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## Introduction

- First reported case of foreign body (FB) migration through soft tissues of the hand described movement of a fragment of glass from wrist into the flexor tendon sheath of the long finger in 1983<sup>1</sup>. Additional reports documented distal migration of fragments of a sewing needle and plant material<sup>4,5</sup>.
- The hand is the most common site for FB implantation secondary to trauma<sup>11</sup>.
- Autopsy series examining tendons of upper and lower extremities found incidental FBs in 4.7%:
  - Upper extremity tendon involvement in 52%<sup>11</sup>.
- Immediate injuries to nerve, bone, muscles, and tendons have been reported<sup>3</sup>.
- Delayed injuries to deep structures of the hand and the sequelae of retained FBs are less common<sup>4</sup>.
- **We report a case of foreign body distal migration within the flexor tendon sheath from the carpal tunnel to the level of the MCP nine days after initial injury.**



## Case Report

- 23 year-old RHD male presents 24 hrs after sustaining a left wrist laceration. Patient is a bartender and injured himself on broken glass.
- Initial exam:
  - 3.5cm laceration on the ulnar aspect of the volar surface of the forearm. No evidence of tendon, nerve, or vascular injury.
- FB (presumably glass) was identified on 3-view X-ray of the left wrist (**Figure 1**).
- Washout and local wound exploration did not lead to retrieval of the FB.
- Patient seen in the office nine days after the injury, complaining of worsening pain and tenderness at the wrist and hand with difficulty in flexion of the digits.
- Repeat XR: retained FB located distally—suggesting migration from just proximal to the carpal canal to 5th metacarpal head (**Figure 2**).
- Exam:
  - Original laceration repair intact (**Figure 3**).
  - FDP, FDS, FPL, EDC, and EPL intact.
  - Capillary refill less than two seconds.
  - Median, ulnar, and superficial radial nerve sensibility grossly normal.
- Plan: formal wound exploration, as continued pain and limited mobility proved to be quite detrimental to the patient's quality of life.

## Procedure Details

- Sutures removed and original wound extended (**Figure 4**).
- Tissue-flaps reflected and 0.5cm defect in carpal fascia was noted (**Figure 5**).
- Hematoma found within the substance of FDS (**Figure 6**). Hematoma evacuated and the wound was copiously irrigated.



- Small portal into the flexor sheath was identified (**Figure 7**).
  - FB located ulnar to the median nerve was removed from the proximal wound.
- Distal incision in the palmar crease made to gain access into the flexor sheath.
- Incision was made into the sheath and a part of the A1 pulley was released (**Figure 8**).
  - Fair amount of clear fluid in the sheath, consistent with non-suppurative tenosynovitis.
  - Fluid sent for culture (No growth).
  - Large FB located on radial aspect of flexor tendon (**Figure 9**).



## Discussion

- Recognition of FB at initial injury relies on clinical exam, imaging, and wound exploration.
- Retained FBs are not uncommon, especially if the fragments are small and initially subclinical<sup>3</sup>.
- Identification and removal of FBs may be difficult if imaging is unable to localize the fragments, if complete surgical exposure and exploration is not feasible, or if the FB migrates from the site of initial injury<sup>2</sup>.

### DIAGNOSIS / IMAGING

- Clinically relevant symptoms of pain and/or swelling related to the FB and its migration may be immediate or delayed.
- Imaging is paramount in the diagnosis and surgical removal of migrated FBs.
- Though metallic FBs are readily seen on plain radiographs, plant material, plastics, and glass may be more difficult to detect<sup>8</sup>.
- Practical imaging guidelines for suspected FBs of the hand:
  - Plain x-ray: initial study of choice, especially useful for metal, glass, or gravel
  - CT: wood and plastic or when plain x-ray films are non-diagnostic for suspected gravel
  - MRI: after other imaging modalities have failed for all FBs<sup>8</sup>.

### MIGRATION WITHIN THE TENDON SHEATH

- Several factors create an optimal environment for migration of a FB in the tendon sheath.
- The carpal tunnel and flexor tendons share a synovial envelope from distal forearm to palm.
- Tendon sheath is a closed space under pressure; Local inflammation causes an increase in baseline pressure<sup>9,10</sup>.
  - Increase in pressure and irritation produces symptoms of synovitis.
- Motion of the finger and the flexor tendon sheath predisposes to distal movement of FBs within the sheath<sup>2</sup>.
  - Fragments can advance distally within the sheath with repeated extension and flexion of the fingers.

## Conclusion

- Lacerations / puncture wounds to the hand can be complicated by retained foreign bodies.
- Patients may experience pain, swelling, and loss of function.
- Diagnosis, localization, and definitive treatment of a foreign body can become more difficult if the foreign body has migrated from the site of original injury.
- Clinical suspicion of retained and migrated foreign bodies must remain high if symptoms do not improve and if a portal into the flexor tendon sheath is identified.

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