

# Open Reduction Internal Fixation with Transverse Volar Plating for Unstable Proximal Interphalangeal Fracture-Dislocation: The Seatbelt Procedure

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## INTRODUCTION

The proximal interphalangeal (PIP) joint has the greatest arc of motion of the three phalangeal joints and is predisposed to stiffness with injury

Unstable intra-articular PIP joint fracture-dislocations pose a treatment difficulty

This pattern of fracture-dislocation requires:

- restoration of joint congruity
- stable fixation to allow early motion of the joint

Fracture-dislocations with a volar shear component >40% may benefit from joint reduction with subchondral support for maintenance of stability

We present a novel technique of volar transverse plating (the Seatbelt procedure) that has demonstrated good short-term results

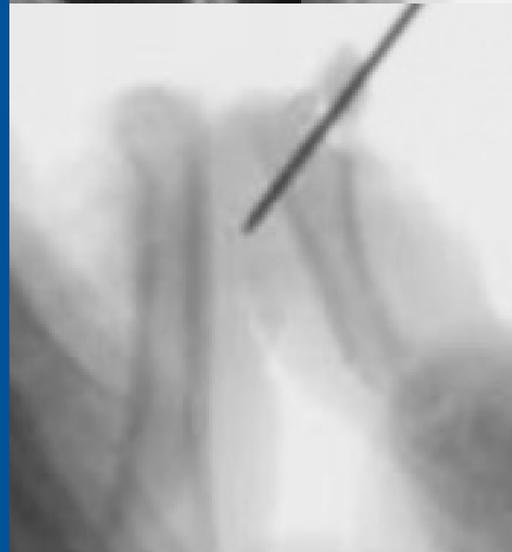
## METHODS

Inclusion criteria: isolated volar shear PIP dorsal fracture-dislocations with clinical signs of instability and persistent dorsal "V" sign on lateral radiographs (Fig. 1), treated with a volar transverse plate and screw construct (Fig. 2)

Exclusion criteria: concomitant dorsal comminution, concomitant ipsilateral hand fractures and follow up less than 6 weeks

Retrospective collection of data for post-op stability, range of motion (ROM), radiographic outcomes and complications over past 5 years

Figure 1



Volar shear fracture >40% articular surface. Dorsal "V" sign present. Intra-op fluoro of shotgun hyperextension of PIP joint for fracture reduction.

## RESULTS

17 patients (12M, 5F), average surgery 21 days (range, 2-52) post-injury, mean follow up of 7.3 months (range, 1.5-24)

- No recurrent dislocations
- Average PIP arc of 77.4°; 12° - 90°
- Average DIP arc of 61.5°

13/17 had arc of motion > 70°; one patient had arc of 25° (78yo, treated 50d post-injury)

16/17 had radiographically concentric joint with one patient showing slight radiographic dorsal subluxation not apparent clinically

2/17 (11.8%) had revision surgery for tenolysis and removal of hardware to improve ROM at 4 and 9 mos post-op

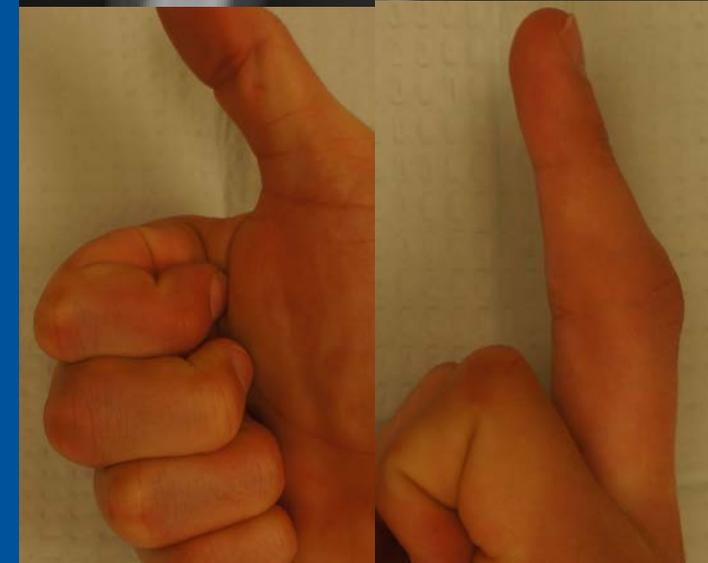
Pre-operative films often underestimate percentage of articular involvement, average 51% articular joint involvement

## CONCLUSIONS

In the setting of PIP dorsal fracture dislocations with volar shear component constituting >40% of the articular surface, the Seatbelt procedure allows for **concentric joint and articular surface reduction with subchondral support for maintenance of stability with early ROM.**

This technique allows for restoration of functional ROM, even in the setting of comminution and delayed presentation (mean >21days post-injury)

Figure 2



PA/lateral films of volar transverse plate. 6 week post-op clinical exam of flexion-extension of PIP joint