

Strategies for Managing Bone Defects of the Lower Extremity



Vasilios D. Polyzois, MD, PhD^{*}, Ioannis P. Stathopoulos, MD, MSc,
Kalliopi Lampropoulou-Adamidou, MD, MSc, Elias S. Vasiliadis, MD, PhD,
John Vlamis, MD, PhD, Spiros G. Pneumaticos, MD, PhD

KEYWORDS

- Induced membranes • RIA technique • Masquelet technique • Papineau technique
- Ilizarov technique • Distraction osteogenesis

KEY POINTS

- Cancellous autograft harvesting by Reamer irrigator aspirator (RIA) method for filling bone voids.
- Use of bone cement for development of induced membranes to later host cancellous autografts.
- Internal fixation and intramedullary nailing in combination with Masquelet technique.
- Papineau technique in combination with external fixation for dealing with composite bone and soft tissue loss.
- Ilizarov technique and distraction osteogenesis as method of choice in the management of combined bone and soft tissue loss.

Management of posttraumatic segmental bone loss as a result of severe open injuries of the lower extremity continues to challenge reconstructive surgeons. Surprisingly severe posttraumatic bone loss of the lower extremity can also occur after very high-energy closed injuries and certainly following failed initial treatment of complex fractures that develop pseudarthrosis, with or without septic complications.

The literature proposes numerous strategies for dealing with such injuries but it is clear that the outcome is often unpredictable. The procedure rarely involves only one stage and complications frequently arise. In most cases the reconstruction process is long and difficult and amputation must be part of the decision-making process in the first place and can be a possible outcome if the reconstructive procedure fails, even after great effort.

Disclosures: None.

3rd Department of Orthopaedics and Traumatology, KAT Hospital, 2 Nikis Street, Kifisia, Athens 14561, Greece

* Corresponding author.

E-mail address: vpolyzois@gmail.com

Clin Podiatr Med Surg 31 (2014) 577–584
<http://dx.doi.org/10.1016/j.cpm.2014.06.008>

podiatric.theclinics.com

0891-8422/14/\$ – see front matter © 2014 Elsevier Inc. All rights reserved.

All proposed strategies should address a list of critical issues, such as mechanical stabilization, biologic stimulation, possible infection, and soft tissue loss. The reconstructive surgeon must always have in mind that it takes a lot more than to just fill a bone void by any means on the road to solid bone union of the extremity and good function.

All traditional treatment strategies have many advantages, but also major drawbacks, such as limited availability, risk of disease transmission, and prolonged treatment. To overcome such limitations, biologic treatments have been developed based on specific pathways of bone physiology and healing.¹

In today's clinical practice the most common operative strategies one can find in the literature are the Ilizarov method of bone transport or acute shortening with simultaneous lengthening; the use of reamer irrigator aspirator autologous bone graft by the Masquelet technique, with or without induced membrane procedures, in combination with internal fixation mostly; the Papineau technique with iliac crest autografts mainly for noncircumferential bone voids; the use of titanium cages in combination with autografts in the place of the original bone defect; and the use of vascularized fibula autografts. There are a few reports on sterilization and reimplantation of the stripped segment if it is readily available after injury and in one piece, even if it is contaminated after extrusion from its original anatomic site.²

All of the previously mentioned strategies can be combined with complex soft tissue coverage techniques in case of severe soft tissue compromise. In most cases of acute trauma it takes a great deal of damaged skin and underlying tissue loss for a segment of bone to pop out of the extremity. Very rarely is use of allografts indicated, especially after the introduction of the reamer irrigator aspirator (RIA) harvesting method, which provides a plethora of cancellous autografts, so allograft material is spared only and rarely for augmentation needs. All techniques that require hardware to be left within the extremity are essentially multistaged procedures requiring previous procedures to clean up possible infection.

All techniques offer advantages and disadvantages. Reconstructive surgeons rarely team up for combined treatment. Orthopedic surgeons, plastic surgeons, vascular surgeons, reconstructive microsurgions, and foot and ankle surgeons ideally should work together for the patient to have a better chance for a good outcome. Surgeons from different subspecialty have a tendency to underestimate the elements of the injury with which they are less familiar. The orthopedic surgeon often pays less attention to surgical approaches to achieve better bone access, sacrificing possibly large vessels or important perforators that could be useful for flap closure of a wound. However, plastic surgeons can perform a complex free tissue transfer with demanding microanastomoses paying less attention to stable fixation, thus dooming chance for bone union, an attitude that can lead to nonunion with a perfect flap on top, which makes a new necessary bony approach even more difficult. Recently, the so-called "orthoplastic ladder" has been introduced by the means of a multidisciplinary approach for the management of the injury in total, or by the qualification of the reconstructive surgeon in all bony, plastic, and reconstructive microsurgical procedures.³

PLATE FIXATION

Plate fixation is indicated when there is no septic inflammation and when the fragments adjacent to the bone gap are large enough to allow adequate screw purchase. The older contraindication of osteoporotic bone is just a relative contraindication after the introduction of locking plates. Usually the use of plating is the final stage of what we call induced membrane/Masquelet technique for the management of bone loss.

Download English Version:

<https://daneshyari.com/en/article/3461815>

Download Persian Version:

<https://daneshyari.com/article/3461815>

[Daneshyari.com](https://daneshyari.com)