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WORKSHOPS OF THE SOO (2010, LA ROCHELLE). TECHNICAL NOTE

Radius graft pedicled on the anterior interosseous artery for recurrent ulnar nonunion

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KEYWORDS
Bone transplantation;
Recurrent pseudarthrosis;
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Summary Recurrent ulnar nonunion challenges the functional prognosis and raises major problems concerning the best therapeutic strategy to follow. The case of a female patient presenting recurrent nonunion of the ulnar diaphysis despite successive treatments is reported. The radius graft pedicled on the anterior interosseous artery from a retrograde approach obtained bone union in 3 months with no functional sequelae. For the first time, we propose a therapeutic alternative calling on a proximally pedicled anterior interosseous flap. This technique can be performed under locoregional anesthesia and does not sacrifice the main artery of the forearm. However, the size of the graft does not entirely compensate for segmentary bone loss. The radius graft pedicled on the anterior interosseus artery is an inventive technique that can solve the problem of difficult ulna nonunions without the disadvantages of vascularized fibula harvesting.

Introduction

The literature on isolated ulnar pseudarthroses is scarce. This is a relatively infrequent complication and its management with conventional surgery produces good results [1,2].

However, when nonunion becomes recurrent, it challenges the patient's long-term functional prognosis and creates major problems in choosing which therapeutic strategy to follow. Based on a clinical case, we detail a new technique calling on a radius graft pedicled on the anterior interosseus artery with retrograde flow.

Clinical case

We report the case of a 61-year-old right-handed female patient, a farmer, nonsmoking, who presented recurrent malunion 20 months after a closed fracture of the middle third of the right ulnar diaphysis. Union was not achieved despite successive treatments including compression plate osteosynthesis, surgical curettage of the pseudoarthrosis with decortication and corticocancellous autologous graft, followed by pulsed electromagnetic field therapy associated with vitamin D (Fig. 1).

In this context, we first discussed free fibula grafting, but this was deemed to be too heavy and disproportionate in terms of cavitary bone loss. For this reason, we performed a radius graft pedicled on the anterior interosseous artery with retrograde flow.

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Figure 1 Recurrent ulnar diaphyseal nonunion.

Surgical technique

The surgery was performed under locoregional anesthesia on a surgical table with arms and using a pneumatic tourniquet with moderate exsanguination.

The approach extended from the Lister tubercle distally to the ulnar crest, which exposed the malunion, and allowed harvesting the vascularized bone graft as well as the dissection of the anterior interosseous pedicle (Fig. 2).

First, the malunion area was approached to remove the plate and screw fixation, excise the devascularized tissues, and carry out medullary permeabilization of the proximal and distal extremities of the ulna. This resulted in loss of cavitary bone substance, which was trimmed in a wedge shape to receive the graft.

We then harvested the vascularized radial graft via the posterosuperior branch of the anterior interosseous artery sized to adapt to the ulnar substance loss.

With the wrist in pronation, the approach was posterior along a line joining the first approach proximally and the Lister tubercle distally. The extensor pollicis longus muscle was identified and retracted toward the ulna and the extensor pollicis brevis toward the radius. The dorsal side of the radius was thus exposed and the proximal and distal posterior branches of the anterior interosseous

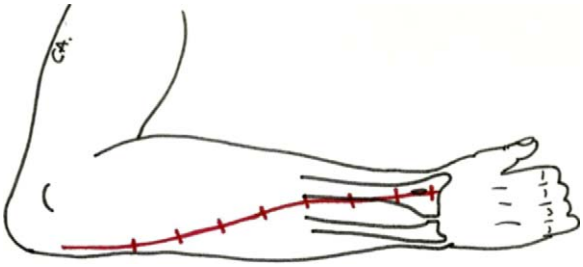

Figure 2 Approach.

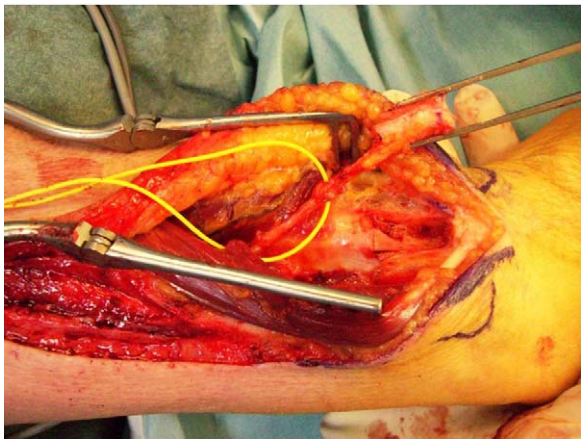

Figure 3 Harvesting pedicled radial graft on the anterior interosseous artery.

artery were identified. The interosseous membrane was incised proximally 5 cm. We then ligated the anastomosis between the proximal posterior branch of the posterior interosseous artery. The corticocancellous graft, vascularized on the proximal posterior branch of the anterior interosseous artery, was harvested on the dorsal side of the radius. It measured 8 mm wide by 2 cm long. The pedicle was released distally and proximally. The transplant was carefully passed through the interosseous membrane and embedded in the prepared wedge-shaped ulnar cavity. It was first fixed with two Kirchner wires. A seven-hole interlocking plate stabilized the assembly. The wound was closed on two planes with a drain in place. The arm was immobilized for 10 weeks with a long-arm cast with the elbow bent at 90° and in supination (Figs. 3 and 4).

Results

Bone union was achieved at 3 months from the vascularized bone graft, 29 months after the fracture. At 6 months from

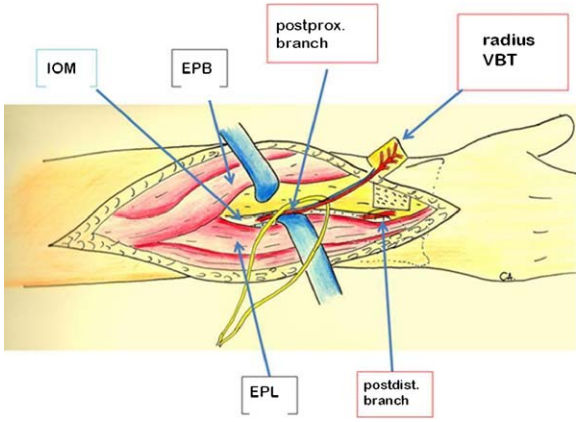

Figure 4 Graft harvesting technique; TOV VBT: vascularized bone transfer; IOM: interosseous membrane; EPB: extensor pollicis brevis; EPL: extensor pollicis longus; Postproximal branch: proximal posterior branch of the anterior interosseous artery; Postdistal branch: distal posterior branch of the anterior interosseous artery.