



CASE REPORT

# Radially subluxated extensor tendons after a karate demonstration

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Traumatic disruption of the extensor tendon mechanism over the metacarpophalangeal joints has become commonly termed as 'boxer's knuckle', with the literature focussing on boxing injuries. Descriptions of the mechanism of tendon subluxation have concentrated on damage to the sagittal band, with ulnar subluxation due to radial sagittal band disruption being the focus. Traumatic radial subluxation has been reported previously,<sup>3</sup> although the mechanism of its occurrence has not been fully uncovered. It has been suggested that boxers should be carefully instructed on good punching technique in order to avoid these injuries.<sup>3</sup>

We describe a case of boxer's knuckle in a karate instructor, with a demonstration of good punching technique resulting in radial subluxation of the extensor tendons of the index and long fingers over the metacarpophalangeal joints. Written informed consent was received from the patient described in this report.

## History

A 37-year-old martial arts instructor damaged his dominant right hand whilst demonstrating good punching technique to his class. The injury occurred

at the time of one apparently standard well executed punch. He presented to clinic with difficulty forming a comfortable closed fist.

## Examination

The extensor tendon of the index finger could be felt to radially subluxate on flexion of the metacarpophalangeal joint. On flexing the metacarpophalangeal joint of the long finger, the extensor tendon could be felt to dislocate radially, with a palpable gap being felt on the ulnar side.

## Management

Ulnar sagittal band disruption of the index and long fingers was diagnosed and the option of surgical management offered to the patient. The risks involved were presented to him, including joint stiffness, scar tenderness and potential difficulties in continuing as a martial arts instructor, before proceeding to surgery.

A transverse, dorsal incision across the second and third metacarpophalangeal joints was employed. Operative findings were complete ulnar sagittal band rupture of the long finger (see Fig. 1) with a capsular tear and partial ulnar sagittal band rupture of the index finger. Both extensor tendons were recentralised by repairing the ulnar sagittal bands with 2-0

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Figure 1 Complete ulnar sagittal band rupture.

polygactin 910 (vicryl). A small extensor tendon slip to provide adequate stability was required to repair the complete disruption of the long finger sagittal band. The capsular tear was not repaired. After demonstrating a technically successful repair with no further subluxation, the skin was closed with subcuticular 4-0 polygactin 910. Postoperatively, he was treated with an outrigger splint for 6 weeks and provided with a standard exercise regime by an occupational therapist. A full range of movement was regained by 10 weeks, with no further subluxation detectable clinically.

## Discussion

In the rheumatoid hand, surgical centralisation of ulnar subluxation of the extensor digitorum tendon is a well established technique.<sup>2</sup> Subluxation also occurs after traumatic injury, with ulnar subluxation after radial sagittal band disruption being the normal finding. Two cadaveric studies have confirmed the biomechanical favourability of ulnar subluxation occurring.<sup>4,6</sup>

Radial subluxation has been described previously as occurring in athletes after trauma in five cases,<sup>3</sup> with one other traumatic case of radial dislocation of the long finger described in the literature as occurring after 'flicking a spider' from an arm.<sup>1</sup> A congenital case has also been reported.<sup>5</sup> It is interesting to note that in the study by Hame and Melone, three of the five affected fingers were the small finger. Biomechanically, the ulnar direction of pull, of the extensor communis tendon, from its origin at the lateral epicondyle of the humerus is at its greatest at the index finger MCP joint and least at the small finger MCP joint, fitting in with the findings.

In both cadaveric studies described, it has been postulated that the stabilising affect of the

juncturae tendinum could have prevented radial subluxation after ulnar sagittal band rupture. Araki et al. used an amputated hand to investigate their case after 'flicking a spider' and found that after dividing the long finger ulnar sagittal band and the intertendinous fascia on the ulnar side of the tendon, radial subluxation could be produced, but only after flexing the long finger whilst resisting flexion of other fingers. This technique would allow the intertendinous fascia of the index finger to put a radial pull on the long finger tendon.

The karate instructor's long finger tendon in our case would dislocate without any resisted flexion of the other fingers being required, indicating that the role of the intertendinous fascia was not that great here. All five of the radially subluxated tendons in the report by Hame and Melone also showed capsular tears, giving an indication of the high energy of the mechanism of injury in these cases. The joint capsule of the long finger MCP joint in our case was ruptured also, with the index finger MCP joint capsule remaining intact. However, the index finger was only subluxating, whilst the long finger tendon was dislocating. Perhaps the high impact damage offers some reason as to why tendons can be shown to radially subluxate clinically, but not in cadaveric studies so far. A more comprehensive cadaveric study of the role of the juncturae tendinum/intertendinous fascia may provide more clues.

Surgical repair of the joint capsule was not undertaken in our case and the subject rapidly regained a full range of MCP joint flexion. In Hame and Melone's series on Boxer's knuckles, capsular tears were not repaired in order to avoid a loss of range of movement from an inevitably tight repair after adequate debridement of the capsular edges, avoiding a potentially increased risk of re-rupture. In their series, the tendons could all be adequately centralised with sagittal band repair only. In contrast, the completely dislocated tendon in this case, required an extensor tendon slip to affect an adequate centralisation.

Traumatic radial dislocation of the extensor communis tendon is a very unusual injury. This is the first time that it has been described as a karate injury, but more interestingly, the first time that it has been attributed to a single, perfectly well executed punch. Boxers can be advised to learn good punching technique and advised on high quality hand protection. Excessive hand protection may not however prove acceptable for martial artists. Instructors can of course warn potential martial artists of potential hand injury when punching without protection and have a low threshold for advising their pupils to seek medical advice when injured.

## References

1. Araki S, Ohtani T, Tanaka T. Acute dislocation of the extensor digitorum communis tendon at the metacarpophalangeal joint. A report of five cases. *J Bone Joint Surg Br* 1987;69A: 616–9.
2. Dell PC, Renfree KJ, Dell RB. Surgical correction of extensor tendon subluxation and ulnar drift in the rheumatoid hand: long-term results. *J Hand Surg Br* 2001;26B(6): 560–4.
3. Hame SL, Melone CP. Boxer's knuckle in the professional athlete. *Am J Sports Med* 2000;28:879–82.
4. Koniuch MP, Peimer CA, VanGorder T, Moncada A. Closed crush injury of the metacarpophalangeal joint. *J Hand Surg (Am)* 1987;19A:590–4.
5. Nagano Y, Imakyure T. Case report of the dislocation of the extensor tendon due to a congenital factor. *Orthop Surg (Jpn)* 1969;20:1435–7.
6. Young CM, Rayan GM. The sagittal band: anatomic and biomechanical study. *J Hand Surg (Am)* 2000;25A:1107–13.