

## Soft Tissue Reconstruction of the Extremities: Review Questions

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### QUESTIONS

Choose the single best answer for each question. All questions refer to the following case study.

A 45-year-old woman presented with a 20-year history of recurrent osteomyelitis of her proximal tibia following an open fracture. Laboratory and radiographic evaluation includes a complete blood cell count, which is normal; an erythrocyte sedimentation rate, which is elevated; a bone scan, which shows increased activity in the proximal tibia; and a computed tomographic scan, which shows a sequestrum in the proximal third of the tibia. An arteriogram demonstrates normal vasculature.

- In addition to wide débridement of bone and soft tissue, bone biopsy, and bone culture, which one of the following is the most appropriate initial surgical treatment for this patient?**
  - Placement of antibiotic-impregnated beads, external fixation if needed
  - Coverage with gastrocnemius muscle flap, external fixation if needed
  - Latissimus dorsi microvascular tissue transfer, external fixation if needed
  - Iliac crest bone graft, external fixation if needed
- The patient's tibia is débrided in the operating room and dressed and fixated appropriately. No flap coverage was performed. The patient has been maintained on intravenous antibiotics. The pathology report from the bone biopsy confirms chronic osteomyelitis. Culture results show *Staphylococcus aureus* that is sensitive to all tested antibiotics except penicillin. Which of the following is the next appropriate surgical procedure?**
  - Iliac crest bone graft and gastrocnemius muscle flap
  - Iliac crest bone graft followed by dressing changes
  - Iliac crest bone graft and latissimus dorsi microvascular tissue transfer
  - Repeat débridement, cultures, and placement of antibiotic-impregnated beads
- The patient's leg is débrided in a second-look procedure and no dead bone remains. Two days following this procedure, cultures from this débridement show no bacterial growth. The proximal tibia was exposed in the wound at the time of the second débridement and is without soft tissue coverage. Which of the following is the next appropriate surgical procedure?**
  - Cancellous iliac crest bone graft and a lateral gastrocnemius muscle flap with a split-thickness skin graft
  - Cancellous iliac crest bone graft and a medial gastrocnemius muscle flap with a split-thickness skin graft
  - Cancellous iliac crest bone graft and a latissimus dorsi microvascular transfer with an attached skin paddle
  - Forearm fasciocutaneous microvascular transfer
- On the first postoperative day, the flap is noted to be swollen and congested. The patient is on intravenous dextran 40 and oral aspirin. Which of the following treatments should next be performed?**
  - Explore the flap
  - Apply medicinal leeches to the flap
  - Administer intravenous heparin
  - Discontinue the dextran

*(turn page for answers)*

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EXPLANATION OF ANSWERS

- 1. (A) Placement of antibiotic-impregnated beads, external fixation if needed.** Initial treatment of chronic infection requires aggressive débridement of all infected and dead tissue. In order to cure osteomyelitis, a radical resection of dead bone, similar to surgery for malignancy, is required. Bone should always be sent for biopsy and cultures should be obtained for aerobic bacteria, anaerobic bacteria, fungus, and *Mycobacterium*. Skeletal stability may be compromised if necessary to obtain adequate débridement. In such cases, stabilization with an external fixator is performed. In experienced hands, ring fixation is often the best choice for these cases. At the first débridement of a chronic infection, bone grafting and flap coverage should not be performed because a clean wound must first be established. Antibiotic-impregnated beads have been shown to be useful in the initial treatment of an infected wound because they allow for higher local antibiotic levels than systemic antibiotics alone.
- 2. (D) Repeat débridement, cultures, and placement of antibiotic-impregnated beads.** The definitive treatment for chronic infections that require wide débridement of bone and soft tissue is usually bone grafting to fill the created defect and a soft tissue coverage procedure. However, before grafting and soft tissue coverage can be performed, the eradication of infection must be confirmed. In acute injuries in which infection has not yet been established, early flap coverage may be appropriate; however, in cases of chronic infection, the infection

must first be eradicated. In this case, a second-look débridement and cultures should be performed prior to the flap coverage.

- 3. (B) Cancellous iliac crest bone graft and a medial gastrocnemius muscle flap with a split-thickness skin graft.** This wound has now been adequately débrided and converted from a contaminated infected wound into a clean wound. Cancellous bone grafting to help restore skeletal integrity can now be performed. Compared with cortical bone graft, cancellous bone graft is preferred because of its better osteoinductive properties as well as its relative resistance to infection. Vascularized bone transplant (eg, free fibula flap) is occasionally required, but only for large defects. The soft tissue defect in this case is in the proximal third of the tibia; therefore, it can easily be covered by a local rotation flap. The flap of choice is the medial gastrocnemius. The lateral gastrocnemius can be used if necessary as an adjunct, but care must be taken in mobilizing the flap around the peroneal nerve.
- 4. (A) Explore the flap.** Patients with congested, failing flaps should be returned to the operating room for exploration. In the case of rotational flaps such as the medial gastrocnemius, the pedicle may have been kinked, or swelling around the pedicle may be interfering with venous drainage.

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