle: anatomy, injury, imaging, and treatment. *J Can Chiropr Assoc.* 2007;51(3):158-165.
2. Mathes SJ, Nahai F, eds. *Reconstructive Surgery: Principles, Anatomy and Technique.* Philadelphia: Churchill Livingstone; 1997:1391-1418.
3. Pu LL. Medial hemisoleus muscle flap: a reliable flap for soft tissue reconstruction of the middle-third tibial wound. *Int Surg.* 2006 Jul-Aug;91(4):194-200.
4. Pu LL. Further experience with the medial hemisoleus muscle flap for soft-tissue coverage of a tibial wound in the distal third of the leg. *Plast Reconstr Surg.* 2008 Jun;121(6):2024-2028.

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65. A 13-year-old boy is brought to the office because he has difficulty opening his hand and extending his fingers. History includes release of the forearm compartments to treat a pulseless hand following a supracondylar humerus fracture 2 years ago. On physical examination, passive extension of the fingers is restricted when the wrist is fully extended; it improves with full wrist flexion. Which of the following muscles is the most likely cause of the limitation described?
- A) Flexor carpi radialis
 - B) Flexor carpi ulnaris
 - C) Flexor digitorum profundus
 - D) Flexor digitorum superficialis
 - E) Lumbricals

The correct response is Option C.

The most likely cause of the restricted finger extension described is fibrosis of the flexor digitorum profundus muscle. The patient exhibits Volkmann ischemic contracture as a complication of late treatment (over 24 hours from the time of initial ischemia) of arterial compromise associated with the fracture. The muscle groups at the greatest risk during these ischemic episodes are within the deep flexor compartment of the forearm. This risk occurs because the arterial supply is relatively distant from the usual site of occlusion and because this compartment is relatively less distensible. In the scenario described, the flexor digitorum profundus and flexor pollicis longus are at the greatest risk.

Superficial muscle groups such as the flexor carpi radialis, flexor carpi ulnaris, and the flexor digitorum superficialis typically recover some function and do not lead to contractures in the forearm. Likewise, the small muscles of the hand, such as the lumbricals, tend to be less severely injured than the deep compartment of the forearm.

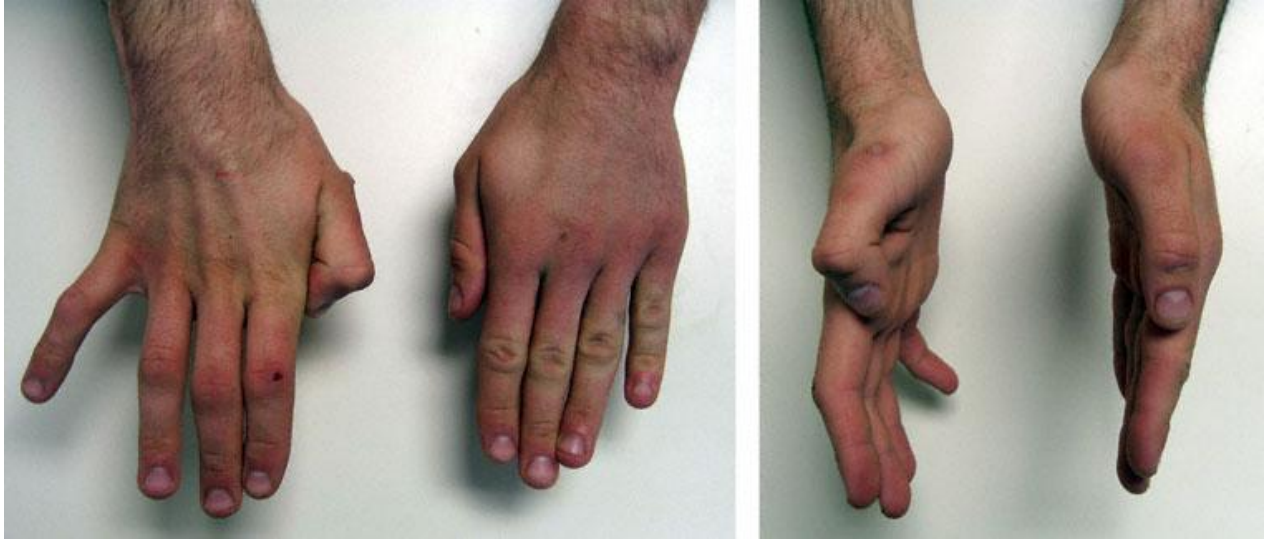
References

1. Blakey CM, Biant LC, Birch R. Ischaemia and the pink, pulseless hand complicating supracondylar fractures of the humerus in childhood: long-term follow-up. *J Bone Joint Surg Br.* 2009 Nov;91(11):1487-1492.
2. Ultee J, Hovius SE. Functional results after treatment of Volkmann's ischemic contracture: a long-term followup study. *Clin Orthop Relat Res.* 2005 Feb;(431):42-49.

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3. Gülgönen A. Invited review article: surgery for Volkmann's ischaemic contracture.
J Hand Surg Br. 2001 Aug;26(4):283-296.

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66. A 24-year-old man comes to the office because he says the ring and little fingers of his right hand “catch” when he puts his hand in his pocket and that he “pokes” himself in the eye when washing his face. History includes repair of a complete transection of the right ulnar nerve at the wrist 1 year ago. On physical examination, he is unable to extend the interphalangeal joints of the ring and little fingers when the metacarpophalangeal joints are flexed. Photographs are shown. Which of the following tendon transfers is the most appropriate management?

- A) Extensor indicis proprius (EIP) to adductor
- B) EIP to extensor digiti minimi
- C) EIP to first dorsal interosseous
- D) Flexor digitorum superficialis (FDS) of the little finger to A2 pulley
- E) FDS of the little finger to lateral band

The correct response is Option E.

Of the tendon transfer choices offered, only the FDS transfer to the lateral band (of both the ring and little fingers) will correct the loss of interphalangeal joint extension described, thereby diminishing the tendency for the flexed/abducted finger to catch on pocket edges.

The clinical scenario and photographs demonstrate failure of the intrinsic muscle function to return following a low ulnar nerve repair. The deformities demonstrated include ulnar clawing of

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the little finger primarily, abduction of the little finger (Wartenberg sign), hyperflexion of the interphalangeal joint of the thumb, and atrophy of the intrinsics (especially notable in the hypothenar eminence on the lateral view). Of these deformities, the patient is bothered primarily by the little finger deformity.

Correction of clawing can be achieved actively or passively. Patients who can extend the interphalangeal joints while hyperextension of the metacarpophalangeal joints is blocked (Bouvier test) can achieve correction of clawing with active or passive transfers. Active transfers attempt to re-create the normal function of the intrinsics by directing pull through the lateral bands. Passive transfers re-create the intrinsic function of metacarpophalangeal joint flexion (similar to externally blocking hyperextension) but do not extend the interphalangeal joints.

EIP transfers are useful for correction of the lateral pinch functions of the intrinsic minus hand. An EIP transfer to the adductor tendon re-creates the thumb component of lateral pinch, while the EIP transfer to the first dorsal interosseous tendon would improve the index function in pinch.

EIP transfer to the extensor digiti minimi is one method used to reduce hyperabduction of the little finger. This would not correct the flexion deformity at the level of the proximal interphalangeal joint.

FDS transfer to the A2 pulley provides a passive transfer, which, based on the patient's inability to extend the interphalangeal joints during the Bouvier test, would not correct the deformity.

References

1. Sammer DM, Chung KC. Tendon transfers: Part II. Transfers for ulnar nerve palsy and median nerve palsy. *Plast Reconstr Surg*. 2009 Sep;124(3):212e-221e.
2. Chung MS, Baek GH, Oh JH, et al. Extensor indicis proprius transfer for the abducted small finger. *J Hand Surg Am*. 2008 Mar;33(3):392-397.

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67. A 55-year-old woman comes to the office with progressive swelling around the wrist. Tendon rupture is suspected. Which of the following tendons is most likely to rupture in a patient with rheumatoid arthritis?

- A) Extensor digitorum communis
- B) Extensor digitorum manus
- C) Extensor pollicis longus
- D) Flexor digitorum profundus
- E) Flexor pollicis longus

The correct response is Option A.

Tendon rupture in patients with rheumatoid arthritis is caused by either constant wear over a bony prominence leading to attrition, direct invasion of the tendon, or synovitis and ischemic necrosis of the tendon secondary to proliferative synovitis. When tendon rupture occurs, it is usually painless and results only after trivial use of the tendon. In some patients, the functional deficit is not noticeable immediately, leading to a delay in diagnosis.

The tendons involved most commonly are the extensor tendons on the ulnar aspect of the hand. Once the ulnar extensors rupture, the progression will advance radially to the remaining extensors. Other complications of rheumatoid arthritis can be confused with extensor tendon rupture and should be ruled out. These include metacarpophalangeal joint dislocation, extensor tendon displacement between the metacarpal heads, and paralysis of the common extensor muscle.

Extensor pollicis longus rupture is the second most common rupture found in rheumatoid disease of the hand, and it is diagnosed by an inability to extend the interphalangeal joint of the thumb. The flexor pollicis longus will rupture more commonly than any of the other flexor tendons of the remaining fingers. Differential diagnosis includes the presence of rheumatoid nodules in the tendon preventing movement of the tendon through the finger. Treatment of tendon ruptures involves tendon grafts and transfers, as well as removal of bony prominences when appropriate.

References

1. Chung KC. Rheumatoid arthritis. In: Guyuron B, Eriksson E, Persing JA, eds. *Plastic Surgery: Indications and Practice*. Philadelphia: WB Saunders; 2009:1271-1272.
2. Feldon P, Terrono AL, Nalebuff EA, et al. Rheumatoid arthritis and other connective tissue disease. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Elsevier Churchill Livingstone; 2005:80.

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68. A 28-year-old man comes to the office 8 weeks after sustaining an amputation of the tip of the index finger that healed by secondary intention and has resulted in a hook nail deformity. Physical examination shows the residual nail growing over the residual tip of the finger. Which of the following is the most likely cause of this patient's current condition?
- A) Dorsal-sided tissue loss with loss of eponychial fold
 - B) Dorsal-sided tissue loss with loss of germinal matrix
 - C) Lateral-sided soft-tissue loss with ingrown nail fold
 - D) Volar-sided tissue loss with the nail bed folding over the residual tip
 - E) Volar-sided tissue loss with nail bed overgrowth by eponychial fold

The correct response is Option D.

The nail is supported by the dorsal tuft of the terminal phalanx. Following distal fingertip trauma, varying amounts of nail support may be lost, resulting in the nail curving palmarwards. This curvature is dependent on the degree of bony loss, the amount of remaining nail bed, and the degree of scar contracture at the hyponychial-pulp interface. The "parrot beak," or hook nail, deformity is caused most commonly by tight closure of a fingertip amputation and excessive palmar tension at the hyponychial-pulp suture line.

The hook nail deformity is a relatively common complication following fingertip amputation. It can be corrected or prevented with a carefully performed surgical procedure. The nail plate is removed. The redundant nail bed that is folded over the tip of the terminal phalanx is carefully removed with an additional 2 mm that is supported by the terminal phalanx, which ensures that wound healing will not draw the nail bed over the tip of the phalanx again. The fingertip is then resurfaced by a V-Y advancement flap, with precautions taken to avoid all tension in the flap.

References

1. Kumar VP, Satku K. Treatment and prevention of "hook nail" deformity with anatomic correlation. *J Hand Surg Am.* 1993 Jul;18(4):617-620.
2. Dumontier C, Gilbert A, Tubiana R. Hook-nail deformity. Surgical treatment with a homodigital advancement flap. *J Hand Surg Br.* 1995 Dec;20(6):830-835.
3. Strick MJ, Bremner-Smith AT, Tonkin MA. Antenna procedure for the correction of hook nail deformity. *J Hand Surg Br.* 2004 Feb;29(1):3-7.

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69. A 25-year-old right-hand dominant man is brought to the emergency department after sustaining a stab wound to the right arm in a bar fight. Physical examination shows a 2 × 1-cm laceration over the antecubital fossa. He is unable to flex the interphalangeal joint of the thumb and the proximal interphalangeal joint of the index finger. Which of the following nerves is most likely injured?
- A) Lateral antebrachial cutaneous
 - B) Median
 - C) Musculocutaneous
 - D) Radial
 - E) Ulnar

The correct response is Option B.

Median nerve palsy is marked by the inability to oppose the thumb or flex the thumb at the interphalangeal joint. The inability to flex the index finger at the proximal interphalangeal joint is also noted. The lateral antebrachial cutaneous nerve provides sensory innervation to the lateral aspect of the arm. The median antebrachial cutaneous nerve innervates the skin of the anterior and middle surfaces of the forearm to the level of the wrist. This nerve does not innervate any muscles. Radial nerve palsy is marked by the inability to extend the fingers, thumb, and wrist. Patients with radial nerve palsies have difficulty grasping objects. The results of tendon transfers to restore function in patients with radial nerve palsies are among the best and most predictable outcomes. Ulnar nerve palsy symptoms include a “claw” deformity, with flexion deformities of the ring and little fingers. In later stages, profound muscle wasting of the both hypothenar eminence and the first web space is seen.

References

1. Davis TRC. Median nerve palsy. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:1131-1159.
2. Sammer DM, Chung KC. Tendon transfers: Part II. Transfers for ulnar nerve palsy and median nerve palsy. *Plast Reconstr Surg*. 2009 Sep;124(3):212e-221e.

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70. A 62-year-old woman is undergoing excision of a ganglion on the dorsal wrist with lidocaine Bier block. During the procedure, she says she feels pain, becomes restless progressively, develops a metallic taste in the mouth, and has ringing in the ears. Which of the following is the most appropriate management?
- A) Administer diphenhydramine intravenously and continue with the procedure
 - B) Decrease the tourniquet pressure by 50 mmHg to ease the tourniquet pain
 - C) Deflate the tourniquet completely, wait a few minutes to reperfuse the arm, then exsanguinate and reinflate the tourniquet
 - D) Inject bupivacaine (Marcaine) locally to help with the pain and continue with the procedure
 - E) Maintain an airway and administer oxygen

The correct response is Option E.

The clinical scenario describes tourniquet cuff leak leading to lidocaine toxicity. Factors that predispose to cuff leak during Bier block anesthesia include obesity (funnel-shaped arms) and hypertension. Initial signs of lidocaine toxicity include anxiety, tinnitus, and perioral numbness; muscular twitching, seizures, and respiratory or circulatory arrest may develop later. Critical initial management includes maintenance of the airway, oxygen ventilation, and intravenous fluid administration.

Administering diphenhydramine intravenously and continuing with the procedure is inappropriate. Diphenhydramine should not be administered because the patient's symptoms are not consistent with an allergic reaction.

Deflating the tourniquet completely, waiting a few minutes to reperfuse the arm, then exsanguinating and reinflating the tourniquet, and deflating the tourniquet by 50 mmHg to ease the tourniquet pain, are both inappropriate. Deflating the tourniquet will worsen the patient's condition by increasing the serum concentration of lidocaine.

Administering bupivacaine (Marcaine) locally to manage the pain and continuing with the procedure is inappropriate because the underlying problem is not incisional pain. Continuing with the procedure without addressing the patient's distress may lead to the development of more serious complications.

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References

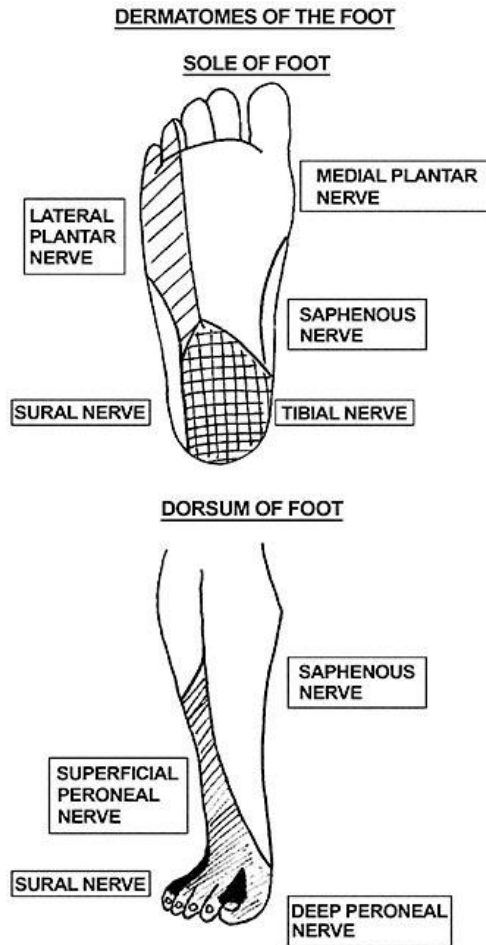
1. Frank R, Cowan BJ, Lang S, et al. Modification of the forearm tourniquet techniques of intravenous regional anaesthesia for operations on the distal forearm and hand. *Scand J Plast Reconstr Surg Hand Surg*. 2009;43(2):102-108.
2. Bou-Merhi JS, Gagnon AR, St. Laurent JY, et al. Intravenous regional anesthesia administered by the operating plastic surgeon: is It safe and efficient? Experience of a medical center. *Plast Reconstr Surg*. 2007;120:1591.

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71. A 40-year-old woman is referred by her orthopedic surgeon for reconstruction because of an exquisitely tender scar over the site of the anterolateral portal for arthroscopy of the left ankle. Examination shows a 1-cm scar over the lateral malleolus. Tinel sign is present over the scar. Sensation is diminished over the middle part of the dorsum of the foot. Which of the following nerves is most likely to have been injured during the arthroscopy?
- A) Lateral malleolar
 - B) Medial plantar
 - C) Saphenous
 - D) Superficial peroneal
 - E) Sural

The correct response is Option D.

In the patient described, the dermatomal distribution of numbness of the middle of the dorsum of the foot suggests injury of the superficial peroneal nerve (SPN). The SPN supplies the sensation to the middle portion of the dorsum of the foot, except for the skin in the great toe web space (which is innervated by the deep peroneal nerve). The lateral malleolar nerve is a terminal branch nerve supplying the skin of the lateral malleolus. The medial plantar nerve supplies the medial three fourths of the plantar surface of the foot. The saphenous nerve travels to the dorsum of the foot, medial malleolus, and the area of the head of the first metatarsal. At the level of the ankle, the saphenous nerve is found between the medial malleolus and the anterior tibial tendon, just lateral to the saphenous vein. The sural nerve is located at an average of 7 mm posterior to the lateral malleolus and supplies sensation to the lateral aspect of the foot. A diagram is shown.



According to one study, in ankle arthroscopy the risk of SPN injury is maximal in the 0 to 3 mm lateral to the peroneus tertius tendon. To avoid injury to the SPN, the safest placement of the anterolateral portal is 4 mm lateral to the peroneus tertius tendon.

In another study, in 82% of specimens, the SPN ran between the lateral border of the talocrural joint and the peroneus tertius tendon at the talocrural joint level, where the anterolateral portal was placed. Therefore, the SPN was at high risk for injury with anterolateral portal placement.

References

1. Ogut T, Akgun I, Kesmezacar H, et al. Navigation for ankle arthroscopy: anatomical study of the anterolateral portal with reference to the superficial peroneal nerve. *Surg Radiol Anat.* 2004 Aug;26(4):268-274.

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2. Saito A, Kikuchi S. Anatomic relations between ankle arthroscopic portal sites and the superficial peroneal and saphenous nerves. *Foot Ankle Int.* 1998 Nov;19(11):748-752.

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(Please note that this pictorial appears in color in the online examination)

72. A 67-year-old man comes to the office because of a mass over his left palm that has grown rapidly during the past month. He reports that the mass has bled several times, although he does not recall trauma. Physical examination shows a 5 × 8-mm, lobulated, reddish purple mass. A photograph is shown. Which of the following is the most likely diagnosis?
- A) Hemangioma
 - B) Malignant melanoma
 - C) Merkel cell carcinoma
 - D) Pyogenic granuloma
 - E) Squamous cell carcinoma

The correct response is Option D.

Pyogenic granulomas are benign vascular tumors of unknown etiology. These lesions grow rapidly and can easily bleed with little or no trauma. Because of these characteristics, they are often confused with a malignancy. Although trauma is sometimes associated with these lesions, over three quarters of cases have no history of trauma or any other predisposing factor. They have also been associated with pregnancy. Their differential diagnosis includes malignancies

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such as basal or squamous cell carcinoma or malignant melanoma, as well as other vascular-type anomalies.

Treatment of pyogenic granulomas often consists of a shave removal and cauterization. For recurrent or large lesions, surgical excision is recommended.

Hemangiomas are benign, vascular tumors that occur in children, usually in the limbs or trunk. Despite their vascular origin, hemangiomas do not metastasize or undergo malignant transformation. With age, growth of hemangiomas will slow and in many cases regress by age 5 to 7 years.

Malignant melanomas represent one of the most aggressive forms of skin cancers. Generally, these are pigmented, although an amelanotic or melanotic variance may occur.

Merkel cell carcinomas are a rare, aggressive skin cancer usually appearing as a flesh-colored or bluish red nodule on the face, head, or neck. These appear mostly in elderly patients. Merkel cell carcinoma is of a neuroendocrine origin in the skin.

Squamous cell carcinomas are the second most frequent type of skin cancer. This type of lesion can be present on the hand, especially in patients with a history of radiation exposure. They generally present as a broad, flat lesion with the appearance of a scab. The most common areas for these are sun-exposed areas, such as the face and the back of the hand.

References

1. Walsh JJ IV, Eady JL. Vascular tumors. *Hand Clin.* 2004 Aug;20(3):261-268, v-vi.
2. Pantanowitz L, Duke WH. Intravascular lesions of the hand. *Diagn Pathol.* 2008 May 30;3:24.
3. Quitkin HM, Rosenwasser MP, Strauch RJ. Efficacy of silver nitrate cauterization for pyogenic granuloma of the hand. *J Hand Surg.* 2003 May;28(3):435-438.

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73. A 55-year-old man with bilateral carpal tunnel syndrome comes to the outpatient surgical unit for elective surgical intervention of the dominant right hand. He will be the tenth procedure of the day for the surgeon performing the operation. The surgeon favors an open technique; he has performed 150 carpal tunnel operations since finishing his hand fellowship 3 years ago. Which of the following is most likely to increase the risk of wrong-site surgery?
- A) The elective nature of the procedure
 - B) Only one surgeon is involved in the operation
 - C) The procedure will be performed using an open technique
 - D) The surgeon has a high volume of cases scheduled for the same day
 - E) The surgeon has only been practicing independently for 3 years

The correct response is Option D.

The term “wrong-site surgery” includes surgery on the wrong organ or extremity, the wrong patient, or the wrong vertebral level. This error can result in disastrous outcomes for the patient, as well as the institution and professionals involved. Traditionally, these errors have been considered “sentinel events” that require a root cause analysis to define the hazards that triggered the event. Fortunately, wrong-site surgery is rare; however, the true incidence is unknown and appears to be increasing. Attempts to quantify the true incidence of wrong-site surgery are limited by underreporting to The Joint Commission and the often covert nature of these events caused by liability concerns. One review has estimated an incidence rate of one wrong-site surgery per 100,000 operations. This rate was 4 times higher among hand surgeons, however, with an estimated one in five hand surgeons predicted to perform a wrong-site surgery in their career.

A Joint Commission review of a series of sentinel events identified a number of factors contributing to the increased risk of wrong-site surgery, such as emergency cases; unusual physical characteristics, including morbid obesity or physical deformity; unusual time pressures to start or complete the procedure; unusual equipment or setup in the operating room; multiple surgeons involved in the case; and multiple procedures being performed during a single surgical visit. A large series of wrong-site hand surgeries showed an increased rate of wrong-site surgery with increasing surgeon age and experience, and a direct correlation with increasing surgical case volumes.

While more than one factor was often identified after a root cause analysis, the majority involved a breakdown in communication between the surgical team and the patient and his or her family.

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While it seems that something as simple as operating on the correct side would be intuitive, in reality, the enormous pressures of time and patient volume in the current health care environment set up surgeons for an eventual system failure. Review of the factors noted above demonstrates that the major component in preventing wrong-site surgery is effective communication between surgeon and patient, and the surgeon bears the ultimate responsibility of assuring that this level of communication exists.

Current Joint Commission requirements include a preoperative verification, site marking, and a “time out” in the operating room. One recent study of malpractice claims after wrong-site surgery showed that two thirds of wrong-site surgeries could have been prevented by an effective site-verification protocol. Recommendations for effective site verification include the following:

1. Site marking by the surgeon with initials or “yes.”
2. Preoperative verification process: verification of patient identity, site, side, and procedure confirmed by two members of the health care team, including the surgeon. The informed consent should be compared with the operating room schedule. A “time out” before incision will then provide a final confirmation of the appropriate procedure and site. A specific, detailed protocol to define this process that involves clear recommendations for specific behaviors is more likely to be followed than general or ambiguous recommendations.
3. Inconsistencies: any inconsistencies or uncertainties about the correct operative site should be resolved by the surgeon with agreement by the patient and nursing staff. Specific and explicit protocols should be in place to address the manner in which these uncertainties are resolved.
4. The informed consent must specify laterality and attempt to localize multiple structures if surgery will be performed in multiple locations.

References

1. Kwaan MR, Studdert DM, Zinner MJ, et al. Incidence, patterns, and prevention of wrong-site surgery. *Arch Surg.* 2006 Apr;141(4):353-357.
2. Michaels RK, Makary MA, Dahab Y, et al. Achieving the National Quality Forum's "Never Events": prevention of wrong site, wrong procedure, and wrong patient operations. *Ann Surg.* 2007 Apr;245(4):526-532.
3. Meinberg EG, Stern PJ. Incidence of wrong-site surgery among hand surgeons. *J Bone Joint Surg Am.* 2003 Feb;85-A(2):193-197.
4. Joint Commission on Accreditation of Healthcare Organizations. Sentinel event alert: a follow-up review of wrong site surgery. Available at: http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_24.htm. Accessed July 13, 2009.

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74. A 34-year-old man is brought to the emergency department 2 hours after sustaining injuries to the right wrist when he punched a glass window. Surgical exploration shows a complete laceration of the median nerve at the level of the wrist. A 1-cm gap between the proximal and the distal stumps of the nerve is noted. Which of the following treatments is most likely to provide the best functional outcome?
- A) Multistrand nerve grafting
 - B) Nerve transfer
 - C) Nerve transposition
 - D) Primary epineurial repair
 - E) Single-strand nerve grafting

The correct response is Option D.

The need for nerve grafting is dependent upon many parameters, such as the length of the gap, the excursion of the nerve, the wound bed, and vascularity, among others. For clean, sharp injuries with nerve gaps measuring less than 1 cm in a large peripheral nerve such as the median, most authors agree that primary repair of the nerve results in the best outcome. Autologous nerve grafting should be reserved for cases in which there is tension on the nerve ends with primary repair. Both multistrand nerve grafting and single-strand nerve grafting produce similar outcomes and are inferior to primary repair. Nerve transfer would only be considered if there were no proximal nerve to repair to the distal nerve. Nerve transposition would only be appropriate for gaining length in the ulnar nerve, where the switch from the extensor side of the elbow to the flexor side results in increased relative length in the nerve.

References

1. Vanderhooft E. Functional outcomes of nerve grafts for the upper and lower extremities. *Hand Clin.* 2000 Feb;16(1):93-104, ix.
2. Lohmeyer JA, Siemers F, Machens HG, et al. The clinical use of artificial nerve conduits for digital nerve repair: a prospective cohort study and literature review. *J Reconstr Microsurg.* 2009 Jan;25(1):55-61. Epub 2008 Nov 26.

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75. A 3-year-old girl is brought to the office because the second and third toes of both of her feet are webbed. The patient's mother desires correction of the deformity. Physical examination shows a simple complete syndactyly. Which of the following is the most appropriate surgical treatment after release of syndactyly?

- A) Local flaps
- B) Local flaps and full-thickness skin grafts
- C) Local flaps and split-thickness skin grafts from the lateral thigh
- D) Primary closure

The correct response is Option B.

Syndactyly of the toes is a common congenital deformity of the lower extremity. Syndactyly of the toes is less of a functional problem than that of the hand, but it can represent a significant emotional and psychological toll on the patient and his or her family. Patients in cultures that are accustomed to open-toe footwear and sandals may have difficulty wearing shoes. Surgery is indicated for patients who desire correction of this deformity. Incomplete syndactyly of the toes can be repaired with local flaps without the use of grafts, but complete syndactyly requires the use of full-thickness skin grafts. Thinning of the fat from around the neurovascular bundles is essential to assure closure with local flaps. Skin grafts are seldom required for incomplete syndactyly. If they are required, full-thickness grafts should be obtained from the lateral groin. Full-thickness skin grafts harvested from the medial groin may produce undesirable hair growth as the child matures.

References

1. Park S, Eguchi T, Tokioka K, et al. Reconstruction of incomplete syndactyly of the toes using both dorsal and plantar flaps. *Plast Reconstr Surg*. 1996 Sep;98(3):534-537.
2. Lim YJ, Teoh LC, Lee EH. Reconstruction of syndactyly and polysyndactyly of the toes with a dorsal pentagonal island flap: a technique that allows primary skin closure without the use of skin grafting. *J Foot Ankle Surg*. 2007 Mar-Apr;46(2):86-92.

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76. A 46-year-old man is brought to the emergency department after sustaining an injury to the dominant right wrist. Examination shows a 6-cm-diameter wound on the dorsal surface of the wrist. Significant contamination of the wound and segmental tendon loss are noted. Neurovascular status is intact. The patient is unable to extend the index, long, and ring fingers. Which of the following is the most important next step in management?
- A) Immediate coverage with a free flap and delayed tendon grafting
 - B) Irrigation and debridement of all contaminated and nonviable tissue
 - C) Placement of allograft tendons and skin substitutes
 - D) Primary repair of tendons
 - E) Primary single-stage tendon grafting and coverage with a groin flap

The correct response is Option B.

Severely contaminated wounds, open fractures, and joint capsule lacerations require emergent and thorough irrigation and debridement. Fractures and skin loss should be treated in the initial procedure when feasible. Fractures should be fixed rigidly enough to allow early dynamic splinting or active motion. For lacerations without associated injury, the extensor tendon can be repaired emergently or in a delayed primary fashion after irrigation, debridement, and loose closure of the wound. If the repair is delayed, it should be performed within 7 days before the tendon ends retract or soften.

The results of extensor tendon repair depend on the complexity of trauma and the anatomical zone of tendon injury. In general, results of primary extensor tendon repair are better in Verdan Zones I, II, IV, and V, and worse in Zones III and VI.

Tendons should not be repaired under tension as tendon force imbalance and tendon rupture will usually result. Tendon grafting should not be performed in a contaminated wound and probably should be staged in this situation if it is necessary because of tendon loss.

References

1. Carl HD, Forst R, Schaller P. Results of primary extensor tendon repair in relation to the zone of injury and preoperative outcome estimation. *Arch Orthop Trauma Surg*. 2007 Feb;127(2):115-119.
2. Newport ML. Extensor tendon injuries in the hand. *J Am Acad Orthop Surg*. 1997 Mar;5(2):59-66.

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77. A 62-year-old man is brought to the emergency department by helicopter after sustaining severe injuries to the head, neck, and right femur during a motor vehicle collision. The patient's condition is stabilized, and the femur is temporarily reduced and splint immobilized. Peripheral pulses in the right leg are not palpable and capillary refill is noted; handheld Doppler shows weak pulses. Which of the following is the most appropriate next step to establish lower extremity vascular injury in this patient?

- A) CT angiography
- B) Doppler ultrasonography
- C) Measurement of ankle brachial index
- D) Serial physical examinations

The correct response is Option A.

As with many patients who have sustained severe upper or lower extremity trauma, the vascular status of the limb in the patient described is in question. Because of significant collateral blood flow in the upper and lower extremities, capillary refill and handheld Doppler tones can often be found even with complete disruption of major arteries. Although traditional angiography is known as the “gold standard” for the diagnosis of vascular injuries, it is not without its difficulties. A special suite, technicians, and physicians are needed to perform traditional angiography, and the potential for morbidity has been noted. As a result, CT angiography is fast becoming the new “gold standard” for the diagnosis of vascular injuries. Coupled with the fact that many trauma patients will be brought to the CT suite for other injuries, CT angiography is a rapid and natural next step to be taken when the head or abdomen is being scanned. Serial physical examination, ankle brachial index, and Doppler ultrasonography are adequate techniques, but they may be operator-dependent or sometimes have difficulty localizing the actual injury. Both traditional and CT angiography will localize the injury, but, for obvious reasons, CT angiography has overtaken traditional angiography in the diagnosis of acute vascular injury in the trauma patient.

References

1. Bravman JT, Ipaktchi K, Biffl WL, et al. Vascular injuries after minor blunt upper extremity trauma: pitfalls in the recognition and diagnosis of potential "near miss" injuries. *Scand J Trauma Resusc Emerg Med*. 2008 Nov 25;16(1):16.
2. Redmond JM, Levy BA, Dajani KA, et al. Detecting vascular injury in lower-extremity orthopedic trauma: the role of CT angiography. *Orthopedics*. 2008 Aug;31(8):761-767.

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78. An 18-year-old man is brought to the emergency department after sustaining a degloving injury to the dorsal aspect of the nondominant left hand in an all-terrain vehicle rollover. Physical examination shows loss of the soft tissues and the extensor tendons of the index, long, ring, and little fingers and an abnormal Allen test. Fractures of the second, third, and fourth metacarpal shafts are also present. Following serial debridements, the patient has a dorsal hand defect measuring 6 × 8 cm with obvious open fractures. Which of the following is the most appropriate management of the soft-tissue defect?

- A) Anterolateral thigh free flap
- B) Full-thickness skin grafting
- C) Rectus abdominis muscle free flap
- D) Reverse radial forearm flap
- E) Split-thickness skin grafting

The correct response is Option A.

Degloving injuries of the dorsal hand are managed initially with serial debridements. Negative pressure dressings can also be used as a bridge to definitive soft-tissue reconstruction. Single-stage reconstruction involves bone fixation, tendon reconstruction, and soft-tissue coverage. Dorsal hand defects with exposed bone cannot be safely reconstructed with a split-thickness skin graft and require durable coverage. Although more durable than split-thickness skin grafts, full-thickness grafts cannot be expected to take over a large area such as this defect with exposed bone. Appropriate choices include the anterolateral thigh free flap or other perforator flaps (thoracodorsal artery perforator flap) or muscle flaps. A defect of the size described is best reconstructed with a perforator flap that minimizes donor site defects. Local flaps such as the reverse radial forearm flap can be used in the upper extremity, although advances in microsurgery have led to a decrease in use, so as to minimize the added morbidity of the already injured extremity.

References

1. Friedrich JB, Katolik LI, Vedder NB. Soft tissue reconstruction of the hand. *J Hand Surg Am.* 2009 Jul-Aug;34(6):1148-1155.
2. Javaid M, Cormack GC. Anterolateral thigh free flap for complex soft tissue hand reconstructions. *J Hand Surg Br.* 2003 Feb;28(1):21-27.

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79. A 25-year-old man is brought to the emergency department after he was hit by a motor vehicle while walking across the street. Physical examination shows a Gustilo Type IIIB open fracture of the tibia. Reconstruction with an anterolateral thigh flap is planned. An incision between which of the following structures is the most appropriate approach to access the posterior tibial vessels?

- A) Lateral malleolus and the Achilles tendon
- B) Lateral malleolus and the extensor hallucis longus tendon
- C) Medial malleolus and the Achilles tendon
- D) Tibialis anterior and the extensor hallucis longus tendons

The correct response is Option C.

The sural nerve is located at the distal leg between the lateral malleolus and the Achilles tendon.

The greater saphenous vein is located between the medial malleolus and the extensor hallucis longus tendon.

The posterior tibial vessels are located between the medial malleolus and the Achilles tendon.

The dorsalis pedis artery is located between the tendons of the tibialis anterior and the extensor hallucis longus.

References

1. Hoppenfeld S, deBoer P, Buckley R. The Ankle and foot. In: Hoppenfeld S, deBoer P, Buckley R, eds. *Surgical Approaches in Orthopaedics: The Anatomic Approach*. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2009:639-643.
2. Valentine RJ, Wind GG. Vessels of the leg. In: Valentine RJ, Wind GG, eds. *Anatomic Exposures in Vascular Surgery*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2003:477.

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80. A 44-year-old woman comes to the office because of a 2-year history of a painless mass in the volar aspect of the forearm that has been enlarging gradually. She has no history of skin lesions or neurologic symptoms. Physical examination shows a 1.5-cm mass that is mobile in a transverse direction. Light tapping over the mass results in tingling of the index and long fingers. MRI shows a well-circumscribed area of enlargement within the median nerve that is hyperintense on T2 imaging. Which of the following is the most appropriate management?
- A) En bloc resection with nerve grafting
 - B) Excision with nerve preservation
 - C) Incisional biopsy
 - D) Percutaneous needle biopsy
 - E) Segmental resection with primary nerve repair

The correct response is Option B.

The most appropriate course of treatment is excision with microsurgical nerve preservation.

Neurilemoma (schwannoma) is the most common benign nerve tumor of the upper extremity. These tumors result from a proliferation of Schwann cells. Lesions often present on the flexor surface of the hand and forearm and are generally painless; however, they may sometimes be accompanied by paresthesia. In some cases, there may be neurologic deficits. Neurilemmas are typically mobile in a transverse direction but not longitudinally. On MRI, they appear isointense with muscle on T1-weighted images but are hyperintense to subcutaneous fat on T2 imaging.

These lesions typically shell out easily from the surrounding nerve. Careful dissection with microsurgical technique is advocated to preserve nerve function. In most cases, the tumors can be removed with a small risk of neurologic deficits. Recurrence is uncommon, and there are rare instances of malignant transformation.

Neurilemmas are to be distinguished from neurofibromas, which are benign nerve tumors arising within nerve fascicles that are difficult to excise. These may be seen in the setting of neurofibromatosis. In cases where the tumor is intimately intertwined with nerve fascicles, segmental resection of involved fascicles may be necessary, followed by nerve reconstruction. There is a greater chance of neurologic dysfunction after excision of neurofibromas.

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En bloc resection with nerve grafting is also not necessary for the well-circumscribed neurilemoma. In the excision of neurofibromas that are intimately associated with the nerve, if functioning fascicles need to be sacrificed, nerve grafting can be used to bridge the gap.

Incisional biopsy is usually not recommended, as the lesion can instead be completely excised in a single session. Biopsy of the lesion can result in scarring, making a subsequent attempt at resection more difficult. In tumors with a high suggestion of malignancy based on imaging studies or clinical behavior (ie, severe pain and progressive neurologic deficits), biopsy may be used to obtain a tissue diagnosis.

Percutaneous needle biopsy is generally not recommended because results typically will not affect the treatment plan, and it can result in scarring of the nerve and increase the chance of damage during resection. Needle biopsy may also result in neurologic defect or pain.

Segmental resection with nerve repair is generally not necessary for neurilemmomas because these lesions will typically shell out easily from the surrounding nerve. In the case of neurofibromas where fascicles are intimately intertwined with the tumor, resection of involved nerve fascicles may be necessary.

References

1. Athanasian EA. Bone and soft tissue tumors. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:2211-2263.
2. Murray PM. Tumors of the hand and wrist. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2005:584-591.
3. Russell SM. Preserve the nerve: microsurgical resection of peripheral nerve sheath tumors. *Neurosurgery*. 2007 Sep;61(3 Suppl):113-117.

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81. A 12-year-old boy is brought to the emergency department because of persistent pain and bruising under the fingernail of his left index finger 6 hours after sustaining a crush injury. Physical examination shows a subungual hematoma that is contained to a portion distal to the lunula. The surrounding nail plate is adherent and intact. The nail plate is not torn or lifted. Which of the following is the most appropriate management?
- A) Amputation
 - B) Digital block with epinephrine
 - C) Elevation
 - D) Nail plate removal and sterile matrix graft
 - E) Trephination

The correct response is Option E.

The treatment of nail injuries can vary depending upon whether or not a nail plate injury is noted. When the nail plate is intact, the diagnosis of a nail bed injury is determined by the presence of a subungual hematoma. Subungual hematomas cause pressure in the closed space between the nail plate and nail bed, resulting frequently in throbbing pain. Hematoma drainage (trephination) is required for pain relief. This can be done with a battery-powered microcautery device or heated sterile paper clip. The hole should be large enough to allow for prolonged drainage. Care should be taken with the cautery device to avoid further injury to the nail bed.

If the nail edges are disrupted or the nail plate is torn, the nail plate should be removed to explore and repair the nail bed. The torn nail plate can be removed to provide exposure for the repair. Lifting the nail plate can sometimes further injure the nail bed. Complete removal is not always mandatory.

Extremity elevation will only alleviate the pain minimally. A digital block with epinephrine will provide temporary relief. Amputation is excessive treatment for a nail bed hematoma.

Nail beds that are missing a sterile matrix can be reconstructed with a sterile matrix graft, often from the same injured nail bed (smaller defect) or the great toe (larger defect).

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References

1. Wilhelmi BJ, Zook EG. Fingernail and fingertip injuries. In: Guyuron B, Eriksson E, Persing JA, eds. *Plastic Surgery: Indications and Practice*. Philadelphia: WB Saunders; 2009:992-1000.
2. Rayatt S, Pandey U, Khanna MA. Re: Tissue adhesives. *Ann Plast Surg*. 2001 Nov;47(5):576.
3. Seaberg DC, Angelos WJ, Paris PM. Treatment of subungual hematomas with nail trephination: a prospective study. *Am J Emerg Med*. 1991 May;9(3):209-210.
4. Roser SE, Gellman H. Comparison of nail bed repair versus nail trephination for subungual hematomas in children. *J Hand Surg Am*. 1999 Nov;24(6):1166-1170.

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82. A 34-year-old right-hand dominant woman comes to the office because of cramping pain in the midvolar forearm. She says that the pain radiates up her arm to the elbow. It is exacerbated when she is working at her job as an accountant and is relieved by inactivity. Physical examination shows pain in the forearm and wrist, and a negative Tinel sign at the wrist. Which of the following syndromes is the most likely diagnosis?
- A) Anterior interosseous syndrome
 - B) Carpal tunnel
 - C) Cubital tunnel
 - D) Flexor carpi radialis tunnel syndrome
 - E) Pronator syndrome

The correct response is Option E.

Clinical symptoms of pronator syndrome include forearm pain as well as paresthesias and hypoesthesia in the cutaneous distribution of the median nerve (ie, the thumb, index, middle, and radial aspect of the ring finger). Patients often have occupations that require repetitive use of the upper extremities. Physical examination shows pain to palpation of the median nerve of the midvolar forearm. Anterior interosseous syndrome is secondary to injury to the motor branch of the median nerve. This syndrome is characterized by weakness of the pincer movement of the thumb and index finger. Symptoms of carpal tunnel syndrome usually arise with paresthesia in the median nerve distribution and pain on the volar aspect of the palm. Physical examination findings include Tinel sign over the carpal tunnel. Electromyography studies show distal motor and sensory latencies at the carpal tunnel. Cubital tunnel syndrome presents with paresthesia of the ulnar aspect of the ring finger and the little finger. In addition to paresthesia, weakness with grip and Tinel sign at the medial elbow are found commonly. Flexor carpi radialis tunnel syndrome presents with pain at the radiovolar wrist, usually following repetitive activities.

References

1. Mackinnon SE, Novak CB. Compression neuropathies. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:999-1045.
2. Dang AC, Rodner CM. Unusual compression neuropathies of the forearm, part II: median nerve. *J Hand Surg Am*. 2009 Dec;34(10):1915-1920.

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83. A 35-year-old man is brought to the emergency department after sustaining a deep laceration of his left dorsal hand. Physical examination shows a transverse 2-cm laceration over the dorsal metacarpal joint of the index finger with exposed extensor tendons. Radial nerve block at the level of the wrist is planned before exploration. The needle should be inserted superficial to which of the following landmarks?

- A) Flexor carpi radialis tendon
- B) Lister tubercle
- C) Radial artery
- D) Second dorsal extensor compartment
- E) Styloid process of the radius

The correct response is Option E.

The sensory branch of the radial nerve arises between the brachioradialis and extensor carpi radialis brevis approximately 8 cm proximal to the styloid process of the radius. It pierces the fascia approximately 5 cm (3 fingerbreadths) proximal to the radial styloid. The nerve then fans out proximal to the wrist and passes superficially to the radial styloid and first dorsal compartment. The flexor carpi radialis tendon and radial artery are located in the volar forearm. The second dorsal extensor compartment and Lister tubercle of the radius are dorsal and ulnar to the radial sensory nerve.

References

1. Auerbach DM, Collins ED, Kunkle KL, et al. The radial sensory nerve. An anatomic study. *Clin Orthop Relat Res.* 1994 Nov;(308):241-249.
2. Abrams RA, Brown RA, Botte MJ. The superficial branch of the radial nerve: an anatomic study with surgical implications. *J Hand Surg Am.* 1992 Nov;17(6):1037-1041.
3. Nishanian E, Gargarian M. Regional anesthesia. In: Hurford WE, Bailin MT, Davison JK, et al, eds. *Clinical Anesthesia Procedures of the Massachusetts General Hospital.* 5th ed. Philadelphia: Lippincott Williams & Wilkins; 1998:264-287.

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84. A 30-year-old man comes to the emergency department after sustaining a laceration of the palm of the left hand from a knife. He reports difficulty flexing the ring finger of the left hand. A photograph is shown. Which of the following is the most appropriate method to clinically assess the integrity of the flexor digitorum superficialis tendon?
- A) Hold the distal interphalangeal joint of the ring finger in extension and ask the patient to flex
 - B) Hold the index, long, and little fingers in extension and ask the patient to flex
 - C) Hold the long, ring, and little fingers flexed at the metacarpophalangeal (MCP) joint and ask the patient to flex
 - D) Hold the MCP joints of the index, long, and little fingers in flexion and ask the patient to extend
 - E) Hold the ring finger extended at the MCP joint and ask the patient to flex

The correct response is Option B.

The flexor digitorum superficialis (FDS) tendon flexes the proximal interphalangeal (PIP) joint. The flexor digitorum profundus (FDP) tendon can also flex the PIP joint, in addition to flexing

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the distal interphalangeal (DIP) joint. To confirm that the FDS tendon is flexing the PIP joint, FDP motion must be excluded.

The FDP tendons to the long, ring, and little fingers share a common muscle belly. Thus, holding the long and little fingers in extension will prevent the FDP to the long, ring, and little fingers from firing. Any flexion of the PIP joint of the ring finger must then be caused by the FDS tendon.

Holding the DIP joint of the ring finger in extension will prevent DIP flexion. It will not, however, prevent the pull of the FDP tendon from being transmitted to the PIP joint.

Holding the long, ring, and little fingers flexed at the MCP joint will not exclude FDP motion.

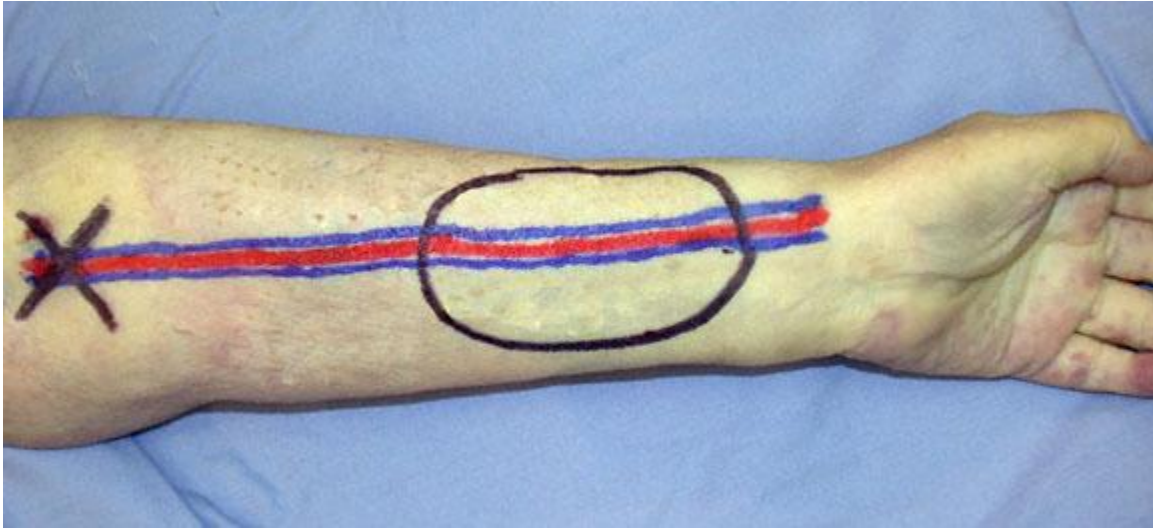
Holding the MCP joint of the ring finger extended will not exclude FDP motion.

Asking the patient to extend will not assess the integrity of a flexor tendon such as the FDS.

References

1. Selier JG III. *Essentials of Hand Surgery*. Philadelphia: Lippincott Williams & Wilkins; 2001.
2. Zidel P. Tendon healing and flexor tendon surgery. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007.

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85. A 55-year-old woman is scheduled to undergo surgery for soft-tissue coverage of an open joint elbow wound. The vascular pedicle of the flap in the photograph shown passes between which of the following tendons?
- A) Brachioradialis and abductor pollicis longus
 - B) Brachioradialis and flexor carpi radialis
 - C) Brachioradialis and flexor pollicis longus
 - D) Brachioradialis and pronator teres
 - E) Flexor carpi radialis and pronator teres

The correct response is Option B.

The clinical image shown depicts a radial forearm flap. The vascular pedicle of the radial forearm flap is the radial artery that is a branch of the brachial artery. Proximally, the radial artery runs deep to the brachioradialis muscle and it passes distally between the bellies of the brachioradialis and flexor carpi radialis. The radial forearm flap cutaneous paddle is perfused by septocutaneous perforators from the radial artery.

The other options are incorrect because the vascular pedicle does not pass between those muscles.

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References

1. Azari KK, Andrew Lee WP. Radial forearm flap for elbow coverage. In: Moran SL, Cooney WP III, eds. *Master Techniques in Orthopaedic Surgery: Soft Tissue Surgery*. Philadelphia: Lippincott Williams & Wilkins; 2009:129-137.
2. Masquelet AC, Alain G. Forearm radial flap. In: Masquelet AC, Alain G. *An Atlas of Flaps of the Musculoskeletal System*. Informa Healthcare; 2001.

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86. A 45-year-old gardener with a 10-year history of poorly controlled type 2 diabetes mellitus comes to the emergency department because of excruciating pain and swelling of the left forearm 1 day after he scraped his left arm on a rosebush. Physical examination shows extreme tenderness, edema, and crepitus. Which of the following is the most appropriate management?
- A) CT scan
 - B) Econazole
 - C) Hyperbaric oxygen
 - D) Immediate surgical debridement

The correct response is Option D.

Necrotizing fasciitis is a severe soft-tissue infection affecting the skin, subcutaneous tissue, and fascia. It characteristically spares the underlying muscle, progresses quickly, and is associated with high morbidity and mortality rates and severe systemic sepsis. The inciting event is often trauma, even minor trauma and small puncture wounds, but hematogenous spread is also a recognized etiology.

The vast majority of patients have some form of chronic debilitating disease that weakens the immune system. Diabetes mellitus appears to be the most common disease, but these may include substance abuse and renal failure. These patients are at higher risk for increased mortality.

Two types of necrotizing fasciitis have been described. Type I are mixed aerobic and anaerobic infections, with facultative anaerobic bacteria and non-group A streptococci being present. This is the most common type and is present in about 75% of cases. Type II infections are monomicrobial and are caused by group A *Streptococcus* species alone or in combination with staphylococcal species. For this reason, antibiotic coverage should be broad.

The disease progresses quickly but does evolve through several stages. Initial symptoms include tenderness, erythema, edema, warm skin, and fever; however, symptoms may vary depending on patient characteristics. Initial lab findings may include leukocytosis, thrombocytopenia, and hyperkalemia, but these are variable. When critical skin ischemia occurs, blisters or bullae are formed. In the late stage, lesions turn black and necrotic and are anesthetic as the nerves become involved.

Diagnosis begins with a high clinical suspicion in all patients, particularly those with risk factors. Appropriate treatment is surgical debridement, broad-spectrum intravenous antibiotic therapy

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covering gram-positive, gram-negative, and anaerobic organisms, and careful monitoring and correction of fluid and electrolytes in an intensive care setting.

Most authorities agree that hyperbaric oxygen is to be recommended for the treatment of necrotizing fasciitis as an adjunct, if facilities are available and there is no delay in surgical debridement. However, most studies regarding the efficacy of hyperbaric oxygen are anecdotal with a distinct lack of properly designed prospective randomized controlled trials.

Mortality rates are reported to be 10 to 75% and are increased in patients with underlying immune compromise, delayed treatment, or involvement of the chest wall.

References

1. Cheung JP, Fung B, Tang WM, et al. A review of necrotising fasciitis in the extremities. *Hong Kong Med J*. 2009 Feb;15(1):44-52.
2. Golger A, Ching S, Goldsmith CH, et al. Mortality in patients with necrotizing fasciitis. *Plast Reconstr Surg*. 2007 May;119(6):1803-1807.
3. Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:89-90.
4. Liu YM, Chi CY, Ho MW, et al. Microbiology and factors affecting mortality in necrotizing fasciitis. *J Microbiol Immunol Infect*. 2005 Dec;38(6):430-435.
5. Brook I. Aerobic and anaerobic microbiology of necrotizing fasciitis in children. *Pediatr Dermatol*. 1996 Jul-Aug;13(4):281-284.
6. Mulla ZD. Hyperbaric oxygen in necrotizing fasciitis. *Plast Reconstr Surg*. 2008 Dec;122(6):1984-1985.
7. Anwar MU, Haque AK, Rahman J, et al. Early radical surgery and antimicrobial therapy with hyperbaric oxygen in necrotizing fasciitis. *Plast Reconstr Surg*. 2008 Jan;121(1):360-361.

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87. A 28-year-old man comes to the office for evaluation because of restricted movement of the little finger of his right hand 3 years after sustaining a Zone II flexor tendon injury. Active flexion of the proximal interphalangeal joint is to 20 degrees; he is unable to actively flex the distal joint. Staged flexor tendon reconstruction is considered. Which of the following factors would prohibit consideration for tendon reconstruction?

- A) Limited passive range of motion of the distal interphalangeal joint
- B) Patient age
- C) Poorly compliant patient
- D) Scarred soft-tissue bed
- E) Uncontrolled pain

The correct response is Option C.

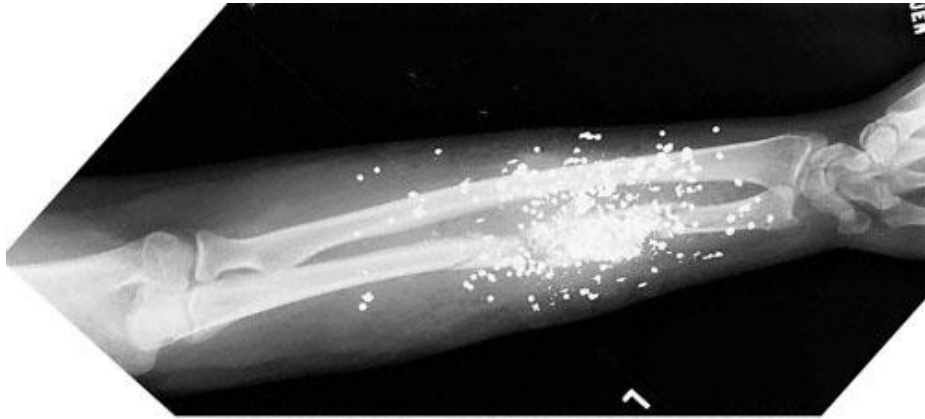
Staged flexor tendon reconstruction is a challenging endeavor that should not be undertaken lightly. To reach a successful outcome, both the patient and the surgeon must make a commitment to extensive surgeries, therapy sessions, and the possibility that the outcome may not be ideal; in fact, the outcome may compromise some existing function (as in cases of secondary quadruplegia or infection).

Prerequisites for attempted surgical intervention include good passive range of motion of all joints involved; a healthy, well-vascularized soft-tissue bed for tendon gliding; and good patient compliance with postoperative therapy and wound care. In such a setting, staged flexor tendon reconstruction can be undertaken with a reasonably good chance of success. Patient range of motion can be controlled with therapy. With good compliance, patient age is not a factor. Uncontrolled pain can become controlled with appropriate medication and therapy.

References

1. Leffelt M, Ray E, Sherman R. MOC-PS(SM) CME article: treatment of flexor tendon laceration. *Plast Reconstr Surg*. 2008 Apr;121(4 Suppl):1-12.
2. Freilich AM, Chhabra AB. Secondary flexor tendon reconstruction, a review. *J Hand Surg Am*. 2007 Nov;32(9):1436-1442.
3. Strickland JW. Delayed treatment of flexor tendon injuries including grafting. *Hand Clin*. 2005 May;21(2):219-243.

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88. A 45-year-old woman is brought to the emergency department after sustaining a shotgun injury to the nondominant left forearm. A preoperative x-ray study is shown. Bone stabilization is performed. The ulnar nerve, multiple flexor tendons, and the ulnar artery are repaired during surgery and are left exposed. A photograph taken following the repair is shown. The wound was covered with allograft skin while viability of the hand was confirmed for 2 days. Which of the following is the most appropriate definitive coverage for the wound?
- A) Free anterolateral thigh flap
 - B) Full-thickness skin grafting from the groin
 - C) Pedicled groin flap
 - D) Reverse lateral arm flap
 - E) Split-thickness skin grafting from the thigh

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The correct response is Option A.

Shotgun blasts at close range can create a devastating pattern of injury. X-ray study shows a heavily comminuted ulna fracture. The scenario also involves tendon, vascular, and nerve injury. In choosing the appropriate coverage for the wound described, the surgeon will need to consider the protection of exposed structures, the ability to rehabilitate the extremity, and the possible need for future surgery on the arm.

A free tissue transfer will provide viable, full-thickness tissue from a nontraumatized area to cover the wound. Many donor sites are available, including fasciocutaneous flaps such as the anterolateral thigh flap, as well as muscle flaps. Some authors advocate fasciocutaneous flaps over muscle flaps with the rationale that the fat on the deep surface of the flap will better allow glide of tendons and nerves deep to it; in addition, a fasciocutaneous flap, once healed, can be incised like normal skin for any future surgery that might be necessary in the patient's arm. A photograph is shown.



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Skin grafting, whether split-thickness or full-thickness, carries several liabilities. Both types of grafts provide skin but no subcutaneous tissue. In addition, both heal by adhering to the wound bed. Because the patient described has exposed tendon in the wound bed, skin grafting would likely cause significant tendon adhesions and thus impaired mobility. In addition, adhesion of the skin graft to a nerve, particularly a repaired nerve, carries a risk of chronic pain and nerve dysfunction.

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A pedicled groin flap can provide thin, pliable, full-thickness tissue to cover defects of the forearm. However, the flap is done as a two-staged procedure, with the arm tethered to the groin for 2 to 3 weeks to allow vascular ingrowth. In the patient described, having the arm dependent for that period of time would significantly worsen edema and compromise the ability to begin rehabilitation of the extremity.

A reversed lateral arm flap provides full-thickness soft-tissue coverage for defects about the elbow. Its harvest does not require sacrifice of a major artery to the hand. The lateral arm flap would not be able to reach the distal limit of the wound described. In addition, the lateral arm flap donor site can be closed primarily for flaps up to 12 × 6 cm, which is significantly smaller than the wound in the patient described.

References

1. Browne EZ Jr, Pederson WC. Skin grafts and skin flaps: skin grafting. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:1629-1648.
2. Pederson WC. Upper extremity microsurgery. *Plast Reconstr Surg*. 2001 May;107(6):1524-1537.
3. Smith PJ, Foley B, McGregor IA, et al. The anatomical basis of the groin flap. *Plast Reconstr Surg*. 1972 Jan;49(1):41-47.

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89. A 76-year-old woman with rheumatoid arthritis comes to the office because of a 2-month history of difficulty flexing the index finger of the left hand. She says that when she flexes the finger, a painful snapping sensation occurs. Physical examination shows fullness of the flexor tendon at the level of the A1 pulley. Which of the following is the most appropriate surgical treatment?
- A) Release of the A1 pulley alone
 - B) Release of the A1 pulley and stair-step expansion repair of the pulley
 - C) Removal of the entire flexor digitorum superficialis tendon
 - D) Routing of the A1 pulley under the flexor tendons
 - E) Synovectomy and debridement of the flexor tendons

The correct response is Option E.

This examination and history of the patient described are consistent with a diagnosis of trigger finger. Trigger fingers are common in patients with rheumatoid arthritis and are related to intratendinous nodules, as well as synovial inflammation common with rheumatoid arthritis. Typical management of trigger fingers consists of conservative treatment with steroid injection as the initial course of action. This is true in patients with rheumatoid arthritis as well. When patients have failed conservative treatment with steroid injection, surgery is indicated. Normally, division of the A1 pulley results in excellent success. However, in the case of a rheumatoid patient, the A1 pulley is often the only remaining structure preventing ulnar drift of the tendons and joints. As a result, the A1 pulley should never be divided in a rheumatoid patient. The most appropriate surgical treatment is flexor tenosynovectomy and removal of intratendinous nodules. If this is unsuccessful, removal of a slip of the superficialis tendon is appropriate. Stair-step expansion and rerouting the tendon are not appropriate treatments.

References

1. Ferlic DC, Clayton ML. Flexor tenosynovectomy in the rheumatoid finger. *J Hand Surg Am.* 1978 Jul;3(4):364-367.
2. Lister G. *The Hand: Diagnosis and Indications*. 3rd ed. New York: Churchill Livingstone; 1993:393.

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90. A 24-year-old man comes to the emergency department 6 hours after sustaining an open distal radius fracture and loss of soft tissue while he was working on a farm. History includes diabetes mellitus. On physical examination, distal pulses and sensation are intact. Debridement and repair with open reduction and internal fixation are planned. Which of the following factors places this patient at greatest risk for infection postoperatively?

- A) Gustilo fracture classification
- B) History of diabetes mellitus
- C) Method of fracture fixation
- D) Period of time from injury to initial debridement
- E) Type of contamination

The correct response is Option E.

Of the listed factors relating to risk of postoperative infection in this scenario, the strongest correlation is with contamination type.

The Gustilo–Anderson fracture classification has been found to have some correlation with open fracture infection rates, but this relationship is not as strong in the distal radius as it is in long bones of the lower extremity. Recent studies by Glueck, et al, and Swanson, et al, have shown that contamination is a much stronger correlate.

A history of systemic illness, such as diabetes mellitus, and the type of fracture fixation seem to have a modest correlation to postoperative infections in distal radius fractures, but the findings are generally not statistically significant.

The timing of the initial debridement, as long as it occurs within the first 24 hours of injury, does not significantly affect infection rate. In contrast, there is evidence to suggest that performing multiple serial debridements in significantly contaminated wounds is of benefit in preventing postoperative infection.

References

1. Glueck DA, Charoglu CP, Lawton JN. Factors associated with infection following open distal radius fractures. *Hand (N Y)*. 2009 Feb 5; 4(3):330-334.
2. Swanson TV, Szabo RM, Anderson DD. Open hand fractures: prognosis and classification. *J Hand Surg [Am]*. 1991 Jan;16(1):101-107.

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3. Rozental TD, Beredjiklian PK, Steinberg DR, et al. Open fractures of the distal radius. *J Hand Surg [Am]*. 2002 Jan;27(1):77-85.

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91. A 16-year-old boy is brought to the emergency department following a laceration of his distal forearm after falling through a window. Physical examination shows a deep 4-cm laceration that involves the ulnar nerve. Direct end-to-end neurorrhaphy is performed immediately. Which of the following is the most appropriate next step in management?
- A) Active range of motion protocol
 - B) Nerve conduction at 3 months
 - C) Passive motion protocol
 - D) Sensory reeducation
 - E) Wrist and elbow immobilization

The correct response is Option E.

Following peripheral nerve repair, the extremity should be immobilized at the joint above and below the level of repair. For an ulnar nerve injury at the wrist, the elbow and wrist should be splinted in flexion. The dorsal splint should extend to the tips of the fingers, and the palmar splint should extend to the proximal interphalangeal joints only. The splints are bandaged so there is restriction but no rigid immobilization.

Active and passive range of motion protocols are used in tendon repairs, not nerve repairs. These early motion protocols minimize adhesions of tendons to surrounding structures.

Sensory reeducation is a method or combination of techniques that help patients with a sensory impairment to learn to interpret the altered neural impulses reaching the conscious level through the injured hand. Sensory reeducation does not induce axonal regeneration or reinnervation, but it takes advantage of and maximizes the full sensory potential obtained by nerve repair. In other words, the patient relearns each sensory modality and reeducates stereognosis and locognosis in as short a time as possible following peripheral nerve injury and repair. In children with peripheral nerve injury, however, the capacity for neural regeneration and cerebral plasticity is such that excellent recovery of functional sensation in the hand can occur without the need for sensory reeducation.

References

1. Mavrogenis AF, Spyridonos SG, Antonopoulos D, et al. Effect of sensory re-education after low median nerve complete transection and repair. *J Hand Surg Am*. 2009 Sep;34(7):1210-1215. Epub 2009 Jun 25.

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2. Ruijs AC, Jaquet JB, Kalmijn S, et al. Median and ulnar nerve injuries: a meta-analysis of predictors of motor and sensory recovery after modern microsurgical nerve repair. *Plast Reconstr Surg*. 2005 Aug;116(2):484-494.
3. Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:1075-1112.
4. Dellon AL, Curtis RM, Edgerton MT. Reeducation of sensation in the hand after nerve injury and repair. *Plast Reconstr Surg*. 1974 Mar;53(3):297-305.

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92. An otherwise healthy 35-year-old man is brought to the emergency department after he collided with a parked bus while riding his motorcycle at 20 mph. On admission, he is cleared by the trauma service to undergo orthopedic exploration of an open fracture of the tibia and fibula. The surgeon achieves external fixation and begins washout of a 15-cm anterior wound with exposed denuded bone. A consultation regarding initial evaluation for soft-tissue coverage is requested. Which of the following additional findings is most likely to lead to the decision to recommend eventual below-the-knee amputation rather than reconstruction for this patient?
- A) Gap of the tibial nerve of 4 cm
 - B) Grade 2 liver laceration
 - C) Ipsilateral full-thickness anterior plantar skin avulsion with associated metatarsal fractures
 - D) New-onset absence of the pulses in the foot following external fixation
 - E) Parietal contusion requiring endotracheal intubation and neurosurgical consultation

The correct response is Option A.

Avulsion of the tibial nerve is one of the two absolute indications for amputation in the context of Gustilo Type IIIB and IIIC open tibial fractures. This is because outcomes of microsurgical reconstruction of the insensate foot in these cases are very poor.

The other absolute contraindication to reconstruction is a warm ischemia time of 6 hours or greater, which the patient described does not have. The patient has just lost pulses after manipulation and fixation. This is a new finding, with very recent ischemia time. This is a potentially fixable situation, and not necessarily a contraindication to reconstruction. Recent loss of pulses could contribute to a need for amputation in the future but would not require that decision now.

Polytrauma, such as a liver laceration or an intracranial injury, can evolve into relative contraindications to reconstruction, but they are not absolute contraindications by themselves. The liver laceration could resolve and allow safe microsurgical reconstruction. Even the delay of time to reconstruction that polytrauma can necessitate can be managed with bony fixation, wound care, and vacuum-assisted closure placement until construction of a flap can be performed.

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The loss of plantar skin and metatarsal fractures by themselves are also not an absolute contraindication to reconstruction. This is a potentially reconstructible problem that should not push the plastic surgeon to recommend amputation. The additional foot trauma can potentially be reconstructed either with a skin graft or a flap.

The intracranial injury can evolve to a point where neurosurgery would eventually release the patient for a free flap. So, the parietal contusion is not necessarily an absolute contraindication to reconstruction, depending on the eventual outcome from the head injury. The patient may very well get better from that, and become a limb salvage candidate. It all depends on severity.

References

1. Tomaino MM. Amputation or salvage of type 3B/3C tibial fractures: what the literature says about outcomes. *Am J Orthop (Belle Mead NJ)*. 2001 May;30(5):380-385.
2. French B, Tornetta P III. High-energy tibial shaft fractures. *Orthop Clin North Am*. 2002 Jan;33(1):211-230, ix.

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93. 52-year-old woman comes to the office because of a 9-month history of the nail deformity shown. Physical examination shows thinned skin overlying an eponychial mass. The finger is nontender to palpation. She is dissatisfied primarily by the appearance of the nail. Which of the following is the most appropriate initial step in management?
- A) Excision of the mass under the eponychial fold
 - B) MRI of the finger
 - C) Nail bed reconstruction with a split toenail bed graft
 - D) Nail germinal matrix ablation
 - E) Oral administration of fluconazole for 12 weeks

The correct response is Option A.

The most appropriate treatment of the nail groove shown is excision of the mucous cyst (ganglion) that underlies the eponychial fold and is deforming the germinal matrix. After excision of the cyst, all grooving should improve, if not resolve completely.

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MRI plays a role in the identification of glomus tumors of the finger. These tumors may arise deep to the sterile nail matrix. MRI of the lesion shown might define the ganglion cyst, but is not necessary for diagnosis and would add a substantial cost to the treatment.

Nail bed reconstruction with a split sterile matrix graft can be used to address nonadherent nail plates that occur secondary to loss of the sterile matrix. The photographs shown do not demonstrate any broad, white areas of the nail plate suggestive of detachment.

Ablation of the nail germinal matrix may be necessary when split or thin nails arise following trauma to the germinal matrix. In these settings, removal of the germinal matrix with permanent loss of the nail can provide a permanent solution to the nail deformity.

Oral fluconazole is useful for treatment of onychomycosis. Nails affected by fungal infection typically present with loss of luster, discoloration, and crumbling reflective of the nail's brittleness. None of these findings are present in the scenario described.

References

1. Rizzo M, Beckenbaugh RD. Treatment of mucous cysts of the fingers: review of 134 cases with minimum 2-year follow-up evaluation. *J Hand Surg Am.* 2003 May;28(3):519-524.
2. Brown SJ. Efficacy of fluconazole for the treatment of onychomycosis. *Ann Pharmacother.* 2009 Oct;43(10):1684-1691. Epub 2009 Sep 23.
3. Hsieh SC, Chen SL, Chen TM, et al. Thin split-thickness toenail bed grafts for avulsed nail bed defects. *Ann Plast Surg.* 2004 Apr;52(4):375-379.

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94. A 45-year-old woman is evaluated because of a 6-year history of lymphedema of the lower extremities that causes chronic fatigue and swelling of both legs that impairs daily activities. Conservative treatment to control the swelling, including weight loss, compression garments, and daily intermittent pneumatic pump compression, was not successful. Physical examination of the left thigh shows thick, fibrotic, nonpitting tissues. The circumference of the left thigh is 10 cm larger than the right thigh. Which of the following is the most appropriate surgical treatment?

- A) Buried dermal flaps
- B) Microvascular lympholymphatic anastomoses
- C) Omental transposition
- D) Staged skin and subcutaneous excision
- E) Total excision of all skin and subcutaneous tissue

The correct response is Option D.

Staged skin and subcutaneous excision has become the option of choice for many authors. This procedure is safe, reliable, and has shown the most consistent improvement with the lowest incidence of complications. Physiologic procedures, including omental transposition, buried dermal flaps, enteromesenteric bridging, lymphangioplasty, and microvascular lympholymphatic or lymphovenous anastomoses, have not shown favorable long-term results.

References

1. Miller TA, Wyatt LE, Rudkin GH. Staged skin and subcutaneous excision for lymphedema: A favorable report of long-term results. *Plast Reconstr Surg*. 1998 Oct;102(5):1486-1498.
2. Brorson H, Svensson H. Liposuction combined with controlled compression therapy reduces arm lymphedema more effectively than controlled compression therapy. *Plast Reconstr Surg*. 1998 Sep;102(4):1058-1067.
3. Rinehart-Ayres ME. Conservative approaches to lymphedema treatment. *Cancer*. 1998 Dec 15;83(12 Suppl Am):2828-2832.
4. Foldi E. The treatment of lymphedema. *Cancer*. 1998 Dec 15;83(12 Suppl Amer):2833-2834.

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95. A 15-year-old boy is brought to the emergency department because he felt a “pop” followed by acute pain in his left ring finger while grabbing an opposing player’s jersey during a rugby match. Physical examination shows pain, tenderness, and swelling over the volar aspect of the finger, from the area of the distal interphalangeal joint flexor crease to the proximal interphalangeal (PIP) joint crease. The distal phalanx rests at neutral and no active flexion is possible. The patient can flex at the PIP with minimal discomfort. Which of the following is the most appropriate management?
- A) End-to-end flexor tendon repair
 - B) Flexor tendon reinsertion
 - C) Open reduction and pin fixation of the middle phalanx
 - D) Splinting, followed in 2 weeks by range-of-motion exercises
 - E) Tendon transfer

The correct response is Option B.

The scenario described provides a classic example of a distal flexor tendon avulsion. Because of several potential factors, the ring finger is the most common finger to present with this type of injury. The flexor digitorum profundus of the ring finger has a less robust insertion at the distal phalanx than the long finger, which is a tip-off in the vignette for this classic injury. Yet the ring finger is similarly involved in the type of hyperextension force, or resisted flexion force, which generates this injury. The little finger does not present as much with this injury either.

Flexor tendon reinsertion is correct, because the indicated management is early operation and reinsertion, if possible, of the avulsed tendon. This can be accomplished in a variety of ways, but that discussion is not central to the question.

Splinting, followed in 2 weeks by range-of-motion exercises is wrong, because that answer describes how one might treat a sprain, which this is not. If one treated the tendon avulsion conservatively, and incorrectly, by splinting, the surgeon would lose the window for early repair, and the outcome for the patient would be poor. Secondary or delayed reconstruction in these cases is often not possible, and when possible, they often have results inferior to immediate repair.

Tendon transfer is wrong because tendon transfers are not used for immediate repair of flexor avulsions. Tendon transfers are useful for secondary reconstruction in nerve palsies, for example. But they are not relevant to this distal and acute injury, confined to a single digit.

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Open reduction and pin fixation of the middle phalanx is wrong because the injury is not a fracture of the middle phalanx. It is true that one form of the flexor avulsion can involve an avulsion fracture off of the volar aspect of the distal phalanx, and that reinsertion of the fragment is part of the repair. But flexor tendon avulsion does not involve fracture of the middle phalanx. Furthermore, this is not an avulsion of the flexor digitorum sublimis because the patient flexes at the PIP with minimal discomfort, as per the vignette.

End-to-end flexor tendon repair is wrong because this injury is a tendon avulsion from a distal bony insertion. There is no distal tendon to which to perform an end-to-end repair. Successful repair of a flexor digitorum profundus (FDP) avulsion really requires some form of anchoring of the distal FDP to distal phalanx bone.

References

1. Gunter GS. Traumatic avulsion of the insertion of the flexor digitorum profundus. *Aust N Z Surg.* 1960;30:1-8.
2. Manske PR, Lesker PA. Avulsion of the ring finger flexor digitorum profundus tendon: an experimental study. *Hand.* 1978 Feb;10(1):52-55.

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96. A 55-year-old man is scheduled to undergo a large oncologic extirpation in the groin. Closure of the resulting defect with a rectus femoris musculocutaneous flap is planned. Which of the following is the most likely functional outcome?

- A) 15-Degree extensor lag of the knee
- B) 20-Degree flexion contracture of the hip
- C) Compromised ability to stand for extended periods
- D) Inability to adduct the leg
- E) No loss of function

The correct response is Option A.

The rectus femoris flap provides reliable and robust soft tissue for coverage of abdominal, groin, and hip defects. Because the rectus femoris is one of the quadriceps muscles and inserts into the patella, its use can have functional consequences. It is generally recommended to perform patellar tendon repair following harvest of the rectus femoris; despite this repair, there can still be about 15 degrees of extensor lag at the knee. Flexion contracture of the hip, difficulty standing for extended periods, and difficulty adducting the leg have not been described with this flap harvest.

The expanded rectus femoris flap has several advantages for massive abdominal wall reconstruction. The expanded flap easily can reach the xiphoid, and it has impressive width. The donor site can be closed primarily with an acceptable scar. The muscle remains innervated and functional, which may help prevent bulging.

Large or complicated abdominal wall defects caused by recurrent incisional hernias, infections, or tumor resections often require the use of prosthetic mesh, local tissue transposition, or even distant muscle flaps for proper reconstruction. In a series of 12 cases of reconstruction of the abdominal wall using pedicled rectus femoris muscle flaps for wounds resulting after tumor resections, recurrent incisional hernias, and infection, abdominal wall stability and donor site morbidity were examined clinically. Follow-up time ranged from 6 months to 4 years. In all but one patient, a stable abdominal wall could be reconstructed. The loss of true muscular capacity in the quadriceps muscle of the operated leg was 19% compared with the nonoperated leg, but this result was tolerated well.

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References

1. Matthews MS. Abdominal wall reconstruction with an expanded rectus femoris flap. *Plast Reconstr Surg*. 1999 Jul;104(1):183-186.
2. Terry GC. The anatomy of the extensor mechanism. *Clin Sports Med*. 1989 Apr;8(2):163-177.
3. Kuo YR, Jeng SF, Kuo MH, et al. Free anterolateral thigh flap for extremity reconstruction: clinical experience and functional assessment of donor site. *Plast Reconstr Surg*. 2001 Jun;107(7):1766-1771.
4. Daigeler A, Fansa H, Altmann S, et al. The pedicled rectus femoris muscle flap for reconstruction of complicated abdominal wall defects. *Rozhl Chir*. 2005 May;84(5):238-243.

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97. A 55-year-old woman comes to the office because of a 3-month history of severe pain and stiffness after undergoing tendon repair to correct a laceration to the extensor digitorum communis in Zone VI of the long finger of the nondominant hand. Which of the following additional clinical findings is most likely to support a diagnosis of complex regional pain syndrome?

- A) Adhesion
- B) Disrupted tendon repair
- C) Normal blood flow
- D) Numbness
- E) Osteopenia

The correct response is Option E.

Osteopenia is related to disuse and is typical in Stage II of complex regional pain syndrome (CRPS). Calcium stores need to be depleted by 30 to 50% for the osteopenia to become apparent, so this finding may appear more regularly in postmenopausal women. The demineralization affects both cortical and cancellous bone.

The clinical presentation of CRPS is slightly different depending on the stage. In Stage I, there is extreme pain out of proportion to the injury, hyperesthesia, edema, erythema, and hyperhidrosis, all of which last for 3 months. Stage II is the “dystrophic” phase and spans between the third and the ninth month. It is characterized by pain, pronounced stiffness, “hard” edema, altered blood flow (increased warmth alternating with cyanosis), hair loss, decreased moisture, and osteopenia visible on plain x-ray study. Stage III starts at approximately the ninth month and lasts until 18 months after onset. It represents the “atrophic” phase, which features increased stiffness and pale, cool, and dry skin, but decreased pain.

Tendon adhesions and disruption of the tendon repair are not unique features of CRPS and occur regardless as complications of tendon repair surgery.

Abnormalities in blood flow are common in CRPS, which is a direct effect of autonomic dysfunction, and occurs in 98% of cases. The vasomotor changes include loss of thermoregulatory and sudomotor control and manifest as a discolored limb (pale, red, or blue) with excessive sweating or anhidrosis.

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Numbness is not a typical feature, whereas hyperalgesia and allodynia are very prominent and extend beyond the anatomical confines of any particular peripheral nerve. Exception would be noted if the inciting injury were to involve the nerve.

References

1. Collins ED, Boynton JF. Complex regional pain syndrome and repetitive stress injury. In: Trumble TE, ed. *Hand Surgery Update*. Vol 3. Rosemont, IL: American Society for Surgery of the Hand; 2003:335-345.
2. Smith P. *Lister's The Hand: Diagnosis and Indications*. 4th ed. London: Churchill Livingstone; 2002:141-270.
3. Koman LA, Poehling GG, Smith BP, et al. Complex regional pain syndrome. In: Green DP, Hotchkiss RN, Pederson WC, et al, eds. *Green's Operative Hand Surgery*. 5th ed. Philadelphia: Churchill Livingstone; 2005:2015-2044.

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98. A 63-year-old woman who underwent a Mohs resection of a squamous cell carcinoma of the hand is scheduled to undergo reconstruction of a defect on her long finger. She underwent ultraviolet light treatment for eczema 54 years ago. A photograph of the defect is shown. Which of the following is the most appropriate course of action?
- A) Construction of a second metacarpal artery flap
 - B) Full-thickness skin grafting
 - C) Occlusive dressing
 - D) Split-thickness skin grafting

The correct response is Option B.

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Skin cancers are the most common cancers in the world. In the United States, half of all cancers are skin cancers. Most skin cancers are thought to be related to solar exposure. Squamous cell cancers of the hand are often related to environmental agents (eg radiation or therapeutic light treatment).

If viable peritenon is available, full-thickness skin grafting is the best reconstruction option for the patient described. Healing by secondary intention in this patient would lead to a flexion contracture of the finger. In a 60-year-old patient with viable soft tissue over the tendon, a local or regional flap would not be required. Both options add another surgical procedure and have a high risk of complication and stiffness. For palmar defects, a split-thickness skin graft does not provide acceptable, durable coverage.

References

1. MacFarlane DF, Alonso CA. Occurrence of nonmelanoma skin cancers on the hands after UV nail light exposure. *Arch Dermatol*. 2009 Apr;145(4):447-449.
2. Talbot SG, Mehrara BJ, Disa JJ, et al. Soft-tissue coverage of the hand following sarcoma resection. *Plast Reconstr Surg*. 2008 Feb;121(2):534-543.

99. A 25-year-old lawyer comes to the office because of a 1-year history of limited ability to extend the right long finger at the proximal interphalangeal joint with no limitation of flexion following a jammed finger after playing basketball. X-ray study shows a normal articular surface and no evidence of fracture or foreign body. Which of the following is the most likely cause of this patient's condition?

- A) Dorsal collateral ligament contracture
- B) Dorsal edema
- C) Dupuytren contracture
- D) Extensor adhesions
- E) Flexor adhesions

The correct response is Option E.

Previous injuries to a flexor tendon or canal can result in scar formation of the tendon to an adjacent structure. Other structures which can limit digital extension include volar plate contracture (including checkrein ligaments), collateral ligament contracture (true and accessory), scarring or insufficiency of the skin volar to the joint, and joint irregularity, arthrosis, or bony block.

Dorsal collateral ligament contractures can limit the passive and active flexion of the PIP joint. Dorsal edema occurs commonly following injury near the PIP joint but also limits flexion of the joint. Dupuytren contracture rarely involves the proximal interphalangeal (PIP) joint in a patient of the age described; it is a spontaneously occurring condition that is more common with advanced age. The metacarpophalangeal joint is more likely to be involved first, followed by the PIP joint. Extensor adhesions can occur following injury to the dorsal finger and are a common cause of limitation in flexion.

References

1. Goldfarb CA, Boyer MI. Soft tissue and joint contractures. In: Guyuron B, Eriksson E, Persing JA, eds. *Plastic Surgery: Indications and Practice*. Philadelphia: WB Saunders; 2009:1168.
2. Neumeister MW, Wilhelmi BJ. Flexor tendon injuries. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2006:535-540.

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3. Wilhelmi BJ, Neumeister MW. Extensor tendon injuries. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2006:545-550.
4. Neumeister MW, Wilhelmi BJ. Flexor tendon lacerations. eMedicine Web site. Available at: <http://emedicine.medscape.com/article/1238823-overview>. Updated February 8, 2010.
5. Gillespie JN, Wilhelmi BJ. Intrinsic plus hand. eMedicine Web site. Available at: <http://emedicine.medscape.com/article/1243815-overview>. Updated May 13, 2009.

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100. A 43-year-old woman comes to the emergency department after sustaining an amputation at the fingertip of the long finger of the dominant hand while attempting to unclog a snowblower. Physical examination shows pulp loss of 1×1.2 cm. Which of the following is the most appropriate method of reconstruction to maximize sensation and function?

- A) Cross-finger flap from the ring finger
- B) Full-thickness skin graft harvested from the hypothenar eminence
- C) Full-thickness skin graft harvested from the medial elbow
- D) Moist dressing changes until healing is complete
- E) V-Y advancement flap

The correct response is Option D.

Injuries to the fingertip are among the most common injuries seen by the hand and plastic surgeons. These injuries can affect all components of the hand, including skin, bones, nerves, tendons, and vessels. In fingertip injuries without a bony amputation or with minimum exposed bone (less than 0.5 mm), a variety of reconstruction methods are possible. For preservation of sensation of the fingertip, the most appropriate method of reconstruction is healing by secondary intention with the use of moist dressings.

Skin grafts, either full- or split-thickness, have the poorest sensory recovery. Flaps, either local or regional, provide decreased sensation in the reconstruction.

References

1. Lemmon JA, Janis JE, Rohrich RJ. Soft-tissue injuries of the fingertip: methods of evaluation and treatment. An algorithmic approach. *Plast Reconstr Surg*. Sep 2008;122(3):105e-117e.
2. Bickel KD, Dosanjh A. Fingertip reconstruction. *J Hand Surg Am*. 2008 Oct;33(8):1417-1419.

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Section 3: Craniomaxillofacial

101. Which of the following structures arises from the lateral nasal processes during embryologic development?

- A) Columella
- B) Nasal ala
- C) Nasal septum
- D) Nasal tip
- E) Premaxilla

The correct response is Option B.

The nasal structures form during the sixth week of gestation. The nasal pits form the nasal placodes. These eventually deepen as a result of the formation of the medial and lateral nasal prominences. The external nasal structures appear as the medial nasal processes (MNP) enlarge and coalesce in the midline. Failure of this normal process can result in nasal deformities such as those seen in the cleft nasal deformity. The frontonasal process (FNP) forms above the nasal placode, while the lateral nasal processes (LNP) remain outside and lateral to the nasal placode. Fusion of the medial nasal, lateral nasal, and maxillary prominences produces the continuity between the nose, upper lip, and palate.

The MNP give rise to the nasal tip, columella, philtrum, and premaxilla. The nasal septum is a downgrowth from the merged medial nasal prominences. The forehead, the bridge of the nose, and the root of the nose come from the FNP. The nasal alae are derived from the LNP.

References

1. Gosain AK, Moore F. Embryology of the head and neck. In: Aston SJ, Beasley RW, Thorne CH, et al, eds. *Grabb and Smith's Plastic Surgery*. 5th ed. Philadelphia: Lippincott-Raven; 1997:223-236.
2. Johnston MC, Bronsky PT, Millicovsky G. Embryogenesis of cleft lip and palate. In: McCarthy JG, ed. *Plastic Surgery*. Philadelphia: WB Saunders; 1990:2451-2495.

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102. Which of the following synostoses is most predictably treated with endoscopic suturectomy and postoperative orthotic molding?

- A) Coronal
- B) Lambdoidal
- C) Metopic
- D) Sagittal
- E) Squamosal

The correct response is Option D.

Patients with sagittal synostosis may undergo an endoscopic correction that entails a synostectomy of the fused suture and additional bone, microfracturing of the parietal bones, and postoperative orthotic use to achieve an ideal calvarial form with normal cephalic index. There is no type of fixation utilized in this surgery. It must be done at a younger age than the open approach. The ideal time frame is between 2 to 4 months of age. Surgeons have tried endoscopic treatment for other types of synostoses with variable and controversial results. The open approach is still most successful in treatment of lambdoidal, coronal, and metopic synostosis. Squamosal synostosis generally does not require surgical intervention.

References

1. Jimenez DF, Barone CM. Endoscopy-assisted wide-vertex craniectomy, “barrel-stave” osteotomies, and postoperative helmet molding therapy in the early management of sagittal suture craniosynostosis. *Neurosurg Focus*. 2000 Sep 15;9(3):e2.
2. Barone CM, Jimenez DF. Endoscopic craniectomy for early correction of craniosynostosis. *Plast Reconstr Surg*. 1999 Dec;104(7):1965-1973.
3. Stelnicki EJ. Endoscopic treatment of craniosynostosis. *Atlas Oral Maxillofac Surg Clin North Am*. 2002 Mar;10(1):57-72.
4. Persing JA. MOC-PS(SM) CME article: management considerations in the treatment of craniosynostosis. *Plast Reconstr Surg*. 2008 Apr;121(4 Suppl):1-11.
5. Panchal J, Uttchin V. Management of craniosynostosis. *Plast Reconstr Surg*. 2003 May;111(6):2032-2048.

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103. An 18-year-old woman who underwent repair of unilateral cleft lip and palate in infancy comes to the office for consultation regarding facial aesthetics. Cephalometric analysis shows an SNA angle of 75 degrees (N 81.2), an SNB angle of 81 degrees (N 77.3), and an SNPg angle of 81 degrees (N 80). A negative overjet of 1.5 mm is noted. A photograph is shown. After orthodontic preparation, which of the following is the most appropriate surgical management?
- A) Maxillary advancement
 - B) Maxillary advancement and mandibular setback
 - C) Maxillary advancement, mandibular setback, and advancement genioplasty
 - D) Maxillary setback
 - E) Maxillary setback, mandibular advancement, and advancement genioplasty

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The correct response is Option C.

The cephalogram is a standardized x-ray study used for analyzing facial disharmony and asymmetry. Labeled landmarks help establish the relationship of the maxilla, mandible, and skull base to other facial structures. The sella (S) point marks the center of the hypophyseal fossa. The nasion (N) is the junction of the nasal and frontal bones at the most posterior point of the curve of the nose. Point “A” marks the innermost curvature from the maxillary anterior nasal spine to the alveolar process. The angle created by these points (SNA) establishes the maxillary position in relation to the skull base. Point “B” is located at the innermost curvature from the chin to the alveolar process of the mandible. The SNA angle similarly establishes the mandibular relationship to the skull base.

The prominence of the chin is often an important consideration in orthognathic surgery. The pogonion is the most anterior chin point. SNPg angle is representative of the degree of chin prominence relative to the cranial base (mandible position).

Normal angle values are given in the text. The patient described is in a dramatic Angle class III malocclusion. The SNA is less than normal, and the SNB is greater than normal. The chin position is appropriate. In order to establish a class I dental relationship, the maxilla must advance, and the mandible must be set back. Doing so will also move the chin back. Therefore, to maintain the preoperative chin position, a compensatory advancement genioplasty should also be performed.

References

1. McCarthy JG, Grayson B. Orthognathic surgery. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2006:151-164.
2. Schendel S. Orthognathic surgery. In: Achauer BM, Eriksson E, Guyuron B, et al, eds. *Plastic Surgery: Indications, Operations, and Outcomes*. Vol 2. St. Louis: Mosby; 2000:871-896.
3. Zoldos J, Sotereanos G. Pediatric orthognathic surgery syndromes. In: Bentz ML, ed. *Pediatric Plastic Surgery*. McGraw-Hill Professional; 1997: 227-257.

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104. A 70-year-old woman has a circular defect 18 cm in diameter on the parietal aspect of the scalp after excision of squamous cell carcinoma. The pericranium has been removed with the scalp tissue. Adjuvant radiation therapy is planned beginning 4 to 6 weeks after surgery. Which of the following is most appropriate for coverage of the defect?

- A) Latissimus dorsi muscle free flap with split-thickness skin graft
- B) Primary closure after galeal scoring
- C) Split-thickness skin grafting
- D) Temporary reconstruction with a split-thickness skin graft followed by a rotation-advancement flap after scalp tissue expansion

The correct response is Option A.

The latissimus dorsi muscle free flap with split-thickness skin grafting can be used to reconstruct large scalp defects in a single stage, allowing the patient to proceed with radiation therapy after recovery from surgery.

While temporary reconstruction with a split-thickness skin graft followed by definitive reconstruction with a rotation-advancement flap after tissue expansion is feasible for defects approaching 50% of the scalp surface area, this choice is inappropriate, as skin grafts usually have poor take on bare calvarium devoid of pericranium, particularly when treated with radiation. Radiated tissues are more difficult to expand, and their expansion is associated with a high rate of complications. Primary closure is usually only feasible in scalp defects less than 3 cm in diameter, even with galeal scoring to increase scalp flap length and reduce wound tension. Graft take can be improved by burring the bone down to the bleeding diploic space, but this technique results in unstable bone coverage, particularly in the setting of postoperative radiation.

References

1. Hussussian CJ, Reece GP. Microsurgical scalp reconstruction in the patient with cancer. *Plast Reconstr Surg*. 2002 May;109(6):1828-1834.
2. Leedey JE, Janis JE, Rohrich RJ. Reconstruction of acquired scalp defects: an algorithmic approach. *Plast Reconstr Surg*. 2005 Sep 15;116(4):54e-72e.
3. Newman MI, Hanasono MM, Disa JJ, et al. Scalp reconstruction: a 15-year experience. *Ann Plast Surg*. 2004 May;52(5):501-506.

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105. A 53-year-old woman comes to the office because of a 2-year history of a lump on her right ear. Physical examination shows a $2.5 \times 2 \times 1.5$ -cm neurofibroma on the concha. Resection of the skin of the entire conchal bowl and the underlying conchal cartilage is planned. Which of the following flaps is most appropriate for reconstruction of the defect?
- A) Postauricular island
 - B) Rhomboid
 - C) Rim advancement
 - D) Rotation advancement
 - E) Temporalis fascia

The correct response is Option A.

Lesions arising on the thin anterior skin of the concha involve the perichondrium; thus, adequate excision usually requires the removal of underlying conchal cartilage. The defect may be closed with a skin graft, but closure with a local flap takes less time and provides better results in skin color, lack of contraction, and reestablishment of contour. The postauricular “revolving door” island flap is most appropriate for repair of the defect described; it is ideally suited for particularly large defects of the concha. The larger the pedicle, the more secure the flap. Total concha replacement can occur with this skin flap. The design of the flap is partially on the posterior ear and partially on the mastoid area. A skin incision is made around the island, and the flap is raised posteriorly and anteriorly. The skin is incised through the anterior surface of the ear, and the posterior skin elevation stops at the ear mastoid groove. This vertical attachment becomes the pedicle of the flap, or the “hinge” of the “revolving door.” The posterior skin island can be rotated like a revolving door into the interior conchal defect, and the conchal defect is reconstructed while the posterior defect is closed primarily. This flap is also useful for smaller conchal defects. However, the pedicle will be narrower.

A rhomboid flap would be inappropriate in this area because there is not an adequate donor site for this flap. Rhomboid flaps are more appropriate in the cheek and in areas of lax skin. Rim advancement flaps and rotation advancement flaps are ideally suited for defects of the helix of the ear. Smaller defects can be adequately treated by advancing the rim, while larger defects require undermining of the postauricular skin and thus creating a rotation advancement flap. Temporalis fascia flaps are ideal for total ear resurfacing but also require skin coverage over the fascia.

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References

1. Jackson IT. *Local Flaps in Head and Neck Reconstruction*. 2nd ed. St. Louis: Quality Medical Publishing; 2007:313-346.
2. Masson JK. A simple island flap for reconstruction of concha-helix defects. *Br J Plast Surg*. 1972 Oct;25(4):399-403.

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106. A 3-day-old female newborn is in the neonatal intensive care unit because of airway obstruction, micrognathia, glossoptosis, and cleft palate. Placement of the patient in the prone position has failed to stabilize the airway. Which of the following is the most appropriate immediate next step in management?

- A) Endotracheal intubation
- B) Mandibular distraction
- C) Tongue-lip adhesion
- D) Tracheostomy

The correct response is Option A.

The Pierre Robin sequence consists of micrognathia or retrognathia, glossoptosis, and airway obstruction (with or without cleft palate). Cleft palate is a frequently associated feature, but not cleft lip. There is little evidence of genetic transmissions. The retrognathia is believed to contribute to the glossoptosis, which in turn produces the airway obstruction.

Initial management is conservative. Prone positioning is the mainstay of initial airway management. Upright feedings, the use of nasogastric tubes, and endotracheal intubation may assist with the early management of the child.

Before undertaking any operative intervention designed to address the glossoptosis, such as mandibular distraction or tongue-lip adhesion, a nasoendoscopy is recommended. This is performed to rule out other anatomical sites or causes of airway obstruction. For airway obstruction arising only from glossoptosis, a tongue-lip adhesion is a reasonable first treatment option. This procedure is most effective in infants with good prospects for mandibular growth early in infancy (ie, Stickler syndrome, velocardiofacial syndrome, nonsyndromic patients). In some syndromes with poor mandibular growth potential, such as Treacher Collins syndrome or facial microsomia, or when the degree of mandibular hypoplasia or retrusion is particularly severe, mandibular distraction may provide a more effective management option.

References

1. Bardach J, Morris HL. *Multidisciplinary Management of the Cleft Lip and Palate*. Philadelphia: WB Saunders; 1990.
2. Schaefer RB, Stadler JA III, Gosain AK. To distract or not to distract: an algorithm for airway management in isolated Pierre Robin sequence. *Plast Reconstr Surg*. 2004 Apr 1;113(4):1113-1125.

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3. Kirschner RE, Low DW, Randall P, et al. Surgical airway management in Pierre Robin sequence: is there a role for tongue-lip adhesion? *Cleft Palate Craniofac J*. 2003 Jan;40(1):13-18.
4. Rogers GF, Lim AA, Mulliken JB, et al. Effect of a syndromic diagnosis on mandibular size and sagittal position in Robin sequence. *J Oral Maxillofac Surg*. 2009 Nov;67(11):2323-2331.



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107. A 79-year-old woman comes to the office because of a large scalp defect following Mohs micrographic surgery for basal cell carcinoma. A photograph of the defect (left) and a rotation flap designed to cover the defect (right) are shown. At the completion of the procedure, a large “dog ear” is noted at the pivot point of the flap. Which of the following is the most appropriate next step in management?
- A) Burrow triangle
 - B) Compression
 - C) Direct excision
 - D) Staged advancement
 - E) Observation

The correct response is Option E.

The most appropriate next step in management is observation. A Burrow triangle would not sufficiently address this deformity and is not necessary. Compression and staged advancement are not necessary, as the deformity resolves spontaneously. The temptation to excise should be resisted, as most of these “dog ears” resolve over time. Photographs immediately after the procedure (left) and 5 months later (right) are shown.

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Excision would only increase the length-to-width ratio and compromise blood supply to the flap. If the contour abnormality is unacceptable to the patient after some time has passed, then excision at a later time can be performed. The need for this is exceedingly rare.

References

1. Leedy JE, Janis JE, Rohrich RJ. Reconstruction of acquired scalp defects: an algorithmic approach. *Plast Reconstr Surg*. 2005 Sep 15;116(4):54e-72e.
2. Wells MD. Scalp reconstruction. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:607-632.

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108. A 55-year-old woman is referred to the office by her dentist because of a 6-week history of exposed intraoral bone. She takes zoledronic acid for osteoporosis. Physical examination shows a 1-cm ulceration of gingiva with exposed necrotic bone adjacent to the right premolar. No infection or fistulization is noted. In addition to meticulous oral hygiene, which of the following is the most appropriate management?

- A) Administration of prophylactic oral antibiotics
- B) Curettage and bone grafting
- C) Dental extraction
- D) Segmental resection
- E) Observation only

The correct response is Option E.

The most appropriate management is observation only. The clinical vignette illustrates a case of Stage I bisphosphonate-related osteonecrosis of the jaw (BRONJ). These patients are typically asymptomatic, with the exception of exposed and/or necrotic bone.

Antibiotics are not recommended unless there is infection (Stage II or III). Stage II BRONJ features exposed and/or necrotic bone with pain and local infection.

Curettage and bone grafting is not appropriate.

Dental extractions are risky and may trigger exacerbation. In cases of serious tooth decay, endodontics (root canal) and crown amputation is preferred.

Segmental resection is reserved for Stage III BRONJ. In general, the need for surgery is guided by the severity of the stage. Stage III BRONJ is characterized by exposed and/or necrotic bone with pain, infection, and the presence of another complication, such as osteolysis extending from the superior to the inferior border of the mandible, pathologic fracture, or extraoral fistula.

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References

1. Ruggiero SL. Diagnosis and management of bisphosphonate-related osteonecrosis of the jaws (BRONJ). In: Marciani RD, Carlson ER, Braun TW, eds. *Oral and Maxillofacial Surgery*. Vol 2. 2nd ed. St. Louis: Saunders; 2009:557-566.
2. Ellis E III. Management of the patient undergoing radiotherapy or chemotherapy. In: Hupp JR, Ellis E III, Tucker MR, eds. *Contemporary Oral and Maxillofacial Surgery*. 5th ed. St. Louis: Mosby; 2008:363-381.

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109. A 6-week-old female infant is brought to the office for evaluation of a skull deformity shown in the photograph. Physical examination shows the absence of calvarial bone in multiple areas of the cranium. CT scan (also shown) confirms a kleeblattschädel skull deformity. Which of the following is the most likely indication for surgical intervention at this time?

- A) Airway compromise
- B) Hydrocephalus
- C) Increased intracranial pressure
- D) Loss of vision
- E) Orbital exposure

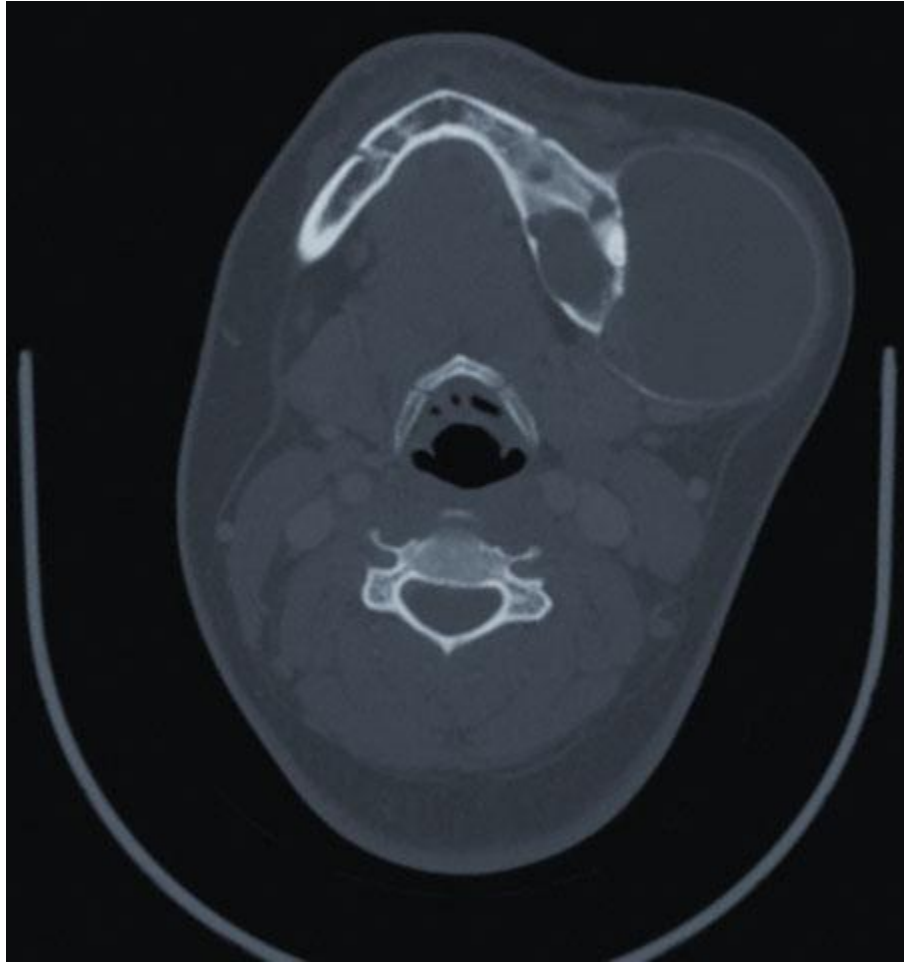
The correct response is Option C.

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The kleeblattschädel skull deformity occurs secondary to multiple suture synostoses. This results in a significant increase in intracranial pressure that causes the skull deformity shown in the CT scan. The increase in intracranial pressure produces a “moth-eaten” appearance and is the reason for early surgical intervention. This skull deformity is not typically associated with hydrocephalus. Visual compromise sometimes occurs late in life secondary to increased intracranial pressure. Orbital exposure can be a reason for early surgical intervention in some types of syndromic craniosynostosis, such as Crouzon syndrome and Apert syndrome, but is not seen in the scenario described. Airway compromise would be an indication for urgent surgical intervention, but it is not typical for kleeblattschädel skull deformity.

References

1. Jarrahy R, Kawamoto HK, Keagle J, et al. Three tenets for staged correction of Kleeblattschädel or cloverleaf skull deformity. *Plast Reconstr Surg*. 2009 Jan;123(1):310-318.
2. Bristol RE, Lekovic GP, Rekate HL. The effects of craniosynostosis on the brain with respect to intracranial pressure. *Semin Pediatr Neurol*. 2004 Dec;11(4):262-267.
3. Cohen MM Jr. Cloverleaf skulls: etiologic heterogeneity and pathogenetic variability. *J Craniofac Surg*. 2009 Mar;20 Suppl 1:652-656.



110. A 24-year-old woman comes to the office because of a painless swelling of the jaw. The swelling first appeared 3 years ago and has increased in size since then. She has never smoked cigarettes and has no family history of cancer. CT scan of the jaw is shown. Which of the following is the most likely diagnosis?

- A) Ameloblastoma
- B) Dental abscess
- C) Fibrous dysplasia
- D) Osteoradionecrosis
- E) Squamous cell carcinoma

The correct response is Option A.

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Ameloblastomas are benign, locally invasive odontogenic tumors accounting for 1% of tumors of the jaw and 10% of odontogenic tumors. Approximately 80% occur in the mandible and 20% occur in the maxilla. The peak incidence occurs in the third and fourth decades of life but may also arise in children and adolescents. On x-ray study, ameloblastomas may be unilocular or, more commonly, multilocular with a “soap bubble” or “honeycomb” appearance. Treatment may include enucleation and curettage or more radical resection. Segmental mandibulectomy with immediate reconstruction is favored currently and is associated with the lowest recurrence rates. In rare cases, metastatic ameloblastoma and ameloblastic carcinomas have been reported.

Dental abscesses are infectious processes and present with pain, acute swelling, and fever. CT scans are usually not necessary, although periapical x-ray studies and pantomography are usually obtained. Fibrous dysplasia is a benign hamartomatous lesion that has a diffuse, “ground-glass” appearance on x-ray study. It is usually treated conservatively, with shaving and recontouring of the bone. Osteoradionecrosis is a late complication related to radiation therapy for cancer. It is often associated with pain, bone exposure, and, as a late finding, orocutaneous fistula. Findings upon CT scan include cortical erosion and loss of bony trabeculation within the marrow space. Pathologic fractures may also be present. Squamous cell carcinoma is rare in young people who do not smoke cigarettes, but it can occur. It is usually associated with a mucosal lesion. On x-ray study, bony invasion may be noted in locally advanced cases.

References

1. Chana JS, Chang YM, Wei FC, et al. Segmental mandibulectomy and immediate free fibula osteoseptocutaneous flap reconstruction with endosteal implants: an ideal treatment method for mandibular ameloblastoma. *Plast Reconstr Surg*. 2004 Jan;113(1):80-87.
2. Sham E, Leong J, Maher R, et al. Mandibular ameloblastoma: clinical experience and literature review. *ANZ J Surg*. 2009 Oct;79(10):739-744.
3. Vayvada H, Mola F, Menderes A, et al. Surgical management of ameloblastoma in the mandible: Segmental mandibulectomy and immediate reconstruction with free fibula or deep circumflex iliac artery flap (evaluation of the long-term esthetic and functional results). *J Oral Maxillofac Surg*. 2006 Oct;64(10):1532-1539.

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111. A 10-month-old boy is brought to the office because of the ocular defect shown in the photograph. Which of the following is the correct term for this anomaly?

- A) Anophthalmia
- B) Coloboma
- C) Congenital cataract
- D) Palpebral fissure
- E) Tessier No. 6 cleft

The correct response is Option B.

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Coloboma is a congenital ocular defect of the eyelid, iris, retina, choroid, or optic disk. The defects can range in size from a small notch to a large structural cleft. Palpebral colobomas are thought to arise from a localized growth disturbance, while colobomas of the iris, retina, and optic disk arise from defective closure of the optic fissure. Upper eyelid coloboma rarely affects vision; large defects of the lower eyelid can lead to corneal ulceration.

Anophthalmia is total absence of the eye. A congenital cataract is a lens opacity that is present in 1:4000 to 1:10,000 newborns. The size and location determine the effect on vision. The palpebral fissure is the natural opening between the upper and lower eyelids. A Tessier No. 6 cleft involves the inferolateral aspect of the lower eyelid, inferior orbital rim, and the zygoma. This cleft often has an associated lower eyelid coloboma and is related to Treacher Collins syndrome.

References

1. Levin AV. Congenital eye anomalies. *Pediatr Clin North Am*. 2003 Feb;50(1):55-76.
2. Guercio JR, Martyn LJ. Congenital malformations of the eye and orbit. *Otolaryngol Clin North Am*. 2007 Feb;40(1):113-140, vii.

112. A 22-year-old man is brought to the emergency department after sustaining injuries during an all-terrain vehicle collision. Clinical examination shows telecanthus and periorbital ecchymosis. A fracture dislocation involving which of the following structures is most likely contributing to the telecanthus?

- A) Inferior rectus muscle tendon
- B) Lateral canthal tendon
- C) Lateral rectus muscle tendon
- D) Medial canthal tendon
- E) Medial rectus muscle tendon

The correct response is Option D.

The medial canthal tendon is a fibrous band attached to the medial orbital wall (frontal bone and lacrimal crest). During significant trauma to the frontal and mid face region, fractures of the medial orbital wall, the nasomaxillary buttress, and the lateral nasal bones can occur and result in a naso-orbital-ethmoid fracture. With displacement of the fractures, the medial canthal tendon is also displaced laterally, resulting in telecanthus. Telecanthus is an increased distance between the medial canthi beyond the normal range for an adult. The medial canthal ligament is closely approximated to the lacrimal system and orbicularis oculi muscle.

The lateral canthal tendon is a fibrous band that attaches to the lateral orbital wall and is not involved in producing traumatic telecanthus. The lateral and medial rectus muscle tendons are the attachments of these extraocular muscles to the bony orbit. Disturbance of these muscles and/or tendons would result in strabismus.

References

1. Turgut G, Ozkaya O, Soydan AT, et al. A new technique for medial canthal tendon fixation. *J Craniofac Surg*. 2008 Jul;19(4):1154-1158.
2. Markowitz BL, Manson PN, Sargent L, et al. Management of the medial canthal tendon in nasoethmoid orbital fractures: the importance of the central fragment in classification and treatment. *Plast Reconstr Surg*. 1991 May;87(5):843-853.
3. Sargent LA. Nasoethmoid orbital fractures: diagnosis and treatment. *Plast Reconstr Surg*. 2007 Dec;120(7 Suppl 2):16S-31S.

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113. A 42-year-old woman is brought to the emergency department after sustaining traumatic fractures of the right orbit and zygoma in a motor vehicle collision. Physical examination shows localized edema. Which of the following indications is most likely for immediate ophthalmologic consultation?

- A) Corneal abrasion
- B) Diplopia
- C) Eyelid ptosis
- D) Hyphema
- E) Subconjunctival hemorrhage

The correct response is Option D.

Hyphema is defined as blood within the anterior chamber of the eye. It is caused by tearing of the vessels within the iris as a result of trauma. Subconjunctival hemorrhage, on the other hand, stains the bulbar conjunctiva with blood from the site of a nearby fracture. Blood within the eye is worrisome because clotting can interfere with fluid egress from the anterior chamber, leading to the development of glaucoma. Immediate ophthalmology consultation, urgent intraocular pressure measurement, and slit-lamp examination should be performed to determine the extent of hemorrhage. Blindness, blurred vision, eye pain, globe rupture, or retrobulbar hematoma also warrant ophthalmology consultation. Patients with painful corneal abrasions have epithelial defects diagnosed by urgent (but not emergent) slit-lamp examination with topical fluorescein. Diplopia, or double vision, may be present in one or several directions of gaze following blunt trauma to the face. Neither diplopia nor traumatic ptosis warrants emergent consultation.

References

1. Papaconstantinou D, Georgalas I, Kourtis N, et al. Contemporary aspects in the prognosis of traumatic hyphemas. *Clin Ophthalmol*. 2009;3:287-290.
2. Ashaye AO. Traumatic hyphaemia: a report of 472 consecutive cases. *BMC Ophthalmol*. 2008 Nov 26;8:24.
3. Walton W, Von Hagen S, Grigorian R, et al. Management of traumatic hyphema. *Surv Ophthalmol*. 2002 Jul-Aug;47(4):297-334.

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114. A 54-year-old man is scheduled for total laryngopharyngectomy for recurrent squamous cell cancer of the lateral and posterior pharyngeal wall. He has previously been treated with local resection, chemotherapy, and radiation therapy. Which of the following is the most appropriate method of reconstruction after this procedure?
- A) Bilateral deltopectoral flap
 - B) Cervical esophagostomy with percutaneous gastrostomy tube
 - C) Jejunum flap
 - D) Latissimus dorsi myocutaneous flap
 - E) Tubed pectoralis major myocutaneous flap

The correct response is Option C.

The planned resection in the patient described is a total laryngopharyngectomy resulting in a circumferential defect of the pharynx. The goals of reconstruction are to restore the continuity of the gastrointestinal tract while avoiding fistula formation and donor site/recipient site deformities. The most appropriate reconstructive option that meets these requirements for a circumferential defect of the pharynx is a free jejunum flap. The free jejunum flap rapidly restores pharyngeal continuity and has high success rates in large series. Although the patient described is at risk for fistulas because of previous surgery and chemoradiation, most pharyngeal leaks seal spontaneously after free jejunum transfer.

Tubed fasciocutaneous flaps (eg, radial forearm or anterolateral thigh flaps) can also be used for circumferential defects of the pharynx; however, musculocutaneous flaps such as latissimus dorsi or pectoralis major flaps are secondary choices because they are associated with significant bulk. This bulkiness usually requires skin grafting of the neck and in some instances may occlude the tracheostomy. In addition, the excess bulk associated with musculocutaneous flaps makes tubing the skin paddle difficult and prone to breakdown caused by excessive tension. Finally, in order to tube a musculocutaneous flap, large skin flaps are necessary (because of the excess bulk associated with the muscle) and often require skin grafting of the donor site. Donor site skin grafting can be a significant source of morbidity and may be associated with wound-healing complications. Bilateral deltopectoral flaps can be used for treatment of circumferential defects of the pharynx; however, they are associated with high leak rates and require multiple stages. A cervical esophagostomy would not restore continuity of the pharynx and would result in a significant diminution of quality of life.

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References

1. Disa JJ, Pusic AL, Mehrara BJ. Reconstruction of the hypopharynx with the free jejunum transfer. *J Surg Oncol*. 2006 Nov 1;94(6):466-470.
2. Disa JJ, Pusic AL, Hidalgo DA, et al. Microvascular reconstruction of the hypopharynx: defect classification, treatment algorithm, and functional outcome based on 165 consecutive cases. *Plast Reconstr Surg*. 2003 Feb;111(2):652-660.
3. Gherardini G, Evans GRD. Reconstruction of the oral cavity, pharynx, and esophagus. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007:447-456.

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115. A 33-year-old woman is brought to the emergency department after sustaining injuries in a motor vehicle collision. The patient notes pain on opening her mouth. Physical examination shows bilateral facial swelling and loss of posterior facial height. An anterior open bite is also noted. Which of the following additional findings on physical examination is most likely to suggest a bilateral subcondylar fracture in this patient?

- A) Bilateral facial numbness
- B) Bilateral mastoid ecchymosis
- C) Blood in the external auditory canal
- D) Clear fluid in the external auditory canal
- E) Preauricular pain

The correct response is Option E.

Bilateral subcondylar fractures result in premature occlusion of the posterior teeth along with an anterior open bite, loss of posterior facial height, and bilateral facial swelling with pain on mouth opening. These findings occur because the subcondylar fracture interrupts the integrity of the vertical buttress. The lateral pterygoid muscles displace the condylar necks medially and anteriorly, allowing the unopposed vertical action of the temporalis and masseter muscles to shorten the posterior facial height. Swelling bilaterally would be expected in this fracture, and opening would displace the fracture line, causing pain.

Bilateral facial numbness suggests a fracture of the ramus or body as the inferior alveolar nerve traverses these areas. Blood in the external auditory canal suggests a fracture more proximal than subcondylar. Bilateral mastoid ecchymosis and/or clear fluid in the external auditory canal suggest a skull base fracture.

References

1. Stacey DH, Doyle JF, Mount DL, et al. Management of mandible fractures. *Plast Reconstr Surg*. 2006 Mar;117(3):48e-60e.
2. Rudderan RH, Mullen RL, Phillips JH. The biophysics of mandibular fractures: an evolution toward understanding. *Plast Reconstr Surg*. 2008 Feb;121(2):596-607.

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116. A 6-year-old boy is brought to the office because of persistent hypernasal speech. He has a history of cardiac anomalies and learning difficulties. Physical examination shows a broad nose, malar flattening, epicanthal folds, retrognathia, and vertical maxillary excess. Intraoral examination shows a bifid uvula and a palpable notch of the posterior nasal spine. Which of the following imaging studies is most appropriate prior to surgical intervention?

- A) Carotid angiography
- B) MRA of the head and neck
- C) PET scan of the brain
- D) Renal ultrasonography

The correct response is Option B.

The patient described appears to have velocardiofacial syndrome, an autosomal dominant condition caused by a deletion of the long arm of chromosome 22. Manifestations of velocardiofacial syndrome include cleft palate, velopharyngeal insufficiency, and cardiac abnormalities. Abnormal facial features associated with this syndrome include a broad, prominent nose, malar flattening, epicanthal folds, retrognathia, and vertical maxillary excess. MRA is the diagnostic study of choice for detecting abnormalities of the carotid vasculature, notably medialization, which may complicate palatal or pharyngeal surgery. While carotid angiography would yield similar information, it is too invasive. Neither PET scan of the brain nor renal ultrasonography addresses this issue.

References

1. MacKenzie-Stepner K, Witzel MA, Stringer DA, et al. Abnormal carotid arteries in the velocardiofacial syndrome: a report of three cases. *Plast Reconstr Surg*. 1987 Sep;80(3):347-351.
2. Mitnick RJ, Bello JA, Golding-Kushner KJ, et al. The use of magnetic resonance angiography prior to pharyngeal flap surgery in patients with velocardiofacial syndrome. *Plast Reconstr Surg*. 1996 Apr;97(5):908-919.
3. Ross DA, Witzel MA, Armstrong DC, et al. Is pharyngoplasty a risk in velocardiofacial syndrome? An assessment of medially displaced carotid arteries. *Plast Reconstr Surg*. 1996 Dec;98(7):1182-1190.

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117. An otherwise healthy 20-year-old woman who underwent functional septorhinoplasty 3 months ago comes to the office because she says her food “does not taste normal.” Physical examination shows that the nasal airway is open and unobstructed. No functional abnormalities are noted. Which of the following is the most likely diagnosis?

- A) Gustatory rhinorrhea
- B) Neurapraxia of lingual nerve during the surgery
- C) Olfactory dysfunction from nasal surgery
- D) Taste bud alterations from prescribed antibiotics
- E) Tongue injury from intubation

The correct response is Option C.

Because 80% of a meal's flavor is a result of olfactory input, patients often interpret a loss of smell as a loss of taste. For most patients who complain of chemosensory loss, however, the sense of taste—biologically, the sensation of salt, bitter, sweet, sour, and umami (monosodium glutamate)—which is from cranial nerve V, is intact. In a large prospective study, 7 to 9% of individuals who have undergone various types of nasal surgery experienced a decrease in olfactory function.

Gustatory rhinorrhea is an increasingly recognized complication of septoplasty and rhinoplasty that is associated with clear rhinorrhea postoperatively when the patient eats. This complication is not usually associated with changes in taste. It probably stems from inappropriate nerve regeneration, not dissimilar to gustatory sweating (Frey syndrome) after parotidectomy. Many drugs can affect taste, but usually antibiotics given for this type of surgery would be limited to a short course, and their side effects would almost certainly be resolved. Injury to the tongue and its nerves, including the lingual nerve, is possible, but rare; injury also would have been resolved in a period of 3 months.

References

1. Pade J, Hummel T. Olfactory function following nasal surgery. *Laryngoscope*. 2008 Jul;118(7):1260-1264.
2. Guyuron B, Michelow B, Thomas T. Gustatory rhinorrhea—a complication of septoplasty. *Plast Reconstr Surg*. 1994 Sep;94(3):454-456.

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118. A 16-year-old girl is brought to the office for consultation regarding reconstruction to correct hemifacial atrophy. The parents first noticed the condition when the patient was 6 years old; it has been stable for 18 months. Physical examination shows an asymmetric face with atrophy of the right side. There is significant unilateral atrophy of skin, subcutaneous tissue, and bone. Facial reconstruction is planned. Which of the following is the most appropriate method of reconstruction?

- A) Latissimus dorsi free flap
- B) Omental free flap
- C) Osteocutaneous fibula flap
- D) Parascapular free flap
- E) Silicone injection

The correct response is Option D.

Of the choices given, the most appropriate method of reconstruction in the patient described, who has Romberg disease, is a parascapular free flap.

Patients with Romberg disease may have deformities composed of skin, subcutaneous tissue, muscle, and bone. Options for reconstruction include synthetic material and implants, biologic fillers, bone grafts, fat grafts, and free tissue transfer.

Facial contouring with silicone injection has been unsatisfactory with severe scarring, contracture formation, and skin breakdown. Removal of liquid silicone can be a very challenging task and can make future reconstructions more difficult. Muscle and myocutaneous flaps are not ideal, as they can be too bulky, and the eventual muscle atrophy leads to unpredictable long-term results. Omental flaps for facial recontouring have been described, but they have several drawbacks. These include the need for an intra-abdominal harvest and the difficulty in long-term flap fixation, with eventual descent given the absence of dermal or fascial components to be used in fixation. The parascapular flap provides a versatile source of composite tissue that remains relatively stable as it matures, and it provides tissue components for appropriate fixation.

References

1. Hunt JA, Hobar PC. Common craniofacial anomalies: conditions of craniofacial atrophy/hypoplasia and neoplasia. *Plast Reconstr Surg*. 2003 Apr 1;111(4):1497-1508.
2. Siebert JW, Soltanian H, Hazen A. Hemifacial atrophy. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 4. 2nd ed. Philadelphia: WB Saunders; 2006:555-569.

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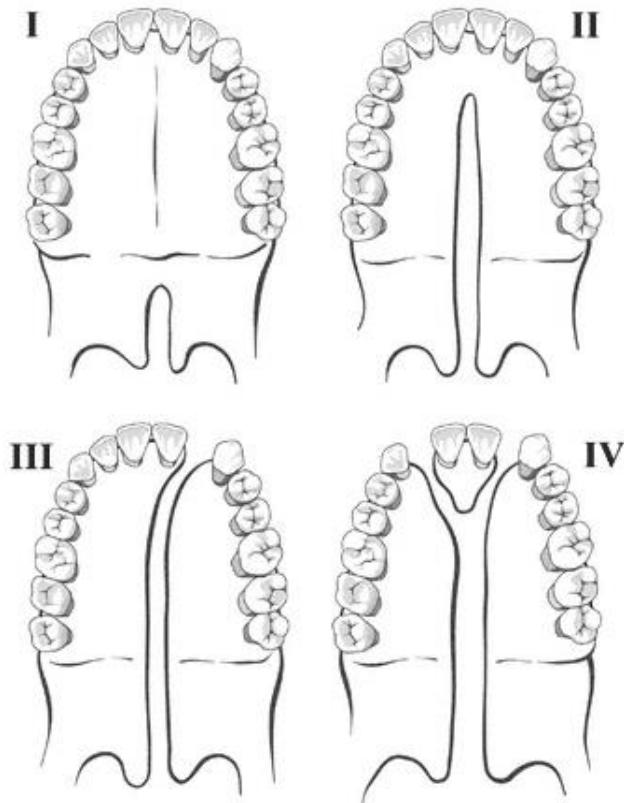
119. A newborn is evaluated because of a cleft of the soft and hard palates that extends to the incisive foramen. Which of the following is the most appropriate Veau classification of this cleft?

- A) I
- B) II
- C) III
- D) IV

The correct response is Option B.

Classification of a cleft palate is based on the degree of anatomical disruption of the primary and secondary palates. The Veau classification divides the cleft palate into four categories and is a widely utilized scheme for cleft palate classification. The Veau II cleft involves the hard and soft palate and is limited to the secondary palate; therefore, it is the most appropriate answer. Veau Class I is an incomplete cleft involving the soft palate. A Veau III is a complete unilateral cleft lip and palate, where the nasal septum fails to fuse with one palatal shelf, whereas a Veau IV is a complete bilateral cleft lip and palate in which both palatal shelves fail to fuse with the nasal septum. Other classification systems, such as the Kernahan “Y” classification, are also widely used.

An image is shown.



References

1. van Aalst JA, Kolappa KK, Sadove M. MOC-PSSM CME article: Nonsyndromic cleft palate. *Plast Reconstr Surg.* 2008 Jan;121(1 Suppl):1-14.
2. Smith AW, Khoo AK, Jackson IT. A modification of the Kernahan "Y" classification in cleft lip and palate deformities. *Plast Reconstr Surg.* 1998 Nov;102(6):1842-1847.

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120. A 19-year-old man comes to the office for evaluation of a large lower jaw. Physical examination shows an Angle class III malocclusion. Which of the following is the most likely finding on cephalometric evaluation?

- A) ANB angle is more acute than normal
- B) SNA angle is more obtuse than normal
- C) SNB angle is more obtuse than normal
- D) SNO angle is more acute than normal

The correct response is Option C.

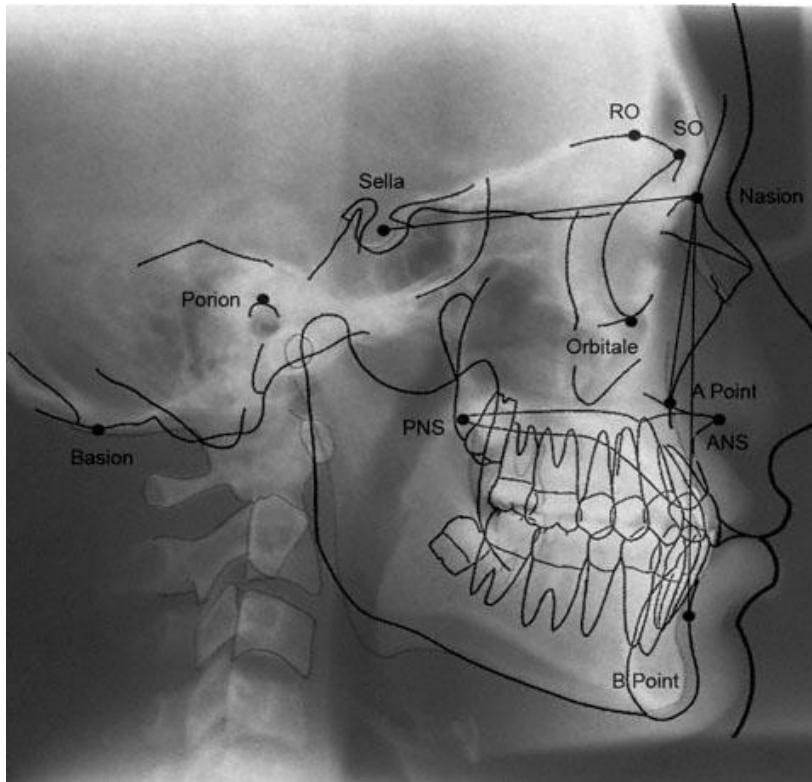
In a patient with mandibular prognathism (ie, projecting mandible), the SNB angle is more likely to be larger or more obtuse than normal. On a lateral cephalogram, the SNB is formed by the angle drawn between the sella, nasion, and B point (supramentale) of the mandible.

The ANB angle describes the position of the mandible relative to the maxilla. In the scenario described, the ANB angle would be more acute than normal.

The SNA angle describes the sagittal position of the maxilla and would be expected to be normal in the patient described.

The SNO angle describes the relationship between the inferior orbital rim and the skull base.

An image is shown.



References

1. Hurst CA, Eppley BL, Havlik RJ, et al. Surgical cephalometrics: applications and developments. *Plast Reconstr Surg.* 2007;120(6):92e-104e.
2. Grayson BH. Cephalometric analysis for the surgeon. *Clin Plast Surg.* 1989 Oct;16(4):633-644.

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121. A 24-year-old man comes to the office for follow-up examination 2 weeks after undergoing open reduction and internal fixation of a fracture of the right zygomaticomaxillary complex. The procedure was performed with intraoral and sub tarsal eyelid incisions. Physical examination shows ectropion of the right lower eyelid. Ophthalmologic examination shows no vision abnormalities; the cornea is intact. Which of the following is the most appropriate management of the ectropion?

- A) Coverage with a tarsoconjunctival flap
- B) Lateral canthoplasty
- C) Placement of an allograft to the middle lamella
- D) Skin grafting to the external lamella
- E) Observation with massage

The correct response is Option E.

Complications related to the eyelid are common following orbital fracture reconstruction. Approximately 10 to 20% of patients will require some operative revision for globe or eyelid malposition. This is because of the edema and swelling present at the initial operation. As a result, the incidence of scleral show and ectropion is also high because of eyelid retraction. The majority of the conditions described will resolve without intervention within a period of several weeks. Conservative therapy is recommended and includes tarsorrhaphy, massage, and application of ophthalmic steroid ointment or drops. Occasionally, a permanent deformity may result. Surgical treatment includes releasing the scar tissue with lateral canthal elevation. Depending on the location of the scar contracture, grafting to either the external or middle lamella may also be necessary. The incidence of corneal irritation or abrasion, as well as dry eye, may lead to earlier exploration; otherwise, conservative treatment is recommended.

References

1. Hollier LH Jr, Thornton JF. Craniofacial trauma supplement. *Plast Reconstr Surg*. 2007 Dec;120(7):45.
2. Hollier LH Jr, Kelley P. Soft tissue and skeletal injuries of the face. In: Aston SJ, Beasley RW, Thorne CH, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007:319-323.

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122. A 20-year-old man comes to the office with severe malocclusion 8 weeks after sustaining injuries during a motor vehicle collision. Physical examination shows healing lacerations, loss of sensation in the infraorbital nerve distribution on the affected side, and no orbital rim step-off deformity. CT scan shows a unilateral orbital blowout fracture with a mid face fracture. No mandibular fracture is identified. Which of the following is the most appropriate initial step in management?

- A) Le Fort I osteotomy with fixation
- B) Maxillomandibular fixation
- C) Open reduction and internal fixation of the fracture
- D) Open reduction and reconstruction of the orbital floor fracture

The correct response is Option A.

Because the patient is 8 weeks out from the injury, the fracture lines are immobile and a Le Fort I osteotomy and maxillomandibular fixation would be required to correct the malocclusion. Maxillomandibular fixation alone would not get the patient into normal occlusion at this late date. Open reduction and internal fixation of the zygomaticomaxillary complex fracture is not indicated at this time because the bone is solid and minimally displaced. While correction of the orbital floor fracture would be indicated if there were entrapment or increased orbital volume, this management would not address the malocclusion.

References

1. Fonseca RJ. *Oral and Maxillofacial Trauma*. 3rd ed. St. Louis: WB Saunders; 2005.
2. Kelley P, Crawford M, Higuera S, et al. Two hundred ninety-four consecutive facial fractures in an urban trauma center: lessons learned. *Plast Reconstr Surg*. 2005 Sep;116(3):42e-49e.
3. Manson PN. Organization of treatment in pan facial fractures. In: Prein J, ed. *Manual of Internal Fixation in the Cranio-Facial Skeleton: Techniques Recommended by the AO/ASIF Maxillofacial Group*. Heidelberg, Germany: Springer; 1998:95-107.
4. Bagheri SC, Holmgren E, Kademani D, et al. Comparison of the severity of bilateral Le Fort injuries in isolated midface trauma. *J Oral Maxillofac Surg*. 2005 Aug;63(8):1123-1129.

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123. A 53-year-old woman undergoes resection of an adnexal tumor of the upper lip with negative margins. The resulting defect is a full-thickness excision of 75% of the upper lip. Which of the following is the most appropriate method of reconstruction?

- A) Abbe flap only
- B) Bilateral Estlander flaps with an Abbe flap
- C) Bilateral Karapandzic flaps with an Abbe flap
- D) Radial forearm flap only
- E) Radial forearm flap with a palmaris longus sling

The correct response is Option C.

Lip defects are encountered commonly as a result of skin cancers such as squamous cell cancer and basal cell cancer. However, tumors of the minor salivary glands are also seen. The patient described is relatively young and has a large resection of the central upper lip. The best choice for reconstruction is closure with bilateral Karapandzic flaps and a central Abbe flap for philtral reconstruction. Karapandzic flaps enable transfer of the remaining upper lip while maintaining the innervations of the musculature (unlike the Gilles flap). Although bilateral Karapandzic flaps alone may be useful for defects up to 80% of the width of the upper lip, they are not an ideal choice in the patient described because the philtrum would be lost, thereby resulting in a significant cosmetic deformity. The Estlander flap is useful for reconstruction of commissure defects but not central defects. The Abbe flap alone is insufficient to close a 75% defect. The radial forearm flap, either with or without a palmaris longus sling, is not optimal because of differences in color match, innervation, and lack of vermilion reconstruction.

References

1. Anvar BA, Evans BC, Evans GR. Lip reconstruction. *Plast Reconstr Surg*. 2007 Sep 15;120(4):57e-64e.
2. Dupin C, Metzinger S, Rizzuto R. Lip reconstruction after ablation for skin malignancies. *Clin Plast Surg*. 2004 Jan;31(1):69-85.

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(Please note that this pictorial appears in color in the online examination)

124. A 49-year-old man is scheduled to undergo reconstruction of the nasal lining as a staged procedure for nasal reconstruction 2 weeks after rhinectomy. The resection is a subtotal rhinectomy and includes the columella and nasal tip (shown). Which of the following is most likely to provide both support and lining for the patient described?
- A) Bipedicle mucosal advancement flap
 - B) Ear composite graft
 - C) Full-thickness skin graft
 - D) Septal pivot flap
 - E) Turn-in flap

The correct response is Option D.

The septal pivot flap is a composite flap of mucosa and septal cartilage. It can be used to provide both lining and support in the patient described because the septum has not been resected in the ablative portion of the procedure. The septal branches arising from bilateral superior labial vessels are the pedicle for this flap.

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The bipedicle mucosal advancement flap is useful for reconstruction of the ala and is based medially on blood vessels arising from the septum (labial artery) and laterally on vestibular blood supply. This flap provides lining only and is not available to this patient. An ear composite graft would be useful if the graft were less than 1.5 cm. A full-thickness skin graft can be used to provide lining but does not provide support. Prefabricated flaps with full-thickness skin grafts and cartilage grafts performed at a later date are possible; however, this plan requires two operations. The turn-in flap involves skin that is elevated and attached only at the edges of the defect to provide lining. This flap does not provide support. In addition, turn-in flaps cannot be performed within 2 weeks of surgery because new blood vessels need to develop across the scar.

References

1. Burget GC, Menick FJ. Nasal support and lining: the marriage of beauty and blood supply. *Plast Reconstr Surg.* 1989 Aug;84(2):189-202.
2. Kim EM, Bartlett S. Nasal reconstruction. In: Guyuron B, Eriksson E, Persing JA, eds. *Plastic Surgery: Indications and Practice*. Philadelphia: WB Saunders; 2008.

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(Please note that this pictorial appears in color in the online examination)

125. The 3-month-old infant shown has a bilateral cleft lip and palate. Which of the following is a goal of the nasoalveolar molding seen in the photograph?

- A) Expansion of the alveolar cleft
- B) Expansion of the soft tissue of the lip
- C) Lengthening of the columella
- D) Lengthening of the septum

The correct response is Option C.

Nasoalveolar molding (NAM) is the fabrication and adjustment of a custom intraoral appliance that narrows the cleft, aligns the cleft segments, shapes existing nasal structures, and expands deficient nasal tissues. Bilateral cleft lip and palate is associated with a nasal deformity that is defined by a short columella. The premaxilla is typically protuberant if the cleft is complete. NAM allows alignment of the premaxilla with the lateral alveolar segments. Once this is accomplished, nasal stents are placed to lengthen the columella.

The alveolar clefts are aligned and narrowed. Generally the septum is in the midline and does not require any lengthening. The upper cleft lip does not require expansion; rather, it requires layered repair with good muscular approximation at the time of the primary lip and nasal repair.

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References

1. Lee CT, Garfinkle JS, Warren SM, et al. Nasoalveolar molding improves appearance of children with bilateral cleft lip-cleft palate. *Plast Reconstr Surg*. 2008 Oct;122(4):1131-1137.
2. Liou EJ, Subramanian M, Chen PK. Progressive changes of columella length and nasal growth after nasoalveolar molding in bilateral cleft patients: a 3-year follow-up study. *Plast Reconstr Surg*. 2007 Feb;119(2):642-648.
3. Cutting C, Grayson B, Brecht L, et al. Presurgical columellar elongation and primary retrograde nasal reconstruction in one-stage bilateral cleft lip and nose repair. *Plast Reconstr Surg*. 1998 Mar;101(3):630-639.

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(Please note that this pictorial appears in color in the online examination)

126. An otherwise healthy 19-year-old man is referred to the office for evaluation of two biopsy-proven skin basal cell carcinomas. Physical examination shows an asymmetry of the jaw. His father died of extensive skin cancer at 40 years of age. CT scan of the mandible is shown. Which of the following is the most likely cause of the asymmetry?
- A) Ameloblastoma
 - B) Invasive basal cell carcinoma
 - C) Metastatic cancer
 - D) Odontogenic keratocyst
 - E) Osteosarcoma

The correct response is Option D.

The scenario described, Nevoid Basal Cell Carcinoma Syndrome (Gorlin syndrome, NBCCS), is rare but noteworthy. NBCCS is an autosomal dominant syndrome. Diagnosis of NBCCS is made in the presence of either two major criteria or one major and two minor criteria. The major criteria consist of the following: (1) more than two basal cell carcinomas or one basal cell carcinoma in patients younger than age 20 years; (2) odontogenic keratocysts of the jaw (proven

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by histologic analysis); (3) three or more palmar or plantar pits; (4) bilamellar calcification of the falx cerebri; (5) bifid, fused, or markedly splayed ribs; and (6) a first-degree relative with NBCCS. Odontogenic keratocysts are seen in 74 to 80% of patients. They usually begin to develop in the first decade (after age 7 years), with the peak incidence in the second and third decades. They are more common in the mandible than in the maxilla. They are usually asymptomatic, but they may cause pathologic fracture, swelling, loose teeth, or displacement of developing permanent teeth. Ameloblastoma has been reported with NBCCS but is very rare. Although other tumors such as fibrosarcoma, rhabdomyosarcoma, and meningioma have been reported to have increased incidence, osteosarcoma and cancers that spread to the mandible have not been reported with increased frequency in patients with NBCCS.

Finally, recognition of syndromic causes of skin cancer allows for proper questions regarding family medical history, as well as the appropriate workup for potentially more threatening occult pathologies. Diagnosis of such a syndrome also sets the stage for appropriate genetic counseling.

References

1. Eslami B, Lorente C, Kieff D, et al. Ameloblastoma associated with the nevoid basal cell carcinoma (Gorlin) syndrome. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2008 Jun;105(6):10e-3e. Epub 2008 Apr 16.
2. Hauck RM, Manders EK. Familial syndromes with skin tumor markers. *Ann Plast Surg.* 1994 Jul;33(1):102-111.

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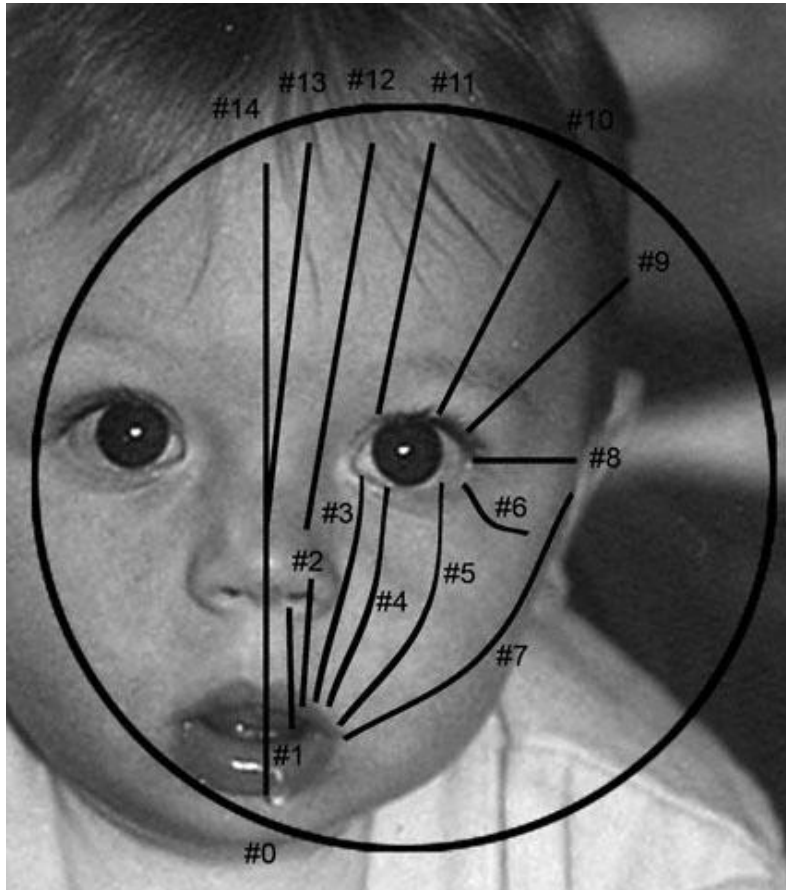
127. A 3-year-old boy is brought to the office because of a congenital soft tissue notch of the lower lateral eyelid. Which of the following is the most appropriate Tessier classification for the underlying craniofacial cleft?

- A) Tessier No. 3
- B) Tessier No. 4
- C) Tessier No. 6
- D) Tessier No. 10

The correct response is Option C.

The Tessier No. 3 cleft defect symptoms include a defect between the lateral incisors and canine. This cleft typically involves the alar base and medial canthal region. In severe cases, the cleft may enter the orbit medial to the punctum. Tessier No. 4 facial clefts extend from the upper lip, around the alar base, along the nasomaxillary junction, and across the tear duct and medial orbital tissues. Tessier No. 6 facial clefts may disrupt bone and soft tissues along the lower lateral orbit. These defects are frequently associated with colobomas of the lower eyelid. Extending into the frontal bone, Tessier No. 10 clefts involve the superior orbital rim and medial third of the orbit. Proptosis with fronto-orbital encephalocele may be present with significant clefts at this location. No. 7 clefts may produce macrostomia and extend through the lateral zygomatic arch. An image is shown.

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References

1. Crosby M. *Essentials of Plastic Surgery: A UT Southwestern Medical Center Handbook*. St. Louis: Quality Medical Publishing Inc; 2007:165-170.
2. Zhou YQ, Ji J, Mu XZ, et al. Diagnosis and classification of congenital craniofacial cleft deformities. *J Craniofac Surg*. 2006 Jan;17(1):198-201.

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128. A 67-year-old woman comes to the office because of a mass on the left side of the roof of the mouth. The patient notes that it has enlarged gradually since she first noticed it 6 months ago. Examination shows a 2-cm mass on the left hard palate and loss of sensation over the left cheek. Examination of a specimen obtained on biopsy shows adenoid cystic carcinoma. Which of the following skull-base foramina is most likely to be involved by this tumor?

- A) Jugular
- B) Lacerum
- C) Ovale
- D) Rotundum
- E) Stylomastoid

The correct response is Option D.

Adenoid cystic carcinoma of the hard or soft palate is a slow-growing, insidious disease with a tendency to spread via a perineural mechanism along the palatine branches of the maxillary division of the trigeminal nerve. The facial nerve exits the skull base from the stylomastoid foramen. The foramen lacerum, foramen ovale, and the foramen rotundum contain the internal carotid artery, mandibular (V3) nerve, and maxillary (V2) nerve, respectively. The glossopharyngeal (IX), vagus (X), and spinal accessory (XI) nerves emerge from the jugular foramen.

References

1. Harnsberger HR. The skull base. In Harnsberger HR, ed. *Handbook of Head and Neck Imaging*. 2nd ed. St. Louis: Mosby; 1994:399-425.
2. Ojiri H. Perineural spread in head and neck malignancies. *Radiat Med*. 2006 Jan;24(1):1-8.

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129. A male newborn is evaluated because of persistent cyanosis at birth. The cyanosis is relieved by crying. Physical examination shows normal facies. Which of the following is the most likely diagnosis?

- A) Choanal atresia
- B) Lingual thyroid
- C) Lymphatic malformation
- D) Pierre Robin sequence
- E) Subglottic stenosis

The correct response is Option A.

The patient described most likely has bilateral choanal atresia. Paradoxical cyanosis (cyanosis that is relieved by crying) is a classic symptom because newborns are obligate nose breathers. The diagnosis was traditionally confirmed by an inability to pass a catheter through the nose into the nasopharynx. CT scans are now routinely obtained and may show narrowing of the posterior nasal cavity because of medial displacement of the lateral nasal wall and pterygoid plates, as well as enlargement of the posterior vomer. Choanal atresia may be isolated or associated with other abnormalities, such as in the CHARGE association (coloboma, heart defects, choanal atresia, retarded growth and development, genital hypoplasia, and ear abnormalities), or with various craniosynostotic syndromes.

Lingual thyroid results from failure of some or all of the thyroid gland to descend from the tuberculum impar of the tongue during embryonic development and presents as a posterior tongue mass that may obstruct the airway. Lymphatic malformations, also known as cystic hygromas when occurring in the head and neck region, are soft, subcutaneous masses that may be associated with respiratory distress when very large. Pierre Robin sequence consists of glossoptosis (posterior displacement of the tongue), micrognathia (small mandible), airway obstruction, and often a cleft palate. Respiratory distress is caused by obstruction by the tongue and is relieved by prone positioning. Congenital subglottic stenosis results in respiratory distress caused by narrowing of the subglottic airway. The stenosis may be membranous, in which there is submucosal hypertrophy of fibrous connective tissue and mucous glands, or cartilaginous, in which the cricoid cartilage is shaped abnormally. None of these entities typically presents with paradoxical cyanosis.

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References

1. Corrales CE, Koltai PJ. Choanal atresia: current concepts and controversies. *Curr Opin Otolaryngol Head Neck Surg*. 2009 Dec;17(6):466-470.
2. Hengerer AS, Brickman TM, Jeyakumar A. Choanal atresia: embryologic analysis and evolution of treatment, a 30-year experience. *Laryngoscope*. 2008 May;118(5):862-866.
3. Samadi DS, Shah UK, Handler SD. Choanal atresia: a twenty-year review of medical comorbidities and surgical outcomes. *Laryngoscope*. 2003 Feb;113(2):254-258.

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130. A 27-year-old man is brought to the emergency department 1 hour after sustaining a knife wound to the left cheek. Physical examination shows a wound just anterior to the left ear that extends intraorally. A photograph is shown. He is able to elevate the brow, close the eyes, smile, and evert the lower lip. The laceration is irrigated thoroughly. Which of the following is the most appropriate next step in management?
- A) Application of wet-to-dry dressings
 - B) Cannulation of Stensen duct
 - C) Closure of the facial wound and administration of sialogogues
 - D) Starch-iodine test
 - E) Testing of the distal branches of the facial nerve with a stimulator

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The correct response is Option B.

After ruling out facial nerve injury, the next priority in management of a cheek laceration is to rule out injury to the parotid (Stensen) duct. Failure to repair a parotid duct laceration can result in a salivary fistula or sialocele. A small amount of methylene blue dye injected via an intravenous catheter, introduced through the ductal papilla in the mouth opposite the maxillary second molar, may be effective in identifying lacerations. Whenever possible, it is best to repair lacerations primarily using fine suture (eg, 8-0 nylon) over a stent. If the duct cannot be repaired because of extensive damage, ligation of the duct can be considered.

Wet-to-dry dressing changes and healing by secondary intention are not indicated in an early, uninfected facial wound. If a ductal injury can be ruled out, the wound should be closed primarily. It is not necessary to explore the facial nerve when the patient has clinically intact facial motor function. Such exploration risks inadvertent injury to the nerve. Anticholinergic medications, such as glycopyrrolate, can be administered to limit salivary secretion during healing and to help prevent salivary fistula or sialocele formation from an unrecognized ductal injury or glandular laceration. Sialogogues increase salivary secretion and are not effective in limiting complications. The starch-iodine test is used to assess gustatory sweating thought to occur because of inappropriate sympathetic reinnervation of the facial sweat glands after parotid surgery and is not indicated in the initial management of the patient described.

References

1. Lewkowicz AA, Hasson O, Nahlieli O. Traumatic injuries to the parotid gland and duct. *J Oral Maxillofac Surg*. 2002 Jun;60(6):676-680.
2. Steinberg MJ, Herrera AF. Management of parotid duct injuries. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2005 Feb;99(2):136-141.

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131. A 44-year-old man is referred by his pulmonologist for consultation regarding surgical management of obstructive sleep apnea. He is unable to tolerate treatment with continuous positive airway pressure. History includes septoplasty to correct a deviated nasal septum and uvulopalatopharyngoplasty 2 years ago. History also includes orthodontic treatment 30 years ago. Current examination shows a Class I molar relationship with normal overjet. Cephalometric analysis shows an SNA angle of 76.7 degrees (N 80), an SNB angle of 72.1 degrees (N 78), and a posterior airway space (PAS) of 4 mm (N 11.0 $\pm$ 1). Orthognathic surgery is planned. Which of the following is the most appropriate management?

- A) Mandibular advancement
- B) Maxillary advancement
- C) Maxillary and mandibular advancement
- D) Maxillary/palatal expansion

The correct response is Option C.

Options for management of obstructive sleep apnea (OSA) include medical and surgical modalities. The first line of treatment is continuous positive airway pressure. Surgical treatments are directed toward the level of pathology(ies); ie, nose, palate, or base of the tongue. The goal of orthognathic surgery in the treatment of OSA is the enlargement and decreased collapse of the velo-oropharyngeal airway through anterior displacement of the soft tissues and musculature. Orthognathic treatment in adult OSA patients generally involves maxillary and mandibular advancement. The amount of advancement is usually greater than 10 mm regardless of cephalometric analysis. Success rates seen with simultaneous large advancement of the maxilla and mandible are between 75 and 100%.

References

1. Riley RW, Powell NB, Li KK, et al. Surgery and obstructive sleep apnea: long-term clinical outcomes. *Otolaryngol Head Neck Surg*. 2000 Mar;122(3):415-421.
2. Schendel S, Powell NB. Surgical orthognathic management of sleep apnea. *J Craniofac Surg*. 2007 Jul;18(4):902-911.

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132. A 60-year-old man is referred for consultation regarding planned reconstruction of a defect that will result after excision of extensive squamous cell carcinoma of the lateral floor of the mouth with mandibular erosion. Preoperative photographs are shown. Which of the following flaps is most appropriate for reconstruction of the defect described?
- A) Free latissimus dorsi musculocutaneous flap with the twelfth rib
 - B) Osteocutaneous fibula free flap
 - C) Osteocutaneous iliac crest free flap
 - D) Osteocutaneous radial forearm free flap
 - E) Osteomuscular dorsal scapular pedicled flap

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The correct response is Option B.

This question illustrates the increasing knowledge of perforators and their distribution in flap harvesting. In the case of the fibula, many septo- and musculocutaneous perforators arise from the peroneal artery and can be used to fashion independent skin islands. Because of the experience in understanding vascular territories, safe isolation of bone, skin, and muscle components of the fibula free flap can independently be performed based on their own perforators.

Both the free flap and pedicled latissimus flap have been described for reconstruction of lateral mandibular defects. They allow for a large sheet of skin that can be de-epithelialized and used, albeit bulkily, for through-and-through defects. If more proximal dissection of the thoracodorsal pedicle is used to the subscapular artery, so-called “mega flaps” of latissimus with scapular bone and/or serratus anterior musculocutaneous components are other options. The iliac crest free flap allows for large components of bone with a skin paddle. The skin, however, is neither pliable nor independent of the bone. With the addition of the internal oblique muscle to line the oral cavity and the skin used for cheek replacement, a through-and-through defect can be reconstructed with this flap.

The osteocutaneous radial forearm flap provides thin and pliable skin that can be de-epithelialized for through-and-through defects. Separate skin paddles have been devised for this flap, but they are hard to center on the bone for such a defect. In addition, the bone is rather thin and cannot accommodate osteointegrated implants. The donor site has to be managed carefully as poor attention to detail (including poor patient selection) could leave the patient at risk for pathologic fracture of the radius remnant.

The osteomuscular dorsal scapular flap is a variant of the pedicled osteocutaneous trapezius flap with a portion of scapular bone and provides an alternative technique for bone and skin defects. Like the latissimus pedicled flap, it provides one skin paddle and transports limited bone, and is generally reserved for patients with smaller defects and severe neck vasculopathy.

Before recent understanding of perforator distribution, the scapular/parascapular free flap with bone was the flap of choice. It, unlike the fibula free flap, requires repositioning of the patient and nonsimultaneous harvesting.

References

1. Cheng MH, Saint-Cyr M, Ali RS, et al. Osteomyocutaneous peroneal artery-based combined flap for reconstruction of composite and en bloc mandibular defects. *Head Neck*. 2008 Dec 15 [Epub ahead of print].
2. Deleyiannis FW, Rogers C, Ferris RL, et al. Reconstruction of the through-and-through anterior mandibulectomy defect: indications and limitations of the double-skin paddle fibular free flap. *Laryngoscope*. 2008 Aug;118(8):1329-1334.
3. Deschler DG, Hayden RE. The optimum method for reconstruction of complex lateral oromandibular-cutaneous defects. *Head Neck*. 2000 Oct;22(7):674-679.

133. Avulsions occur most commonly at which of the following layers of the scalp?

- A) Aponeurotic layer
- B) Loose areolar layer
- C) Pericranium
- D) Skin
- E) Subcutaneous layer

The correct response is Option B.

The layers of the scalp can be remembered by the mnemonic SCALP: skin, subcutaneous tissue, aponeurotic layer (also called the galea), loose areolar tissue, and pericranium. The skin, subcutaneous tissue, and galea are intimately fused and move as a unit. These layers are separated from the pericranium by a layer of areolar tissue. This layer allows easy movement of the scalp and provides a space for fluid accumulation. It is through this layer that separation most easily occurs in the setting of trauma to or surgical reflection of the scalp. Emissary veins cross this space as they drain the scalp into the intracranial venous sinuses. Because of the potential for accumulation of fluid in the loose areolar tissue, an infection or abscess in this layer may lead to meningitis or septic venous sinus thrombosis. However, the incidence of such events is low.

The galeal aponeurosis is considered the strength layer of the scalp and is contiguous with the frontalis and occipitalis muscles and the temporoparietal fascia laterally. The pericranium is tightly adherent to the skull. It derives its blood supply from the diploic circulation via a multitude of perforating blood vessels and can serve as a vascularized bed for accepting skin grafts. The subcutaneous tissue contains the vessels, lymphatics, and nerves that supply the scalp.

References

1. Mueller RV. Facial trauma: soft tissue injuries. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 3. 2nd ed. Philadelphia: WB Saunders; 2006:30-32.
2. Leedy JE, Janis JE, Rohrich RJ. Reconstruction of acquired scalp defects: an algorithmic approach. *Plast Reconstr Surg*. 2005 Sep 15;116(4):54e-72e.

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134. A 22-year-old man is brought to the emergency department after sustaining injuries to the head during a high-speed motor vehicle collision. Examination shows fluid draining from the nostrils. Beta-2 transferrin test on the fluid is positive. CT scan shows a frontal sinus fracture. The anterior and posterior tables are nondisplaced. Which of the following is the most appropriate next step?
- A) Cranialization of the frontal sinus
 - B) Dural repair
 - C) Obliteration of the frontal sinus
 - D) Reduction and fixation of the anterior-table frontal sinus
 - E) Observation

The correct response is Option E.

A positive beta-2 transferrin test result indicates a cerebrospinal fluid (CSF) rhinorrhea. The first priority is to seal the leak. The patient should be observed before proceeding. The head of the bed should be elevated, and consideration should be given to placement of a lumbar CSF drain. If the leak does not resolve, surgical intervention should be planned.

Once the CSF rhinorrhea has resolved, operative repair of the facial fractures can begin. After the premorbid occlusion is established, the mandible fractures are plated sequentially.

Cranialization is reserved for displaced posterior table frontal sinus fractures. Dural repair is not needed at this stage as the CSF leak will probably seal on its own. Obliteration of the frontal sinus may be required if the CSF rhinorrhea fails to respond to conservative treatment.

References

1. Bradley J. Fractures of the frontal bone. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2005:231-235.
2. Kuang A, Lorenz P. Fractures of the mandible. In: McCarthy JG, Galiano RD, Boutros SG, eds. *Current Therapy in Plastic Surgery*. Philadelphia: WB Saunders; 2005:251-256.
3. Lettieri S. Facial trauma. In: Achauer BM, ed. *Plastic Surgery: Indications, Operations, and Outcomes*. Vol 2. St. Louis: Mosby; 2000:923-940.

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135. A 40-year-old Caucasian woman comes to the office for consultation because she is dissatisfied with the appearance of her smile. Physical examination shows bilabial incompetence, malocclusion, a retrusive chin, and a gummy smile. Cephalometric analysis shows decreased SNA and SNB angles. Which of the following is the most likely diagnosis?

- A) Mandibular deficiency
- B) Mandibular excess
- C) Maxillary retrusion
- D) Vertical maxillary deficiency
- E) Vertical maxillary excess

The correct response is Option E.

Long-face deformity (vertical maxillary excess) is characterized by an increase in the lower third of the face. A gummy smile is associated with this deformity. The mid facial appearance is flattened. Although all types of Angle occlusion patterns are possible, type II is most common.

Mandibular retrusion is associated with a retrusive chin and Angle class II malocclusion, but the teeth would not be visible in repose. Mandibular excess would not be associated with a retrusive chin but would be associated with Angle class III malocclusion.

Maxillary retrusion is associated with maxillary hypoplasia and often a shortening of the lower vertical facial height. Angle class III malocclusion is seen with this deformity, and cephalometric analysis shows a decreased SNA angle but an increased SNB angle.

Vertical maxillary deficiency, although often associated with Angle class II malocclusion, results in shortening of the lower third of the face, and the teeth are not seen in repose. SNA and SNB angles are frequently increased in this deformity.

References

1. Schendel SA, Carlotti AE Jr. Variations of total vertical maxillary excess. *J Oral Maxillofac Surg*. 1985 Aug;43(8):590-596.
2. Schendel SA. Orthognathic surgery. *Plast Surg Indic Oper Outcomes*. 2000;59:871-895.

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136. A 25-year-old man comes to the office for a follow-up examination because he has had intraoral drainage and pain and swelling over the right mandible for the past 24 hours. Ten days ago, he underwent maxillomandibular fixation followed by rigid internal fixation. CT scan of the head shows a soft-tissue collection along the right mandibular body; there is no evidence of osteomyelitis, and the rigid fixation is stable. Which of the following is the most appropriate management?
- A) Incision and drainage
 - B) Incision and drainage, removal of hardware, and external fixation
 - C) Incision and drainage, removal of hardware, and maxillomandibular fixation
 - D) Incision and drainage, removal of hardware, and vascularization of fibula flap transfer
 - E) No additional intervention is needed

The correct response is Option A.

Postoperative infections are the most common complication after mandibular fracture repair, with an incidence ranging from 0.4 to 32%. Management of these infections requires adequate incision and drainage as well as intravenous antibiotics and mouth care. If the source of infection is an exposed infected tooth root, it should be removed. It is important that rigid internal fixation be maintained until the bone fracture segments have ossified because nonrigid fixation, such as external fixation or maxillomandibular fixation, can lead to worsening of infection.

Removal of the internal hardware is rarely necessary unless the hardware is actively infected and loosened because of bone involvement (osteomyelitis).

Repair with vascularized fibula flap transfer is also not indicated because there is no evidence for osteomyelitis or extensive bone loss.

References

1. Bochlogyros PN. A retrospective study of 1521 mandibular fractures. *J Oral Maxillofac Surg.* 1985;43:597-599.
2. Haug RA, Schwimmer A. Fibrous union of the mandible: a review of 27 patients. *J Oral Maxillofac Surg.* 1994;52:832-839.
3. Thaller SR. Fractures of the jaws. In: Goldwyn RM, Cohen MM, eds. *The Unfavorable Result in Plastic Surgery: Avoidance and Treatment.* 3rd ed. Philadelphia: Lippincott Williams & Wilkins; 2001.

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137. A 40-year-old woman comes to the office for consultation about reconstruction following excision of a squamous cell carcinoma from the cheek. Examination shows a 6-cm skin defect in the upper medial aspect of the right cheek. Which of the following methods of reconstruction is most likely to provide the best aesthetic result?
- A) Cervicofacial flap
 - B) Deltopectoral flap
 - C) Placement of tissue expanders
 - D) Primary closure
 - E) Split-thickness skin graft

The correct response is Option A.

Large defects of the upper medial cheek are best repaired with local skin. The wound described is too large to be repaired primarily without significant distortion of the lower eyelid.

Cervicofacial flaps can be used for moderate-to-large defects of the upper medial cheek with tension-free closure. These flaps are particularly useful in older patients with loose skin. Tension-free closure is critical for avoiding lower eyelid complications.

A deltopectoral flap is useful for reconstruction of defects of the neck or lower face. It is not appropriate in the patient described.

Tissue expanders may be placed adjacent to the defect; however, they should not be used in a patient with an open wound. Use of tissue expanders in this manner would result in an excessive risk of extrusion.

Primary closure along the relaxed skin tension lines with wide undermining would result in excessive tension on the wound, resulting in distortion of the lower eyelid.

Split- or full-thickness skin grafts could be used to reconstruct the defect in the patient described; however, the aesthetic result would be suboptimal.

References

1. Mehrara BJ. Reconstruction of the cheeks. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007:375-388.
2. Zide B, Longaker M. Cheek surface reconstruction: best choices according to zones. *Oper Tech Plast Reconstr Surg*. 1998;5:26-36.
3. Antonyshyn O, Gruss JS, Zuker R, et al. Tissue expansion in head and neck reconstruction. *Plast Reconstr Surg*. 1988 Jul;82(1):58-68.

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138. A 25-year-old man is brought to the emergency department 2 hours after being punched in the left side of the face. Physical examination shows swelling on the left side of the face. The panoramic x-ray study (Panorex) shown was obtained. Which of the following is the most appropriate management?
- A) Extraction of all components of the third left mandibular molar and maxillomandibular fixation (MMF) for 2 weeks
 - B) Extraction of all components of the third left mandibular molar and MMF for 6 weeks
 - C) Extraction of all components of the third left mandibular molar, MMF, and open reduction and internal fixation (ORIF)
 - D) Ligating the third left mandibular molar to the adjacent tooth for stability, MMF, and ORIF
 - E) Preservation of the third molar, MMF, and ORIF

The correct response is Option C.

The x-ray study shows a fracture of the root, thus the tooth and root must be removed. Indications for extraction of a tooth in the line of a fracture include the need for MMF to regain the patient's occlusion. The left parasymphiseal and comminuted left angle fractures can be

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managed in a number of ways, but the parasymphyseal fracture requires open reduction and internal fixation to prevent lateral displacement of the left mandibular body by the masseter muscle.

References

1. Chidylo SA, Marschall MA. Teeth in the line of a mandible fracture: which should be performed first, extraction or fixation? *Plast Reconstr Surg.* 1992 Jul;90(1):135-136.
2. Crawley WA, Sandel SJ. Fractures of the mandible. In: Ferraro JW, ed. *Fundamentals of Maxillofacial Surgery.* New York: Springer; 1997:192-202.

139. A 50-year-old man is scheduled to undergo resection of a squamous cell cancer of the right floor of the mouth with invasion into the mandibular body. Composite resection of the right hemimandible and a 2-cm resection of the floor of the mouth followed by immediate reconstruction with a fibula flap are planned, necessitating the use of an osteocutaneous flap. Which of the following best describes the course of the blood supply for the skin paddle of this flap?
- A) Musculocutaneous and septocutaneous perforators from the peroneus longus and brevis muscles
 - B) Musculocutaneous perforators from the flexor hallucis brevis muscle
 - C) Septocutaneous and musculocutaneous perforators from the anterior tibialis muscle
 - D) Septocutaneous perforators from the posterior intermuscular septum
 - E) Septocutaneous perforators from the posterior tibialis muscle

The correct response is Option D.

The blood supply for the fibula flap skin paddle used for reconstruction arises from septocutaneous perforators from the peroneal artery that traverse the posterior intermuscular septum. The position of these vessels can be marked before the procedure with a pencil Doppler probe. In the majority of cases, the blood supply to the fibula flap skin paddle is reliable for microsurgical transfer. The skin flap also has blood supply arising from musculocutaneous perforators originating from the soleus and gastrocnemius muscles; however, these vessels are, in most cases, ligated because their dissection is tedious, and they often arise from the posterior tibial artery. The anterior and posterior tibialis muscles do not provide blood supply to the fibula flap skin paddle.

References

1. Disa JJ, Pusic AL, Hidalgo DH, et al. Simplifying microvascular head and neck reconstruction: a rational approach to donor site selection. *Ann Plast Surg.* 2001 Oct;47(4):385-389.
2. Wallace CG, Chang YM, Tsai CY, et al. Harnessing the potential of the free fibula osteoseptocutaneous flap in mandible reconstruction. *Plast Reconstr Surg.* 2010 Jan;125(1):305-314.

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140. An 80-year-old woman comes to the office for a follow-up examination 3 weeks after she underwent open reduction and internal fixation of bilateral mandibular fractures. Her postoperative occlusion and mouth opening were initially satisfactory, but the patient is now unable to open her mouth beyond 10 mm of interincisal distance with no deviation. A postoperative x-ray study shows that the condyles are seated in the glenoid fossa appropriately. Which of the following is the most appropriate management at this time?
- A) Gap arthroplasty
 - B) Implantation of a total joint prosthesis
 - C) Injection of a corticosteroid in the temporomandibular joint
 - D) Physical therapy
 - E) Repeat open reduction and internal fixation of the fracture

The correct response is Option D.

In the scenario described, the most appropriate management is physical therapy. Factors that lead to post-traumatic temporomandibular joint (TMJ) ankylosis include age, location of the fracture, length of immobilization, and intracapsular hemorrhage with or without injury to the meniscus. The patient described is elderly and has bilateral fractures of the mandibular body that have been properly reduced and fixed internally. Her TMJ ankylosis is caused by reduced mobility caused by pain. Physical therapy is the first line of treatment in the early development and prevention of postoperative ankylosis. Corticosteroid injections are not typically used in ankylosis. Repeat open reduction and internal fixation is not indicated when the fractures are already correctly reduced and are not related to the condyles. If the patient's fractures had been in the condylar region, surgery could have been considered in the presence of radiographic evidence of a persistent physical block to TMJ mobility. Established ankylosis is usually managed with some form of a surgical arthroplasty followed by up to 1 year of physical therapy.

References

1. Chacon GE, Larsen PE. Principles of management of mandibular fractures. In: Milloro M, ed. *Peterson's Principles of Oral and Maxillofacial Surgery*. 2nd ed. Hamilton, Ontario: BC Decker; 2004:401-433.
2. Kademani D, Rombach DM, Quinn PD. Trauma to the temporomandibular joint region. In: Fonseca RJ, Walker RV, Betts NJ, et al, eds. *Oral and Maxillofacial Trauma*. 3rd ed. St. Louis: Elsevier Saunders; 2005:523-565.

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141. A 21-year-old man comes to the office for evaluation of a secondary palate fistula following palatoplasty 20 years ago. History includes three unsuccessful attempts at fistula repair using local tissue. Repair using a tongue flap to provide soft tissue to the palate is planned. Blood supply runs primarily in which of the following regions of the tongue?

- A) Ventral third
- B) Middle third
- C) Dorsal third
- D) Dispersed throughout

The correct response is Option A.

For procedures on the tongue, it is imperative to understand the location of the major vascular channels. The primary blood supply is afforded by the lingual arteries. The paired lingual arteries run laterally, primarily within the ventral third of the tongue. Additional vascularity is supplied by the facial and ascending pharyngeal arteries. Vessels that cross from one side to the other exist primarily at the tip with the median septum being relatively avascular.

References

1. Moore KL, Dalley AF. *Clinically Oriented Anatomy*. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2006.
2. Lopez R, Lauwers F, Paoli JR, et al. Vascular territories of the tongue: anatomical study and clinical applications. *Surg Radiol Anat*. 2007 Apr;29(3):239-244. Epub 2007 Mar 22.

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142. A 30-year-old man comes to the office because of excessive tearing of the left eye 3 months after repair of a deep laceration of the left medial canthus. Physical examination confirms epiphora of the left eye. A missed injury to the lacrimal drainage system is suspected. Which of the following is most appropriate to evaluate the suspected injury?
- A) CT scan
 - B) Jones test
 - C) MRI
 - D) Nasal endoscopy
 - E) Schirmer test

The correct response is Option B.

The most appropriate choice is the Jones test, which evaluates the drainage component of the lacrimal system. There are two steps in this test. The first step involves instilling two drops of a 2% fluorescein solution into the conjunctiva and observing the appearance or absence of this dye in the ipsilateral middle turbinate by means of a curved, cotton-tipped applicator. When dye is noted on the applicator within 3 minutes, the drainage system is intact. Therefore, if no obstruction is noted, the epiphora is caused by hypersecretion. If no dye passes through the nasolacrimal duct, then a secondary dye test is performed by force-injecting 1 mL of saline through the punctum. If this is done and the dye appears in the nose, then a functional or incomplete block of the nasolacrimal duct is present; if no dye appears, then a complete block is diagnosed. Differentiating a canalicular block from a nasolacrimal duct block is done by cannulating and injecting 1 mL of saline through a canaliculus and observing the passage of clear fluid out the other canaliculus. A No. 00 Bowman probe can also be passed through the canaliculus, and the distance to the obstruction can be measured. Typical distances are 8 mm to common canaliculus, 10 to 12 mm to the tear sac, and 16 mm to the upper end of the nasolacrimal duct.

CT scans are only useful in evaluating the nasal cavity. They cannot visualize the lacrimal drainage system unless the study is performed as a CT-dacryocystography, which is a specific subvariety of CT scanning, and is reserved as a confirmatory second-line test.

Similarly, MRI can only identify abnormalities of the nasal cavity and not details of the drainage system.

Nasal endoscopy can only examine the nasal cavity for an abnormal location of the meatus under the middle turbinate. It can also determine if there is a physical obstruction of the lower end of

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the nasolacrimal duct at that location because of polyps or granulation tissue. This test could be indicated if the Jones test were to show partial obstruction.

The Schirmer test is considered a secretory test only and cannot be used to make any determination regarding tear excretion. The Schirmer test is most useful in diagnosing lacrimal hyposecretion. In the clinical scenario described, the epiphora appeared following the injury in the medial canthus; therefore, it is less likely to be related to hypersecretion. Yet a positive Jones test result (dye passes) in the presence of epiphora would clue the physician toward hypersecretion.

References

1. Wobig JL, Dailey RA. Evaluation of the lacrimal system. In: Wobig JL, Dailey RA, eds. *Oculofacial Plastic Surgery: Face, Lacrimal System, and Orbit*. New York: Thieme; 2004:138-144.
2. Dryden RM. Repair of canalicular lacerations with silicone intubation. In: Levine MR, ed. *Manual of Oculoplastic Surgery*. 3rd ed. Philadelphia: Butterworth-Heinemann; 2003:37-40.

143. Which of the following syndromes is most commonly associated with Pierre Robin sequence?

- A) Beckwith-Wiedemann
- B) Facial microsomia
- C) Stickler
- D) Treacher Collins
- E) Velocardiofacial

The correct response is Option C.

Pierre Robin sequence denotes a group of physical findings that include micrognathia or retrognathia, glossoptosis, and respiratory distress with or without cleft palate. Once thought to be a syndrome, it is now understood to be a developmental sequence; ie, “a pattern of multiple anomalies derived from a single known or presumed prior anomaly or mechanical factor.” The underdeveloped (micrognathia) or retropositioned (retrognathia) mandible limits space for the growing tongue and forces it to assume a posterior/elevated position in the oropharynx (glossoptosis). This leads to delayed elevation/fusion of the palatal shelves (cleft palate) and respiratory distress.

The mandibular anomaly in Pierre Robin sequence is causally heterogeneous and can result from either a malformation (eg, Stickler syndrome), a disruption (eg, amniotic band syndrome), or deformation (eg, oligohydramnios). Nearly half of all cases have an identifiable syndrome, and over 40 associated syndromes have been described. In syndromic Pierre Robin sequence, over 40% are Stickler, which is caused by one of three collagen mutations (type II, COL2A1 is the most common) Stickler patients have wide phenotypic variability that often results in delayed or missed diagnosis in minor cases. Clinical findings associated with Stickler syndrome are ocular problems (retinal detachment, myopia, and blindness), facial abnormalities (flat nose, small mandible, or cleft palate), hearing loss, and degenerative joint disease and pain.

Although patients with Beckwith-Wiedemann syndrome, facial microsomia, Treacher Collins syndrome, and velocardiofacial syndrome may have symptoms of Pierre Robin sequence, these associations are significantly less common than Stickler syndrome.

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References

1. Evans AK, Rahbar R, Rogers GF, et al. Robin sequence: a retrospective review of 115 patients. *Int J Pediatr Otorhinolaryngol*. 2006 Jun;70(6):973-980.
2. Printzlau A, Andersen M. Pierre Robin sequence in Denmark: a retrospective population-based epidemiological study. *Cleft Palate Craniofac J*. 2004 Jan;41(1):47-52.
3. Cohen MM Jr. Robin sequences and complexes: causal heterogeneity and pathogenetic/phenotypic variability. *Am J Med Genet*. 1999 Jun 4;84(4):311-315.

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144. A 62-year-old man is referred for evaluation because of a 3-cm lesion of the left lateral aspect of the tongue extending into the lateral buccal sulcus that was diagnosed 6 weeks ago. He has smoked two packs of cigarettes daily for the past 40 years and drinks six alcoholic beverages daily. Physical examination shows a bulky tumor that is not amenable to transoral excision. Mandibular osteotomy is planned for access. Which of the following is the most appropriate surgical approach to access the tumor?

- A) Lateral
- B) Median
- C) Paramedian
- D) Sagittal split
- E) Segmental

Please note: Upon further review, this item was not scored as part of the examination.

The correct response is Option C.

Oropharyngeal tumors requiring mandibular osteotomy provide exposure to three types of osteotomies, which are described as lateral, median, and paramedian.

Salient Features of the Three Types of Mandibular Osteotomy

	Lateral	Median	Paramedian
Site of osteotomy	Through the body/angle of mandible	In the midline	Between lateral incisor and canine
Exposure	Limited	Good	Good
Inferior alveolar nerve and vessels	Must be transected	Can be spread	Can be spared
Division of genial muscles	Not required	Inevitable	Not required—only the mylohyoid needs division
Mechanical stability	Poor because of unequal pull of muscles on the two mandibular segments	Good	Good
Fixation of osteotomy	May require intermaxillary fixation which interferes with maintenance of postoperative oral hygiene	Miniplates or stainless steel wire	Miniplates or stainless steel wire
Postoperative	Osteotomy lies within the lateral	Lies outside the	Lies outside the lateral

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radiation therapy portal: increased risk of complications lateral portal: safe portal: safe

Segmental mandibular osteotomy would be appropriate for a tumor that is adherent to or invades the mandible. Sagittal split mandibular osteotomy is used in orthognathic surgery to adjust the position of the mandible relative to the maxilla.

References

1. Patel SG, Shah JP. Tumors of the oropharynx. In: Patel SG, Shah JP, eds. *Cancer of the Head and Neck*. Hamilton, Ontario: BC Decker, Inc; 2001:127.
2. Spiro RH, Gerold FP, Shah JP, et al. Mandibulotomy approach to oropharyngeal tumors. *Am J Surg*. 1985;150:466-469.

145. An 18-year-old man comes to the emergency department 2 hours after being punched in the right eye during a fistfight. Physical examination shows swelling, diplopia, and a significant limitation of downward gaze in the affected eye. He is able to rotate the eye in all other directions. This finding is most consistent with dysfunction of which of the following extraocular muscles?

- A) Inferior oblique
- B) Inferior rectus
- C) Superior oblique
- D) Superior rectus

The correct response is Option B.

The patient described has a fracture of the orbital floor with entrapment or paralysis of the inferior rectus muscle. The inferior rectus muscle is innervated by cranial nerve III (oculomotor nerve) and is responsible for downward rotation of the eye.

The inferior oblique muscle is innervated by cranial nerve III and is responsible for upward and outward rotation of the eye. Entrapment or paralysis of the inferior oblique following orbital trauma limits downward gaze; it is difficult for patients to look down when walking down stairs. The superior oblique is innervated by the trochlear nerve (cranial nerve IV) and is responsible for downward and outward rotation of the eye. The superior rectus muscle is innervated by the oculomotor nerve and rotates the eye upward.

References

1. Iliff N, Manson PN, Katz J, et al. Mechanisms of extraocular muscle injury in orbital fractures. *Plast Reconstr Surg*. 1999 Mar;103(3):787-799.

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(Please note that this pictorial appears in color in the online examination)

146. A 2-month-old male infant is brought to the office because of mid face hypoplasia, craniosynostosis, and bilateral hand and foot anomalies. A photograph of the left foot is shown. This patient most likely has which of the following syndromes?
- A) Apert
 - B) Crouzon
 - C) Goldenhar
 - D) Nager
 - E) Treacher Collins

The correct response is Option A.

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The patient described has Apert syndrome. This autosomal dominant syndrome is characterized by bicoronal craniosynostosis that leads to turribrachycephaly, mid face hypoplasia, and complex hand and feet syndactyly. Patients with Crouzon syndrome, an autosomal dominant disorder, typically have craniosynostosis involving the coronal, sagittal, and lambdoid sutures, as well as turribrachycephaly. Other findings include mid face hypoplasia, exorbitism, and proptosis. The extremities are normal.

Goldenhar syndrome, or oculoauriculovertebral dysplasia, involves asymmetry of the hard and soft tissues of the face. This condition is most commonly unilateral but may be seen bilaterally in some patients. Manifestations of this syndrome include hypoplasia involving the mandible and underlying soft tissues of the face, epibulbar dermoids, and varied degrees of microtia on the affected side. Most patients have associated vertebral abnormalities. Nager syndrome, or acrofacial dysostosis, is an autosomal recessive disorder characterized by craniofacial and upper extremity abnormalities. Patients with Nager syndrome have hypoplasia of the orbits, zygoma, maxilla, mandible, and soft palate. Auricular defects may also be present. Hypoplasia or agenesis occurs in the radius, thumbs, and metacarpals. Some patients may have radioulnar synostosis and elbow joint deformities. Patients with Treacher Collins syndrome, or mandibular dysostosis, have hypoplasia of the zygoma, maxilla, and mandible, downward slanting of the palpebral fissures, colobomas of the lower eyelids, absence of eyelashes, and auricular defects.

References

1. Vander Kolk CA. Syndromic craniosynostosis. In: Achauer BM, Eriksson E, Guyuron B, et al, eds. *Plastic Surgery: Indications, Operations, and Outcomes*. Vol 2. St. Louis: Mosby; 2000:707-719.
2. McCarthy JG, Epstein FJ, Wood-Smith D. Craniosynostosis. In: McCarthy JG, ed. *Plastic Surgery*. Vol 4. Philadelphia: WB Saunders; 1990:3019-3025.
3. Bartlett SP, Mackay GJ. Craniosynostosis syndromes. In: Aston SJ, Beasley RW, Thorne CH, et al, eds. *Grabb and Smith's Plastic Surgery*. 5th ed. Philadelphia: Lippincott-Raven; 1997:295-304.

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147. A 50-year-old man comes to the office because of a clicking sensation when he opens his mouth. He sustained injuries to the right side of his face 1 year ago when he was involved in a snowmobile collision. Evaluation at that time showed no evidence of a fracture. Current physical examination shows adequate range of motion of the mandible. Which of the following is the most likely cause of the condition described?

- A) Blood within the temporomandibular joint capsule
- B) Contact of the condylar head against the articular eminence
- C) Contact of the mandibular condyle against the glenoid fossa
- D) Foreign body in the temporomandibular joint
- E) Subluxation of the articular disk

The correct response is Option E.

A “clicking sensation” upon opening the jaw is commonly caused by anterior subluxation of the articular disk. The temporomandibular joint is unique in that it is a diarthrodial joint, having one space above the disk and a second space below. Clicking occurs when the posterior attachments of the disk become attenuated or ruptured. The disk is then allowed to sublux anteriorly and then relocate. Patients with painless clicks may be observed; those with painful clicking during jaw closure require treatment. Conservative management consists of NSAID therapy, the use of a bite block, and aggressive physical therapy. More aggressive management includes surgery, which is reserved for those who fail conservative therapy. The other causes are much less likely.

References

1. Kummoona R. Surgical reconstruction of the TMS for chronic subluxation and dislocation. *Int J Oral Maxillofac Surg.* 2001;30(4):344-348.
2. Jacobs JS, Bessette R. Temporomandibular joint deformities. In: Smith JW, Aston SJ, eds. *Grabb and Smith's Plastic Surgery.* 4th ed. Boston: Little, Brown and Co; 1991:247-270.
3. Mendes D, Jacobs JS. Traumatic deformities and reconstruction of the temporomandibular joint. In: Cohen M, ed. *Mastery of Plastic and Reconstructive Surgery.* Vol 2. Lippincott Williams & Wilkins; 1994:1220-1229.

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148. A 16-year-old boy is referred for consultation regarding treatment of maxillary retrusion and an Angle class III malocclusion. History includes repair of a complete unilateral cleft lip and palate in infancy. Maxillary advancement is planned after completion of facial growth. Completion of facial growth is best determined by which of the following?

- A) Chronologic age of the patient
- B) Complete eruption of the second molars
- C) Hand-wrist x-ray study
- D) Serial cephalometric x-ray study

The correct response is Option D.

Serial cephalometric x-ray study is a reliable method to determine completion of maxillofacial growth in adolescents. Chronologic age cannot also be used in the examination of adolescent growth because there is wide variation among individuals in the timing of the pubertal growth spurt. Minimal or no change in the velocity of maxillofacial growth at this time is a good indicator of skeletal maturity. Ossification of bones of the wrist and hand is normally the standard for assessing skeletal development. However, its validity in the examination of craniofacial growth has recently come into question. Dental development indicators are not reliable predictors of an individual's stage of skeletal development.

References

1. Flores-Mir C, Nebbe B, Major PW. Use of skeletal maturation based on hand-wrist radiographic analysis as a predictor of facial growth: a systematic review. *Angle Orthod.* 2004 Feb;74(1):118-124.
2. Proffit WR. *Contemporary Orthodontics*. 3rd ed. St. Louis: Mosby; 1999:10.

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149. A 38-year-old man comes to the office because of facial asymmetry and pain in the left mid face. He says that he first started noticing the asymmetry at 14 years of age. The pain began 3 years ago. Physical examination shows atrophy of the temporal and mid facial soft tissue and bone. A photograph is shown. Which of the following is the most likely diagnosis?

- A) Bell palsy
- B) Hemifacial microsomia
- C) Parry-Romberg syndrome
- D) Torticollis
- E) Treacher Collins syndrome

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The correct response is Option C.

Acquired facial asymmetry, as demonstrated in the photograph, is known as Parry-Romberg syndrome, or hemifacial atrophy. It involves both skeletal and soft tissue, and it is characterized by slow atrophy of the tissues of half of the face. It typically appears between the ages of 5 and 15 years, and it can be associated with neurologic symptoms such as seizures and trigeminal neuralgia. Facial atrophy usually begins in the temporal and/or nasolabial fold region and progresses to involve the mouth, the area around the eye, and the brow. Many patients go on to develop atrophy of half of the upper lip and tongue and exposure or damage to the roots of teeth on the affected side. The skin overlying the affected areas may become hyperpigmented. The atrophy may progress slowly and plateau, or it may progress indefinitely. The etiology of Parry-Romberg syndrome is unknown and occurs sporadically.

Bell palsy is a mononeuropathy involving cranial nerve VII and the facial nerve; it results in unilateral facial nerve paralysis. It is not usually self-limiting but may result in residual weakness in rare cases.

Hemifacial microsomia is a congenital anomaly involving an underdevelopment of either one or both sides of the face. It more commonly affects the lower half of the face, resulting in mandibular hypoplasia, microtia, and vestigial remnants. Hemifacial microsomia is the second most common facial congenital difference, after cleft lip and palate.

Torticollis involves tightness of the sternocleidomastoid muscle of the neck resulting in a head tilt toward the affected muscle. Patients may have a mild underdevelopment of the lower half of the face on the affected side secondary to deformational pressure. Torticollis is generally congenital, thought to be secondary to intrauterine positioning, and is treated with physical therapy.

References

1. Terenzi V, Leonardi A, Covelli E, et al. Parry-Romberg syndrome. *Plast Reconstr Surg*. 2005 Oct;116(5):97e-102e.
2. Buonaccorsi S, Leonardi A, Covelli E, et al. Parry-Romberg syndrome. *J Craniofac Surg*. 2005 Nov;16(6):1132-1135.

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150. A 6-month-old male infant is brought to the office for evaluation of a lesion of the right cheek. The lesion first appeared at 2 weeks of age as a 1-cm telangiectatic spot, and it has rapidly increased to 3 cm. Physical examination shows a raised, spongy mass. Which of the following is the most appropriate management at this time?
- A) Oral administration of a corticosteroid
 - B) Pulsed-dye laser therapy
 - C) Subcutaneous administration of interferon
 - D) Surgical excision
 - E) Observation

The correct response is Option E.

Observation is the most appropriate management of the child with the nonulcerating, nonobstructive hemangioma described.

Hemangiomas are a vascular tumor of infancy. They are typically not present at birth but appear within the first few months of life. They undergo a proliferating phase of rapid growth in the first 3 to 6 months of life, followed by an involuting phase that can last up to 12 years of age but is completed most commonly by age 5 to 7 years. Finally, an involuted phase is reached with complete regression of the hemangioma, leaving some scar or discoloration in 50% of patients.

Diagnosis is often made by a complete history and physical examination. Hemangiomas should not be confused with venous malformations that are often present at birth. These malformations can maintain a consistent color and grow with the child. Doppler ultrasonography, CT scan, and MRI can be useful in diagnosis.

Given that most hemangiomas ultimately regress completely, most are managed appropriately with observation and reassurance of the family. Intervention is indicated to avoid morbidity and mortality from alarming hemangiomas. These include ulcerating hemangiomas (bleeding and infection), obstructing hemangiomas (sight, hearing, airway), and hemangiomas compromising hemodynamic stability. Local or systemic corticosteroids, interferon, the pulsed-dye laser, and surgical excision are treatment modalities in the armamentarium to treat hemangiomas.

References

1. Beck DO, Gosain AK. The presentation and management of hemangiomas. *Plast Reconstr Surg*. 2009 Jun;123(6):181e-191e.
2. Marler JJ, Mulliken JB. Vascular anomalies. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 2006:19-68.

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Section 4: Breast and Cosmetic

151. A 45-year-old woman comes to the office 3 weeks after undergoing an injection of hyaluronic acid filler into her tear troughs. She says that she now has two visible lumps in the area of injection. Physical examination shows two nodules with blue domes over the tear troughs. Which of the following is the most appropriate management?

- A) Corticosteroid injection
- B) Dermabrasion
- C) Excision
- D) Incision and drainage
- E) Observation

The correct response is Option D.

The most appropriate management is incision and drainage. Blue dome nodules are indicative of an injection depth into the superficial dermis or epidermis that was overly superficial. This is easily remedied with a small percutaneous puncture with a number 11 blade or needle, followed by expression of the material. Overfilling of hyaluronic acid can be dissipated by injecting hyaluronidase directly into the area. This enzyme dissolves the material. This technique can be useful especially in a patient with asymmetric filling of their tear troughs.

Steroid injection is indicated when the deformity is secondary to an inflammatory reaction, such as in the case of granuloma formation. Further, steroid-induced skin atrophy is a significant risk in the periorbital area.

Dermabrasion is useful in residual skin irregularities because of scarring or rhytides.

Excision is unnecessarily aggressive and will cause scarring.

Observation is not appropriate. With a superficial injection depth, the material is sequestered in a layer where it is not metabolized easily. These visible deformities can last many months without treatment.

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References

1. Alam M, Dover JS. Management of complications and sequelae with temporary injectable fillers. *Plast Reconstr Surg*. 2007 Nov;120(6 Suppl):98S-105S.
2. Lemperle G, Rullan PP, Gauthier-Hazan N. Avoiding and treating dermal filler complications. *Plast Reconstr Surg*. 2006 Sep;118(3 Suppl):92S-107S.
3. Lemperle G, Gauthier-Hazan N. Foreign body granulomas after all injectable dermal fillers: part 2. Treatment options. *Plast Reconstr Surg*. 2009 Jun;123(6):1864-1873.

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152. A 60-year-old woman comes to the office because she is unhappy with the thin appearance of her lips and wrinkles around her mouth (shown). Which of the following is the most appropriate management?

- A) Implantation of acellular human dermis
- B) Injection of botulinum toxin type A
- C) Injection of hyaluronic acid
- D) Injection of poly-L-lactic acid
- E) Injection of silicone

The correct response is Option C.

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Hyaluronic acid injectable products, such as Juvéderm, Restylane, or Perlane, are the best treatment available to improve fullness of the nasolabial fold and lip area. The products smooth wrinkles and depressions by filling the subcutaneous tissue. Volume deficiency is the essential problem with deep facial folds, particularly below the level of the eyes.

Implantation of acellular human dermis (AlloDerm) requires the risk of a surgical procedure without the promise of long-term results in lip augmentation. AlloDerm injectable Cymetra product is no longer available commercially and was plagued by its difficulty during injection due to high density.

Botulinum toxin type A (BOTOX Cosmetic) paralyzes muscles that animate the face and pull on the skin, resulting in deepening of the creases of the face. BOTOX Cosmetic does not fill deficient volume. In paralyzing the levator of the lip that deepens the nasolabial fold, BOTOX Cosmetic lowers the lip, enhancing the length of the upper lip and resulting in a more atrophic appearing lip.

Poly-L-lactic acid (Sculptra) is a filler, but it is also known to result in nodule formation in dynamic muscles of the face, particularly around the lip and eye.

Silicone is not FDA-approved for injection in the United States because of its known risks of nodule formation and overlying skin inflammation and necrosis, which are progressive.

References

1. Born T. Hyaluronic acids. *Clin Plast Surg.* 2006 Oct;33(4):525-538.
2. Goldberg DJ. Legal ramifications of off-label filler use. *Clin Plast Surg.* 2006 Oct;33(4):597-601.
3. Kanchwala SK, Holloway L, Bucky LP. Reliable soft tissue augmentation: a clinical comparison of injectable soft-tissue fillers for facial-volume augmentation. *Ann Plast Surg.* 2005 Jul;55(1):30-35.

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153. A 53-year-old woman is referred for consultation regarding breast reconstruction following mastectomy. Autologous breast reconstruction options are discussed. Which of the following is an advantage of the pedicled transverse rectus abdominis musculocutaneous (TRAM) flap over the free TRAM flap?

- A) Decreased complications in patients with a history of smoking
- B) Decreased incidence of complete flap loss
- C) Decreased risk of abdominal hernia
- D) Decreased risk of fat necrosis
- E) Ease of inseting and flap shaping

The correct response is Option B.

There is considerable controversy regarding the merits of the pedicled TRAM, free TRAM, free deep inferior epigastric perforator (DIEP), and free superficial inferior epigastric perforator (SIEP) flap reconstructions. Reconstruction with each flap has distinct advantages and disadvantages. Currently, the literature does not clearly favor the use of one procedure over the others.

The pedicled TRAM flap is characterized by a shorter operative time and a decreased risk of complete flap loss when compared to the free flaps. However, the pedicled TRAM flap shows a higher incidence of fat necrosis with partial flap loss, as well as an increased length of stay. Free flaps offer ease of flap shaping and inseting, as well as a decreased risk of abdominal hernia and abdominal wall weakness. Free flaps are more suitable for patients who are diabetic, are overweight, or smoke cigarettes.

Deciding which particular procedure to perform requires assessment on a case-by-case basis and consideration of the surgeon's level of comfort with the different techniques.

References

1. Sigurdson L, Lalonde DH. MOC-PSSM CME article: Breast reconstruction. *Plast Reconstr Surg*. 2008 Jan;121(1 Suppl):1-12.
2. Honig SF. Incidence, trends, and the epidemiology of breast cancer. In: Spear SL, ed. *Surgery of the Breast: Principles and Art*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins. 2005:3-26.

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154. The principal blood supply to the nasal tip is provided by which of the following arteries in a patient who undergoes open rhinoplasty via a transverse columellar incision?

- A) Columellar
- B) Lateral nasal
- C) Posterior ethmoid
- D) Sphenopalatine
- E) Superior labial

The correct response is Option B.

The principal blood supply to the nasal tip following division of the columellar skin is the lateral nasal artery, a branch of the anterior ethmoid artery (internal carotid circulation). When rhinoplasty is conducted via stepped incision in the external approach, the columellar artery, a branch of the superior labial artery (external carotid circulation) component, may be abolished by division or cautery. The other options described supply blood to the posterior nasal septum (sphenopalatine artery), the upper lip (superior labial artery), and the upper central nasal septum (posterior ethmoid artery).

References

1. Rohrich RJ, Gunter JP, Friedman RM. Nasal tip blood supply: an anatomic study validating the safety of the transcolumellar incision in rhinoplasty. *Plast Reconstr Surg.* 1995 Apr;95(5):795-799.
2. Rohrich RJ, Muzaffar AR, Gunter JP. Nasal tip blood supply: confirming the safety of the transcolumellar incision in rhinoplasty. *Plast Reconstr Surg.* 2000 Dec;106(7):1640-1641.

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155. A 45-year-old woman with a T2 N0 M0 invasive ductal carcinoma in the inferior pole of the left breast is scheduled to undergo segmental mastectomy followed by radiation therapy. She currently wears a size 36E brassiere and wants to have any cup size from a C to D. After segmental resection of the tumor, which of the following procedures is most likely to yield the best cosmetic result in this patient?
- A) Bilateral reduction mammoplasty
 - B) Primary closure of the left breast and reduction mammoplasty of the right breast
 - C) Reconstruction of the left breast with a latissimus dorsi musculocutaneous flap and reduction mammoplasty of the right breast
 - D) Reconstruction of the left breast with a transverse rectus abdominis musculocutaneous flap and mastopexy of the right breast
 - E) A single-stage breast reconstruction with placement of a silicone prosthesis in the left breast and reduction mammoplasty of the right breast

The correct response is Option A.

In a patient with large breasts, in whom a partial mastectomy is required, reduction mammoplasty is an appropriate management. This procedure will potentially relieve symptoms of macromastia, reduce the amount of breast tissue present in both breasts, and offer the best aesthetic outcome. Implantation of a prosthesis in a breast that will undergo radiation therapy increases the risk for complications and would likely lead to a less symmetrical result. The latissimus dorsi or transverse rectus abdominis musculocutaneous (TRAM) flaps could be used for immediate partial reconstruction, but they are ideal for delayed reconstruction of partial mastectomy defects. Reduction mammoplasty does not preclude future reconstruction options, but a latissimus flap reconstruction would. With a T2 tumor, a significant portion of the lower pole of the breast is removed to obtain clear margins. Even though the patient described has moderate-to-large breasts, there is a high likelihood that she will develop a deformity of the left breast and asymmetry with the right breast if no reconstruction is performed.

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References

1. Kronowitz SJ, Feledy JA, Hunt KK, et al. Determining the optimal approach to breast reconstruction after partial mastectomy. *Plast Reconstr Surg*. 2006 Jan;117(1):1-11; discussion 12-14.
2. Honig SF. Incidence, trends, and the epidemiology of breast cancer. In: Spear SL, ed. *Surgery of the Breast: Principles and Art*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins. 2005:3-26.

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156. A 50-year-old woman is scheduled to undergo transcutaneous blepharoplasty. Fat transposition and canthopexy are planned. The inferior oblique muscle of the eye is most vulnerable to injury when dissecting between which of the following structures?

- A) Central fat compartment and lateral fat compartment
- B) Lateral fat compartment and orbicularis retaining ligament
- C) Medial canthal tendon and medial fat compartment
- D) Medial fat compartment and central fat compartment
- E) Orbicularis retaining ligament and arcus marginalis

The correct response is Option D.

The inferior oblique muscle of the eye can be found between the medial fat compartment and the central fat compartment. When performing either excision or manipulation of the medial and central fat compartments, the inferior oblique muscle is vulnerable to injury. These injuries include resection, cauterization, scarring, hemorrhage, edema, and suture injury while repairing the septum orbitale. Depending upon the extent of injury, the symptoms can be transient or permanent. One study suggested that transection of less than 50% of the muscle will not cause permanent diplopia.

The orbicularis retaining ligament is a structure that originates along the orbital rim and inserts into the overlying orbicularis oculi muscle. Laterally, it contributes to the lateral canthal ligament. Recent studies have demonstrated that the orbicularis retaining ligament is a circumferential structure. The arcus marginalis is the periosteal extension of the septum orbitale as it attaches into the orbital rim. The inferior oblique muscle lies deep to both of these structures.

References

1. Mowlavi A, Neumeister MW, Wilhelmi BJ. Lower blepharoplasty using bony anatomical landmarks to identify and avoid injury to the inferior oblique muscle. *Plast Reconstr Surg*. 2002 Oct;110(5):1318-1322.
2. Ghavami A, Pessa JE, Janis J, et al. The orbicularis retaining ligament of the medial orbit: closing the circle. *Plast Reconstr Surg*. 2008 Mar;121(3):994-1001.
3. Muzaffar AR, Mendelson BC, Adams WP Jr. Surgical anatomy of the ligamentous attachments of the lower lid and lateral canthus. *Plast Reconstr Surg*. 2002 Sep 1;110(3):873-884.

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157. A 38-year-old woman, gravida 2, para 2, is scheduled to undergo reduction mammoplasty because of pain in the neck and shoulders. She wears a size 44E brassiere. Physical examination shows pendulous breasts. The sternal notch-to-nipple distance is 40 cm. Hypertrophy of which of the following muscles is most likely in this patient?

- A) Latissimus dorsi
- B) Levator scapulae
- C) Pectoralis major
- D) Rhomboid major
- E) Trapezius

The correct response is Option E.

Each of the muscles described is an extrinsic muscle of the back. The trapezius elevates the scapula in squaring the shoulders, and the superior, middle, and inferior fibers act together to pull the scapulae posteriorly, bracing the shoulders. The latissimus extends, adducts, and medially rotates the humerus. The levator scapulae elevate the scapula and rotate the glenoid cavity inferiorly, and the rhomboid major and minor together retract the scapula and fix the scapula to the thoracic wall.

In mammary hypertrophy, the downward pull of the breasts rotates the shoulders forward, requiring significantly more work of the shoulder girdle muscles. It is the unique function of the trapezius to “square” the shoulders that makes it most vulnerable in mammary hypertrophy; because of the extra work this requires, it often becomes hypertrophic.

Patients often complain of shoulder, neck, and upper back pain as a result of the trapezius strain.

References

1. Moore KL. *Clinically Oriented Anatomy*. 3rd ed. Baltimore: Williams & Wilkins; 1992.
2. Jones GE. Breast reduction. In: Mathes SJ, Hentz VR, eds. *Plastic Surgery*. Vol 6. 2nd ed. Philadelphia: WB Saunders; 2006.

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158. Which of the following is the number of aesthetic subunits that compose the surface anatomy of the nose?

- A) Six
- B) Seven
- C) Eight
- D) Nine
- E) Ten

The correct response is Option D.

The nose has nine topographic subunits. These include the nasal dorsum, tip, and columella, as well as the paired sidewalls, ala, and soft triangle subunits. This system of classification of the nasal surface anatomy allows for greater ease of reconstruction because scars can be positioned between the subunits, where they will be less obvious. In addition, knowledge of the aesthetics of each subunit helps in choosing replacement tissue of the appropriate contour and thickness. If a patient has a defect that encompasses more than one half of the aesthetic subunit, it is best to reconstruct the entire subunit rather than to attempt to cover the defect.

References

1. Yotsuyanagi T, Yamashita K, Urushidate S, et al. Reconstruction of large nasal defects with a combination of local flaps based at the aesthetic subunit principle. *Plast Reconstr Surg*. 2001 May;107(6):1358-1362.
2. Burget GC, Menick FJ. The subunit principle in nasal reconstruction. *Plast Reconstr Surg*. 1985 Aug;76(2):239-247.

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159. A 27-year-old woman comes to the office for consultation regarding mesotherapy for minimal lipodystrophy of the flank regions. She asks about the relative effectiveness of nonsurgical treatment with mesotherapy as compared to suction lipectomy. Which of the following is the most appropriate response?

- A) Mesotherapy is as effective as suction lipectomy, and it is approved by the US Food and Drug Administration (FDA)
- B) Mesotherapy is as effective as suction lipectomy, but it is not FDA-approved
- C) Mesotherapy is not as effective as suction lipectomy, and it is FDA-approved
- D) Mesotherapy is not as effective as suction lipectomy, and it is not FDA-approved

The correct response is Option D.

Mesotherapy involves the subcutaneous injection of medications as a nonsurgical alternative to suction lipectomy. Currently, mesotherapy is not an effective alternative to suction lipectomy and is not approved by the US Food and Drug Administration (FDA). Although used initially in the treatment of psoriasis, chronic pain, and cellulite, mesotherapy has been advocated as an alternative to suction lipectomy. In mesotherapy, a variety of medications are injected into the mesoderm, the layer of fat and connective tissue below the skin. The most common medications utilized for lipolysis are phosphatidylcholine and isoproterenol. Currently, there are no clinical reports demonstrating the effectiveness of mesotherapy in body contouring.

References

1. Park SH, Kim DW, Lee MA, et al. Effectiveness of mesotherapy on body contouring. *Plast Reconstr Surg*. 2008 Apr;121(4):179e-185e.
2. Matarasso A, Pfeifer TM; Plastic Surgery Educational Foundation DATA Committee. Mesotherapy for body contouring. *Plast Reconstr Surg*. 2005 Apr 15;115(5):1420-1424.

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160. A 46-year-old woman with ductal carcinoma in situ is scheduled to undergo right mastectomy. Immediate reconstruction with a tissue expander and acellular dermal matrix (ADM) is planned. Which of the following is an expected outcome with use of ADM?

- A) Decreased formation of seroma
- B) Decreased incidence of hematoma
- C) Decreased risk of infection
- D) Increased capsule contracture
- E) Increased initial fill of the expander

The correct response is Option E.

According to Sbitany, et al, acellular dermal matrix (ADM) allows for a greater initial fill of saline. This potentially improves cosmetic outcome, as it better capitalizes on preserved mastectomy skin for reconstruction. Sbitany, et al, concluded that ADM-assisted prosthesis breast reconstruction has a safety profile no worse than that of complete submuscular coverage but offers the benefit of fewer expansions and the potential for more predictable secondary revisions.

ADM has enhanced prosthesis-based reconstruction and remains useful in immediate prosthetic breast reconstruction. However, it has been found to have higher rates of postoperative seroma and infection. It has also been reported to decrease capsule contracture.

References

1. Sbitany H, Sandeen SN, Amalfi AN, et al. Acellular dermis-assisted prosthetic breast reconstruction versus complete submuscular coverage: a head-to-head comparison of outcomes. *Plast Reconstr Surg*. 2009 Dec;124(6):1735-1740.
2. Chun YS, Verma K, Rosen H, et al. Implant-based breast reconstruction using acellular dermal matrix and the risk of postoperative complications. *Plast Reconstr Surg*. 2010 Feb;125(2):429-436.
3. Basu CB, Leong M, Hicks JM. Does acellular cadaveric dermis (ACD) affect breast implant capsule formation in reconstructive breast surgery? A histopathologic comparison of breast capsule and ACD. *Plast Reconstr Surg*. 2009 Oct;124(4S):62-63.

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161. A 53-year-old woman who underwent laparoscopic gastric bypass surgery comes to the office for consultation regarding abdominal contouring. History includes an open cholecystectomy, ventral hernia repair, appendectomy, and caesarean delivery. The presence of which of the following scars on this patient's abdomen is most likely to result in postoperative wound healing complications?

- A) Laparoscopic port scar
- B) Pfannenstiel (low transverse) scar
- C) Right lower quadrant scar
- D) Right subcostal scar
- E) Upper midline scar

The correct response is Option D.

The blood supply to the abdominal wall arises from the intercostal arteries, the superior and inferior superficial epigastric arteries, and the perforators from the deep superior epigastric arteries through the rectus abdominis muscle. In a traditional abdominoplasty with undermining of the superior flap up to the costal margin, the superficial inferior epigastric arteries and the perforators that arise from the rectus abdominis muscles are divided. This leaves the abdominal flap to survive on the flow from the intercostal vasculature. The subcostal scar from the prior open cholecystectomy is the most likely scar to pose a problem for wound healing in the patient described. This scar has divided the blood flow through the intercostal circulation; thus, flow inferior to the scar may be unreliable.

The port scars are unlikely to cause problems with blood supply due to their small size. The Pfannenstiel, or low transverse, caesarean section scar will require either inclusion within the tissue to be removed or placement within the inferior incision in the old scar line if it is sufficiently low. Placement of the incision above the old scar may impair the blood flow between the two scars. However, even in the scenario described, it is less likely to cause a healing issue because of the transverse orientation of the scar and the lack of undermining between the new incision and old scar. The right lower quadrant (appendectomy) scar will not be an issue, as this will be removed with the tissue resection. The upper midline scar is not as likely to cause a wound healing issue, as circulation from the intercostal vessels from both sides should supply blood flow to the flap on each side of the midline.

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References

1. de Castro CC, Aboudib Júnior JH, Salema R, et al. How to deal with abdominoplasty in an abdomen with a scar. *Aesthetic Plast Surg*. 1993 Winter;17(1):67-71.
2. Pitman GH. Applied anatomy in body contouring. In: Nahai F, ed. *The Art of Aesthetic Surgery: Principles and Techniques*. Vol 3. St. Louis: Quality Medical Publishing; 2005:2105-2213.
3. Shermak MA, Mallalieu J, Chang D. Do preexisting abdominal scars threaten wound healing in abdominoplasty? *Eplasty*. 2010 Jan 18;10:e14.

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162. A 45-year-old man comes to the office because of a chronic “stuffy nose” that is worse in the mornings than in the evenings. After decongestion, examination shows a slight posterior bony septal deviation, internal nasal valve angle of 12 degrees, and bilateral inferior turbinate hypertrophy. After a failed course of medical management, which of the following is the most appropriate single treatment?

- A) Alar batten grafts
- B) Flaring sutures
- C) Inferior turbinate reduction
- D) Septoplasty
- E) Spreader grafts

The correct response is Option C.

While each of the listed procedures can help with nasal airway obstruction, bilateral inferior turbinate hypertrophy is its most common cause. The nasal valve consists of four distinct airflow-resistive components. The vestibule terminates in an airflow-resistive aperture between the septum and the caudal end of the upper lateral cartilage. Its cross-sectional area is stabilized by its cartilaginous structures and inspiratory isometric contractions of the alar dilator muscles. Its walls are devoid of erectile tissues that might otherwise affect its cross-sectional area and airflow resistance. By contrast, the bony entrance to the cavum is occupied by erectile tissues of both lateral (turbinates) and septal nasal walls that modulate the cross-sectional area of airway and airflow resistance. The body of the cavum offers little resistance to airflow. Valve constriction induces “orifice flow” of inspiratory air as it enters the body of the cavum, disrupting laminar characteristics and enhancing exchanges with nasal mucosa of heat, water, and contaminants. Acoustic rhinometric and rhinomanometric measurements show that it is seldom necessary to extend septal and/or turbinate surgery far beyond the piriform aperture in the treatment of nasal obstruction. The bony septal deviation is small and posterior, so septoplasty would not be the most helpful. Spreader grafts and flaring sutures help with internal nasal valve collapse, but are not the most beneficial in this instance. Alar batten grafts are used to correct external nasal valve collapse, which the patient described does not have. The normal internal valve angle is 10 to 15 degrees.

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Rhinitis is the common cause of nasal obstruction. Medical treatment should be instituted for turbinate hypertrophy before committing to surgery. Rhinitis has many pathogeneses. The most common type, infectious rhinitis, is nearly always caused by a virus (rhinovirus, or the common cold). Oral or topical decongestants are helpful during the acute phase. Topical decongestants are safe, if used on a short-term basis (3 days) to avoid rhinitis medicamentosa.

Another common cause of nasal obstruction is allergic rhinitis, which is an antigen-antibody reaction mediated by immunoglobulin E. Allergic rhinitis is a seasonal affliction; symptoms occur after exposure to an airborne pollen or fungal spore. Associated symptoms include sneezing, itching, and coryza. Many medication options are available for conservative medical management, each having its own specific indications for use. The most useful classes of medications include decongestants, second-generation antihistamines, cromolyn sodium nasal spray (mast cell stabilizer), nasal topical corticosteroids, ipratropium bromide nasal spray (anticholinergic), and corticosteroid injection of the inferior turbinate. Often, these medications are used in various combinations to maximize the treatment for each patient.

References

1. Courtiss EH. Diagnosis and treatment of nasal airway obstruction due to inferior turbinate hypertrophy. *Clin Plast Surg*. 1988 Jan;15(1):11-13.
2. Cole P. The four components of the nasal valve. *Am J Rhinol*. 2003 Mar-Apr;17(2):107-110.
3. Zhao K, Dalton P. The way the wind blows: implications of modeling nasal airflow. *Curr Allergy Asthma Rep*. 2007 May;7(2):117-125.

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163. A 45-year-old woman comes to the office for consultation regarding augmentation mammoplasty. She wears a size 32B brassiere; height is 5 ft 3 in (160 cm), and weight is 130 lb (59 kg). Subglandular placement of saline prostheses is planned. Which of the following is the primary advantage of using saline rather than silicone prostheses in this patient?

- A) Easier detection of rupture
- B) Less capsular formation
- C) Less wrinkling
- D) Lighter prosthesis
- E) Lower risk of leakage

The correct response is Option A.

Although both silicone and saline prostheses rupture at a similar rate, a saline rupture is more easily detectable because the saline is resorbed in the body. The deflated breast will be smaller in volume. Subtle changes, such as decreased upper pole fullness or increased softness, may be the only clues to silicone rupture on physical examination. Ultrasonography or MRI may be needed to confirm the diagnosis.

Saline prostheses are firmer than silicone; they are more likely to be palpable than silicone prostheses as well. Neither prosthesis has been associated with systemic immune syndromes, and both prostheses produce capsular contracture, wrinkling, and leakage.

References

1. Spear SL, Bulan EJ, Venturi ML. Breast augmentation. *Plast Reconstr Surg*. 2004 Oct;114(5):73e-81e.
2. Hölmich LR, Vejborg IM, Conrad C, et al. Untreated silicone breast implant rupture. *Plast Reconstr Surg*. 2004 Jul;114(1):204-214.

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164. A 50-year-old woman is scheduled to undergo transcutaneous lower eyelid blepharoplasty for periorbital aging. Which of the following is the most likely complication 3 months postoperatively?

- A) Chemosis
- B) Infection
- C) Lacrimal system dysfunction
- D) Lagophthalmos
- E) Lower eyelid malposition

The correct response is Option E.

The most common complication following lower blepharoplasty is lower eyelid malposition. Lower eyelid malposition ranges from mild scleral show to severe cicatricial ectropion. Malposition of the lower eyelid results from abnormal downward forces on the eyelid. Excessive scarring, over-resection of skin, imbrication of the orbital septum, orbicularis paralysis, edema, and hematoma can all produce lower eyelid malposition. Predisposing factors for malposition that should be identified preoperatively include malar hypoplasia, globe proptosis, high myopia, laxity of the lower eyelid, and thyroid ophthalmopathy. Postoperative mild scleral show can often be managed with massage and topical lubrication. However, severe ectropion may require scar release, skin grafting, or a lower eyelid tightening procedure such as a canthoplasty.

Chemosis is a postoperative sequela, but it usually resolves in 6 weeks. Infection of the lower eyelid following blepharoplasty is rare given that the eyelid is well vascularized. Lacrimal system dysfunction is rare and often returns to normal without surgical intervention. Lagophthalmos can occur following upper blepharoplasty and can lead to postoperative pain, guarding, or incomplete eyelid closure. Lagophthalmos is usually temporary and resolves with lubrication and eyelid massage.

References

1. Lelli GJ Jr, Lisman RD. Blepharoplasty complications. *Plast Reconstr Surg*. 2010 Mar;125(3):1007-1017.
2. Trussler AP, Rohrich RJ. MOC-PSSM CME article: Blepharoplasty. *Plast Reconstr Surg*. 2008 Jan;121(1 Suppl):1-10.
3. Hass AN, Penne RB, Stefanyszyn MA, et al. Incidence of postblepharoplasty orbital hemorrhage and associated visual loss. *Ophthal Plast Reconstr Surg*. 2004 Nov;20(6):426-432.

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165. A 28-year-old woman comes for follow-up evaluation 2 weeks after undergoing bilateral augmentation mammoplasty with subpectoral placement of 325-mL, round, smooth saline prostheses. She is now concerned that both prostheses appear “too high.” Physical examination shows fullness in the upper quadrants of both breasts. Which of the following interventions is most appropriate?
- A) Administration of oral zafirlukast
 - B) Application of a circumferential breast band
 - C) Injection of corticosteroid into the inframammary crease
 - D) Open capsulotomy
 - E) Percutaneous release of the inframammary crease

The correct response is Option B.

The most appropriate recommendation is breast band application. Breast shape following augmentation mammoplasty undergoes dynamic changes. The skin envelope and pectoralis muscle stretch under the expansion pressure of the prosthesis. The skin of the lower pole will stretch, allowing the prostheses to migrate inferiorly. Breast massage and a circumferential elastic breast band applied around the superior breast encourage this migration.

Zafirlukast is a leukotriene-antagonist that is used for the treatment of asthma. Preliminary studies suggest improvement in capsule contractures. This drug is associated with potential life-threatening liver complications as well as neuropsychiatric events. Because administration in the scenario described would constitute an off-label use of the drug, extensive discussion with the patient would be required prior to use.

In the past, steroid was injected into the saline compartment of a double-lumen prosthesis in an attempt to decrease the incidence of capsule contraction. This delivery system was uncontrolled and many prostheses migrated beyond the normal limits of the inframammary crease. Postoperative steroid injection has been used with some success for the prevention of recurrent capsule contracture following capsulectomy.

If residual inferior pectoralis muscle fibers are left intact along the rib or capsule contracture develops, open capsulotomy may be required; however, conservative treatment is indicated at this early postoperative period.

Percutaneous release would expose the patient to unnecessary complications of prosthesis injury, bleeding, and inframammary crease malposition.

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References

1. Maxwell GP, Baker MB. Augmentation mammoplasty: general considerations. In: Spear SL, ed. *Surgery of the Breast: Principles and Art*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2006:1237-1260.
2. Camirand A, Doucet J, Harris J. Breast augmentation: compression—a very important factor in preventing capsular contracture. *Plast Reconstr Surg*. 1999 Aug;104(2):529-538.
3. Reid RR, Greve SD, Casas LA. The effect of zafirlukast (Accolate) on early capsular contracture in the primary augmentation patient: a pilot study. *Aesthet Surg J*. 2005 Jan-Feb;25(1):26-30.
4. Caffee HH. Capsule injection for the prevention of contracture. *Plast Reconstr Surg*. 2002 Oct;110(5):1325-1328.

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166. A plastic surgeon is asked by a local charity to donate his services to an annual fundraiser. Which of the following medical services is currently permitted by the code of ethics of the American Society of Plastic Surgeons (ASPS)?

- A) Augmentation mammoplasty
- B) Liposuction
- C) Injection of botulinum toxin type A
- D) Rhytidectomy
- E) No services are permitted

The correct response is Option C.

Injection of botulinum toxin type A does not require an incision; therefore, it is not a medical procedure as defined by the American Society of Plastic Surgeons (ASPS). The ASPS defines a “procedure” (Section 2, Article I [K] of the code of ethics) as a medical service that requires an incision. Examples of medical services that require an incision include, but are not limited to, rhytidectomy, augmentation mammoplasty, blepharoplasty, and suction lipectomy. Examples of medical services that do not require an incision include, but are not limited to, injections (botulinum toxin type A, hyaluronic acid), microdermabrasion, and other skin surface treatments. The other options listed all require an incision and are therefore prohibited as donations.

References

1. American Society of Plastic Surgeons. Code of Ethics of the American Society of Plastic Surgeons. Modified October 2009.
2. Reed M. Membership approves code of ethics amendments and glossary. *Plast Surg News*. 2010 Jan:32.

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167. A 40-year-old woman comes to the office because of firmness of the right breast. Twenty years ago, she underwent augmentation mammoplasty with smooth silicone prostheses placed in subglandular pockets. Which of the following is the most appropriate management?

- A) Injection of corticosteroids
- B) Treatment with zafirlukast (Accolate)
- C) Closed capsulotomy
- D) Open capsulotomy
- E) Total capsulectomy

The correct response is Option E.

In the patient described with a capsular contracture, the most appropriate option is open capsulectomy. As opposed to open capsulotomy, open capsulectomy removes the entire capsule. Leaving the capsule behind in open capsulotomy can contribute to late seromas. Scar tissue left behind during an open capsulotomy may also prevent the prosthesis and breast from obtaining a natural shape.

Closed capsulotomy is no longer advised for breast prostheses because of the risk of rupturing the prosthesis during the procedure. Open capsulotomy and open capsulectomy with replacement of the prosthesis in the subglandular plane will continue to be associated with higher capsular contracture rates than submuscular or dual-plane placement. These are options for the patient as long as she understands the trade-offs of keeping the prosthesis in this plane.

Zafirlukast (Accolate) is a leukotriene receptor antagonist that is used as a bronchodilator in the management of asthma. The evidence supporting its use in capsular contracture is anecdotal. It is not approved by the US Food and Drug Administration (FDA) for use in capsular contracture; therefore, its use in the scenario described would be considered an “off-label” indication. As such, zafirlukast cannot be recommended for the routine treatment of capsular contracture.

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References

1. Handel N. Managing complications of augmentation mammoplasty. In: Spear SL, ed. *Surgery of the Breast: Principles and Art*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2005:1417-1435.
2. Spear SL, Carter ME, Ganz JC. The correction of capsular contracture by conversion to “dual-plane” positioning: technique and outcomes. *Plast Reconstr Surg*. 2006 Dec;118(7 Suppl):103S-113S.

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168. A 16-year-old boy is brought to the emergency department after sustaining an avulsion injury involving the skin of the anterior part of the left ear. Physical examination shows a 2 × 2-cm flap elevated off the conchal bowl. Which of the following arteries is most likely to be involved?

- A) Infraorbital
- B) Occipital
- C) Posterior auricular
- D) Superficial temporal
- E) Transverse facial

The correct response is Option C.

The primary blood supply to the anterior surface of the ear is the posterior auricular artery. Arterial supply of the auricle comes from the posterior auricular artery and from the superficial temporal artery. The anterior surface of the ear is supplied by perforators of the posterior auricular artery. Only a small branch of the superficial temporal artery crosses the superior helix to supply the triangular fossa. The occipital artery provides a minor contribution to the posterior aspect of the ear.

Neither the transverse facial artery nor the infraorbital artery provides supply to the auricle. The transverse facial artery runs anteriorly to supply the parotid gland, parotid duct, and masseter muscle. The infraorbital artery provides supply to the medial angle of the orbit, the dorsal nasal area, and the upper lip.

References

1. Park C, Lineaweaver WC, Rumly TO, et al. Arterial supply of the anterior ear. *Plast Reconstr Surg*. 1992 Jul;90(1):38-44.
2. Hackney FL. Plastic surgery of the ear. In: *Selected Readings in Plastic Surgery*. Vol 9. 2001:1-26.

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169. A 24-year-old woman comes to the office 8 months after undergoing a circumareolar mastopexy/augmentation. She is concerned because her areolas are now asymmetric. They were symmetric preoperatively. Physical examination shows that the right areola diameter is 7 cm and the left areola diameter is 4 cm. The most likely cause of this asymmetry is a failure of which of the following?

- A) Breast pillar approximation
- B) Periareolar de-epithelialization
- C) Prosthesis pocket
- D) Purse-string suture
- E) Skin envelope tailor tacking

The correct response is Option D.

The most likely cause of nipple-areola asymmetry in the patient described is failure in the purse-string suture. Periareolar mastopexy/augmentation has been plagued with inconsistent control of the nipple-areola complex diameter. This mastopexy technique creates concentric resection of periareolar epithelium to elevate the nipple-areola complex and reduce the skin envelope. The etiology of this areola-spreading is the tension of the closure intrinsic to the technique. Use of a permanent suture for the purse-string helps limit the postoperative spreading of the areolar diameter. Introduction of the interlocking polytetrafluoroethylene (GORE-TEX) suture has allowed improved control of areolar shape and diameter. If one of the purse-string sutures breaks or pulls through its dermal attachments, that areola will be subject to the forces of tension and expand in diameter. In the patient described, operative correction involves either replacing the purse-string on the widened side or removing the purse-string on the smaller diameter areola.

Periareolar de-epithelialization is the cause of the tension and is an essential part of the procedure. In patients who are significantly asymmetric, tension of the areolas will also be asymmetric; however, a permanent purse-string suture is crucial in these cases.

Prosthesis pocket and parenchyma shaping sutures will not have the impact on areolar diameter that is described in this scenario.

Envelope tailor tacking relates to final adjustments in periareolar de-epithelialization.

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References

1. Hammond DC, Khuthaila DK, Kim J. The interlocking Gore-Tex suture for control of areolar diameter and shape. *Plast Reconstr Surg.* 2007 Mar;119(3):804-809.
2. Spear SL, Boehmler JH IV, Clemens MW. Augmentation/mastopexy: a 3-year review of a single surgeon's practice. *Plast Reconstr Surg.* 2006 Dec;118(7 Suppl):136S-147S.
3. Spear SL, Giese SY, Ducic I. Concentric mastopexy revisited. *Plast Reconstr Surg.* 2001 Apr 15;107(5):1294-1299.

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170. A 38-year-old woman undergoes suction-assisted lipectomy of the hips, abdomen, and outer thighs. Using a super-wet technique, 3 L of aspirate is obtained. Which of the following is the most accurate estimate of the percentage of fluid infiltrate that remains in the body at the end of the procedure?

- A) 10%
- B) 30%
- C) 50%
- D) 70%
- E) 90%

The correct response is Option D.

The most accurate estimate of infiltrate remaining in the body is 70%. Fluid management is critical in the treatment of suction lipectomy patients. Profound hemodynamic changes occur with increasing significance as the volume of infiltrate and aspirate increases. To avoid fluid overload leading to pulmonary edema, the plastic surgeon must realize that the majority of infiltrate will remain in the patient's body and be absorbed over time. Fluid requirements should include maintenance fluid (the amount of fluid required to replace normal daily requirements plus deficits related to being nothing-by-mouth), aspirate removed, and fluid infiltrated (70% estimated to be intravascular). These calculations will be vastly different depending on the type of wetting solution used, such as dry technique (no additional infiltrate), wet technique (200 to 300 mL per site), super-wet technique (1 mL of infiltrate for every 1 mL of aspirate), or tumescent technique (3 mL of infiltrate for every 1 mL of aspirate).

References

1. Haeck PC, Swanson JA, Gutowski KA, et al. Evidence-based patient safety advisory: liposuction. *Plast Reconstr Surg.* 2009;124(Suppl):28S-44S.
2. Iverson RE, Pao VS. MOC-PS(SM) CME article: liposuction. *Plast Reconstr Surg.* 2008 Apr;121(4 Suppl):1-11.
3. Rohrich RJ, Leedy JE, Swamy R, et al. Fluid resuscitation in liposuction: a retrospective review of 89 consecutive patients. *Plast Reconstr Surg.* 2006 Feb;117(2):431-435.

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171. A 42-year-old woman is evaluated because of an invasive cancer of the right breast. Which of the following best approximates the likelihood that this patient's cancer is associated with the *BRCA1* or *BRCA2* genes?

- A) 1%
- B) 10%
- C) 25%
- D) 40%
- E) 75%

The correct response is Option B.

Among familial breast cancers, 5 to 10% are considered to be hereditary. These familial breast cancers are linked to specific mutations on a cancer susceptibility gene. The breast cancer susceptibility genes (*BRCA*) belong to a class of genes known as tumor suppressors. In normal cells, *BRCA1* and *BRCA2* genes stabilize the DNA and prevent uncontrolled cell growth.

A woman's lifetime risk of developing breast and/or ovarian cancer is greatly increased if she inherits a mutation on *BRCA1* or *BRCA2* genes. *BRCA1*- and *BRCA2*-related breast cancers occur in younger women and are often associated with estrogen receptor-negative tumors.

References

1. Solomon JS, Brunicardi CF, Friedman JD. Evaluation and treatment of *BRCA*-positive patients. *Plast Reconstr Surg*. 2000 Feb;105(2):714-719.
2. Soltanian H, Okada H. Understanding genetic analysis for breast cancer and its implications for plastic surgery. *Aesthet Surg J*. 2008 Jan-Feb;28(1):85-91.

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172. A 69-year-old woman comes to the office for consultation regarding lower eyelid blepharoplasty. Physical examination shows a negative canthal tilt. Snap-back testing of the lower eyelid shows 8 mm of distraction. Transcutaneous lower blepharoplasty with fat transposition is planned. Which of the following is the most appropriate surgical choice to avoid postoperative malposition of the lower eyelid?

- A) Horizontal wedge excision
- B) Lateral canthoplasty
- C) Orbicularis repositioning
- D) Posterior lamellar graft
- E) Tarsorrhaphy

The correct response is Option B.

Lateral canthal support can treat preexisting lower eyelid laxity and can help protect against postblepharoplasty malposition of the lower eyelid. The choice of treatment can be determined by the extent of eyelid laxity. For severe lower eyelid laxity (greater than 6 mm of eyelid distraction), a lateral canthoplasty with lateral cantholysis allows for increased superior mobility and precise positioning of the lower canthal tendon inside the orbital rim. While horizontal wedge excision of the lower eyelid addresses the horizontal lower eyelid laxity, it is not recommended in negative canthal tilt patients (lateral canthus at lower level than medial canthus), who also require lateral eyelid resuspension. Mild eyelid laxity (1 to 2 mm of eyelid distraction) can also be addressed with orbicularis repositioning. A posterior lamellar graft would not be an appropriate treatment for this condition. In minimal cases of eyelid laxity, temporary external support of the lower eyelid with a tarsorrhaphy stitch at the lateral limbus can help protect the cornea and prevent early cicatricial ectropion.

References

1. Trussler AP, Rohrich RJ. MOC-PS CME article: Blepharoplasty. *Plast Reconstr Surg*. 2008 Jan;121(1 Suppl):1-10.
2. Muzaffar AR, Mendelson BC, Adams WP Jr. Surgical anatomy of the ligamentous attachments of the lower lid and lateral canthus. *Plast Reconstr Surg*. 2002 Sep 1;110(3):873-884.
3. Patipa M. The evaluation and management of lower eyelid retraction following cosmetic surgery. *Plast Reconstr Surg*. 2000 Aug;106(2):438-453.

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4. Glat PM, Jelks GW, Jelks EB, et al. Evolution of the lateral canthoplasty: techniques and indications. *Plast Reconstr Surg*. 1997 Nov;100(6):1396-1405.

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(Please note that this pictorial appears in color in the online examination)

173. A 25-year-old woman is scheduled to undergo breast reduction with resection of 2.4 lb (1100 g) from each breast. Current weight is 200 lb (91 kg), and height is 5 ft 8 in (173 cm). Physical examination shows macromastia with nipple-sternal notch distance of 34 cm on the left and 35 cm on the right. A photograph is shown. Which of the following postoperative complications is most likely in this patient?

- A) Bleeding
- B) Fat necrosis
- C) Infection
- D) Seroma
- E) Wound breakdown

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The correct response is Option E.

Breast reduction is one of the most commonly performed procedures in plastic surgery, and outcomes following breast reduction have been well studied. Common risks associated with breast reduction include infection, symptomatic scar, seroma, wound healing complications, fat necrosis, asymmetry, and need for reoperation. BMI, volume of breast tissue resection greater than 1000 g per breast, and tobacco use are the greatest risk factors for complication following surgery. Wound healing complications are more likely to occur following breast reduction in a young, healthy, but obese patient with large resection volumes. Other complications might occur but are less common. None of the other complications have been associated with risk factors.

References

1. Cunningham BL, Gear AJ, Kerrigan CL, et al. Analysis of breast reduction complications derived from the BRAVO study. *Plast Reconstr Surg*. 2005 May;115(6):1597-1604.
2. Eggert E, Schuss R, Edsander-Nord A. Clinical outcome, quality of life, patients' satisfaction, and aesthetic results, after reduction mammoplasty. *Scand J Plast Reconstr Surg Hand Surg*. 2009;43(4):201-206.
3. Roehl K, Craig ES, Gómez V, et al. Breast reduction: safe in the morbidly obese? *Plast Reconstr Surg*. 2008 Aug;122(2):370-378.

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174. A 42-year-old man is brought to the emergency department after sustaining a dog bite to the tip of the nose. History includes hypertension. Physical examination shows a 3-cm soft-tissue deficit involving 80% of the nasal tip. In addition to resection of the remaining nasal tip, which of the following methods of reconstruction is most likely to provide the most satisfactory aesthetic outcome?

- A) Split-thickness skin graft
- B) Full-thickness skin graft
- C) Dorsal nasal flap
- D) Nasolabial flap
- E) Forehead flap

The correct response is Option E.

Aesthetic principles, as outlined by Burget, et al, dictate that when greater than 50% of the tip or alar subunits are compromised, the best aesthetic outcome will result when the entire subunit is resected and reconstructed. While others such as Rohrich, et al, have argued that this is not an absolute rule and that each case must be analyzed individually, the best aesthetic outcome will result from avoiding scars directly on the tip of the nose in the scenario described. A skin graft will contract and show a different skin color and quality than the surrounding skin, making it less likely to be satisfactory to the patient described. A nasolabial flap, while an appropriate choice for smaller defects and alar defects, is unlikely to reach over the midline. A forehead flap is a classic reconstructive option for nasal tip defects.

The dorsal nasal flap is also a possibility, but it is limited to defects up to 1.5 to 2 cm.

References

1. Menick F. Nasal reconstruction. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007.
2. Kim EM, Bartlett SP. Nasal reconstruction. In: Guyuron B, Eriksson E, Persing JA, eds. *Plastic Surgery: Indications and Practice*. Philadelphia: WB Saunders; 2009.
3. Burget GC, Menick FJ. The subunit principle in nasal reconstruction. *Plast Reconstr Surg*. Aug 1985;76(2):239-247.
4. Rohrich RJ, Griffin JR, Ansari M, et al. Nasal reconstruction—beyond aesthetic subunits: a 15-year review of 1334 cases. *Plast Reconstr Surg*. Nov 2004;114(6):1405-1416; discussion 1417-1419.

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175. A 42-year-old woman is scheduled to undergo facial resurfacing with a fractionated carbon dioxide laser. This procedure acts by targeting which of the following substances in skin?

- A) Collagen
- B) Elastin
- C) Hyaluronic acid
- D) Melanin
- E) Water

The correct response is Option E.

The principle of selective photothermolysis as applied to skin resurfacing (ablation) is based upon water content. The epidermis is composed of 90% water and is vaporized at temperatures in excess of 212°F (100°C). The carbon dioxide laser has water as its chromophore. The carbon dioxide laser has a wavelength of 10,600 nm and has a water absorption coefficient of 800/cm.

The collagen, elastin, hyaluronic acid, and melanin content of skin may be affected by the temperature change from the laser energy, but water is the chromophore that is targeted by an ablative, fractionated carbon dioxide laser.

References

1. Hunzeker CM, Weiss ET, Geronemus RG. Fractionated CO₂ laser resurfacing: our experience with more than 2000 patients. *Aesthet Surg J*. 2009 Jul-Aug;29(4):317-322.
2. Tierney EP, Hanke CW. Ablative fractionated CO₂ laser resurfacing for the neck: Prospective study and review of the literature. *J Drugs Dermatol*. 2009;8(8):723-731.

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176. A healthy 68-year-old woman comes to the office because she is unhappy with the aged appearance of her forehead. She does not smoke cigarettes. Physical examination shows transverse rhytides across the forehead with deep glabellar creases. Forehead height is 11 cm. Which of the following is the most appropriate approach for brow lift surgery in this patient?
- A) Endoscopic
 - B) Open coronal
 - C) Open pretrichial
 - D) Transpalpebral

The correct response is Option C.

Several factors should be considered in planning a brow lift surgery. Generally, as patients age, the face and forehead both elongate. In addition, a receding hairline can also contribute to a long forehead. The forehead, measured from the hairline to the brow, should be approximately one third of facial length. In most individuals, this falls somewhere between 6 and 10 cm. In the patient described, the forehead height is 11 cm, making her forehead slightly long.

Ptosis of the eyebrows may also occur in the aging process, and patients may compensate by using the frontalis muscle, which leads to deep transverse forehead rhytides. The corrugators depress the eyebrow, which leads to vertical glabellar lines. Often, patients with brow ptosis request blepharoplasty, and it is important for the clinician to recognize brow ptosis. This can be done by asking the patient to close his or her eyes and open them slowly. Automatic brow elevation with frontalis activation suggests brow ptosis.

The approach to forehead rejuvenation used depends on the forehead and brow findings in the individual patient. An open pretrichial incision shortens the forehead and is effective on deep rhytides. It is the most appropriate approach in the patient described. Endoscopic procedures are most useful for people with an optimal forehead length. This is due to the technical difficulty of using the endoscope across a long, convex surface. The coronal approach elongates the forehead, and, as such, it is used most commonly in patients with a short forehead. A transpalpebral corrugator resection is most useful for patients with no eyebrow ptosis.

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References

1. Guyuron B. Forehead rejuvenation. In: Guyuron B, Eriksson E, Persing JA, eds. *Plastic Surgery: Indications and Practice*. Philadelphia: WB Saunders; 2009.
2. Guyuron B, Behmand RA, Green R. Shortening of the long forehead. *Plast Reconstr Surg*. 1999 Jan;103(1):218-223.

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177. An otherwise healthy 25-year-old man comes to the office because of a 10-year history of bilateral gynecomastia. Physical examination shows breast enlargement with skin redundancy and palpable glandular and fatty tissue. Which of the following is the most appropriate next step in management?

- A) Determination of 17-ketosteroid level in urine
- B) Mammography
- C) Referral to an endocrinologist
- D) Surgical excision
- E) Testicular ultrasound

The correct response is Option D.

The most appropriate next step for the patient described, who is young with a long history of bilateral gynecomastia since puberty, is surgical excision. The onset of gynecomastia correlates with transient elevations of plasma estradiols prior to the completion of puberty so that the androgen-to-estrogen ratio is altered. Suction lipectomy can also be used as surgical treatment for gynecomastia. Most cases of gynecomastia present at puberty, with an incidence as high as 65% in boys 14 to 15 years of age. The condition disappears during the late teens, with only 7.7% remaining at age 17 years. The incidence rises again with progressive age. The condition is often a normal finding, even though it may be associated with a more serious disease in occasional cases.

In certain cases, systemic causes — such as liver disease, lung carcinoma, testicular carcinoma, adrenal tumors, thyroid disease, testosterone imbalance, and Klinefelter syndrome — or drugs like marijuana, should be considered. For instance, a prepubescent boy presenting with gynecomastia would cause concern. Another example would be if an adult man presented with a 6-month history of unilateral gynecomastia. A work-up including liver function test, urine studies, testicular examination, endocrinology evaluation, and possibly mammography should be done if there is a possibility of cancer (ie, patients with Klinefelter syndrome).

References

1. Aston SJ, Beasley RW, Thorne CH, et al, eds. *Grabb and Smith's Plastic Surgery*. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 1997.
2. Rees TD, LaTrenta G. *Aesthetic Plastic Surgery*. 2nd ed. Philadelphia: WB Saunders; 1994.

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3. Goldwyn RM, Cohen MN. *The Unfavorable Result in Plastic Surgery: Avoidance and Treatment*. 3rd ed. Philadelphia: Lippincott Williams & Wilkins; 2001.

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178. A 45-year-old woman comes to the office because she desires facial rejuvenation. Various fillers, as well as botulinum toxin type A (BOTOX Cosmetic), are discussed as possible treatment options. As part of the discussion of informed consent, the plastic surgeon is obligated to tell the patient which of the following about the use of BOTOX Cosmetic?
- A) Use of BOTOX Cosmetic and fillers in combination for perioral rejuvenation is approved by the FDA
 - B) Use of BOTOX Cosmetic and fillers in combination for periorbital rejuvenation is approved by the FDA
 - C) Use of BOTOX Cosmetic and fillers simultaneously is not approved by the FDA
 - D) Use of BOTOX Cosmetic for amelioration of platysmal banding is approved by the FDA
 - E) Use of BOTOX Cosmetic outside of glabellar frown lines is not approved by the FDA

The correct response is Option E.

Off-label use of drugs or medical devices is the common practice of using a device or drug in a manner not currently approved by the FDA. A widespread, common example is the use of BOTOX Cosmetic for chemodenervation of muscles other than those involved with glabellar rhytides. Strictly speaking, use of botulinum toxin type A to treat anything other than glabellar furrows is not FDA-approved, but it is considered legal. The combination of BOTOX Cosmetic and fillers used outside of approved locations is legal but considered “off label,” and therefore is not FDA-approved. If BOTOX Cosmetic and filler are used in their approved locations simultaneously, there is no issue with FDA approval. The physician must understand that off-label protection is not an open approval for usage, but permits physicians to use medications in a manner different from that approved by the FDA as long as that use is not considered experimental. Generally, there should be evidence that the off-label use is safe by citing general acceptance in the medical community or by the presence of peer-reviewed publications supporting its use. The patient must be informed during the consent process that the use is “off-label,” not FDA-approved, and acknowledge such by signing documentation during the informed consent. Manufacturers may not advertise off-label use to the public, but may distribute peer-reviewed publications to physicians as long as an appropriate disclosure is present identifying the off-label nature of that particular use and any potential conflicts of interest by the publication’s authors.

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References

1. Reisman NR. Ethics, legal issues, and consent for fillers. *Clin Plast Surg*. 2006 Oct;33(4):505-510.
2. Goldberg DJ. Legal ramifications of off-label filler use. *Clin Plast Surg*. 2006 Oct;33(4):597-601.
3. Gorney M, Martello J, Hart L. The medical record. Informing your patients before they consent. *Clin Plast Surg*. 1999 Jan;26(1):57-68, vi-vii.
4. Rohrich RJ, Janis JE, Reisman NR. Use of off-label and non-approved drugs and devices in plastic surgery. *Plast Reconstr Surg*. 2003 Jul;112(1):241-243.
5. Rohrich RJ, Ghavami A, Crosby MA. The role of hyaluronic acid fillers (Restylane) in facial cosmetic surgery: review and technical considerations. *Plast Reconstr Surg*. 2007 Nov;120(6 Suppl):41S-54S.
6. American Society of Plastic Surgeons; American Society for Aesthetic Plastic Surgery. Injectables and fillers: legal and regulatory risk management issues. *Plast Reconstr Surg*. 2006 Sep;118(3 Suppl):129S-132S.
7. Food and Drug Administration Center for Devices and Radiological Health, Office of Device Evaluation. *Executive Summary: Dermal Filler Devices*. General and Plastic Surgery Devices Panel, Public Advisory Committee Meeting. November 18, 2008. Available at: <http://www.fda.gov/ohrms/dockets/ac/08/briefing/2008-4391b1-01%20-%20FDA%20Executive%20Summary%20Dermal%20Fillers.pdf>. Accessed July 13, 2009.

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179. A 43-year-old woman is undergoing bilateral reduction mammoplasty with the inferior pedicle technique. The dermis is preserved during deepithelialization of the pedicle to protect which of the following anatomical structures?

- A) Perforators from the internal mammary artery
- B) Perforators from the lateral thoracic artery
- C) Sebaceous glands
- D) Subdermal plexus
- E) Superficial layer of the superficial fascia of the breast

The correct response is Option D.

The major blood supply to the breast comes from perforating branches of the internal mammary artery, lateral branches of the posterior intercostal arteries, and branches of the axillary artery. The blood supply from the axillary artery includes the pectoral branches, the highest thoracic artery, and the lateral thoracic artery. Those vessels from the pectoral branches enter underneath the muscle before coming through it to supply the breast tissue. The vessels from the lateral thoracic artery, known as the lateral mammary branches, wrap around the lateral border of the pectoralis muscle to supply the lateral breast. The second, third, and fourth perforating branches from the internal mammary artery, known as the medial mammary arteries, enter the medial aspect of the breast. The perforating branches from the second, third, and fourth posterior intercostal arteries, known as the mammary branches, enter the breast laterally. The vascular arcades seem to be concentrated at the periphery of the breast (the cutaneoglandular plexus), and the larger vessels appear to lie not far beneath the skin, superficial to the glandular tissue. This finding has led certain authors to conclude that resection of the gland should not commence fewer than 2 to 3 cm from the chest wall; if skin flaps are elevated, they should be kept at least 2 cm thick for maximum viability. This also justifies preservation of the dermis when deepithelializing flaps to protect the subdermal plexus from injury.

Perforators from the internal mammary artery and lateral thoracic artery supply the breast parenchyma. The superficial layer of the superficial fascia of the breast parenchyma does not provide vascularity.

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References

1. Achauer BM, Eriksson E, Guyuron B, et al, eds. *Plastic Surgery: Indications, Operations, and Outcomes*. St. Louis: Mosby; 2000.
2. Würlinger E, Mader N, Posch E, et al. Nerve and vessel supplying ligamentous suspension of the mammary gland. *Plast Reconstr Surg*. 1998 May;101(6):1486-1493.
3. Ricbourg B. [Applied anatomy of the breast: blood supply and innervation]. *Ann Chir Plast Esthet*. 1992 Dec;37(6):603-620. French.

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180. A healthy 29-year-old woman comes to the office for consultation regarding primary augmentation mammoplasty with silicone prostheses. Which of the following systemic disorders has been reported with increased frequency in patients with silicone breast prostheses?

- A) Anaplastic large cell lymphoma
- B) Guillain-Barré syndrome
- C) Microcytic anemia
- D) Multiple sclerosis
- E) Systemic lupus erythematosus

The correct response is Option A.

Initial reports of rheumatologic disorders in women with silicone prostheses resulted in the moratorium on silicone prostheses in the 1990s. Extensive studies failed to identify a causal link between rheumatologic disorders and breast prostheses.

There have been reports, however, of non-Hodgkin lymphoma in women with breast prostheses. Most of these cases have been anaplastic large cell lymphoma.

Anaplastic large cell lymphoma (ALCL) is exceedingly rare in the population (0.5 to 3% of non-Hodgkin lymphoma); thus, establishing an association is difficult. de Jong et al. studied the association by identifying all women with ALCL in the breast from 1990 to 2006. These patients were then compared to a control group of women with breast lymphomas other than ALCL. The study showed an increased odds ratio of 18.2% for the development of ALCL in women with breast prostheses. All the women with breast prostheses in this study had them placed for cosmetic reasons.

In context, the risk of developing ALCL, even with breast prostheses, is rare (0.1 to 0.3/100,000 women with breast prostheses), and the risk of developing primary breast cancer is much more significant. The plastic surgeon should be aware of these studies to effectively counsel patients.

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References

1. de Jong D, Vasmel WL, de Boer JP, et al. Anaplastic large-cell lymphoma in women with breast implants. *JAMA*. 2008 Nov 5;300(17):2030-2035.
2. Wong AK, Lopategui J, Clancy S, et al. Anaplastic large cell lymphoma associated with a breast implant capsule: a case report and review of the literature. *Am J Surg Pathol*. 2008 Aug;32(8):1265-1268.

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181. Which of the following arteries is the dominant blood supply to the nipple-areola complex?

- A) Axillary
- B) Internal mammary
- C) Subclavian
- D) Superficial epigastric
- E) Thoracodorsal

The correct response is Option B.

Multiple studies have been performed to document the blood supply to the breast and the wide range of normal. The nipple-areola complex receives its blood supply from the mammary arteries, which are a branch of the subclavian artery. The subclavian artery becomes the axillary artery and gives off the thoracodorsal artery. The superficial epigastric artery supplies the upper abdomen. The mammary arteries are sometimes referred to as the thoracic arteries.

References

1. Nakajima H, Imanishi N, Aiso S. Arterial anatomy of the nipple-areola complex. *Plast Reconstr Surg*. 1995 Sep;96(4):843-845.
2. van Deventer PV, Page BJ, Graewe FR. Vascular anatomy of the breast and nipple-areola complex. *Plast Reconstr Surg*. 2008 May;121(5):1860-1861.

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182. A 63-year-old woman comes to the office for follow-up evaluation 1 week after undergoing extended superficial musculoaponeurotic system rhytidectomy. On physical examination, the patient can purse the lips symmetrically, but lower depressor weakness of the right angle of the mouth with a full-denture smile is noted. Which of the following branches of the facial nerve was most likely injured during the procedure?

- A) Frontal
- B) Zygomatic
- C) Buccal
- D) Marginal mandibular
- E) Cervical

The correct response is Option E.

Injury to the cervical branch can mimic injury to the marginal branch, producing lower lip depressor weakness with a full-denture smile.

A cervical nerve injury is differentiated from a marginal nerve injury in that mentalis and orbicularis oris function remain intact, and patients can purse the lips symmetrically. In general, cervical branch weakness typically resolves within 4 to 12 weeks.

Injury to the marginal mandibular nerve can occur in either subcutaneous or superficial musculoaponeurotic system dissection in the region along the angle of the mandible and mandibular border. Injury to the marginal mandibular nerve produces weakness of the lower lip depressors and the mentalis muscle. Although this injury can be permanent, as with other facial nerve injury, spontaneous recovery within 6 months is the expected outcome in most (80%) patients.

Although spontaneous recovery is usually noted within 3 to 4 months, frontal branch injury tends to produce longer lasting facial weakness. The reported incidence varies, but it is most likely less than 1%. The obvious neurologic signs of injury are noted, such as inability to elevate the eyebrow and forehead on the involved side, ptosis of the eyebrow, and loss of forehead wrinkles. The injury can be caused by trauma from the cautery, a suture inadvertently encircling the nerve, or, most likely, neurapraxia caused by stretching. Nearly all types of frontal branch nerve weakness will improve over time. If nerve weakness is noted postoperatively, it is discussed with the patient, and he or she is informed of what has happened and what to anticipate. The motor nerve that is injured most commonly is the buccal branch of the facial nerve.

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References

1. Stuzin JM. MOC-PSSM CME article: Face lifting. *Plast Reconstr Surg.* 2008 Jan;121(1 Suppl):1-19.
2. Daane SP, Owsley JQ. Incidence of cervical branch injury with "marginal mandibular nerve pseudo-paralysis" in patients undergoing face lift. *Plast Reconstr Surg.* 2003 Jun;111(7):2414-2418.

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183. A 17-year-old girl comes to the office for consultation regarding augmentation mammoplasty. Physical examination shows right-sided hypoplasia of the chest wall and breast. Absence of the pectoralis major muscle is noted. This patient is most likely to have which of the following hand anomalies?

- A) Micromelia
- B) Oligodactyly
- C) Phocomelia
- D) Polydactyly
- E) Syndactyly

The correct response is Option E.

Poland syndrome was described by Sir Alfred Poland in 1841 after a cadaver dissection while he was a medical student. His initial report described the absence of pectoralis major and minor musculature and upper extremity anomalies. Absent in his account were other components of the syndrome; these have been added by others. These anomalies include the absence of subcutaneous tissue; anterior rib abnormalities; subclavian venous aberrancies; and dysplasia of the latissimus dorsi, deltoid, external oblique, serratus, rectus abdominis, supraspinatus, and infraspinatus musculature. The most consistent of these components is partial or total absence of the pectoralis major muscle. Other additions to the constellation include upper extremity anomalies apart from syndactyly, including hypoplasia of the hand, forearm, and fingers (brachysymphalangism). Breast anomalies, including amastia and hypomastia, have also been frequently associated with Poland syndrome.

One of the main ways to approach breast reconstruction in these patients is to utilize the latissimus muscle. However, the latissimus dorsi muscle can be hypoplastic or even missing completely. This fact has rarely been reported in literature. In the few published reports in which the latissimus dorsi muscle was found to be hypoplastic, the precise extent of the latissimus deformity could not be judged adequately by physical examination alone because the results of the usual tests for functioning of the muscle (ie, the resistance test, the scapula test, the cough test) were normal. During these operations, however, the latissimus dorsi muscle was found to be grossly attenuated or highly hypoplastic.

Poland syndrome occurs in a predominantly sporadic fashion; however, familial kindreds have been infrequently identified. Associations with other congenital defects have been linked with Möbius syndrome, neuroblastoma, Wilms tumor, myelomeningocele, leukemia, and non-Hodgkin lymphoma.

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The exact cause of Poland syndrome is unknown, but it is most likely a vascular anomaly. The leading theory is that the manifestations result from subclavian artery “kinking” during the sixth week of gestation, with subsequent hypoplasia leading to distal musculoskeletal malformation. This has been termed a subclavian artery supply disruption sequence and is supported by Merlob et al’s evaluation of subclavian artery diameter and flow. They found that these values were consistently decreased by 50% in affected individuals.

References

1. Poland A. Deficiency of the pectoralis muscle. *Guy's Hospital Report*. 1841;6:191.
2. Darian VB, Argenta LC, Pasyk KA. Familial Poland's syndrome. *Ann Plast Surg*. 1989 Dec;23(6):531-537.
3. Beer GM. The clinical findings of a missing latissimus dorsi muscle in Poland's syndrome. *Plast Reconstr Surg*. 1997 Mar;99(3):926-927.

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184. An otherwise healthy 2-week-old male newborn is brought to the office because his parents are concerned about the appearance of his right ear. Physical examination shows a folded upper helix. All components of the auricular structure are present. Gentle digital manipulation restores the ear to normal shape. Which of the following is the most appropriate initial management?

- A) Application of a conforming splint
- B) Burying of the helical cartilage in a retroauricular pocket
- C) Rasping of the antihelical fold with an otoabrader
- D) Resection of the superior auricular muscle
- E) Surgical repair with cartilage grafts

The correct response is Option A.

Lop ear is among the deformations that are acquired in utero, as opposed to true congenital malformations, in which elements of the auricle may be underdeveloped or missing altogether. Circulating maternal estrogens are thought to be the cause of the softened cartilage, which lacks sufficient stiffness to support the upper helix. The cartilage should respond to shaping with a splint that is formed to match the contour of the normal helix. The splint is applied for several weeks or more. The other options involving surgical management are not indicated as primary therapy in the patient described. Resection of the superior auricular muscle may increase the superior auriculocephalic distance and aggravate the malposition of the upper helix. Cartilage rasping is indicated for the treatment of prominent ears in an older child to create a normal antihelical fold. Burying the helical cartilage beneath the mastoid skin is indicated for management of soft-tissue avulsion injury as a prelude to reconstruction. Surgical repair with cartilage grafts is unnecessary.

References

1. Larrabee WF Jr, Makielski KH, Henderson JL. *Surgical Anatomy of the Face*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2004:128-143.
2. Della Rocca RC, Bedrossian EH Jr, Arthurs BP. *Ophthalmic Plastic Surgery: Decision Making and Techniques*. New York: McGraw-Hill Medical; 2002:25-35.

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185. A 42-year-old man comes to the office because of numbness and pain near the elbow 1 year after undergoing bilateral L-brachioplasty following a 150-lb (68-kg) weight loss. Current weight is 200 lb (90 kg) and BMI is 32 kg/m². Nerve electrical conduction studies are most likely to demonstrate injury to which of the following sensory nerves?
- A) Lateral antebrachial cutaneous
 - B) Medial antebrachial cutaneous
 - C) Posterior antebrachial cutaneous
 - D) Radial dorsal cutaneous
 - E) Ulnar dorsal cutaneous

The correct response is Option B.

The demand for brachioplasty in the United States has increased as the number of patients undergoing bariatric surgery has increased. While brachioplasty is considered a safe and effective method of treating upper arm skin excess, the reported complication rate ranges from 25 to 40%. Most common complications of brachioplasty are considered minor and include seroma, poor scarring, edema, wound dehiscence, and underresection. The most common major complication is cutaneous nerve injury, which can occur in up to 5% of patients.

Medial placement of the brachioplasty incision in the bicipital groove is preferred because the ultimate scar will be hidden when the arm is adducted. Medial placement of the incision may damage the cutaneous nerves that run in this area. Both the medial antebrachial cutaneous nerve and the medial brachial cutaneous nerve arise from the medial cord of the brachial plexus. The medial brachial cutaneous nerve runs with the basilic vein and sends two to four branches to the skin 7 cm proximal to the medial epicondyle. Another three to five branches pierce the fascia to innervate the skin at about 15 cm proximal to the medial epicondyle. The medial antebrachial cutaneous nerve runs in close proximity with the intramuscular septum and penetrates the fascia approximately 14 cm proximal to the medial epicondyle. At this point, the nerve runs superficially and is at risk for injury.

While injuries to motor branches of the median and ulnar nerve have been reported, these branches run deep to the brachial fascia and are not injured unless the intramuscular septum is inadvertently punctured.

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References

1. Chowdhry S, Elston JB, Lefkowitz T, et al. Avoiding the medial brachial cutaneous nerve in brachioplasty: an anatomical study. *Eplasty*. 2010 Jan 29;10:e16.
2. Gusenoff JA, Coon D, Rubin JP. Brachioplasty and concomitant procedures after massive weight loss: a statistical analysis from a prospective registry. *Plast Reconstr Surg*. 2008 Aug;122(2):595-603.
3. Knoetgen J III, Moran SL. Long-term outcomes and complications associated with brachioplasty: a retrospective review and cadaveric study. *Plast Reconstr Surg*. 2006 Jun;117(7):2219-2223.
4. Hurwitz DJ, Neavin T. L brachioplasty correction of excess tissue of the upper arm, axilla, and lateral chest. *Clin Plast Surg*. 2008 Jan;35(1):131-140.

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(Please note that this pictorial appears in color in the online examination)

186. A 50-year-old woman comes to the office because she is unhappy with the lax appearance of her neck (shown) after massive weight loss. Which of the following is the most appropriate management?

- A) Dermabrasion
- B) Fat grafting
- C) Laser treatment
- D) Rhytidectomy
- E) Suction lipectomy

The correct response is Option D.

Massive weight loss results in loss of soft-tissue volume with ptosis, increased laxity, and redundant skin of the face. Many patients present with advanced aging in the face because changes subsequent to massive weight loss mimic aging.

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Dermabrasion is a technique used to treat fine rhytides and irregular surface of the facial skin, such as those associated with chronic acne scarring. Laser treatments tighten skin but do not add volume. Both of these modalities have no applicability to neck rejuvenation and may cause irreversible scarring of the neck.

Fat grafting may help fill the depressed nasolabial and perioral folds but does not help to tighten skin or treat platysmal bands.

Rhytidectomy with upward suspension of the superficial musculoaponeurotic system and platysma, along with reduction of skin laxity, is the only valid procedure to treat the manifestations of massive weight loss illustrated in the patient described.

Suction lipectomy will only exacerbate complications of decreasing soft-tissue fullness and will have little to no effect on skin tightening.

References

1. De Castro CC. Anatomy of the neck and procedure selection. *Clin Plast Surg*. 2008 Oct;35(4):625-642, vii.
2. Sclafani AP. Restoration of the jawline and the neck after bariatric surgery. *Facial Plast Surg*. 2005 Feb;21(1):28-32.
3. Ramírez OM. Advanced considerations determining procedure selection in cervicoplasty. Part one: anatomy and aesthetics. *Clin Plast Surg*. 2008 Oct;35(4):679-690, viii.

187. A 37-year-old woman comes to the office for consultation regarding left breast reconstruction after mastectomy to treat breast cancer. Chemotherapy and radiation therapy are planned postoperatively. She wears a size 34D brassiere. Height is 5 ft 6 in (168 cm), and weight is 160 lb (73 kg). BMI is 25.8 kg/m². She does not want abdominal scars. Autologous reconstruction with a transverse musculocutaneous gracilis (TMG) flap is planned. Which of the following is a disadvantage of using a TMG flap for this patient's reconstruction?

- A) Difficulty of flap harvest
- B) High risk of donor site morbidity
- C) High risk of fat necrosis
- D) Small flap size
- E) Variable vascular anatomy

The correct response is Option D.

For breast reconstruction, the TMG flap offers a valuable alternative therapy compared with other standard flaps from the lower abdomen, such as the transverse rectus abdominis musculocutaneous (TRAM) or DIEP flaps. The amount of tissue that can be transferred, however, is limited. The largest flap harvested in one large series weighed 420 g and measured 30 × 10 cm. The flap usually offers enough volume to reconstruct small- to mid-sized breasts. The major advantage of this flap as compared with other flaps, such as the gluteal flap or the perforator latissimus flap, is its constant vascular anatomy. Flap perfusion is always reliable, with low rates of fat necrosis and tissue similar in consistency with breast tissue. The donor scar is inconspicuous. The incision is comparable to incisions for a thigh lift and is well hidden. A distortion of the labia majora is typically not observed. However, as in thigh lifts, a lowering of the scar remains a possible problem. Functional donor-site morbidity after TMG flap harvest itself is low. After having clinically established the transverse approach for routine procedures, harvesting one flap is rapid and usually takes no longer than 30 minutes.

References

1. Fansa H, Schirmer S, Warnecke IC, et al. The transverse myocutaneous gracilis muscle flap: a fast and reliable method for breast reconstruction. *Plast Reconstr Surg*. 2008 Nov;122(5):1326-1333.
2. Schoeller T, Huemer GM, Wechselberger G. The transverse musculocutaneous gracilis flap for breast reconstruction: guidelines for flap and patient selection. *Plast Reconstr Surg*. 2008 Jul;122(1):29-38.

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188. A 32-year-old woman comes to the office for consultation regarding augmentation mammoplasty. She is concerned about the potential complications with the use of silicone gel prostheses within the first 5 years postoperatively. Which of the following is the most commonly reported complication of the implantation of cohesive silicone gel breast prostheses?

- A) Capsular contracture
- B) Granuloma
- C) Hematoma
- D) Infection
- E) Rupture

The correct response is Option A.

Cohesive silicone gel is a breast prosthesis option that has been approved by the FDA since 2006. Cohesive gel prostheses have also been called “gummy bear” prostheses. They maintain their shape because of the increased cross-linking within the silicone gel.

A study by Cunningham followed 1008 patients and 1898 cohesive gel prostheses. Rupture rate was 1.1% for aesthetics and 3.8% for reconstructive procedures. Capsular contracture rates (Baker III/IV) were 9.8/13.7%, and infection was 1.6/6.1%, respectively. Thus, capsular contracture was the most common of the listed complications. The reported incidence of hematoma is approximately 2%.

It should be noted that complications occur more commonly in primary reconstruction as compared to primary augmentation.

These findings are important in the preoperative counseling of patients.

References

1. Cunningham B, McCue J. Safety and effectiveness of Mentor's MemoryGel implants at 6 years. *Aesthetic Plast Surg*. 2009 May;33(3):440-444. Epub 2009 May 13.
2. Cunningham B. The Mentor core study on silicone MemoryGel breast implants. *Plast Reconstr Surg*. 2007 Dec;120(7 Suppl 1):19S-29S.

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189. A 45-year-old woman comes to the office for consultation regarding body contouring 2 years after undergoing gastric bypass surgery. She has lost 120 lb (54 kg) since the procedure was performed. Height is 5 ft 5 in (165 cm), and weight has been stable at 160 lb (72 kg) for 11 months. The patient desires to undergo as few stages as possible. Lower body lift and bilateral mastopexy are scheduled to be performed in a single stage. Which of the following postoperative complications is most likely to occur in this patient?

- A) Dehiscence
- B) Hematoma
- C) Infection
- D) Pulmonary embolism
- E) Seroma

The correct response is Option A.

In appropriately selected patients, multiple body contouring procedures can be combined into a single stage if the surgery can be done in a timely fashion. Overall minor complication rates are higher; however, per procedure complication rates do not seem to increase if more procedures are performed in a single stage. The most common complication in patients undergoing combined procedures in a single stage is related to wound healing issues (approximately 15%). Seroma is the next most common complication (approximately 10%). Infection, hematoma, and pulmonary embolism occur at rates of less than 5%.

References

1. Coon D, Michaels J V, Gusenoff JA, et al. Multiple procedures and staging in the massive weight loss population. *Plast Reconstr Surg*. 2010 Feb;125(2):691-698.
2. Hurwitz DJ, Agha-Mohammadi S, Ota K, et al. A clinical review of total body lift surgery. *Aesthet Surg J*. 2008 May-Jun;28(3):294-303.
3. Shermak MA, Chang D, Magnuson TH, et al. An outcomes analysis of patients undergoing body contouring surgery after massive weight loss. *Plast Reconstr Surg*. 2006 Sep 15;118(4):1026-1031.

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190. A 23-year-old man comes to the office for evaluation of unilateral blepharoptosis. On examination, the excursion of the eyelid margin is measured from downgaze to upgaze while the eyebrow is manually fixed against the supraorbital rim. Which of the following would best approximate the normal excursion distance of levator function for this patient?
- A) 2 to 6 mm
 - B) 7 to 11 mm
 - C) 12 to 16 mm
 - D) 17 to 21 mm
 - E) 21 to 25 mm

The correct response is Option C.

Levator function is measured indirectly by determining the excursion of the eyelid margin as the patient looks from downgaze to upgaze. The eyebrow is manually fixed against the supraorbital rim during this measurement, preventing the frontalis muscle from contributing to eyelid movement. Many patients subconsciously raise their eyebrow in a compensatory effort to elevate the drooping eyelid, a beneficial finding in individuals requiring frontalis suspension. Normal adults typically demonstrate 12 to 16 mm of levator function. Lesser measurements may indicate the presence of a developmental or acquired myopathy.

References

1. Blepharoptosis. In: Yanoff M, Duker JS, eds. *Ophthalmology*. 3rd ed. St. Louis: Mosby; 2008.
2. Park DH, Jung JM, Song CH. Anthropometric analysis of levator muscle function. *Plast Reconstr Surg*. 2008 Apr;121(4):1181-1187.

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191. A 35-year-old woman comes to the office for consultation because she is unhappy with the unevenness of her skin 1 year after undergoing power-assisted suction lipectomy using the super-wet technique. Physical examination shows skin surface irregularities that are radially oriented around a single 1-cm-wide scar. Which of the following modalities was most likely used for this outcome?
- A) Improper power source
 - B) Multiple access sites
 - C) Poor postoperative compression
 - D) Superficial plane of suction
 - E) Use of fine cannulas

The correct response is Option D.

One of the most common deformities of suction lipectomy is surface irregularity, which can have several causes. A large cannula will create a large furrow that may be visualized if the suction lipectomy is not performed evenly. Use of a single port may also lead to irregularities because the suctioning is done from only one angle. Superficial suctioning is also more prone to visible irregularities. The best way to avoid these deformities is to use small cannulas in the deep fat, with cross-tunneling from two sites, such that the tunnels are at right angles to each other. The power source would not cause surface irregularities. Lack of compression will cause prolonged edema, but not surface irregularities.

References

1. Toledo LS, Mauad R. Complications of body sculpture: prevention and treatment. *Clin Plast Surg*. 2006 Jan;33(1):1-11, v.
2. Gingrass MK. Liposuction. In: Thorne CH, Beasley RW, Aston SJ, et al, eds. *Grabb and Smith's Plastic Surgery*. 6th ed. Philadelphia: Lippincott Williams & Wilkins; 2007.

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192. Which of the following is characteristic of the youthful face when compared to the elderly face?

- A) Concavity of the malar region
- B) Deep-set upper orbital sulcus
- C) Egg-shaped face (narrow end down)
- D) Long position of the lower eyelid-malar junction
- E) Obtuse submental angle

The correct response is Option C.

A youthful, aesthetically pleasing face has an inverted cone or egg shape. With age, the cone is flipped over, and the broader end is situated inferiorly in the square jawline and jowls of the aged face.

The concepts and principles of facial aesthetics evolve continually. In the past, the face was thought of in two-dimensional planes or layers that were pulled in various vectors to achieve a more youthful look; the concept of three-dimensional structures is now accepted. The orbital region of youth is full and extends convexly down to the eyelid, ending just above the ciliary border with only a few millimeters of eyelid skin visible. The aged eyelid has diminished upper orbital volume with deep-set sulcus, allowing greater visualization of eyelid skin for up to 1 cm or more. The lower orbital volume diminishes as well, producing the appearance of a lower malar-eyelid junction or long lower eyelid of the aged face. The mid face of youth is marked by convexity of the malar region, which gently curves into the submalar area to produce an inverted cone or egg shape with the narrow aspect at the chin. The youthful neck has a vertical component joined to the horizontal under-jaw, producing an acute angle of 90 degrees or less. As the understanding of the three-dimensional aspects of the youthful and aging face has evolved, so has the treatment.

References

1. Little JW. Volumetric perceptions in midfacial aging with altered priorities for rejuvenation. *Plast Reconstr Surg*. 2000 Jan;105(1):252-266.
2. Hester TR Jr, Douglas T, Szczerba S. Decreasing complications in lower lid and midface rejuvenation: the importance of orbital morphology, horizontal lower lid laxity, history of previous surgery, and minimizing trauma to the orbital septum: a critical review of 269 consecutive cases. *Plast Reconstr Surg*. 2009 Mar;123(3):1037-1049.

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3. Trepsat F. Volumetric face lifting. *Plast Reconstr Surg*. 2001 Oct;108(5):1358-1370.

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193. A 43-year-old Caucasian woman is referred to the office because of a mass on her right breast that has been rapidly growing for 8 weeks. Physical examination shows a 4.5-cm, freely movable mass in the right breast. No axillary adenopathy or nipple discharge is noted. Which of the following is the most likely nonepithelial neoplasm in this patient?
- A) Fibroadenoma
 - B) Hamartoma
 - C) Lipoma
 - D) Phyllodes tumor
 - E) Primary breast lymphoma

The correct response is Option D.

Primary breast lymphoma is rare; it constitutes less than 0.6% of all breast malignancies. Phyllodes tumors represent about 1% of tumors in the breast; they are the most commonly occurring nonepithelial neoplasm of the breast. The tumor has a smooth, sharply demarcated texture and is generally freely movable. It is a relatively large tumor, with an average size of 5 cm. A hamartoma is the most common benign tumor of the lung. Hamartomas of the breast are benign tumors composed primarily of dense fibrous tissues with variable amounts of fat and associated ducts. Eighty-five percent of phyllodes tumors are benign, and 15% are malignant. There is no race predilection, but phyllodes tumors occur almost exclusively in women. In young women under age 25 years, asymmetric, tender, and fibrocystic tissues usually point to a fibroadenoma or circumscribed fibrocystic mass. Lipoma of the breast causes diagnostic and therapeutic uncertainty. Clinically, it may be difficult to distinguish a lipoma from other conditions. Fine-needle aspiration cytology is often not helpful. Both mammography and ultrasonography results are often negative. MRI may be overread, but it is useful as a diagnostic tool. This neoplasm can be seen in men and women.

References

1. Parker SJ, Harries SA. Phyllodes tumours. *Postgrad Med J*. 2001 Jul;77(909):428-435.
2. Chen WH, Cheng SP, Tzen CY, et al. Surgical treatment of phyllodes tumors of the breast: retrospective review of 172 cases. *J Surg Oncol*. 2005 Sep 1;91(3):185-194.
3. Weinzwieg N, Botts J, Marcus E. Giant hamartoma of the breast. *Plast Reconstr Surg*. 2001 Apr 15;107(5):1216-1220.

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194. A 30-year-old man comes to the office for consultation regarding body contouring after undergoing bariatric surgery with the vertical gastric banding technique. He says that he has lost 150 lb (67 kg) and his weight has been stable for 1 year. Current weight is 200 lb (90.72 kg), and height is 6 ft. BMI is 27 kg/m². Which of the following laboratory studies is most appropriate to obtain to evaluate the degree of malnutrition before surgery?

- A) Cholesterol
- B) Folate
- C) Total protein
- D) Transferrin
- E) Vitamin B₁₂ (cobalamin)

Please note: Upon further review, this item was not scored as part of the examination.

The correct response is Option C.

The vertical gastric banding technique in bariatric surgery leads to a restrictive weight loss. The weight loss that follows Roux-en-Y gastric bypass shows both a restrictive and malabsorptive component; the resulting malnutrition can impact the healing process of subsequent body contouring procedures. The preoperative workup for malnutrition before Roux-en-Y gastric bypass includes checking for protein deficiency by the total protein, albumin, and prealbumin concentrations. There can be mineral deficiencies in iron levels, which should be assessed by the transferrin level. Mild caloric malnutrition can be noted in vertical gastric banding, but typically there are no micronutrient and mineral deficiencies. The cholesterol level, while important for cardiac screening and health, is not indicated for a malnutrition workup.

Folate and Vitamin B12 are vitamins and would not apply. Transferrin is used in more acute cases and would not be appropriate to treat a patient whose weight has remained stable for a year.

References

1. Agha-Mohammadi S, Hurwitz DJ. Nutritional deficiency of post-bariatric surgery body contouring patients: what every plastic surgeon should know. *Plast Reconstr Surg*. 2008 Aug;122(2):604-613.

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2. Poitou Bernert C, Ciangura C, Coupaye M, et al. Nutritional deficiency after gastric bypass: diagnosis, prevention and treatment. *Diabetes Metab.* 2007 Feb;33(1):13-24. Epub 2007 Jan 26.
3. Faintuch J, Matsuda M, Cruz ME, et al. Severe protein-calorie malnutrition after bariatric procedures. *Obes Surg.* 2004 Feb;14(2):175-181.

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195. A 50-year-old woman comes to the office because of numbness of the skin of the right central forehead 10 weeks after undergoing upper eyelid blepharoplasty. The procedure involved transpalpebral resection of the medial brow depressor muscles. Injury to which of the following nerves is the most likely cause of this patient's condition?

- A) Abducens
- B) Oculomotor
- C) Supraorbital
- D) Supratrochlear
- E) Zygomaticotemporal

The correct response is Option D.

The most likely cause of numbness in the patient described is injury to the supratrochlear nerve. The supratrochlear nerve courses superiorly through the corrugator muscle and innervates the central forehead skin. It is subject to injury during muscle interruption via either of the transpalpebral, coronal, or endoscopic approaches. The abducens nerve is motor to the lateral rectus muscle of the globe and is not within the operative field. Although it can be injured distal to its exit from the frontal bone, the deep branch of the supraorbital nerve provides sensation to the frontal periosteum. The frontal branches of the facial nerve are motor only to the frontalis muscle. The oculomotor nerve would not result in these findings, as it does not supply sensation to the forehead. The zygomaticotemporal nerve renders sensation to the lateral orbital-forehead skin and is located far lateral to the medial brow depressors.

References

1. Walden JL, Brown CC, Klapper AJ, et al. An anatomical comparison of transpalpebral, endoscopic, and coronal approaches to demonstrate exposure and extent of brow depressor muscle resection. *Plast Reconstr Surg*. 2005 Oct;116(5):1479-1487.
2. Janis JE, Ghavami A, Lemmon JA, et al. The anatomy of the corrugator supercilii muscle: part II. Supraorbital nerve branching patterns. *Plast Reconstr Surg*. 2008 Jan;121(1):233-240.
3. Agur AMR, Dalley AF. *Grant's Atlas of Anatomy*. 12th ed. Lippincott Williams & Wilkins; 2008.

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196. A 63-year-old woman is scheduled to undergo autologous fat injection to improve the contour and increase the size of the right breast. She underwent reconstruction of the right breast with a latissimus dorsi flap 10 months ago because of mastectomy. The patient does not have or desire a breast prosthesis. Which of the following is the most likely sequela of autologous fat injection in this patient?

- A) Calcification
- B) Donor site irregularity
- C) Fat resorption
- D) Hypertrophic scarring
- E) Skin necrosis

The correct response is Option C.

Although controversial, autologous fat injection (lipo-modeling) to the breast and the reconstructed breast has gained popularity in recent years. This can be attributed to several factors, including the publication of large numbers of patient series' demonstrating the safety, efficacy, and improvements in the harvest and preparation of fat. However, the most common complication of fat injection remains to be the resorption of the grafted fat, ranging from 30 to 70%.

Fat and skin necrosis, calcification, hypertrophic scarring, and contour irregularity of both the recipient and donor sites can occur, but to a lesser extent. The rate of skin necrosis is low. Hypertrophic scarring is more common in patients with a history of poor scarring. In the case of calcifications, pre- and postoperative examination by a radiologist specialized in breast imaging is necessary to limit the risk of breast cancer, which may occur coincidentally with lipo-modeling.

References

1. Delay E, Garson S, Tousson G, et al. Fat injection to the breast: technique, results, and indications based on 880 procedures over 10 years. *Aesthet Surg J*. 2009 Sep-Oct;29(5):360-376.
2. Kanchwala SK, Glatt BS, Conant EF, et al. Autologous fat grafting to the reconstructed breast: the management of acquired contour deformities. *Plast Reconstr Surg*. 2009 Aug;124(2):409-418.

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3. Walden JL. Complications after autologous fat injections to the breast. *Plast Reconstr Surg*. 2009 Jul;124(1):326-327.

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197. A 16-year-old girl is referred by her pediatrician for mammoplasty because of breast hypertrophy that has worsened during the past 2 years. She wears a size 36DD brassiere and has constant pain in the shoulders and back due to the weight of her breasts. Menarche occurred at 10 years of age. Height is 5 ft 4 in (163 cm), and weight is 165 lb (75 kg). Physical examination shows breast hypertrophy, shoulder grooving, intertrigo dermatitis, and striae. An abnormality of which of the following is the most likely cause of this patient's condition?
- A) End-organ responsiveness to estrogen
 - B) Number of estrogen receptors
 - C) Progesterone concentration
 - D) Prolactin concentration
 - E) Serum estrogen concentration

The correct response is Option A.

Abnormal end-organ responsiveness to estrogen is the predominant factor leading to breast hypertrophy. It has been demonstrated that normal levels of estrogen, progesterone, and prolactin exist in patients with breast hypertrophy. These patients also have a normal number of estrogen receptors.

References

1. Rosenfield RL, Lipton RB, Drum ML. Thelarche, pubarche, and menarche attainment in children with normal and elevated body mass index. *Pediatrics*. 2009 Jan;123(1):84-88.
2. Mick GJ, McCormick KL, Wakimoto H. Massive breast enlargement in an infant girl with central nervous system dysfunction. *Eur J Pediatrics*. 1991 Jan;150(3):154-157.
3. Jabs AD, Frantz AG, Smith-Vaniz A, et al. Mammary hypertrophy is not associated with increased estrogen receptors. *Plast Reconstr Surg*. 1990 Jul;86(1):64-66.

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198. Which of the following types of medication is most likely to potentiate the effect of botulinum toxin type A?

- A) Angiotensin-converting enzyme (ACE) inhibitors
- B) Beta-adrenergic blockers
- C) Calcium-channel blockers
- D) Diuretics
- E) Nitroglycerin

The correct response is Option C.

BOTOX Cosmetic is used for improving forehead and glabellar lines as well as “crow’s feet” and platysmal bands. The mechanism of action is via blocking neuromuscular transmission by binding to receptor sites on motor nerve terminals, entering the nerve terminals, and inhibiting the release of acetylcholine. The following medications are known to potentiate the effects of BOTOX Cosmetic: penicillamine, quinine, calcium-channel blockers, and aminoglycosides.

References

1. Huang W, Foster JA, Rogachefsky AS. Pharmacology of botulinum toxin. *J Am Acad Dermatol*. 2000 Aug;43(2 Pt 1):249-259.
2. BOTOX Cosmetic (botulinum toxin type A) purified neurotoxin complex (glabellar lines) [package insert]. Irvine, CA: Allergan Corporation; 2002.

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(Please note that this pictorial appears in color in the online examination)

199. A 12-year-old girl with Beckwith-Wiedemann syndrome develops profound breast enlargement at the onset of puberty. Physical examination shows two distinct masses in the right breast and severe hyperplasia consuming the left breast. A photograph is shown. Which of the following is the most appropriate surgical management?
- A) Hormone suppression therapy
 - B) Right lumpectomies; left mastectomy with skin reduction with application of nipple as skin graft
 - C) Right simple mastectomy; left mastectomy with skin reduction with application of nipple as skin graft
 - D) Right simple mastectomy; left simple mastectomy with sentinel lymph node biopsy
 - E) Right total mastectomy; left modified radical mastectomy

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The correct response is Option B.

Epithelial hyperplasia is a benign pathological process. Therefore, modified radical mastectomy or sentinel lymph node biopsy would not be indicated in the absence of cancer. Mastectomy on the right is not indicated because the masses are discrete and separate from the normal breast parenchyma. As such, a viable breast mound can be preserved in this 12-year-old girl. Because of the expansive nature of her hyperplasia on the left, skin reduction is required to ensure smooth contour of her skin flaps. The nipple may be spared because of the benign disease. Reconstruction can be performed in a delayed fashion after development is complete. An adjustable expander/prosthesis can also provide a reasonable breast mound until definitive reconstruction is performed.

Hormone suppression therapy may temporarily slow the growth of the hyperplasia but could adversely affect this child's normal development. It would not comprise definitive management.

References

1. Kumar V, Fausto N, Abbas A, eds. *Robbins & Cotran Pathologic Basis of Disease*. 7th ed. Saunders; 2003:505.
2. Weksberg R, Shuman C, Smith A. Beckwith-Wiedemann syndrome. *Am J Med Genet C Semin Med Genet*. 2005;137(1):12-23.

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200. A 46-year-old woman comes to the office for consultation about improving the appearance of her “saggy” upper eyelids. Physical examination shows moderate skin redundancy in both upper eyelids. The ciliary margin of the upper eyelid is located 1 mm below the superior limbus on the right and 3 mm below the superior limbus on the left. Levator excursion is 14 mm bilaterally. In addition to excision of excess skin bilaterally, which of the following is the most appropriate treatment?

- A) Brow lift surgery on the left
- B) Frontalis suspension in the left eye
- C) Levator aponeurosis plication in the left eye
- D) Orbicularis plication in the left eye

The correct response is Option C.

The normal anatomical position of the ciliary margin of the upper eyelid is 1 mm below the upper corneoscleral junction in straight gaze. The upper corneoscleral junction is the landmark for ptosis measurement. Position of the eyelid in straight gaze along with the levator function determines the required degree of correction and the type of surgery. Patients with severe ptosis (3 mm or more) usually have poor levator function, therefore frontalis suspension is required. In patients with moderate function (6 to 10 mm), levator advancement and resection is required. For patients with excellent levator function (10 mm or more) and mild ptosis, aponeurotic surgery (plication) is appropriate. In levator advancement surgery, the eyelid will be elevated approximately 1 mm for every 3 mm of advancement.

The patient described has two distinct problems that require two different procedures. The upper eyelid skin redundancy can be addressed with a standard upper eyelid blepharoplasty with skin excision and, if needed, a slip of orbicularis muscle. The mild ptosis of her left upper eyelid will be accentuated after the blepharoplasty if left untreated. Since her levator function is excellent, her ptosis can be corrected with a simple plication of the distal levator aponeurosis. This can be accomplished through an upper blepharoplasty incision. In a Fasanella-Servat procedure, a portion of the posterior lamella of the eyelid is resected to improve mild eyelid ptosis by shortening the levator muscle. This procedure would not be used in a patient who requires a skin resection since it uses a posterior approach.

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References

1. Flowers RS, DuVal C. Blepharoplasty and periorbital aesthetic surgery. In: Aston SJ, Beasley RW, Thorne CH, et al, eds. *Grabb and Smith's Plastic Surgery*. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 1997:628-629.
2. Putterman AM. *Cosmetic Oculoplastic Surgery: Eyelid, Forehead, and Facial Techniques*. 3rd ed. Philadelphia: WB Saunders; 1998.
3. Jelks GW, Jelks EB. Preoperative evaluation of the blepharoplasty patient. Bypassing the pitfalls. *Clin Plast Surg*. 1993 Apr;20(2):213-223.

Thank you for your participation.

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