External compression of forearm nonunion

A report on 6 cases

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We treated 6 patients with 7 cases of aseptic nonunion of the forearm with external fixation and compression (Orthofix®) without open reduction and bone grafting. By turning a screw on the side of the bar, compression was carried out until the nonunion gap was radiographically obliterated, usually within 2 weeks. After compression had stopped, the external fixator was retained during the following period of healing and bone remodeling. Healing of the nonunions was seen after 7 (4–11) weeks. 5 patients obtained normal mobility, while 1 had slightly restricted supination and pronation.

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We report our results with the use of the Orthofix® external fixator in the treatment of delayed unions and non-unions of the forearm.

Patients and methods

From 1989–1991, 5 men and 1 woman with 7 cases of aseptic nonunion of the forearm were treated with external fixation and compression (Table 1). In 1 patient, nonunion resulted from osteotomy and bone grafting with subsequent plaster casting, while the remaining were seen after fracture. In 5 patients the fractures were primarily treated with a plaster cast, while 1 (Case 3) primarily had internal plate fixation (DCP). The time from fracture or osteotomy until operation was 7 (2–15) months.

The patient was placed in supine position. With the use of fluoroscopy, 2 cone-formed pins were positioned on each side of the nonunion. After reduction, the bar was mounted and stability was secured. If there were nonunions of both ulna and radius, 2 bars were used. A single dose of antibiotic was used preoperatively. Unloaded joint movements were started immediately after the operation. Compression of the pseudarthrosis, 0.25–0.5 mm a day, was carried out by the patients themselves by turning the screw. The patients were instructed in daily pin-hole-care and followed radiographically in the out-patient clinic. The compression device was retained until bone remodeling and healing were seen (Figure 1). On average the Orthofix fixator was worn for 2 (1–3) months; compression lasted for 2 (1–3) weeks. Obliteration of the pseudarthrosis occurred after an average of 5 weeks.

Results

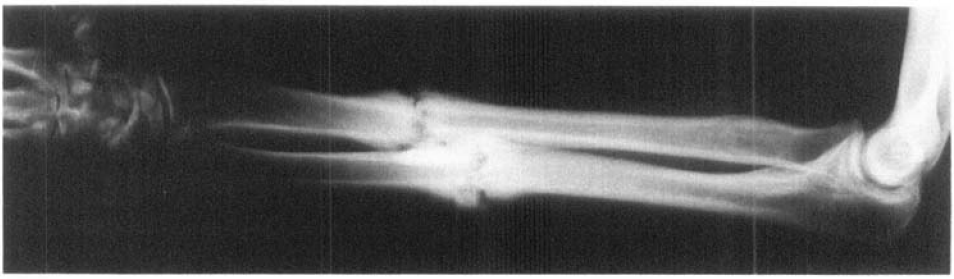
2 patients had superficial pin infections. 1 was treated with systemic antibiotics and relocation of the external

Table 1. Preoperative patient data and characteristics of 7 forearm nonunions

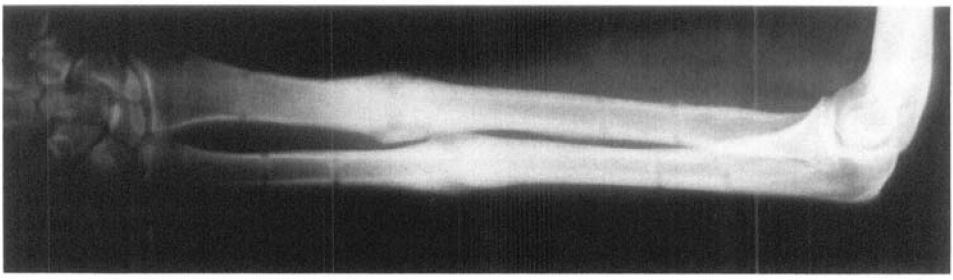
Case	Age	Sex	Fracture localization[a]	Months to referral	Compression period, weeks	Months to removal
1	50	M	Ulna	3	1	1
2	35	M	Ulna + radius	10	3	2
3	57	F	Ulna	7	2	3
4	18	M	Radius	2	1	1
5	25	M	Radius	5	2	1
6	25	M	Ulna	15	3	3

[a]All diaphyseal, except Case 5; distal metaphysis

Figure 1. Case 2



Preoperative, nonunion of both bones.



Obliteration of the gaps after 18 weeks of treatment.

fixator, the other with frequent pin-hole-care by a home-nurse. 5 patients healed and obtained a normal range of movement of their forearm. All patients returned to their previous activities. 1 patient has restricted supination/pronation mobility, unchanged compared to preoperative values. The patient, however, is not bothered by this in his heavy manual labor.

Discussion

Our cases' healing rates are notably faster compared with results of traditional surgical methods where two-stage-surgery often is needed. Rosen (1979) reported the results of internal fixation of 21 cases of forearm nonunions and delayed unions with an average healing time of 7 months. Hansis et al. (1989) reported additional bone-grafting in 76 cases of 131 forearm nonunions treated with internal plate fixation.

Further, external compression permits immediate postoperative motion. However, this kind of longitudinal compression is only possible if no angular deformity of the bone exists and when managing nonunions with defects up to 1.5 cm (Ilizarov 1992).

References

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