

ORIGINAL ARTICLE

Outcome of late presentation of injuries of the volar plate of the proximal interphalangeal joint

BO POVlsen & RAVI SINGH

Department of Orthopaedic Surgery, Guy's & St Thomas' Hospital, London, UK

Abstract

Early recognition and treatment of volar plate injuries within two weeks is reported to give a good outcome, but there is no published information about the consequences of delayed presentation. We present a series of 14 patients with 16 injuries, who presented more than two weeks after the initial injury. All patients were referred to a specialist hand trauma clinic over a 10 months period and were evaluated prospectively and treated with immediate mobilisation by a specialist hand therapist. Mean time to presentation was 27 days (range 14–79) and mean improvement in range of movement was 25° (range 2–52) with mean residual extension lag 10° (range –4–56). All patients returned to their previous levels of function by the time of discharge. We conclude that it is possible to achieve good outcome without surgical intervention even when the presentation time is four weeks if experienced hand therapists manage the rehabilitation.

Key Words: PIPJ, volar plate injury, late presentation, mobilisation, prospective, outcome

Introduction

The proximal interphalangeal (PIP) joint is a hinge joint surrounded and stabilised by the volar plate, lateral and accessory collateral ligaments, and the extensor mechanism. It is the most commonly injured joint in the hand. Forced hyperextension is the commonest of injury, and can range from a mild sprain to a complex fracture dislocation. Eaton and Littler [1] classified injuries to the PIP joint in three ways: hyperextension (type I); dorsal dislocation (type II); and fracture dislocation, stable or unstable (type III). Late complications of these injuries include pain, flexion deformity, swan-neck deformity, and degenerative arthritis.

Early recognition and treatment of these injuries will give a good outcome [2]. There is no clear published evidence about whether delayed presentation and instigation of treatment gives similar outcome in

terms of function and pain relief, compared with those presenting within two weeks of injury.

Patients and methods

We manage hand injuries with clinicians and hand therapists. We reviewed all patients with injuries to the PIP joints of their fingers who presented to our clinic during a period of 10 months. Inclusion criteria for the study were type I and stable post-reduction type II injuries. Patients were excluded if they presented within 14 days of injury, if the type II injury was unstable, if it was a type III injury, or if they had injuries to other joints of the same hand.

Sixteen patients with an injury to a single digit were included in this audit during 10 months. All patients were seen and assessed by the hand therapists

on the day of presentation and started immediate mobilisation. The patients were treated according to the department's treatment programme (Table I) and wore a static extension block splint (Figure 1) made out of a thermoplastic material ("Colourfit" by Orfit, Wijnegem, Belgium) secured with Velcro straps. The splint was set in 20° flexion for the first two weeks, after which it was remoulded to neutral and was worn full time to prevent further injury for the first six weeks. It was remoulded as the swelling settled. If there was a fixed flexion contracture after six weeks a dynamic extension splint was used (Figure 2). Outcomes were assessed in terms of range of movement and extension lag. At the last consultation the patients were asked by a hand therapist if they had returned to their previous function. No specific recording was made of what these activities were.

Results

There were eight men and six women, mean age 42 years (range 22–90) at the time of injury. Of the 16 digits, six injuries resulted from dorsal dislocation, reduced either by the patients themselves or in the Emergency Department before they were seen in the hand clinic. Five injuries were associated with volar avulsion fractures (three of these as a result of dorsal

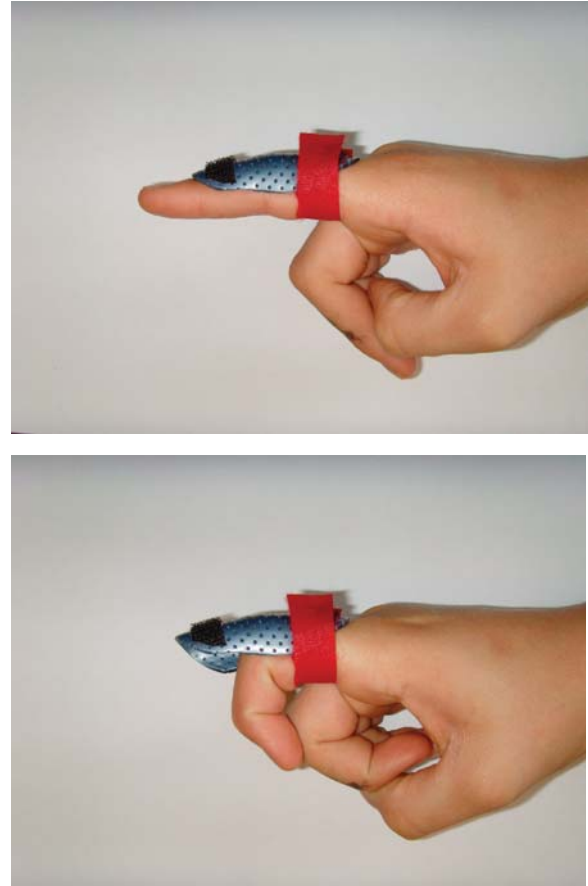


Figure 1. Proximal interphalangeal joint extension-block splint in neutral flexion and extension.

Table I. Position of splint and treatment programme.

Position of splint	
0–2 weeks:	Proximal interphalangeal joint in 20° flexion with dorsal block and metacarpal phalangeal joint and distal interphalangeal joint: Free
From 3 rd week:	Proximal interphalangeal joint in neutral dorsal block and metacarpal phalangeal joint and distal interphalangeal joint: Free
Treatment programme	
0–2 weeks:	
	Splint to be worn full time
	Oedema managed
	Exercise:
	Passive flexion
	Active flexion
	Active flexion of isolated joint
Week 3:	
	Splint to neutral joint extension
Week 6:	
	No splint; return to normal activities; passive extension

dislocation). The mean time to presentation and start of treatment was 27 days (range 14–79) and the mean time to discharge was 74 days (range 29–149) (Table II). Results are shown in Table III. All patients reported to the hand therapist that they had returned



Figure 2. Dynamic extension splint.

Table II. Patients' details.

Case No.	Age/Sex (years)	Mechanism of injury	Volar avulsion fracture	Time to presentation (days)
1	90/F	Dislocation	Yes	20
2	49/F	Hyperextension	Yes	22
3	24/M	Dislocation	No	14
4	58/F	Hyperextension	No	14
5	42/F	Hyperextension	No	27
6	45/M	Hyperextension	No	79
7	43/M	Hyperextension	No	16
8	28/M	Hyperextension	Yes	25
9	28/M	Hyperextension	No	14
10	23/M	Dislocation	No	58
11	23/M	Dislocation	No	44
12	22/M	Dislocation	Yes	16
13	29/F	Hyperextension	No	27
14	52/F	Hyperextension	No	17
15	45/F	Hyperextension	No	14
16	44/F	Dislocation	Yes	24

to their previous levels of function in terms of activities of daily living, recreational activity, and occupation, at time of discharge.

Discussion

There is no clear consensus about the management of injuries to the volar plate of the PIP joint [3]. Recommended treatment regimens of acute injuries range from early immediate mobilisation [2], a period of immobilisation followed by protected mobilisation, to surgical repair of the volar plate [4]. There is evidence that early mobilisation may help [2,5]. Norregaard et al. [5] found no differences in outcome in their prospective randomised study, which compared immobilisation with immediate mobilisation for volar plate injuries. Gaine et al. [2] showed that early mobilisation for volar plate injuries that present within two weeks of injury led to a good outcome. However, they stated that those that presented after two weeks resulted with an extension lag of at least 15°. All our patients presented at least 14 days after injury (mean 27 days (range 14–79)). All these patients

Table III. Development of active range of movement in the proximal interphalangeal joint during treatment.

Joint No.	Duration of treatment (days)	Flexion (°)			Extension lag (°)		
		Start	End	Change	Start	End	Change
1	113	52	80	28	24	10	-14
2	30	88	100	12	2	0	-2
3	59	74	86	12	4	2	-2
4	122	34	34	0	26	46	20
5	57	50	100	50	10	2	-8
6	51	74	98	24	10	10	0
7	79	74	76	2	12	14	2
8	71	80	100	20	4	6	2
9	19	86	88	2	10	12	2
10	149	52	72	20	30	30	0
11	149	64	98	34	10	-4	-14
12	58	48	84	36	8	10	2
13	95	38	86	48	2	4	-2
14	65	48	100	52	18	4	-14
15	38	80	116	36	2	16	-14
16	29	76	98	22	4	0	-4
Mean	74	64	89	25	11	10	-3
(range)	(19–149)	(34–88)	(34–116)	(2–52)	(2–30)	(-4–56)	(-14–20)

were pain-free, satisfied, and back to work and sports a mean time of 74 days after treatment started (Table III). However, we acknowledge that as we did not record exactly what occupational and leisure activities the patients were engaged in, the high incidence of return to previous activities could have been influenced by a low pre-existing range of physical activity. Future studies are necessary to find out if the successful return to previous activities is transferable to all grades of physical activities.

We conclude that a late presentation of type I and stable post-reduction type II injuries of the volar plate do not necessarily adversely affect the outcome, provided that a hand therapist supervises a programme of mobilisation. These patients have a good chance of returning to their preinjury level of function, if they are managed closely by hand therapists. However, late presentation does increase the chance of developing an extension lag, but this does not seem to affect their satisfaction and return to function. Further studies are needed to find out the effect of presentation later than four weeks and the outcome after unstable type II and type III injuries.

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