

JBR-BTR, 2011, 94: 202-203.

## IMAGING IN INDEX FINGER RADIAL COLLATERAL LIGAMENT INJURY: ATTENTION TO DETAIL REALLY PAYS...

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Radial collateral ligament of the index finger is a rare ligament to rupture. X-ray is generally normal, except for subtle findings of soft tissue swelling and occasionally a small fracture. With continuous advances in imaging, ultrasound and high quality MRI allow clear depiction of small structures including joint capsule and collateral ligaments of even the small joints. This helps in definitive diagnosis and determines the extent of injury, which may affect the treatment options and final outcome. We report a rare case of index finger metacarpo-phalangeal joint radial collateral ligament tear. The subtle X-ray abnormality was chased on ultrasound and the diagnosis was proposed on ultrasound and later confirmed on MRI. We also discuss the imaging findings of this rare entity.

**Key-word:** Fingers and toes, injuries.

The stable pinch mechanism depends on the integrity of the radial collateral ligament (RCL) of the index finger (IF) and ulnar collateral ligament of the thumb metacarpo-phalangeal joints (MCPJ). Injury to the collateral ligament of the MCPJ is common in the thumb and small finger, these being the border digits. Index finger MCPJ collateral ligament is rare to get injured. Plain radiograph may have subtle findings which are easily missed. Improved resolution on ultrasound and MRI are creating great interest amongst the radiologists and clinicians to utilize these facilities for making early, definitive diagnosis of these injuries and to predict their extent. Also it helps to diagnose other associated injuries, which might affect the treatment and overall prognosis.

### Case report

A 54-year-old energetic police man was referred to our institution with a history of persistent painful swelling over the MCPJ of the left index finger for 2 months. Clinical history revealed remote trauma. The patient was treated conservatively without much symptomatic relief. Radiograph of the left hand showed a small bone fragment at the radial side of the base of the proximal phalanx of the index finger (IF) with minimal overlying soft tissue swelling (Fig. 1). Due to persistent symptoms, further evaluation was carried out with ultrasound, which confirmed the X-ray finding. Additionally it demonstrated thickening with increased echogenicity of the radial collateral ligament (RCL) (Fig. 2). Dynamic stress testing also



Fig. 1. — X-ray of the left hand in frontal and oblique views shows a small bone fragment (arrow) at the radial aspect of the base of the proximal phalanx of the index finger. Note minimal overlying soft tissue swelling.

confirmed this deficiency. Radial collateral ligament tear was proposed diagnosis. This was further confirmed on MRI, which showed partially torn fibers of RCL at MCPJ on PD and inversion recovery images (Fig. 3) with associated disruption of the radial sagittal band (Fig. 4). T2-weighted images showed increased signal in the ligament, surrounding soft tissue and marrow of the adjacent proximal phalanx. Gradually the patient improved symptomatically without any surgical intervention.

### Discussion

Integrity of the RCL of the index finger MCPJ and the ulnar collateral ligament (UCL) of the thumb MCPJ

predicts a stable pinch mechanism. The RCL is thicker, wider, stronger, more oblique and closer in its origin to the articular surface of the metacarpal head than the UCL (1). Inadequately treated trauma to these ligaments can lead to pain, instability, and weakness of pinch.

In 2006, Gaston and Lourie (2) proposed 3 grades of injury: tenderness over the RCL without instability (Grade 1), laxity with a definite endpoint (Grade 2) and laxity without endpoint (Grade 3). Though rare, this entity is of major clinical significance (2). Support by the first dorsal interosseous muscle and laxity of ligaments in neutral position contribute to its rarity. One study has reported that a force of about 43 kg was necessary to rupture the RCL of the IF (3). RCL tears can be at the metacarpal head, proximal phalanx or mid-substance in descending order of frequency (4).

Common presenting symptoms are history of trauma, local pain,

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Fig. 2. — Ultrasound image of radial aspect of proximal interphalangeal joint of the index finger. The small bony fragment (avulsion fracture) is seen on ultrasound (thin white arrow). The radial collateral ligament is thick with increased echogenicity (arrowheads).

dysfunction and joint instability while using the grip. Examination commonly reveals swelling, local tenderness and laxity to ulnar stress with the IF MCPJ in 60 degree flexion (4). The history and physical examination are usually sufficient to make the diagnosis (5).

Radiographs are generally unremarkable or occasionally show an avulsion fracture, as in our case. Ultrasound reveals injury to the ligament as thickening and increased echogenicity of the ligament. Associated joint effusion and occasionally avulsed bone fragment may be seen, as was noted in our case.

Today, high quality MRI performed with a dedicated wrist coil has replaced the arthrography, which was previously considered the most effective way to image these injuries. It allows localization of the site of injury, extent of tear and identifies associated injuries including extensor hood tear, volar plate and capsular trauma, chondral shearing and occult fractures. MRI may reveal sprain, partial or complete tear of the RCL. Sprain of the ligament is seen as increased signal intensity in the ligament with abnormal morphology. Complete tear is seen as a gap on the sequential images. Partial tear is seen as increased signal intensity and partial discontinuity without retraction. In acute injury, associated joint effusion, bone marrow edema pattern can be seen on T2-weighted images. Chronic tears are seen as thickening and abnormal contour of the ligament (4). Coronal images best show injuries to the collateral ligaments, axial images show injuries to the dorsal capsule, while sagittal images show joint alignment, volar plate and cartilage lesions.

Treatment of this injury is usually conservative, and surgical intervention is considered only in cases of significant instability or similar to

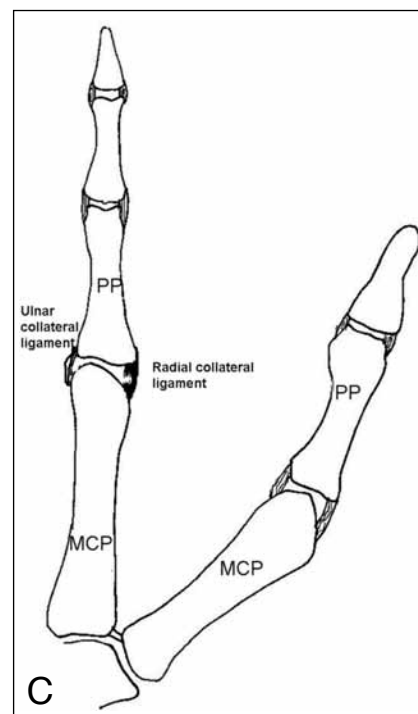
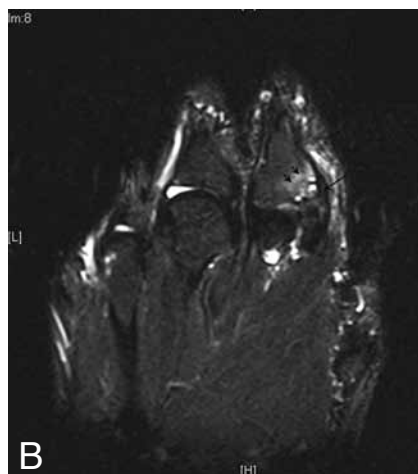
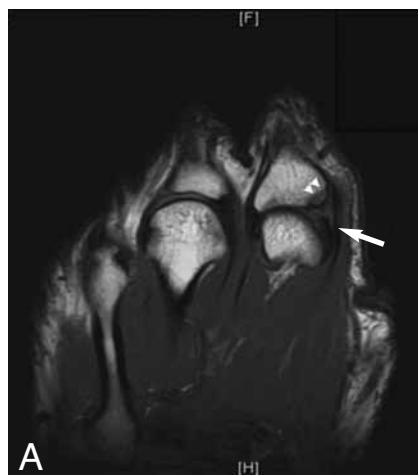


Fig. 3. — Coronal PD (A) and IR MRI images (B) show partially torn radial collateral ligament at metacarpophalangeal joint (arrow) of the index finger. Marrow edema is seen at the base of the proximal phalanx (arrowheads). C is the schematic diagram of the radial and ulnar collateral ligaments at the index finger for comparison.

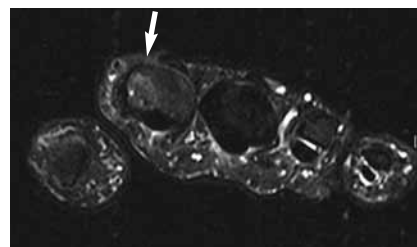


Fig. 4. — Axial inversion recovery image at the same level reveals disruption of radial sagittal band (arrow) with high signal in the surrounding soft tissue and bone marrow suggesting edema.

the Stener lesion of UCL of the thumb. The latter is an interposition of the extensor hood, the sagittal band, or the interosseous tendon between the torn ligament and its attachment (4).

In conclusion, injury to the RCL of the IF is a rare but clinically significant injury due to its effect on functionality of the active limb. A high grade of clinical suspicion with attention to subtle findings on the radiograph helps to suggest the diagnosis. Imaging, especially MRI, plays a crucial role in confirming the diagnosis and determining the extent of rupture along with diagnosing associated injuries.

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