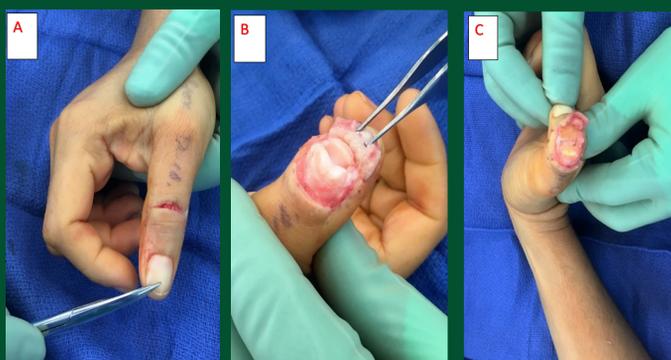


## INTRODUCTION

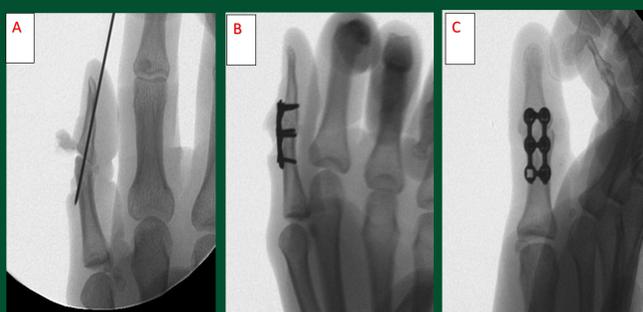
- Arthrodesis is generally the most accepted surgical option for treatment of degenerative and traumatic conditions involving the DIP joint of the fingers or the IP joint of the thumb.
- Ideal position of arthrodesis is thought to be between 5-15 degrees flexed to improve power, fine pinch, and grip at the finger and 15-30 degrees at the thumb
- Many techniques have been described in literature for fusion of the distal interphalangeal joints, including Kirschner wires, tension bands, headless intramedullary compression screws, Herbert screws and other types of intramedullary fixation
- We describe a novel operative technique to perform a distal finger joint arthrodesis in slight flexion using dorsal plate fixation.
- Indications include IP joint pain or deformity secondary to osteoarthritis, rheumatoid arthritis, chronic FPL or FDP rupture, distal interphalangeal joint instability, and post-traumatic malunion. There are no absolute contraindications to using this technique apart from dorsal soft tissue deficit



Operative images depict the surgical technique of Dorsal Plate Fixation of DIP joint arthrodesis. A. An H shaped incision Centered over the DIP joint is shown. B. Extensor Tendon is elevated along with the skin to expose the joint. C. Bone is exposed to allow for plate fixation. D. Dorsal plate is applied over the arthrodesis site with K wire holding the arthrodesis position in place (in a different patient). E. Extensor tendon repaired over the plate to allow for adequate soft tissue cushion.

## Technique

- A transverse incision centered over the DIP joint with vertical limbs along the radial and ulnar aspects of the digit creating an H shape is made.
- Proximally, a full-thickness fasciocutaneous flap is elevated. EPL is identified and incised transversely, approximately 5mm proximal to the level of the IP joint
- Distal dissection proceeds beneath the terminal tendon in order to expose the dorsal aspect of distal phalangeal base for plate placement and to keep a full thickness soft tissue flap distally.
- Identify and release the UCL and RCL of the joint. Debride the articular cartilage down to healthy cancellous bone at both sides of the joint.
- Contour the exposed cancellous bone edges proximally and distally to allow for desired degrees of joint flexion.
- A smooth K-wire is used for provisional fixation and is placed obliquely across the IP joint holding the arthrodesis site in a reduced position
- A low profile mini "grid" or "bicolumnar" plate (Depuy- Synthes, West Chester, PA or Medartis, Basel, Switzerland 1.5 mm variable angled plate) is contoured to the bone at the desired degree of DIP joint flexion and placed in compression mode with non-locking 1.5 mm screws.
- Due to the limited area at the dorsal aspect of the base of the distal phalanx, we have only been able to place 2 screws in the distal phalanx. Proximally, if a six-hole grid plate is selected, 3 or 4 screws can be placed for internal fixation.
- The extensor tendon is repaired over the plate in order to provide soft-tissue coverage for the plate. The skin and subcuticular layers may be closed.
- Rehab: Finger or thumb is placed in a well-padded splint (intrinsic plus for the fingers or thumb spica for the thumb) maintaining the distal interphalangeal joint in its position until there is evidence of wound healing. No immobilization requires once wound is healed.



A. Fluoroscopic image showing the K wire holding the arthrodesis position in place. B. Lateral fluoroscopic image of the plate and screw construct after fixation. C. AP fluoroscopic image of the plate and screw construct after fixation.

## Case Series

- Six patients, aged 35 to 61 years (average, 45.5 y), requiring DIP joint fusion (3 thumbs, 3 fingers) have been treated using this technique.
- Three thumb IP joints were fused at 35, 25, and 25 degrees of flexion, while the three finger DIP joints were fused at 20, 10, and 5 degrees of flexion—depending on the desires of the patient.
- 6/6 (100%) have achieved union.
- 0/6 (0%) wound complication rate.
- 2/6 (33%) elected to undergo plate removal.

## Potential Complications

- Infection
- Wound dehiscence
- Hematoma formation
- Nail bed damage
- Malunion
- Nonunion

## CONCLUSION

- IP joint fusion of the thumb or DIP joint fusion of the fingers can be performed safely with a low profile plate fixation through a dorsal approach.
- Advantages of this technique includes a more functional position of fusion, without violation of the volar/distal aspect of the distal phalanx, and secure internal fixation that does not require immobilization.

