

## Case Study

# Use of the NanoPhix™ Compression Screw for an Avulsion Fracture to the Fourth Distal Phalanx

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Dr. Dane Daley, a graduate of East Tennessee State University College of Medicine, completed a hand fellowship while at OrthoCarolina. He specializes in orthopedic and hand surgery.

## Case Presentation

The patient is a 42-year-old, right-hand dominant male who presented with a left ring finger injury following a forceful pulling injury on a tree branch. Denies previous injuries or surgeries to the left ring finger. On presentation, the left ring finger distal interphalangeal joint is swollen, resting in a hyperextended posture with extensive ecchymosis about the finger. Preoperative radiographs demonstrate a displaced left ring finger distal phalanx intra-articular volar fracture consistent with a Jersey finger.

## Preop Plan

Pre-operative plan is for open reduction internal fixation (ORIF) of the distal phalanx of the left ring finger with NanoPhix™ compression screws via a direct volar approach with a Bruner incision.

## Operative Findings and Approach

At the time of surgery, the patient was found to have a Leddy Packer Type IV Jersey Finger (intra-articular distal phalanx avulsion fracture with associated flexor digitorum profundus [FDP] avulsion with retraction). The plan remained the same with the addition of suture anchor fixation of the tendon to the distal phalanx after ORIF of the fragment. The distal phalanx fracture was fixated with three NanoPhix cannulated screws and the tendon was then repaired through the fragment to the remaining distal phalanx with two micro suture anchors. Total surgical time (start of tourniquet to final splinting and dressings) was 60 minutes.

## Follow-Up

At two weeks follow-up, the patient experienced no pain and had his finger resting in a flexed posture. Radiographs confirmed stability, leading to initiation of occupational hand therapy with a dorsal blocking splint. At six weeks follow-up, the patient continued therapy and returned to gym activity with a brace. He experienced no pain but started getting PIP stiffness and was placed into an LMB splint temporarily. At three months follow-up, the patient completed all therapy and was completely healed. His flexion contracture was approximately 10 degrees of PIP and 15 degrees of DIP joint with approximately 3 mm tip-to-palm distance compared to adjacent digits. At this point, the patient had resumed all daily activities without any issues or limitations.

## Discussion

NanoPhix allowed Dr. Daley to achieve his operative goal of stable fixation, early mobilization, and minimal to no soft tissue damage. The 1.5 mm diameter cannulated design allowed him to effectively and efficiently fixate the avulsion fracture while the unique dual diameter delivery mechanism simplified a more precise and efficient implant placement. His patient experienced anatomic and functional restoration of his distal phalanx, which may result in returning to his daily activities faster than with other implants and surgical approaches.

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## Preoperative



## Postoperative

