Locking of the ring finger at proximal interphalangeal joint due to a sesamoid bone: a case report

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A locked proximal interphalangeal (PIP) joint due to an interposed sesamoid bone (henceforth, sesamoid[s]) is uncommon; although sesamoids have been commonly found in locked metacarpophalangeal (MCP) joints of the thumb. We treated a locked PIP joint following surgery and obtained good functional recovery.

Case Report

A 16-year-old girl injured her right ring finger during basketball practice. She presented to an outside clinic. A plain radiograph (X-ray) of the finger showed a proximal interphalangeal joint subluxation and closed reduction was attempted without success. She was referred to our medical center for further evaluation. On presentation to our clinic, she complained of pain and an inability to flex her injured finger. Examination revealed a tender, swollen right ring finger PIP joint, with a range of motion of 5°–20° flexion. On an X-ray, a small bone fragment was noted in the intra-articular space of the PIP joint (Fig. 1a) and CT scan showed no bony defect around the joint of the ring finger, but demonstrated a sesamoid on the PIP joint of the adjacent middle finger (Fig. 2). As a result, we suspected the bone fragment seen at the right ring finger PIP to be a sesamoid. To confirm our suspicion, we obtained an X-ray of the contralateral ring finger, which also showed a sesamoid on the volar side of the PIP joint (Fig. 1b). We diagnosed the injury as a locked PIP joint due to an interposed sesamoid and planned surgery.

Via a volar approach the joint was opened. After a zigzag skin incision, the tendon sheath (A3 pulley) was opened. With the flexor tendons pulled laterally, the volar plate was found migrating into the PIP joint with a tear near the proximal end (Fig. 3a). While pulling the fingertip distally and hyper-extending the PIP joint, we pulled the volar plate anteriorly toward the volar surface of the hand to reduce it. The volar plate was extracted from the joint space with the small bone fragment attached (Fig. 3b). Because the bone fragment was attached to the dorsal side of the volar plate and there was no cartilaginous or bony defect inside the PIP joint, we concluded that the fragment was a sesamoid. The sesamoid was slightly detached from the volar plate, which allowed us to remove it. Subsequently, we confirmed that the PIP joint could flex and extend smoothly, and the torn volar plate was sutured at the proximal end (Fig. 3c).

After the surgery, the ring finger was buddy taped to the middle finger for 3 weeks with no restriction to early mobilization. After 2 months, the range of motion of the finger recovered to 0°–100° flexion without any complaint of pain from the patient.

Discussion

Although a locked interphalangeal joint of the thumb was reported [2], no past articles have reported a locked PIP joint due to an interposed sesamoid. In 2007, Dharap and colleagues [1] reported that of the 400 hand X-rays obtained, 28.6% revealed sesamoids in the IP joint of the thumb, but none in the PIP joint of any fingers. With regard to the MCP joint, sesamoids were found in the thumb (100%), the index (40.4%), the middle (2.3%), the ring (1.5%), and the little (45.3%) fingers. That is to say, sesamoids can exist in any MCP joint as well as the thumb of the IP joint, but no sesamoid has been confirmed in the PIP joints of any

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Fig. 1 **a** Ipsilateral preoperative X-ray (right finger) showing a sesamoid interposed inside the proximal interphalangeal joint. **b** Contralateral X-ray (left finger) showing a sesamoid palmar to the PIP joint

of the fingers. This injury is, therefore, likely to be very rare as shown by no previous reports in the literature.

We hypothesized that the mechanism of the locking of the joint in our case was as follows. Firstly, the PIP joint was extended excessively. Secondly, the volar plate was torn near the proximal end. Thirdly, the volar plate and the sesamoid were carried onto the cartilage of the proximal phalangeal head, while the PIP joint continued to hyperextend. Lastly, the PIP joint flexed backward, leaving the volar plate and the sesamoid inside the joint. In dorsal dislocations of the PIP joint, generally, the volar plate is torn at the distal

Fig. 2 3D-CT scan shows no bony defect around the PIP joint of the ring finger and a sesamoid bone of the middle finger (white arrow)

Fig. 3 **a** Intraoperative photograph demonstrates the volar plate migrating into the PIP joint (black arrow). Flexor tendons (white arrow) are pulled laterally. **b** After reduction of the migration, a sesamoid bone (white arrow) was confirmed to be attached to the dorsal side of the torn and reflected volar plate (black arrow). **c** The sutured volar plate at the proximal end

end, while in the current case it was torn near the proximal end. Moreover, the sesamoid existed next to the volar plate. In other words, these two findings are different from those of usual dorsal dislocations of the PIP joint. We cannot say with certainty how the sesamoid caused the volar plate to be torn near the proximal end, but we believe the sesamoid had an important role in causing the locking.

References

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