CASE REPORT

Simultaneous combined complete tear of radial and ulnar collateral ligaments of thumb in an adolescent

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SUMMARY

Isolated tear of collateral ligaments of thumb are common but combined injuries of both radial and ulnar collateral ligaments are rare. These cases are reported in athletes involved in high-impact sports. Here, we report a case of a 15-year-old boy with pain at base of the thumb and instability following low-impact sporting activity. On subsequent clinicoradiological assessment, simultaneous combined complete tear of both radial and ulnar collateral ligaments of the thumb was noted. Delayed primary repair of both collateral ligaments was done. This case highlights the rarity of this type of injury in an adolescent and also the use of appropriate clinical tests and imaging modalities for early diagnosis of such injuries. Restoration of joint stability as early as possible either by repair or reconstruction of ligaments needs to be considered to prevent secondary osteoarthritis of metacarpophalangeal joint.

BACKGROUND

Collateral ligament injury of the thumb is one of the most common injuries for which patients are visiting emergency centre. The ulnar collateral ligament (UCL) injuries are more frequent compared with the radial collateral ligament (RCL).¹ The mechanism of injury would be a fall on to an abducted or adducted thumb or when a ball or racquet strikes the thumb.² Usually a hyperabduction or hyperextension of metacarpophalangeal joints leads to collateral ligament injuries of thumb.³ However, combined collateral ligament injuries of thumb are rare and a high index of suspicion is needed for their diagnosis.⁴ If ignored, these collateral ligament injuries can lead to chronic pain, decreased pinch strength, instability and metacarpophalangeal joint (MCP) osteoarthritis.^{1 3} Simultaneous combined collateral ligament injuries of the thumb has been reported by Brian *et al* in adults

Figure 2 'STRESS' views being taken by placing rubber band between the two thumbs.

involved in high-contact sports activities.⁴ Here, we present a case of 15-year-old boy with combined collateral ligament injury. According to the author's knowledge, this is perhaps the first case report of a concomitant collateral ligament injury of the thumb in an adolescent.

CASE PRESENTATION

A 15-year-old boy with routine involvement in sporting activities presented to our hand clinic with complaints of pain at the base of right thumb of 2 months duration. According to the patient, pain along the radial aspect of the thumb appeared while playing volleyball and subsequently he developed pain on the ulnar aspect while playing badminton. There was no history of any direct trauma to the thumb while playing either of these sports and also the patient was not involved in any form of contact sports. Pain was dull aching, non-radiating and aggravated on lifting or turning objects and on movement of the thumb. He was initially managed conservatively with a thumb spica splint for 2 months in other clinic. However, there was no symptomatic improvement. On clinical examination, tenderness was noted over the radial and ulnar condyles of the base of the thumb. There was painful range of movement of first metacarpophalangeal (MCP) joint associated with instability. On performing stress manoeuvre for radial collateral ligament and ulnar collateral ligament of the thumb, grade 2 opening of the first MCP joint was noticed compared with the opposite thumb. Radial opening was increased compared with ulnar one. There were no signs of generalised ligamentous laxity.

Figure 1 X-rays showing the subluxation of the first MCP joint.

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Figure 3 (A) X-rays showing the degree of radial side opening. (B) X-rays showing the degree of ulnar side opening.

Figure 4 MRI showing the consecutive coronal proton density fat saturation images (PDFS) images of thumb showing the complete tear of RCL from proximal attachment from the first metacarpal head (blue arrow) and complete tear of UCL from the distal attachment from base of proximal phalanx (orange arrow). RCL, radial collateral ligament; UCL, ulnar collateral ligament.

INVESTIGATIONS

X-rays showed mild subluxation of the first MCP joint. No other bony abnormality was noted (figure 1). Stress X-rays were taken to know the amount of instability (figure 2). Both radial instability and ulnar instability were present, radial being more increased in respect to the ulnar one. The angle between long axis of first metacarpal and the proximal phalanx of the thumb showed 26 degrees opening on radial side and 11 degrees opening on ulnar side (figure 3).

Ultrasonography (USG) performed by a dedicated musculo-skeletal radiologist showed complete tear of the radial and ulnar collateral ligaments; however, USG could not delineate the origin of the tear, hence the radiologist suggested an MRI.

MRI showed features consistent with USG. There was tear of radial collateral ligament from proximal attachment on the metacarpal head and ulnar collateral ligament tear from distal attachment on the base of the proximal phalanx without any features of Stener's lesion (figure 4).

TREATMENT

Patient underwent delayed primary repair of both ligaments. A lazy 'S' shape incision was made superficial to MCP joint so as to address both the collateral ligaments (figure 5A). Intraoperatively, the capsule was intact but lax and there was complete tear of both the collateral ligaments. The RCL was noted to be torn at the proximal attachment site, whereas the UCL was noted to be torn at the distal attachment site (figure 5B,C). The articular surface of the first MCP joint was pristine. Sufficient stump length of the collateral ligaments were noted and hence delayed primary repair was chosen over reconstruction. Both collateral ligaments were anatomically repaired using 1.8 mm suture anchors (single loaded, FAST FIX, Smith and Nephew). Postrepair instability was absent on performing the stress manoeuvre intraoperatively.

OUTCOME AND FOLLOW-UP

Brotzman and Wilk postoperative rehabilitation protocol was followed.⁵ In phase 1 (0–6 weeks), the thumb was immobilised in thumb spica cast. In phase 2 (6–8 weeks), the cast was converted to a thumb spica splint and passive, active assisted and active mobilisation of the MCP joint was initiated. In phase 3 (8–12 weeks), pinch and grip strengthening exercise was initiated and splinting was advised only during heavy activities. He was refrained from sporting activities for a period of 6 months. At 14 months of postoperative follow-up, there was no valgus and varus instability of the thumb and he has returned back to his sporting activities. Patient is symptomatically better with no pain and instability but with minimal stiffness of the first MCP attributed to post surgery stiffness.

DISCUSSION

The literature describes the mechanism of injury, treatment and rehabilitation protocols for isolated radial or ulnar collateral ligament injuries at the MCP joint of the thumb. There is only one report of simultaneous tears of the radial and ulnar collateral ligaments of the MCP joint of the thumb seen to occur in professional athletes who participate in high-impact sports like rugby and National Football League. Such injuries are thought to occur as an acute event which involves a combination of rotation, axial loading, translation and hyperextension in addition to an abduction and/or adduction force.⁴ In our case, the boy had sustained both the ulnar and radial collateral ligament injuries while playing low-impact sports and following repeated

Figure 5 (A) Lazy 'S' surgical incision. (B) Intraoperative picture showing the complete tear of the proximal attachment of RCL (blue arrow). (C) Intraoperative picture showing the complete tear of the distal attachment of UCL (orange arrow). RCL, radial collateral ligament; UCL, ulnar collateral ligament.

cumulative trauma. As the occurrence of such simultaneous injuries is rare in this age group, it is most likely to be missed by the treating physician as the X-ray looks normal. In cases with high index of suspicion, stress views with a relative opening of 10 to 15 degrees compared with the contralateral side MP joint in extension and 30-degree flexion gives hint towards collateral ligament injury.⁶ USG also plays a major role in diagnosis of such injuries but they do not clearly delineate the level of injury. However, MRI is a gold standard as it gives better details of the torn collateral ligaments including the status of the stump to plan for a repair or reconstruction of the ligaments.^{7–9} Isolated injuries of the collateral ligaments can be managed either surgically or non-surgically based on the degree of instability and the requirements of the patient.¹ Optimal management of the complete collateral ligament lesion requires prompt diagnosis, most accurately confirmed with physical and radiographic stress testing and precise surgical repair.¹⁰ The grade 3 collateral ligament injuries of the thumb should be surgically addressed.¹¹ In a chronic injury and if the torn edges of the ligament are attenuated or fibrotic, then reconstruction should be planned. If

there is a midsubstance tear, a primary end-to-end repair can be done. If there is an avulsion of the ligament from its origin site or insertion site, a primary repair can be considered by using suture anchors which have to be placed in the proper anatomical origin or insertion site of the ligament for a better outcome.¹¹ In our case, a delayed primary repair was considered using a suture anchor as the stumps of the ligament were noted to be in good condition.

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Learning points

- In cases presenting with tenderness at the base of thumb with normal X-rays, collateral ligament injuries should be suspected and stress views should be considered especially when there is history of sporting activity.
- Early diagnosis and treatment can prevent complications like the osteoarthritis of the joint.
- Simultaneous collateral ligament injuries of the thumb in an adolescent is a rare incident.
- Both the ligaments should be addressed by repair or reconstruction simultaneously preferably anatomically depending on the duration of the injury and the status of the torn ligament.
- Graduated rehabilitation protocol and strengthening exercise should be stressed on with adequate protection of the repair.

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