CONTEMPORARY MANAGEMENT OF ULNAR COLLATERAL INJURIES OF THE THUMB IN ATHLETES

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INTRODUCTION
Ulnar Collateral Ligament (UCL) injuries to the thumb metacarpophalangeal (MCP) joint are among the most common injuries sustained in the hand and the most common injury to the thumb. This high prevalence combined with challenges in diagnosis and treatment make these injuries an important health problem for the population at large. However, athletes form a subset in whom incidence of injury is even higher and for whom the significance can be greater.

In elite athletes or those participating in high level sport there are a number of specific treatment considerations that set them apart. Participation and performance in elite sport can be compromised by both pain and weakness. This suggests that the threshold for intervention may be lower in those participating in higher level sporting activity. Early return to sport is another important factor that influences decision making. Most athletes will avoid any treatments that require time out from sport and will prioritise an early return after any intervention, even if there is a risk of delaying their long-term recovery.

This article provides an overview of UCL injuries in athletes, how return to training and competition may influence management, how new techniques can aid in recovery and rehabilitation and reflections reached through personal experience of treating such injuries in high level athletes.

ANATOMY
The thumb MCP joint is a diarthrodial condyloid joint with variably flattened condyles allowing principally flexion and extension but also abduction, adduction and rotation for circumduction to a lesser extent. Static stabilisation of the joint is provided by the collateral ligaments, volar plate and the dorsal capsule, whilst the dynamic stabilisation is provided by the intrinsic musculature around the thumb with the adductor pollicis the most important in relation to valgus stability.

Variation exists in the morphology of the thumb MCP joint with Yoshida et al, describing two main types, flat and round (Figure 1a and b). They found a wide variation in thumb MCP range of movement owing to the differences in the shape of the metacarpal head, in capsular laxity or both. Le et al found a higher prevalence of flat metacarpal head morphology in those undergoing surgery, twice that of those with a round head. This might suggest the UCLs of flatter MCP joints are stiffer and therefore more prone to rupture. However, the cadaveric arm of the same study did not identify any difference in the load to failure between the UCLs of the two groups.

The UCL is a thick band composed of 2 discrete bundles, the UCL proper (pUCL) and the accessory UCL (aUCL), providing stability against valgus forces at the MCP. The pUCL arises just dorsal to the midpoint of the metacarpal head and inserts into the volar aspect of the proximal phalanx. Previous anatomic studies have described the presence of a tubercle on the volar aspect of the ulnar proximal phalanx that acts as a site of insertion for pUCL fibres. The pUCL fibres are lax in extension and tight in flexion conferring maximum valgus stability at 30 degrees of flexion. The fibres of the accessory UCL lie both superficial and volar to the UCL proper, originating from...
the metacarpal head and inserting on the proximal phalanx blending with the fibres of the volar plate. These are lax in flexion and tight in extension, providing maximum valgus stability in full extension (Figure 1c).

The UCL, on average, originates 4.2 mm from the dorsal surface and 5.3 mm proximal to the articular surface of the metacarpal head, and inserts 2.8 mm from the volar surface and 3.4 mm distal to the base of the proximal phalanx. The same cadaveric study performed by Carlson et al, suggests that the adductor pollicis (rather than the pUCL) attaches to the tubercle and the insertions of the ligament during their dissections were consistently volar and proximal to the tubercle. The implication of this is the challenge to accurately restore ‘normal’ anatomy and biomechanics when undertaking a surgical reconstruction. The necessity to create a drill hole large enough to accommodate an anchor or biotenodesis screw precludes the placement of a very volar drill hole due to the risk of joint injury or cortical breach. This point is amplified further when undertaking a reconstruction that may require the creation of bone tunnels large enough to accommodate tendon graft possibly combined with a synthetic augment. In reality, we probably fall short of an accurate anatomic reconstruction in most cases.

MECHANISM OF INJURY
Disruption of the UCL was initially reported by Campbell in 1955 in relation to a chronic instability observed in Scottish gamekeepers. Classically the acute UCL injury has been associated with skiing when a valgus force is applied to the thumb during a fall while holding on to a ski pole but is common across a number of sports particularly those involving contact, throwing and catching.

When an acute excessive valgus force is applied at the thumb MCPJ this can result in a spectrum of injury from a UCL sprain to a complete rupture or avulsion fracture of the ulnar-volar base of the proximal phalanx. The UCL most commonly fails at the distal insertion either as an avulsion or a purely ligamentous injury, although proximal avulsions and mid-substance tears are described, most likely due to the fact that the UCL is narrower distally than proximally. The abduction force can be significant enough to cause a recoil of the torn UCL ligament proximally. If it recoils proximal to the leading edge of the adjacent adductor aponeurosis which subsequently prevents its approximation to its original insertion site, the eponymous Stener lesion occurs. In this situation healing is impossible between the torn proximal end of the ligament and its footprint on the proximal phalanx due to the interposed adductor hood. In more extreme cases the dorsal capsule may also be torn resulting in subluxation of the joint. The incidence of a Stener lesion has been

Figure 1: a) Flat head MCP joint morphology. b) Round head MCP joint morphology. c) Diagram highlighting the two discrete bundles of the UCL. The proper UCL tight in 30 degrees of flexion and the accessory UCL tight in full extension.
reported to be as high as 52% based on operative findings9.

CLINICAL EXAMINATION
Evaluation of UCL injuries starts with a thorough history and examination. A description of the injury mechanism should raise suspicions in the treating clinician. The patient normally describes a forcible hyperextension/abduction type injury but in many cases, a sudden fall or collision sustained during sporting endeavours leads to a poor recollection of mechanism. Nevertheless, suspicion must remain high, particularly in those undertaking throwing, catching or contact sports. In the more chronic setting, athletes typically complain of weakness and sometimes pain with gripping or difficultly throwing.

Depending on the extent of the injury, radial deviation and volar subluxation may be visibly present. However, the majority of these injuries present in a less obvious fashion and a focused clinical examination is required. Bruising and swelling are often present in the acute setting with tenderness along the ulnar aspect of the MCPJ. Rarely, a palpable mass may be present representing a Stener lesion but the absence of this does not definitively rule out its presence. The most important aspect of the examination is stress testing the MCPJ with comparison to the contralateral thumb. The metacarpal head should be stabilised and the examiner must be careful to avoid MCPJ rotation, which may falsely mimic lateral instability, especially in patients with round metacarpal head morphology5.

The parameters in which to record the degree of valgus laxity are in full extension and 30 degrees of flexion, assessing for the presence of a firm end-point in each. If laxity is identified in full extension the injury is likely to involve the aUCL or the volar plate and if instability is present at 30 degrees flexion it more likely represents an injury to the pUCL. Clinical instability is often harder to demonstrate in the acute setting due to the presence of swelling and pain. Chronic cases are usually less painful and joint opening on abduction may be easier to identify with clinical examination alone.

The grading of UCL injuries follows a three-stage classification with grade 1 denoting pain with no laxity to stressing, grade 2 representing a partial tear with a firm end-point and grade 3 a complete tear with increased laxity and no identifiable end-point4. Values to consider in evaluating laxity in complete tears are greater than 30 degrees of coronal plane deviation and greater than 15 degrees relative to the uninjured side4.

Differentiating between partial and complete tears is critical in guiding treatment and with this in mind there are limitations to the clinical examination, especially in the acute setting. A ‘firm end point’ while seeming straight forward can be difficult to ascertain particularly in the presence of both pain and swelling. Measuring the degree of laxity can also be difficult and prone to interobserver variation, even with the use of a goniometer. The use of local anaesthetic can help in these situations and the use of a ring block has been proven to increase the accuracy of the examination. Nevertheless a cadaveric study performed by Mayer et al, has shown that when the examination is performed with the MCPJ in slight pro or supination...
the diagnosis can be misinterpreted and that up to one-third of the population have a natural variance between left and right with a difference in laxity of up to 10-15 degrees. This then raises the question as to whether clinical diagnosis alone is sufficient if pain prevents accurate examination, and variable individual anatomy make the distinction between a partial and complete tear difficult. This highlights the importance of additional imaging to ensure the correct diagnosis is achieved.

**IMAGING**

In all cases a plain radiograph is required as the first line imaging to identify any associated avulsion or metacarpal fracture and any evidence of MCP joint subluxation. An avulsion fragment would arise suspicion for instability if the displacement was greater than 1mm or it was malrotated in relation to its normal footprint (Figure 2a). Stress radiographs have been proposed in cases where the initial plain films are inconclusive although some debate exists with critics concerned that the valgus stress applied could displace or complete a partial injury and other studies highlighting a false negative rate of up to 25%.

Further imaging modalities such as MRI or high-resolution ultrasound (US) are of value. Ultrasound remains a useful diagnostic tool as it is cost effective, widely available and capable of real time dynamic assessment. A partial tear is normally identified as a partial thickening of the UCL with hypoechoic change. A skilled radiologist or sonographer will also be able to detect small articular sided clefts in deep fibres with intact superficial fibres. In a complete tear, the so called 'yo-yo' sign may be demonstrated in which the torn UCL has curled back on itself and the 'string' is the aponeurosis of the adductor pollicis muscle also demonstrated on MRI scan (Figure 2c). A study by Arend, et al, has shown that the absence of normal UCL fibres and the presence of a heterogenous mass proximal to the MCP joint is 100% accurate in the diagnosis of complete UCL rupture (Figure 2b). It has also been reported that the accuracy of US to diagnose a Stener lesion ranges from 81%-100% depending on the experience of the examiner. This accuracy has been shown to decrease with time due to shrinkage of the torn ligament and scar tissue formation suggesting US scanning should be performed within the first week of injury. MRI scan is regarded as the gold standard with a sensitivity and specificity of 96-100% and remains the most reliable imaging modality to establish the diagnosis. It can identify a partial or complete tear, Stener lesion, bone oedema and any associated fractures. It does however carry the disadvantage of a higher cost, no capacity for dynamic scanning or comparison to the uninjured side and in some cases has less availability than USS.

**GOALS OF TREATMENT - ACUTE UCL INJURY**

The management options for athletes need to consider a number of factors including the grade of injury, the presence or absence of a Stener lesion, the chronicity of the injury and the level of athletic participation undertaken by the patient. With regard to higher level athletes, other factors also need to be taken in to account such as hand dominance (particularly relevant in catching, throwing and stick sports), demands on the thumb during respective athletic disciplines, the ability to play with a splint or cast, the timing of the injury in relation to the rest of the season and the patient specific goals. Clearly with the elite athlete a quicker return to sport is desirable along with comparable pre and post-operative injury performance levels, the maintenance of career longevity and avoiding further injury.

For acute UCL injury non-operative management is normally reserved for grade I and II injuries with cast or splint immobilisation for a period of 4 – 6 weeks, followed by mobilisation and strengthening by 6-8 weeks. Return to sport can be limited by immobilisation although in some cases the athlete may be able to return to competitive play if the sport or position of play allows participation with a splint or cast. However, caution needs to be applied as a series by Bernstein et al, reported adjacent joint dislocations in collegiate football lineman with UCL injuries who returned to early protected play in thumb spica casts. These included three proximal interphalangeal (PIP) joint dislocations and a simple elbow dislocation suggesting that immobilisation may result in abnormal mobility and function have been restored.
mechanics on the extremity and potential for further injury1.

Operative management is indicated in those with a grade III injury with a Stener lesion or evidence of joint subluxation. Malrotated avulsion fractures have also been shown to have better outcomes with surgical fixation as conservative management can lead to persistent pain and reduced pinch grip1. Grade III injuries without a Stener lesion represent an area of controversy with some studies reporting good outcomes with non-operative management. Landsman et al. had good outcome measures for conservatively managed complete UCL ruptures although final follow-up range of movement was 60-100% and average pinch grip was 92% as compared to the contralateral side9. Kuz et al. managed 30 patients non-operatively with UCL avulsion fractures with spica immobilisation for 4 weeks reporting good subjective outcomes despite a 25% non-union rate and 3 patients (10%) with persistent clinical signs of instability10. Dinowitz et al, however found less favourable results with conservative management of minimally displaced avulsion fractures with operative management improving pain, pinch and grip strength in 9 patients with failed spica immobilisation11. Given the physical demands on higher level athletes surgical management therefore seems to offer a more predictable outcome. The decision will always be based on the individual, and the specific sporting demands. The timing of any surgical intervention is also important with some athletes choosing to continue playing until the season end and undertaking treatment and rehabilitation during the off season1.

GOALS OF TREATMENT – CHRONIC UCL INJURY

Chronic UCL injury often presents a more challenging situation and can have less predictable outcomes when compared with acute repair12. Operative management is usually indicated due to ongoing instability and pain with the risk of resultant MCPJ osteoarthritis if left untreated. The definition of chronic varies slightly depending on the outcome measures but this usually refers to an injury presenting at more than 6 weeks which may represent failed acute management or a delayed presentation. Several treatment options have been described for the management of chronic injuries ranging from direct repair to tendon grafting and more recently augmentation using a synthetic suture tape.

There has been some controversy around the use of a direct repair technique when compared to reconstruction in chronic injuries. A systematic review by Samora et al, demonstrated excellent clinical outcomes (pain, strength, motion and stability) after surgical treatment of chronic UCL injury, without any significant differences between repair and reconstruction13. Christensen et al, looked at long term outcomes of primary repairs of chronic UCL injury with a mean follow-up of 24 years and reported that repair with available local tissue appeared to be a reasonable alternative to ligament reconstruction. The limitations of this study, however, are that it represented a small cohort (12 patients) with a variety of different repair techniques ranging from bone tunnels to suture anchors with or without k-wire stabilisation of the MCPJ13. It has also been well documented that direct suture techniques have a higher failure rate13, which is likely due to the soft tissue becoming contracted and less predictable making anatomical positioning of the repair more difficult, contributing to loss of motion and increased risk of failure.

A variety of tendon grafts have been proposed for reconstruction of chronic UCL injuries, including palmaris longus14, split or full thickness extensor pollicis brevis15-18 and fourth toe extensor digitorum19. Historically a figure of eight weave and fixation via bone tunnels or bio-interference screws have been utilised. This can leave a bulky repair over the ulna aspect of the MCPJ and can make anatomical restoration more difficult. Despite this autograft reconstruction has been shown to achieve predictably successful outcomes, equivalent to acute repair. No significant difference in the outcome between the types of autograft has been demonstrated and complications, failures and re-operation rates remain low following surgical intervention13. The evolution of chronic UCL reconstruction has resulted in the augmentation of the reconstructed ligament with synthetic suture tape. De Giacomo published a report of a technique in which augmentation of the UCL repair was performed using suture tape in order to provide immediate biomechanical support during the critical time of ligament healing20. In addition, biomechanical analysis of this technique which demonstrated superior load to failure characteristics compared with repair alone, the flat braided suture provides protection to the repair during the initial revascularisation and remodelling phase21. This allows for shorter periods of immobilisation and earlier return to play. Interestingly Patel et al, examined the kinematics of the UCL repair with suture tape augmentation to evaluate the biomechanical characteristics. They found that augmentation restores the varus-valgus kinematics without over-constraining the joint. In addition, the higher valgus angular stiffness afforded by the tape allows for earlier rehabilitation following surgery22. This is particularly important in the athlete who is aiming for a quicker recovery and earlier return to play.

OUTCOMES IN ATHLETES AND RETURN TO SPORT

Functional outcomes and return to play in athletes can vary depending on the type of sport played and the specific demands of the thumb. The chronicity of the injury also plays a part with acute repairs reported as having a more predictable outcome.

Grade I and II injuries are generally managed non-operatively with return to play permitted in certain circumstances with splint immobilisation. A more aggressive approach to grade III injuries is advised in order to begin earlier mobilisation and with the evolution of the suture tape augmentation technique this may allow for this. De Giacomo presented the case of a professional basketball player managed with this technique who returned to full play out of the split at 5 weeks and competitive play at 37 days. In this case early mobilisation with the hand therapists was commenced at day 31. The biomechanical and kinematic studies discussed earlier support the use of this technique in facilitating early mobilisation and return to play.

A study by Jack et al looked at performance and return to sport in major league baseball players following UCL injury. A cohort of 21 players all underwent surgical intervention with 100% of players achieving a return to sport with in-season players returning at a mean of 8 weeks. These players also reported no difference in post-operative performance, number of games played or career longevity2. It should also be noted that UCL and RCL injuries may occur
in combination with Werner et al, finding that 25% of injured thumbs in a cohort of 36 NFL athletes had a combined injury requiring surgical repair of both ligaments. It is clear from the literature that surgical repair or reconstruction of UCL injuries leads to a successful outcome in most cases with high rates of return to sport with good restoration of function and appears to be superior to conservative management in the case of grade III injuries.

**DECISION MAKING**

In the acute setting, suspicion of UCL injury must always be high based on the history alone. The role of clinical examination is to provide supporting evidence of the diagnosis rather than to guide treatment. It is ambitious to expect that an examination limited by pain, swelling, and anatomic variation could differentiate between partial injury, complete rupture or Stener lesion. Therefore, the key points in decision making lie in the anatomic details that can only be determined by scanning. Although the MRI offers a high degree of sensitivity and specificity in terms of diagnosis, dynamic ultrasound probably offers the most robust assessment required for decision making. Focused high-resolution ultrasound combined with dynamic stressing will allow visualisation of small partial injuries that would otherwise be difficult to confirm on MRI alone. Equally, potential rupture and joint instability can be confirmed dynamically and compared to the uninjured side, again not possible with MRI. Therefore, dynamic ultrasound undertaken by an experienced clinician is the investigation modality of choice.

Partial injuries are best treated with protective splinting and therapy. Return to play may be possible in a protective splint or strapping shortly after injury, accepting that the risk of reinjury will be high thus causing ongoing pain that may hamper training, competitive play and ultimately healing. The risk of progression to a complete injury remains obvious especially in contact sports that pose a higher risk such as American Football and rugby. Few athletes will opt to take time out from competitive play for partial injuries, except perhaps in circumstances where sporting regulations prohibit use of a hand orthosis or significant strapping.

Surgical treatment of an acute Stener lesion should be regarded as mandatory in the high-level athlete, and indeed most clinicians would opt to treat these injuries surgically in the non-athletic patient. Although joint stability after conservative treatment of Stener lesions has been described this is often a long path to recovery with unreliable long-term outcomes. As such it is far from ideal for the athlete looking for an early return to play.

In circumstances where a complete rupture has been confirmed and a Stener lesion has been ruled out, the ideal treatment in the athlete remains controversial. The complete injury may initially be treated in the same way as a partial injury. Such measures may be sufficient to allow the athlete to finish the competitive season and consider surgical treatment during the off-season if a satisfactory outcome has not been reached. In circumstances where pain precludes an early return to play or where use of a splint on the hand is not permissible during competition, a period of time away from competition may be unavoidable. In this setting, early surgical treatment may offer benefits over non-operative treatment. Direct repair with use of a synthetic augment has been shown to offer high levels of early post-operative stability. This is sufficient to allow early mobilisation and subsequently an early return to play. On average, a surgically treated rupture will allow the athlete to return to competitive play with minimal pain within 3 weeks, albeit in a protective splint. Non-surgical management of an equivalent injury will require a similar period of time away...
from play without the reassurances and mechanical benefits offered by a surgically repaired ligament.

In cases of chronic instability or instances where poor condition of the ruptured ligament does not allow a robust direct repair, surgical reconstruction is the procedure of choice. The key to successful reconstruction is to restore anatomy as closely as possible and promote early mobility. This is equally true in acute repairs. Here it is vital to make a distinction between ‘stiffness’ and ‘stability’. Most repairs or reconstructions will be followed by a period of 4 to 6 weeks in a static splint before commencement of rehabilitation. Unsurprisingly, this creates a stiff MCP joint that hampers a return to play and indeed a stiff ligament that is still prone to re-rupture. This is starkly different from a stable joint in which mobility and function have been restored. Thus, an early return to play is dependent on achieving a repair or reconstruction that is durable enough to withstand early movement which in turn will support restoration of function and reduce the risk of re-rupture.

AUTHOR’S PREFERRED SURGICAL TECHNIQUE FOR RECONSTRUCTION

A curved dorsal incision is made over the MCP joint and a full thickness flap of skin and subcutaneous tissue is mobilised (Figure 3). Small cutaneous nerve branches are preserved where possible. Visualisation of the adductor aponeurosis is made easier by sweeping a damp gauze swab from dorsal to volar over the ulnar side of the joint. Key points are to identify its proximal leading edge and its dorsal attachment to the extensor pollicis longus tendon. The aponeurosis is incised at its dorsal margin, leaving a 1mm cuff of tissue along the extensor tendon to facilitate later repair (Figure 4). Careful dissection allows the aponeurosis to be turned down revealing underlying structures. Next an assessment is made of the remnant UCL. Typically, a Stener lesion will be recoiled and resemble a thick knot of scarred tissue adjacent to the metacarpal head. In the more acute setting, it may be possible to uncoil this and

![Figure 3: Curved dorsal approach.](image)

![Figure 4: Incision through aponeurosis.](image)

![Figure 5 (a and b): Palmaris tendon harvest via small stab incisions.](image)
Figure 6: Graft sizing.

Figure 7: Clear out drill hole thoroughly to allow anchor to seat.

Figure 8: Graft and fibre tape seated in proximal phalanx.

Figure 9: Drill hole in MC head.

Figure 10: Reconstructed UCL augmented with suture tape.

Figure 11: Closure of aponeurosis.
mobilise the UCL to reach its distal insertion. Any potential injury to the joint capsule should be assessed at this stage with a view to later repair if necessary. The dissection is extended distally to allow exposure of the proximal phalanx and the intended fixation site on the volar aspect. If the ligament is unreparable and reconstruction is to be considered, the remnant ligament should be fully excised to allow accurate placement of drill holes and prevent excessive bulkiness. If present, palmaris longus is the graft of choice and is harvested from the ipsilateral wrist using 2 or 3 percutaneous stab incisions. The identified tendon is divided proximally and then released sequentially through distal stab incisions (Figure 5).

Graft size is important to ensure a good fixation within the drill hole – the risk is a bulky graft that does not allow the anchor to be properly seated. A graft sizing instrument can be used to assess this with 2.0 mm being a minimum and 2.5 mm being a maximum diameter (Figure 6). The harvested tendon is combined with an augment in the form of an Arthrex 1.5mm SutureTape and both are whip stitched at one end using a looped Arthrex FiberWire suture.

Next a 3.5 mm unicortical drill hole is placed in the distal phalanx using the Arthrex drill guide (Figure 7). Due to the relatively large drill hole, care must be taken to place the tunnel on the volar aspect of the joint without breaching either the MCP joint itself or the volar cortex of the proximal phalanx. This vital surgical detail is often overlooked – with such little bone stock, truly anatomic reattachment to the volar lip of the proximal phalanx is rarely feasible. The graft and augment are secured inside the tunnel with a 3.5 mm DX Swivel Lock anchor providing secure knotless unicortical fixation (Figure 8).

The anatomic origin of the UCL on the metacarpal head is marked and again drilled to 3.5 mm (Figure 9). Again, an Arthrex Swivel Lock anchor is used to fix the graft and augment on the metacarpal side. The usual recommendation is for the joint to be flexed to 30 degrees as the anchor is inserted. This represents the position where the native (uninjured) UCL is in maximum tension and where no further ligament lengthening is required to achieve further flexion. However, depending on the morphology of the joint, and the location of the drill holes, 30 degrees may not be the position in which the reconstructed graft is at maximum length. This is especially true when considering flatter head morphologies. If a drill hole is placed in a more central location in the phalangeal base to avoid cortical breach or joint penetration, the joint may need to be flexed to beyond 30 degrees before the maximum required length of the graft is achieved. The synthetic augment has no capacity to stretch and if it is not inserted in a position where the maximum excursion of the joint can be accommodated, it will either restrict range of movement or be at risk of fatigue failure as the limits of range are reached in the medium term.

It is important to ensure that the drill hole has been thoroughly irrigated and all debris has been removed to ensure the graft and anchor are sufficiently seated. In contrast to the first anchor, the graft material in the second anchor will occupy both sides of the drill hole. It is therefore essential to ensure that the swivel lock anchor has been fully seated at the base of the drill hole before tightening (Figure 10). The benefit of the ‘distal first’ approach is that graft tensioning will allow adequate reduction of the joint as it is secured proximally. Any excess tendon material can be discarded and a capsular repair undertaken if necessary. Finally, the aponeurosis is repaired using an absorbable suture, adding a degree of additional stability to the ulnar side of the joint (Figure 11). Following skin closure the thumb is immobilised in a cast that can be exchanged for a rigid removable splint at 1-week post op. Gentle active movements can begin under supervision and progress as pain and swelling allow. In the most pressing cases, the athlete may return to training at 3 weeks post op while wearing a protective brace or heavy strapping. Although the risk of re-injury is not eliminated, it is considerably reduced.

The importance of surgical stabilisation must lie in its ability to allow for early mobilisation, restoration of range of movement and to prevent a stiff MCP joint prone to further injury.
SUMMARY
Ulnar collateral ligament injuries are common in those undertaking competitive sports at all levels, but particularly in those performing at an elite level. The mechanism typically involves a hyperabduction or hyperextension of the thumb MCP which can result in either an incomplete injury (sprain/partial tear) or a complete rupture. Whilst clinical examination is a key step in the diagnosis it is often difficult to accurately distinguish between a partial and full thickness tear or for the presence of a Stener lesion. Determining the grade of injury is critical in guiding management and therefore any doubt about the clinical diagnosis should be addressed by using either dynamic ultrasound or MRI scanning. X-ray can also be useful to assess for avulsion injuries or MCP joint subluxation. In addition, the level of athletic participation, hand dominance, demands on the thumb during the athlete's particular sport, the feasibility of playing immobilized, the length of season remaining, and the athlete's specific goals need to be considered.

Historically sprains and partial tears have been managed conservatively with a splint or cast immobilisation and a period of hand therapy. Those with complete tears or a Stener lesion are usually managed operatively to prevent ongoing pain, instability, decreased pinch grip and eventually symptomatic osteoarthritis. Hand dominance for example is particularly important in catching and throwing sports and a number of studies have focused in particular on athletes in the MLB, the NFL and the rugby leagues. Surgical management should considered for grade III injuries with ligament retraction, injuries with an associated Stener lesion, and avulsion fractures with displacement or malrotation. There are a number of different techniques described in the literature for UCL repair or reconstruction, including, transosseous sutures, suture anchors or more recently suture tape augmentation. The importance of surgical stabilisation however must lie in its ability to allow for early mobilisation, restoration of range of movement and to prevent a stiff MCP joint prone to further injury. The senior author's own experiences and some of the more recent literature seems to support the use of suture tape augmentation, early active range of movement promoting faster recovery and a quicker return to sport.

References
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