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Treatment of scaphoid fractures with a removable cast

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Forty-four fractures of the scaphoid bone were treated with a short-arm removable orthoplast cast and compared with 48 fractures treated with a conventional long-arm plaster cast. At the follow-up, there was no difference between the two treatment groups as regards nonunion or other sequelae. We conclude that the inconvenience of the treatment of scaphoid fracture and the need of physiotherapy can be reduced by using an orthoplast cast.

In the treatment of scaphoid fractures, immobilization of the elbow to prevent rotational movements of the forearm has been considered important (Verdan 1960, Broome 1964). Accordingly, until 1981, we used a long-arm plaster cast for 8–12 weeks. However, in 1981 we introduced a removable and adjustable short-arm orthoplast cast, which was more comfortable to the patient.

This retrospective study compares the results of the two treatments.

Patients and methods

From July 1978 to January 1984, 196 fractures of the carpus were diagnosed at our department, 139 of which were scaphoid fractures. We were able to study charts and radiographs of 130 patients, 92 of whom were reexamined clinically and radiographically at least 1 year after the accident (Table 1). The most frequent mechanism of injury was a fall on an outstretched hand, and 19 patients were involved in traffic accidents.

The scaphoid fracture was diagnosed from the primary radiograph in 66 cases, 15 fractures were detected on radiographs taken 10–14 days later, 4 fractures were detected on a third radiograph, and finally 7 fractures were diagnosed by scintigraphy.

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From July 1978 to September 1981, our treatment was a long-arm plaster cast including the first metacarpophalangeal joint. Between 1981 and 1984, we used a new short-arm orthoplast cast, which was removable and adjustable through a volar lacing (Figure 1). The orthoplast cast adjusts the forearm in supination, permitting 15°–30° pronation. The patients were encouraged to remove the cast for trimming the arm, but no exercises or weight bearing were allowed. Treatment was continued until clinical and radiographic union were found. The duration of treatment was 70 (54–90) days in the long-arm cast group and 73 (56–91) days in the short-cast group.

The follow-up examination included subjective and objective parameters (Table 3). Radiographs of the scaphoid in two projections were obtained.

Table 1. Patients with scaphoid fractures

	Long-arm cast n 48	Orthoplast n 44
Mean age (range)	26 (16–33)	31 (19–50)
Years follow-up (range)	4 (3–5)	2 (1–3)
Women:men	13:35	15:29
Dropouts	19	19

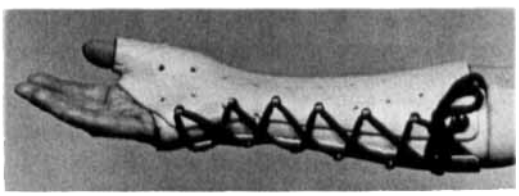

Figure 1. Short-arm orthoplast cast, which is removable and adjustable through a volar lacing.

Table 2. Scaphoid fracture location, nonunions in parentheses

	Long-arm cast	Orthoplast
Proximal	3 (2)	2 (0)
Waist	33 (4)	31 (2)
Distal	6 (0)	7 (1)
Tubercle	6 (1)	4 (0)
Total	48 (7)	44 (3)

Table 3. Outcome of treatment of scaphoid fractures

	Long-arm cast n 48		Orthoplast n 44
Inconvenience of cast			
at rest	18	$P < 0.01$	1
at work	35		3
Physiotherapy	25	$P < 0.01$	9
Pain at rest	0		2
Pain at work	14		15
Cessation of sports	4		2
Reduced movement in wrist[a]			
flexion-extension	3		3
ulnar-radial deviation	5		4
Reduced forearm rotation[a]	1		0
Reduced grip strength[a]	9		9
Arthrosis	1		2

[a] Reduction of 25 percent compared with the unaffected side.

For statistical analysis the chi-square test and the Mann-Whitney rank sum test for unpaired data were used.

Results

Nonunion occurred in two out of five fractures located in the proximal part of the scaphoid as compared with eight out of 77 fractures in the waist and distal part (Table 2). Among the 10 nonunions, four fractures were initially displaced. There were seven nonunions in the long-arm cast group and three in the orthoplast cast group; this difference was not significant ($P = 0.25$).

The results in the two treatment groups with respect to pain, cessation of sport activities, wrist movement, forearm rotation, grip strength, and appearance of arthrosis showed no difference. Reduced elbow motion was not found in any of the groups. The number of patients complaining of inconvenience of the cast at rest was lower in the group treated with the orthoplast. The number of patients needing physiotherapy was also lower in this group (Table 3).

Discussion

Because rotation of the forearm transmits shearing forces to the scaphoid, Verdan (1960) introduced immobilization of the elbow. Whereas Broome et al. (1964) found a reduced immobilization time using a long-arm cast compared with a short-arm cast, Goldman et al. (1969) did not find any difference. Upon reviewing the literature, London (1961) found that union was achieved in more than 90 percent of the published cases independent of the immobilization method.

Our investigation confirms that a comfortable, removable, and adjustable short-arm cast can be used safely in the treatment of scaphoid fractures. The inconvenience of the treatment and the need of physiotherapy after removal of the cast can be reduced without increasing the number of nonunions or other sequelae.

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