Skier's thumb

Daniel Anderson

Background
Injury to the ulnar collateral ligament (UCL) of the first metacarpophalangeal joint (MCPJ) is a common injury, especially in skiers. It is often misdiagnosed, which can lead to chronic instability.

Objective
This article reviews the current literature on UCL injury of the thumb and describes the clinical assessment and management.

Discussion
The UCL of the thumb is often injured as a result of forced abduction of the thumb, with or without extension. The injury can be identified by pain, swelling and haematoma along the ulnar border of the first MCPJ as well as pain and laxity on valgus stress testing. Proper examination involves placing a valgus stress on the thumb and measuring instability. Initial investigation should involve a plain X-ray, supplemented by ultrasound or magnetic resonance imaging, where appropriate. Treatment can be conservative or involve surgical management depending on the severity of the injury.

Keywords: musculoskeletal diseases; orthopaedics, hand; wounds and injuries

Injury to the ulnar collateral ligament (UCL) at the metacarpophalangeal joint (MCPJ) of the thumb (*Figure 1*) is a common injury, especially in skiers. It can lead to chronic instability if not treated appropriately; unfortunately it is commonly misdiagnosed. This injury is also known as 'skier's thumb'[1] or 'gamekeeper's thumb',[2] names relating to the common injury mechanisms, however, the term gamekeeper's thumb refers to a chronic UCL injury, as originally described by Campbell.[2] In relation to skiing, the injury often occurs as a person lands on an outstretched hand while still holding a ski pole, causing forced abduction of the thumb, with or without extension.

The UCL of the thumb runs from the volar and ulnar aspect of the proximal phalanx, beneath the adductor aponeurosis, to the ulnar aspect of the metacarpal head. This anatomy is important because if the ligament ruptures, there is a possibility of the distal end of the ruptured ligament becoming trapped lying superficial and proximal to the adductor aponeurosis, leading to a Stener lesion (*Figure 2*).[3] Described in 1962 by Stener,[3] the adductor aponeurosis then sits between the ruptured end of the ligament and its point of attachment on the phalanx. This interposition prevents healing and is a strong indication for operative management but is very difficult to diagnose. As well as the UCL proper, there is also an accessory ligament which runs palmar to the ligament proper and attaches to the volar plate. In full flexion the UCL is taut, while in full extension it is relaxed.[4] The most important role of the UCL is to stabilise the MCPJ against radial deviation.[4]

Debate continues about which UCL injuries need surgical repair and which can be managed conservatively. If managed inappropriately, they can lead to chronic instability of the thumb MCPJ.[5] In UCL injuries it is necessary to define the type of injury that has occurred and its exact location within the ligament. This information is then used to guide the correct management of the injury in order to achieve the best outcome for the patient.

Clinical presentation

Patients present with pain over the ulnar aspect of the MCPJ of the thumb. Acutely this is always accompanied by haematoma and inflammation. Tenderness to palpation will localise the lesion to the area of the UCL, and usually pain with pinch grip will be present. Occasionally a mass will be felt proximal to the adductor aponeurosis in a Stener lesion.[6]

In order to determine the degree of UCL injury, proper clinical examination is necessary.

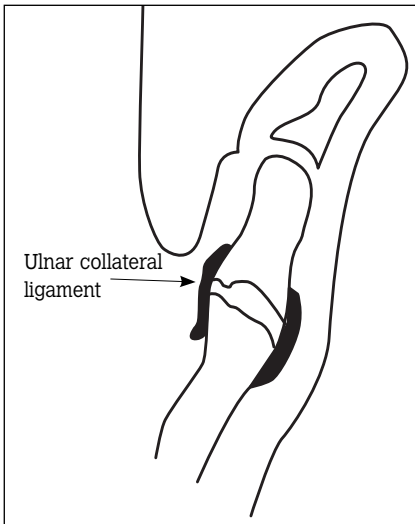

Figure 1. Location of UCL of first MCPJ joint

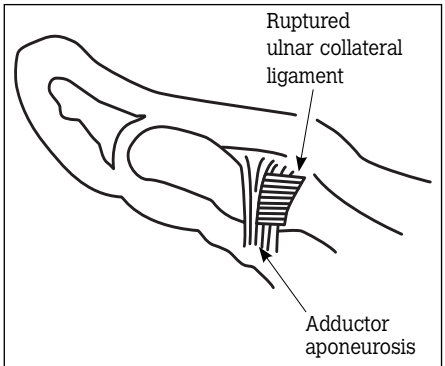

Figure 2. Stener lesion with distal end of torn ligament displaced proximal and superficial to intact adductor aponeurosis

Examination should start with initial observation looking for any deformities both with the hand at rest and in flexion. Sensation should be examined next, followed by active movements of all joints in the thumb. This followed by examination of passive movements and if possible, resisted movements to assess tendon function.

Then the ligaments of the thumb are assessed. Importantly, if there is any concern regarding the possibility of fractures to the first metacarpal or proximal phalanx of the thumb, then plain X-rays should be obtained prior to stress testing of the UCL, as these fractures are a contraindication to valgus stress testing.

Examination of the UCL proper involves applying a valgus force with the thumb in 30 degrees of flexion. If there is more than 30 degrees laxity, or 15 degrees more laxity than on the noninjured side, rupture of the UCL is likely. The thumb is then examined in full extension with a valgus stress to assess the accessory collateral ligament. If there is less than 30 degrees valgus laxity, or 15 degrees or less than on the noninjured side, the accessory collateral ligament is intact. If valgus laxity is greater than 30 degrees, or 15 degrees more than on the noninjured side, then the accessory collateral ligament is also ruptured. If the accessory collateral ligament is still intact a Stener lesion is less likely.[7]

Heyman et al[8] found that a valgus instability of greater than 35 degrees with the joint in extension indicated tears of both the proper and accessory UCL, with Stener's lesions present in 87% of cases. They found that valgus stress testing of the MCPJ in both extension and at 30 degrees flexion was highly predictive.[8] Acutely it can be very difficult to examine the patient's thumb due to pain and inflammation. As such, examination of the thumb MCPJ under local anaesthetic has been found to be beneficial in patients up to 1 week postinjury as it allows a more thorough examination of MCPJ stability.[9] The local anaesthetic should be injected into the ulnar aspect of the MCPJ to act as a nerve block, before assessment of joint laxity. If unable to adequately examine the thumb, a referral to a specialist hand surgeon or sports physician is warranted.

It is also important to remember that where the injury has occurred due to trauma, patients should be assessed for other injuries.

Investigation

First line investigation of injuries to the first MCPJ is plain anteroposterior and lateral X-rays of the thumb. The purpose of the X-ray is to assess for avulsion fractures (*Figure 3*), which are usually easily visible on plain X-ray and impact on the management plan for the patient. In cases where an avulsion fracture is present, valgus stress testing should still be performed.[7]

Much research has been conducted on the most accurate investigations of UCL injuries, particularly ultrasound and magnetic resonance imaging (MRI). Most studies of ultrasound show a sensitivity and specificity of around 80%.[10] Some authors advocate the use of MRI as a superior modality with claims of sensitivity and specificity of 100%.[11,12]

A review by Papandrea et al[13] found three level 1 studies investigating the use of ultrasound for UCL injuries. Their study suggested an average specificity of 81% and sensitivity of 76%. In the same study they found no level 1 studies looking at MRI.[13,14]

Based on the current evidence, no conclusion can be made regarding imaging modalities. As the accuracy of each modality will vary depending on the radiologists' experience, perhaps the best option is discussion with the local radiologist after thorough clinical examination. Future studies are needed to provide more clarity in this area of UCL injuries.

Management

The aims of management are a stable MCPJ of the thumb. The treatment is therefore based on the degree of injury to the UCL.

Conservative management

Immobilisation in a protective splint is the recommended treatment for incomplete ligamentous lesions.[3,14] The splinting allows radial stress on the thumb to be avoided and gives the ligament time to heal. Conservative management is suitable in those patients with less than 30 degrees of valgus laxity in extension of the MCPJ and less than 15 degrees difference between sides, with no evidence of avulsion fracture on X-ray.[7]

Conservative treatment involves the initial use of a plaster of Paris thumb spica cast including the wrist until initial inflammation has resolved (usually about 1 week). Then the patient is switched over to a thermoplastic splint, allowing movement at the interphalangeal joint of the thumb. The position of the splint involves holding the MCPJ in slight flexion with gentle stressing in ulnar deviation. The interphalangeal joints should not be immobilised in the splint. During the period of splint immobilisation, the patient should undergo supervised hand therapy.

After 4 weeks, gentle flexion/extension exercises can begin with the splint being worn between sessions. The splint should remain on at all times apart from during therapy sessions for 6 weeks, after which time it should only be worn during high risk situations such as manual labour. Progressive strengthening exercises may begin after 8 weeks, but unrestricted activity is not allowed until after 12 weeks.[3]

Figure 3. X-ray showing avulsion fracture of distal insertion of UCL of the thumb

Surgical management

A study by Dinowitz et al[15] suggested small avulsion fractures of the UCL with minimal displacement should be surgically managed. They looked at cast immobilisation in a group of patients with this injury and found persistent pain and pinch weakness, whereas after surgical management, pain and strength greatly improved.[15] They supposed the avulsed fragment undergoes rotation and affects healing. Larger displaced avulsion fractures are also better managed surgically.[3]

A large proportion of complete tears of the UCL without bony avulsion are found to have a Stener lesion and therefore require operative management.[8]

Surgery is indicated in Stener lesions as well as displaced bony avulsion. Surgery should preferably be delayed until after the initial inflammation has resolved to optimise outcomes. There are many different surgical repair approaches and the specific approach is best decided by a specialist hand surgeon on a case-by-case basis. Postoperatively the patient should be placed in thumb spica splint and managed as per the conservative approach with ongoing review by hand therapists.

Conclusion

Ulnar collateral ligament injury at the first MCPJ needs to be suspected based on mechanism of injury. Diagnosis should first be based on a thorough clinical examination supplemented by X-ray and ultrasound or MRI as required. Partial tears and minor avulsion fractures can be managed conservatively in a splint with hand therapy. Stener lesions or displaced bony avulsion lesions should be managed surgically by a specialist hand surgeon. In most cases, referral to a specialist hand surgeon or sports physician for opinion is warranted. Further research is needed to elucidate the best imaging modality for accurate diagnosis of UCL lesions of the thumb.

Author

Daniel Anderson MBBS, BAppSC(EXSS), is Principal House Officer, Department of General Surgery, Princess Alexandra Hospital, Brisbane, Queensland. daniel.anderson@health.qld.gov.au.

Conflict of interest: none declared.

References

1. Schultz RJ, Fox JM. Gamekeeper's thumb: results of skiing injuries. N Y State J Med 1973;73:2329–31.
2. Campbell CS. Gamekeeper's thumb. J Bone Joint Surg 1955;37B:148–9.
3. Stener B. Displacement of the ruptured ulnar collateral ligament of the metacarpophalangeal joint of the thumb. J Bone Joint Surg 1962;44B:869–79.
4. Fricker R, Hintermann B. Skier's thumb: treatment, prevention and recommendations. Sports Medicine 1995;19:73–9.
5. Helm RH. Hand function after injuries to the collateral ligaments of the metacarpophalangeal joint of the thumb. J Hand Surg 1987;12B:252–5.
6. Abrahamsson SO, Sollerman C, Lundborg G, et al. Diagnosis of displaced ulnar collateral ligament of the metacarpophalageal joint of the thumb. J Hand Surg Am 1990;15:457–60.
7. Heyman P. Injuries to the ulnar collateral ligament of the thumb metacarpophalangeal joint. J Am Acad Orthop Surg 1997;5:224–9.
8. Heyman P, Gelberman RH, Duncan K, et al. Injuries of the ulnar collateral ligament of the thumb metacarpophalangeal joint. Clin Orthop Relat Res 1993;292:165–71.
9. Cooper JG, Johnstone AJ, Hider P, et al. Local anaesthetic infiltration increases the accuracy of assessment of ulnar collateral ligament injuries. Emerg Med Australas 2005;17:132–6.
10. Hergan K, Mittler C, Oser W. Pitfalls in sonography of the Gamekeeper's thumb. Eur Radiol 1997;7:65–9.
11. Hergan K, Mittler C, Oser W. Ulnar collateral ligament: differentiation of displaced and nondisplaced tears with US and MR imaging. Radiology 1995;194:65–71.
12. Romano WM, Garvin G, Bhayana D, et al. The spectrum of ulnar collateral ligament injuries as viewed on magnetic resonance imaging of the metacarpophalangeal joint of the thumb. Can Assoc Radiol J 2003;54:243–8.
13. Papandrea RF, Fowler T. Injury at the thumb UCL: is there a Stener lesion? J Hand Surg 2008;33A:1882–4.
14. Musharafieh RS, Bassim YR, Atiyeh BS. Ulnar collateral ligament rupture of the first metacarpophalangeal joint: a frequently missed injury in the emergency department. J Emerg Med 1997;15:193–6.
15. Dinowitz M, Trumble T, Hanel D, et al. Failure of cast immobilisation for thumb ulnar collateral ligament avulsion fractures. J Hand Surg 1997;22A:1057–63.

correspondence **afp@racgp.org.au**