Technical note

Retrograde intramedullary nailing of distal humeral nonunions

A new technique with good results in 5 patients

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In younger patients, nonunion of fractures of the distal end of the humerus can be treated by plate fixation and bone-grafting. However, in older ones, many of whom have poor bone quality, loosening of plates and screws is common (Mitsunaga et al. 1982, Sim and Morrey 1985, Ackerman and Jupiter 1988, McKee et al. 1994). Intramedullary nailing could prevent these complications, but the location of the distal nonunion does not seem suitable for retrograde nailing. Antegrade nailing with good results in younger patients has been reported (Paramasivan et al. 2000). We describe a new retrograde nailing technique for distal humeral nonunions.

Technique (Figure 1)

The patient is placed in a prone position with the elbow at 90° of flexion. A dorsal incision over the elbow is made, the ulnar nerve isolated and a chevron osteotomy of the olecranon performed. The triceps tendon is split at the medial and lateral sides and held anteriorly to expose the dorsal side of the nonunion. In the center of the trochlea, a hole is made with a 3.2-mm drill. By increasing the diameters of hand-reamers, this hole is enlarged to 10 mm. After debridement of the nonunion, the proximal medullary canal is opened. A 7-mm AIM Titanium Humeral Nail (DePuy ACE),

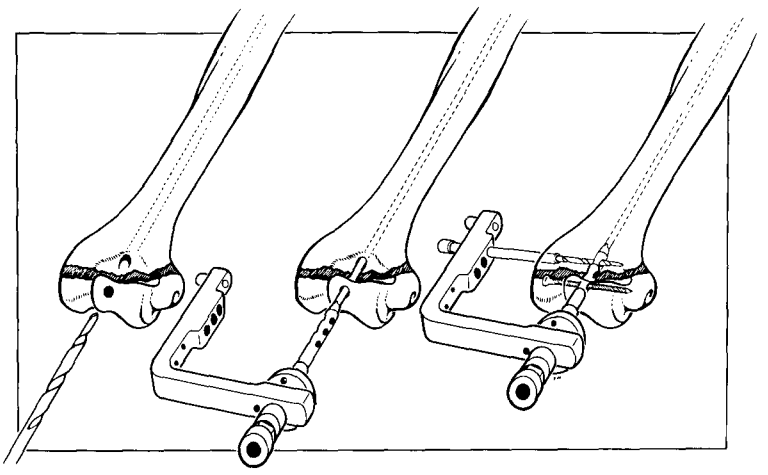

Figure 1. Retrograde nailing technique.

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Figure 2. A 65-year-old woman with rheumatoid arthritis after interposition arthroplasty and atrophic nonunion. After 31 months, union occurred after 4 months.

with a proximal 5 cm diameter of 9 mm, is inserted through the trochlea until the top of the nail is just below the cartilage. Using the proximal locking jig, a cancellous interlocking screw is inserted from medial to lateral distal to the nonunion and a cortical interlocking screw just proximal to the nonunion. Autogenous cancellous bone harvested from the iliac crest is added at the nonunion side. The olecranon is reattached with two oblique Kirschner wires and a figure-of-eight tension bend wire. After immobilization in a sling for 6 weeks, active mobilization of the elbow is started.

Patients

We treated 5 patients, all elderly females (65–74 years), with a distal humeral nonunion (2 supracondylar, 3 transcondylar). 3 patients had been primarily treated with K-wires, the other 2 nonoperatively with plaster. At the time of surgery, all patients complained of pain, instability and loss of motion. The mean time from the fracture to operation of the nonunion was 31 (6–58) months. Mean follow-up was 22 (13–32) months.

Results

In all patients, bony union was achieved within 4–6 months (Figure 2). Mean range of flexion was 125° (120–135°), with a 25° (20–40°) extension loss. Pro-supination was normal and all patients could use their elbow normally in daily activities and had no pain. No complications occurred—e.g., deep wound infection, loss of reduction, nail and/or screw migration or malunion.

Discussion

Our experience shows that a nail can be introduced into the humerus via the elbow joint to stabilize nonunions. Because of the distal location of the nonunions in our 5 patients, we used only two proximal interlocking screws, one proximal and one distal to the nonunion. If the location is more proximal, proximal and distal interlocking screws should be used. In all patients after surgery, the elbow was stable, there was no pain and an acceptable range of motion. Although elbow prostheses have been improved, they are not suitable for this kind of posttraumatic condition (Figgie et al. 1989, Morrey and Adams 1995). In younger patients with a distal humeral nonunion, we still recommend open reduction and plate fixation because the long-term effects of creating a hole through intact cartilage is unpredictable.

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