

Reconstruction of post-traumatic long segment bone defects of the lower end of the femur by free vascularized fibula combined with allograft (modified Capanna's technique)

H. Venkatramani · S. R. Sabapathy ·
J. Dheenadayalan · A. Devendra · S. Rajasekaran

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Abstract

Purpose Salvage of long segment bone loss in the limbs particularly near the joints continues to be a challenge to the trauma surgeon. None of the techniques available are universally successful and all share the disadvantages of multi-staged procedures. A reliable single-stage technique would be ideal to reduce the treatment time and the cost of care. We are presenting here our experience of successfully using the modified Capanna technique of combining allograft and free vascularized fibular graft in treating large bone defects in the distal third of the femur.

Methods Between April 2012 and October 2013, six patients with post-traumatic long segment bone loss in the distal femur had reconstruction of the bone defect by the Capanna technique. The average age was 33 years (range of 18–49 years). The bone defect ranged from 10 to 20 cm (average 15 cm). Five patients had primary reconstruction while one was done after allograft failure. Bone union time and occurrence of any complications were noted. Follow-up ranged from 7 to 24 months (average 15 months).

Results All grafts went onto union. No patient required secondary procedure to achieve union. Average time to union was 6 months. One patient had deep infection and delayed union of distal end of the fibula graft.

Conclusion Free vascularized fibular graft combined with allograft increases initial stability, allows early weight bearing, has higher chances of union and is a good single-stage technique of reconstruction of distal third femur defects.

Keywords Reconstruction long segment bone loss · Femur defect · Free fibula · Allograft · Capanna technique

Introduction

Salvage of complex lower limb injuries associated with extensive soft tissue and/or long segment bone loss continues to be a challenge to the trauma surgeons even today. The introduction of various microsurgical free flaps has solved the problem of managing soft tissue loss to a great extent, but the management of post-traumatic long segment bone loss in weight bearing bones continues to be a major burden. Techniques that are currently used are distraction osteogenesis [1], use of allografts [2], free vascularized fibular grafts [3–6] and Masquelet's induced membrane technique [7, 8]. The success of all the above techniques often demands the supplementation of copious amounts of autografts or the use of bone morphogenic proteins [9]. While each technique has its advocates, none is universally successful and shares the disadvantages of prolonged treatment and the need for multi-staged procedures. Failure to achieve successful bone union at both ends of the defect may lead to secondary amputation, which is a social and financial disaster to the patient and the family. A reliable single-stage technique, if available,

H. Venkatramani
Department of Plastic Surgery, Hand and Reconstructive Surgery
and Burns, Ganga Hospital, Coimbatore, India

S. R. Sabapathy (✉)
Division of Plastic Surgery, Hand and Reconstructive
Microsurgery and Burns, Ganga Hospital, 313, Mettupalayam
Road, Coimbatore 641043, India
e-mail: rajahand@vsnl.com

J. Dheenadayalan · A. Devendra
Department of Orthopaedics, Ganga Hospital, Coimbatore, India

S. Rajasekaran
Division of Spine, Orthopaedics and Trauma, Ganga Hospital,
Coimbatore, India