Delayed Extension Block Pinning in 27 Patients with Mallet Fracture

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INTRODUCTION

A bony mallet finger is a common fracture of the distal phalanx at the terminal extensor mechanism. As untreated bony mallet fingers can cause an array of problems (extension lag, swan neck deformity, osteoarthritis) adequate treatment is essential. Furthermore, due to the benign appearance, patients sometimes present themselves with delayed injuries.

This study had two aims:

- **Primary aim: to determine the patient reported functional outcome of delayed surgical intervention of bony mallet fingers.**
- **Secondary aim: to determine the complication rate of delayed surgical intervention.**

Fig. 1: a mallet fracture

METHODS

Patients

All consecutive patients treated from 2010-2016 at our level 2 trauma center were included in this retrospective cohort study. Inclusion criteria were:

- a bony mallet finger injury (excluding the thumb)
- presenting >21 days after injury
- treated with extension block pinning

Indications for surgery were:

- >2 mm fragment displacement
- volar subluxation of the distal interphalangeal joint.

Table 2: Indications for surgery

	All patients (N=27)
Fracture fragment displacement[a]	12
Volar subluxation	4
Large fracture fragment[b] with fracture fragment displacement	9
Large fracture fragment with volar subluxation	2

[a]Displacement >2mm; [b]Fragment >1/3rd of articular surface

Surgical Technique

The extension block pinning technique described by Ishiguro was used under loco-regional or general anesthesia. K-wire diameters of 0.8 to 1.2 mm were used. The skin was closed using absorbable sutures. Fracture alignment and fixation stability were assessed under fluoroscopic guidance.

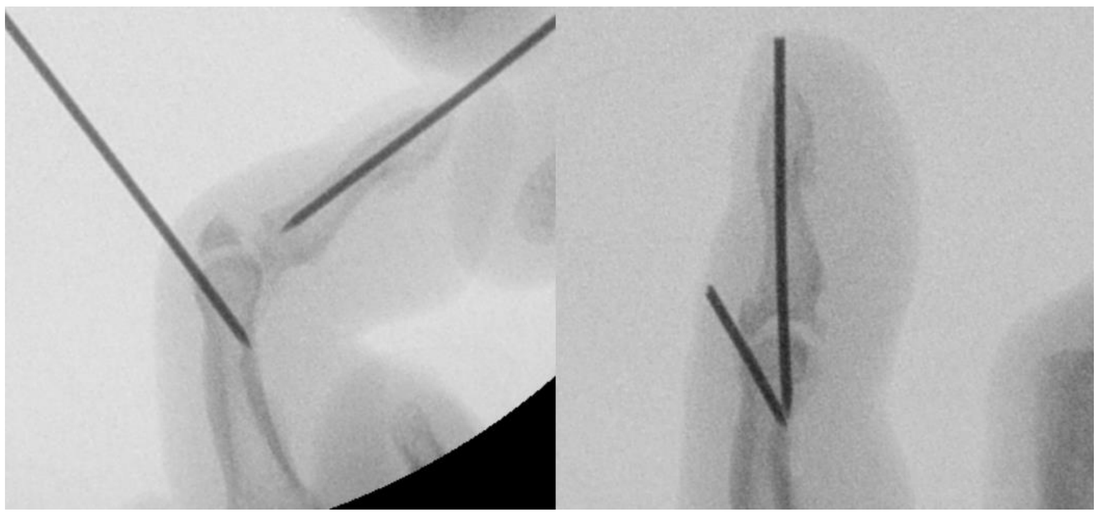

Fig .2: intraoperative fluoroscopy imaging of the extension blocking technique

Postoperative Treatment

Patients' fingers were immobilized for six weeks using a splint. After immobilization, the K-wires were removed during an outpatient clinic checkup. Referral to a hand therapist for guided mobilization was at the surgeon's discretion.

Table 1: Patient demographics, surgical intervention and rehabilitation details

		All patients (N[a]=27)
Age in years	*	34 (18-46)
Time to surgery in days	*	35 (29-42)
Time to follow-up in months	*	40 (25-61)
Male sex	N (%)	22 (81)
Affected finger	N (%)	
D2[b]		4 (15)
D3		4 (15)
D4		2 (7.4)
D5		17 (63)
Dominant hand affected	N (%)	14 (52)
Type of procedure	N (%)	
Open		18 (67)
Closed		9 (33)
Reason for delay	N (%)	
Doctor/patient delay		24 (89)
Failed conservative treatment		3 (11)
Removal of K-wires[c], weeks	*	6 (6-7)
Received physical therapy	N (%)	10 (37)

[a]N = number; [b]D = digit; [c]K-wire = Kirschner-wire; *= Median with IQR (interquartile range)

Study Parameters

The patients were contacted by phone to complete the Patient Rated Wrist and Hand Evaluation (PRWHE-DLV). The PRWHE is a hand/wrist specific questionnaire that has good measurement properties for the evaluation of traumatic hand injuries, and has been used before for the assessment of finger functionality. Electronic patient records were analyzed for complications.

Additionally, the following items were assessed: pain at rest and under load (11-point verbal numeric rating scale), perceived range of motion limitations, stiffness or numbness, cold intolerance, work impairment, subjective cosmetic rating of the finger, patient satisfaction and recommendation of the surgery to family and friends.

RESULTS

- The median PRWHE score for the entire cohort was 0 (IQR 0-5; range 0-22.5).
- There were no early signs of clinical nonunion or malunion. One patient (3.7%) suffered from a loss of K-wire fixation, this patient was re-operated. Three patients (11%) had an infection that required antibiotic treatment.
- Median pain at rest was 0 (IQR 0-0; range 0-0), median pain under load was 0 (IQR 0-1; range 0-6). Other reported issues were perceived limitation in range of motion (n=18, 67%), stiffness (n=9, 33%), numbness (n=4, 15%), cold intolerance (n=11, 41%). Three patients (11%) were impaired in their normal working activities due to the operation. The median cosmetic rating of the finger was 8 (IQR 7-8; range 0-10). Eighteen patients (67%) were satisfied or very satisfied with the operation, 22 patients (81%) would recommend the operation to family and friends.

CONCLUSION

Functional outcome was adequate. Current literature on acutely managed bony mallet fingers shows that delayed extension block pinning does not result in higher complication rates. However, some patients reported multiple lesser functional problems (perceived range of motion loss, residual stiffness) not well captured by the PRWHE, which might have caused lower patient satisfaction. **This study can guide physicians after delayed presentation or failed conservative treatment because adequate functional outcome and low complication rates (without early signs of clinical nonunion) were observed.**