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Platelet-Rich Plasma (PRP)/stem-cell therapy for a partial torn ulnar collateral ligament in a professional football player: case report

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Objective: *Present a unique case of non-operative management of a partial ulnar collateral ligament (UCL) tear where the athlete was able to return to performance-based training in a brief six-week period.*

Case Presentation: *A 29-year-old male running back presented to a sports specialist chiropractor for post-injection management of a grade 2 partial tear of the right UCL treated with ultrasound-guided platelet-rich plasma (PRP) and stem cell injections. Physical exam testing found limitations in elbow range of motion (ROM) as well as positive orthopedic tests confirming*

Plasma riche en plaquettes (PRP)/thérapie par cellules souches pour une déchirure partielle du ligament collatéral ulnaire chez un joueur de football canadien professionnel : rapport de cas

Objectifs: *Présenter un cas unique de gestion non chirurgicale d'une déchirure partielle du ligament collatéral ulnaire (LCU) où l'athlète a pu reprendre l'entraînement axé sur la performance en une brève période de six semaines.*

Présentation de cas: *Un homme de 29 ans, vétéran demi-arrière de la Ligue canadienne de football (LCF), s'est présenté à un chiropraticien spécialisé en sports pour la gestion après injection d'une déchirure partielle de grade 2 du LCU droit traitée par des injections de plasma riche en plaquettes (PRP) et de cellules souches guidées par ultrasons. Les tests d'examen physique ont révélé des limitations dans l'amplitude articulaire (AA) du coude ainsi que des tests orthopédiques positifs confirmant une lésion au ligament collatéral ulnaire*

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a UCL injury including the milking maneuver, and dynamic valgus stress test.

Summary: *Management consisted of multimodal chiropractic care including active release therapy (ART), electroacupuncture and rehabilitation exercises. This patient's improved strength and function without surgical intervention highlights the possible role of biologic injections as a form of non-operative management when combined with multimodal care to accelerate recovery from UCL injuries in elite athletes.*

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KEY WORDS: platelet-rich-plasma, stem-cell therapy, ulnar collateral ligament, sports medicine, chiropractic

(LCU), notamment la manœuvre de traite et le test de provocation en valgus dynamique.

Résumé: *La gestion consistait en des soins chiropratiques multimodaux, notamment l'active release therapy (ART), l'électroacupuncture et des exercices de réhabilitation. La force et la fonction améliorées de ce patient sans intervention chirurgicale soulignent le rôle possible des injections biologiques comme forme de gestion non opératoire lorsqu'elles sont combinées à des soins multimodaux pour accélérer la récupération des lésions du LCU chez les athlètes d'élite.*

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MOTS CLÉS : plasma riche en plaquettes, soin par cellules souches, ligament collatéral lulnaire, médecine sportive, chiropratique

Introduction

The role of the medial ulnar collateral ligament (UCL) in stabilizing valgus stress at the elbow is often stressed and is at an increased injury risk among elite athletes, commonly in baseball, football and tennis.[1] It has been reported that approximately 45% of athletes who sustain injuries to the UCL return to play the ensuing season as reported in the NCAA.[2] Although the degree of injury happens along a spectrum from low-grade partial tear, to tears in >1 location[3], athletes sustaining full-thickness tears of the UCL are primarily managed operatively to restore stability and return to play[1]. Post-operative recovery for full-thickness UCL tears has been reported to take a minimum of nine months away from sport, leading to many implications for these elite athletes.[1] Non-operative management for athletes with partial UCL tears remains a less invasive and enticing first-line treatment, with reported recovery taking between 12 to 14 weeks.

Common nonoperative protocols for these injuries involves chiropractic care with the option of platelet-rich plasma injections (PRP), and more recently mesenchymal stem cells (MSC). There has been an increased interest in the use of biologic injections for the augmentation of UCL healing.[4] These biologics include the use of PRP and MSC. It is proposed that haematologically derived and cytokine-rich PRP facilitates angiogenesis and endothelial cell growth, conjunctively increasing blood flow and accelerating healing as a result.[4] Stem cells can be derived from adult or embryonic sources. The stem cell of interest is the mesenchymal stem cell which, based on environmental conditions can differentiate into osteocytes, chondrocytes, adipocytes, and tenocytes.[4] In North America, the most likely stem cell intervention is a minimally manipulated preparation more appropriately termed connective tissue progenitor cells (CTPs). It is theorized that the mechanism in which MSC therapy promotes healing may be due to the presence of numerous growth factors in the solution.[4] The purpose of this case report is to detail the nonoperative management of a male professional running back with a partial UCL tear who began his return to performance in a matter of six weeks. This case will outline the possible roles of chiropractic care and injections in helping athletes with partial UCL tears return to sport without surgical intervention. Furthermore, this case highlights the paucity in the literature regarding emerging biologic interventions. Although these interventions are gaining popularity, there remains a lack of high-quality and large-scale research confirming their efficacy, safety and long-term outcomes in athletes. The absence of strong evidence complicates decision-making for sports clinicians and strength and conditioning professionals responsible for developing treatment and recovery plans.

Case Presentation

A 29-year-old running back sustained a right grade 2 proximal UCL tear when his arm was suddenly hyperextended while making a block. This diagnosis was confirmed via diagnostic ultrasound prior to the playoff season and the patient was able to finish playing the rest of the season while equipped with protective bracing, which included a combination of zinc oxide tape strapping for the UCL (base) with an external compression sleeve. After the season ended, he sought out a sports physician who administered ultrasound guided PRP and placental stem cell injections to the right UCL. Two weeks after receiving injections, the patient presented to a sports specialist chiropractor for rehabilitation and treatment with primary complaints of sharp pain with terminal elbow extension and wrist supination. The pain was very local to the medial elbow without referral or paresthesia. The pain was rated on a subjective pain scale (VAS) as a sharp 8/10 with terminal elbow extension and supination, and a dull 4/10 at rest. There was no previous trauma to his right elbow before the injury, and no other remarkable findings to the upper extremity. The patient reported that they had tried some light isometric exercises but had not been back to strength training since the injection. Additionally, he reported that his elbow was consistently sore when sleeping at night. Systems review was unremarkable and the patient was very eager to get back to off-season training as soon as possible.

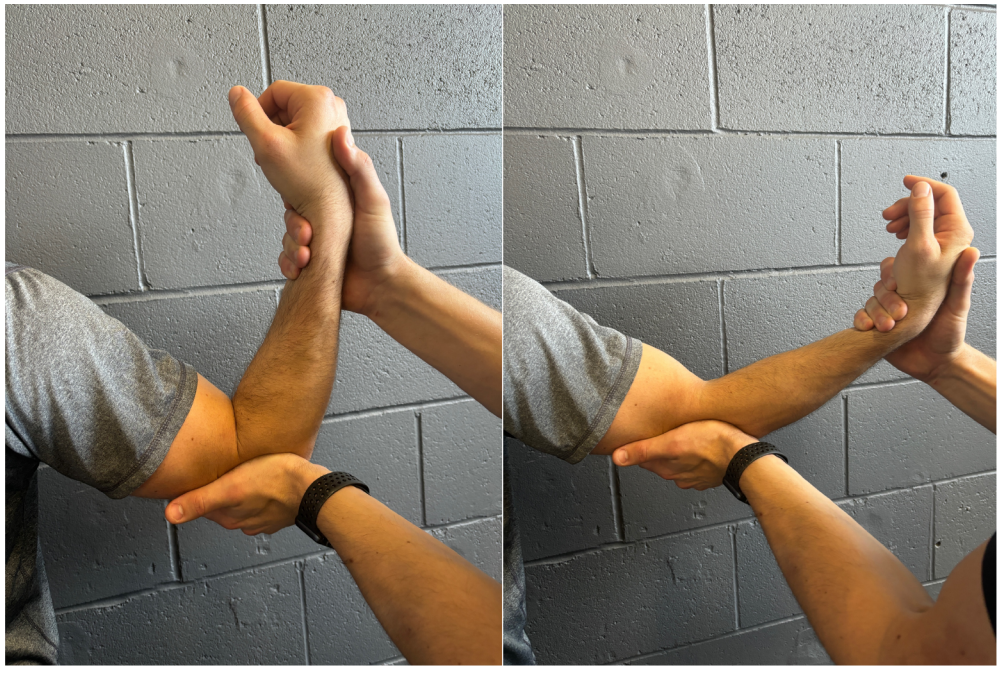

Figure 2.
Dynamic (or moving) valgus stress tests A valgus load is applied while flexing and extending the elbow.

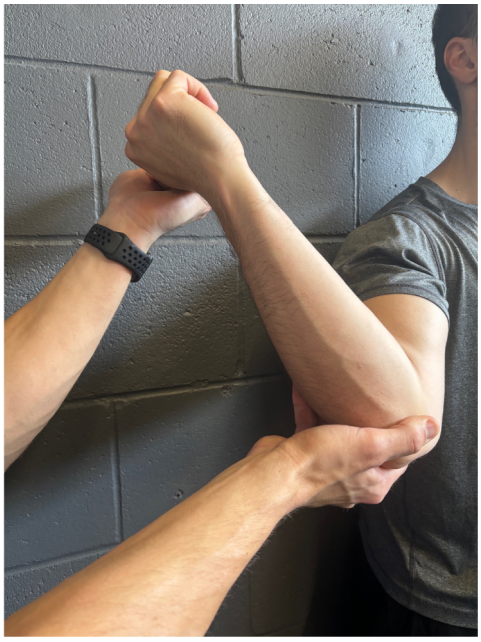

Figure 1.
Milking maneuver. The patient's thumb is pulled laterally with the shoulder & elbow flexed to 90 degrees and forearm supinated.

On physical examination, the patient presented with no discolouration, effusion or trophic changes in the right upper extremity. During palpation, the chief complaint was reproduced at the proximal and mid-body portion of the UCL. Range of motion testing using a manual goni-

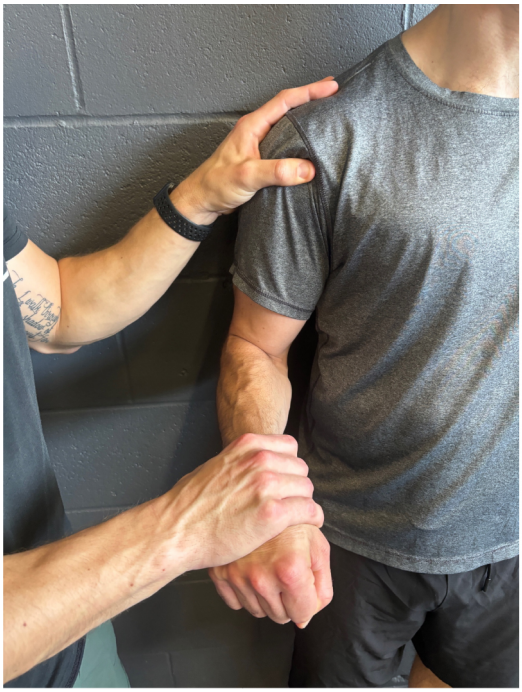

Figure 3.
Yergason's test. Patient externally rotates and supinates their arm against manual resistance from a 90-degree flexed and pronated position.

ometer[5] revealed passive supination and extension were painful at 8 degrees of elbow ROM, as well as pain at the medial elbow during end-range wrist flexion and pronation. There was pain produced over the medial elbow/UCL with active extension after 10 degrees of flexion and pain with active terminal elbow flexion. Resisted range of motion testing of the right elbow at 90 degrees of flexion found 3/5 strength in flexion, 4.5/5 strength in extension, 3/5 strength in pronation and 4.5/5 strength in supination.[6] Orthopedic testing revealed moderate discomfort with valgus stress to the right elbow with grade 1 laxity. Similarly, the milking maneuver (Figure 1), and the dynamic (or moving) valgus stress tests (Figure 2) both elicited grade 1 laxity with discomfort. These tests all reflect potential compromise to the anterior bundle of the UCL when there is no firm end point and reproduction of the patient's pain.[7]

Additionally, Yergason's test (Figure 3), produced medial right elbow pain with 3/5 strength. Palpation revealed hypertonic muscles of the right pronator teres, common flexor origin, distal biceps tendon and anconeus. Palpation of the right UCL, medial epicondyle, common flexor origin and both heads of pronator teres produced pain.

Management and outcome

A multimodal plan of management was started twice per week for the first two weeks, consisting of active release therapy (ART)®, Mulligan mobilizations with movement (MWM)®, contemporary medical electroacupuncture and rehabilitation exercise. ART was performed on the entire upper extremity with specific emphasis on the pronator teres, common flexor muscle origin, distal biceps tendon and anconeus. MWM was performed in all ranges to both the right glenohumeral joint and right elbow joint. The manual therapies incorporating both ART® and MWM® were utilized to help restore passive elbow ROM, normalize muscle tone, and increase blood flow and mechanical tension to the joint and surrounding connective tissues.[8,9] Medical electroacupuncture was administered using 0.22x50mm needles and an ES-130 stim unit to the motor points of pronator teres, flexor carpi ulnaris, flexor carpi radialis, flexor digitorum superficialis, biceps, common extensor origin and supinator. The parameters of the electrical stimulation included a varying intensity of low frequency stimulation (2-10 Hz) for 15-20 minutes. Early rehabilitation exercises are outlined in Table 1 which included wrist and elbow active ranges of motion with a green TheraBand® to patient tolerance, multi-angle wrist flexor and extensor exercises, TheraBand® or light dumbbell extensions at 90-degree elbow positioning, loaded closed chain high plank with active elbow supination/pronation and 90-90 isometric band holds. The purpose of exercise selection in the initial phase was to help improve neuromuscular coordination, modulate pain, and vary single and multi-joint loading scenarios in the upper extremity and torso. These strategies were modified from best current concepts in UCL reconstruction rehabilitation[5] with emphasis on accelerated loading and more advanced exercises due to the location, extent and stage of physiological healing.

Table 1.
Rehabilitation plan for partial proximal UCL tear – Stage 1 (Weeks 1-4 Post-Injection)

GOALS	• Pain modulation • Protect healing tissue • Prevent muscle atrophy	
REHABILITATION STRATEGIES	• Pain free isometrics locally at elbow • Continue loading pain-free ROM globally at adjacent joints: wrist, shoulder & scapula • Continue/progress with other full body strength and conditioning	
EXERCISES	**Sets & Reps**	**Notes**
Grip Strength Protocol a. Neutral wrist b. Flexed wrist c. Extended wrist	2 sets x 8-10 reps	• Performed with a grip ball • All sets and reps performed for each positioning (a, b & c)
Supine isometric tricep curl with TheraBand®	3 sets x 8-10 reps; 10 second hold each	• Green TheraBand (rated light strain from patient)
High plank with active elbow rotation (supination/pronation)	3 sets x 10 reps	• All reps should be pain free
Standing Shoulder external/internal rotation	3 x 12 reps	• Completed with heavy band on cable to fatigue
Shoulder 90-90 isometric external rotation with TheraBand®	2 x 10 reps; 10 second hold each	• Initialed with a green theraband and progressed to cable machine
Isometric barbell bench press with elbow positioned at 90°	3 x 8 reps; 12 second hold each	• Weight rack used to position barbell

During this initial plan of management, the patient had clearance to continue training from a sports physician while modifying upper body movements. These modifications included isometric loading parameters only when isolating elbow ROM, focus on closed-chain versus open-chain exercises for increased joint stability and relative light effort loading (<50% 1RM). These decisions were made to protect the healing UCL while trying to minimize disuse atrophy and arthrogenic inhibition in the surrounding tissues.[10] Due to his lack of pain, full ROM and improved strength after week 2, the patient was allowed to progress with more strenuous rehabilitation exercises and more formal strength, eccentric muscle capacity, and early power production at week 3 on. These exercises progressed over the six-week period where the athlete was under the care of the sports specialist chiropractor and are highlighted in Tables 2 and 3. An interesting finding in this case was the drastic change in elbow strength and perceived pain at week 3 compared to his initial examination where he was able to load the elbow with high strain movements with little to no pain or strength loss. His success with strength and conditioning continued to increase and he was back to full loading and performance testing in the offseason at six weeks. It is important to note the several variables and

Table 2.
Rehabilitation plan for partial proximal UCL tear – Stage 1(Weeks 4-6 Post-Injection)

GOALS	• Promote healing of repaired tissue • Regain and progress with muscular strength • Begin progressive overload principles • Continue with most stage 1 exercises	
REHABILITATION STRATEGIES	• Begin concentric/eccentric contractions where tolerated and at adjacent joints • Progress with both closed-chain and open-chain exercises for the upper extremity • Multi-joint coordination and strength production	
EXERCISES	**Sets and Reps**	**Notes**
Shoulder, elbow and wrist controlled articular rotations (CARS)	2 sets x 10 reps	
Bear crawl with isometric elbow extension	3 sets x 12 reps	• Progressed to full, multi-directional bear crawls
Single arm TheraBand® triceps extension (3010 tempo)	2-3 sets x 6-8 reps	• Progressed to higher load on cable machine
Multi-angle overhead TheraBand® isometrics with rhythmic stabilization	3 sets x 5 reps; 15 seconds of rhythmic stabilization	• Varying angles of shoulder abduction-external rotation
Supine triceps curls with dumbbells	3 sets x 10-12 reps	• 5-10lb dumbbells
Dumbbell hammer curls	3 x 12 reps	• 2020 tempo • 10 lbs dumbbells
Eccentric wrist curls (flexion/extension) with dumbbell	2 x 8 reps	• 3010 tempo • 10 lbs • elbow at 90°
Active supination/pronation with golf club	3 x 10 reps	• 3131 tempo • 2 sets with elbow bent; 1 set with elbow extended
Kettlebell arm bars	3 x 12 reps	• 30lb kettlebell bottom up
Isometric barbell bench press with elbow increasingly positioned >90°	3 x 8 reps; 12 second hold each	• Elbow increasingly positioned >90° with each set
Prone L Raises with dumbbells	3 x 8 reps	• 2-3lbs used

limitations with such findings in this particular case study which will be explored in the discussion. Nonetheless, this case highlights the need for sport-focused clinicians to be aware of a rapidly evolving field where biologic aids and advancement in regenerative medicine may augment the traditional timelines in some injuries.

Table 3.
Rehabilitation plan for partial proximal UCL tear – Stage 3 (weeks >6 post-injection)

GOALS	• Continue to increase strength, power and endurance of the upper extremity • Gradual return to post-season training and on-field drills • Re-test preseason (pre-injury) strength measures • Continue with most stage 2 exercises	
REHABILITATION STRATEGIES	• Increase muscle strength and endurance capacity • Reintroduce familiar in/off-season training exercises • Monitor for progress and accelerated RTP protocols	
EXERCISES	**Sets and Reps**	**Notes**
Eccentric floor press with dumbbells with external rotation	3 sets x 8-12 reps	• >110 lbs dumbbells • rep ranges to fatigue
Barbell bench press with releasers	3 sets x 8-10 reps	• 3110 tempo • Started week 5 at 135lbs • At week 8 at 400lbs
Eccentric pull ups with weight belt	3 sets x 8 reps	• 25lb weight belt
EZ bar triceps curls (skull crushers)	3 x 10 reps	• >90 lbs
Eccentric single-arm row with external rotation	4 x 8 reps	• >90 lbs

Discussion

Due to the UCL's primary role in resisting valgus stress at the elbow, athletes who participate in throwing sports are at an increased odds of sustaining injuries to the UCL.[11] In professional baseball, it has been reported that UCL injuries account for 10% of all injuries. The literature surrounding UCL injuries has focused on overhead or throwing athletes and the prevalence of these injuries in non-throwing athletes due to contact mechanisms has not been well developed. A 2019 study by Li *et al*.[11] compared the incidence, severity and outcomes of elbow UCL injuries in contact versus throwing athletes in the NCAA. Among 25 different sports across 5 seasons, men's football was reported as having the highest number of injuries, with 75% of injuries resulting from a contact mechanism of injury, primarily from a valgus load from blocking. Although football had the greatest number of injuries, injuries in throwing athletes were of greater severity and resulted in more time lost and a higher rate of surgery.[11] Although throwing athletes are more susceptible to UCL injuries via the throwing mechanism of injury, UCL injuries appear to be common in other sports due to contact mechanisms.

The rate of UCL reconstruction procedures have increased >300% from 2003 to 2014 without a consensus on an evidence-based treatment protocol for nonoperative management.[1] Surgical repair of the UCL has shown favourable outcomes for complete or partial tears, but typically requires between 10 to 16 months for a full recovery with additional risks of surgical complications such as fractures, inadequate healing, and nerve injuries.[12] With a typical season lasting 21 to 24 weeks, depending on the

timeline of injury, surgical repair of this patient's UCL would require them to miss anywhere from a few games to a full season, making nonoperative management of partial tears an attractive first-line treatment.[1] Conservative care is typically the first-line treatment at all levels of sport due to its non-invasive approach and established protocols for injury management. However, the method, expectations, and recovery timelines can vary depending on the athlete's level of competition. In adolescent athletes, conservative care is emphasized to prevent disruptions in development and minimize the risks associated with invasive procedures. Collegiate athletes often face a greater urgency to return to play, balancing the pressures of competition with the need to consider long-term health outcomes. For professional athletes, the focus is usually on the fastest and most effective recovery strategies, which may include a combination of conservative treatments and biologic interventions to expedite their return to peak performance. Although the athlete sought treatment in the offseason allowing a longer recovery period, there is great potential for biological injections with chiropractic care to improve timelines and expedite the return to play process. In this particular case, there was a significant increase in strength, ROM and lack of pain at six weeks which allowed an opportunity to resume performance-based training. It was at this point in the recovery period where almost all upper extremity loading was at pre-injury levels, such as consistently bench pressing 315 pounds for multiple repetitions. The bench press was a significant metric, apart from being a means to demonstrate overall load capacity of the elbow, it allowed direct comparison to pre-season and in-season testing levels. This is an atypical timeline to achieve such function with most partial UCL tears and presents an opportunity to study how variables such as biologic injections may help augment healing in combination with traditional care methods and will be discussed further in the paper.

There is a growing body of evidence showing positive outcomes with a conservative approach in certain cases of UCL injury.[12] As such, rehabilitation played an important role in this patient's recovery. A 2019 systematic review by Cascia *et al*.[12] highlighted the importance of a structured rehabilitation program in order to regain elbow stability and function. This athletes progress was monitored weekly and the rehabilitation program was modified to progress with the athlete's condition, aiding in a full recovery without surgical intervention. It is important for the primary sports clinician to monitor progress and rehabilitation on an individualized basis as healing is rarely linear. In this case, the functional abilities at three weeks post-injection were drastic. Given the numerous confounding variables and bias, much more research is needed to draw firm conclusions on best practices post-biologic injections and these injuries.

The UCL is predominantly avascular which may delay healing time and quality. Blood supply differs for the UCL, with the proximal portion of the UCL being well-vascularized, therefore, the location of the tear affects prognosis.[13] Distal UCL tears are more likely to require surgical intervention, while proximal tears may have success with non-operative management.[4,14] Recent research suggests that the use of MSC's provides tissues with important growth factors necessary for healing and tissue regeneration. An interesting aside should be mentioned, North American stem cell therapies use minimally modified solutions of stem cells. Bone marrow aspirate concentrate and adipose-derived are the most commonly used MSC formulations.[4,15] With placental and embryonic stem cell usage subject to additional ethical debate, adult bone marrow and adipose tissue remains a clinically available source.[15]

The yield from bone marrow aspirate reports a low concentration of stem cells.[16] Therefore, the effectiveness of MSC therapy is most likely due to the numerous growth factors found within the sample.[4]

Although outside the scope of this case report, from a re-injury standpoint, there may be beneficial considerations when deciding on the use of MSC as an adjunct to rehabilitation and/or surgery. Animal studies have histologically examined differences in healing. They have found an earlier increase in the concentration of Sharpey like fibres in the ACL's and patellar tendons (Patellar ligament) that were treated with MSC's. These fibres are more consistent with a ligamentous tissue, as they are seen predominantly in the areas where ligament begins to transition to bone.[17,18] Traditional ligament healing presents with the formation of dense fibrous scar tissue. Interestingly, the ACL's treated with MSC's had significantly higher failure loads and stiffness than controls at 8 weeks of healing.[17] Furthermore, from a clinical perspective, cost, risk, and benefit should be considered when suggesting the implementation of additional adjuncts of

therapy. Recent research on ACL healing in animal models with the combination of MSC's and PRP found indications of better osteointegration of the tendon graft versus control and PRP alone.[19] PRP is a relatively widely used therapy with a minimal risk profile[20], and PRP is an effective treatment adjunct for partial UCL tears[21]. There is evidence that PRP improves return to-play times and increases the rate of ligament reconstitution in high-level throwing athletes.[22,23] PRP has an excellent safety profile as it is prepared from autologous blood, making it innately safe. Pain and synovial reactions are common adverse reactions, with the rate of pain after a PRP injection not being higher than control injections.[24] While MSC therapy is less common, it is also regarded as safe for extra-articular administration.[24] Similar to PRP, common preparations of MSC's are autologous in nature. The most common side effect is pain and swelling at the site of the injection, with no serious adverse effects being observed.[25,27] In Ontario, neither PRP or MSC therapies are covered by public health. Presently, MSC's are not approved in Canada for the treatment of musculoskeletal pathologies.

The neurophysiological effect of manual therapy provides the rationale for the implementation of passive therapy within a conservative approach to a UCL tear's plan of management. Passive therapy can benefit the rehabilitation process by inhibiting pain via desensitization of pain receptors, decrease disability, and promote tissue healing.[28] Moreover, acupuncture can be an adjunct to further augment recovery by reducing pain and promoting recovery from exercise induced delayed onset muscle soreness.[29] There may be an additional benefit to the administration of acupuncture to induce vasodilation by stimulating both calcitonin gene-related peptide (CGRP) and nitric oxide (NO). Inducing vasodilation in the periphery can be beneficial in promoting healing.[30] In context to this case, there are several variables that may have rendered success in strength and reduced pain at both the three and six-week marks. With respect to ligament and connective tissue healing, these timelines correspond to the late proliferative and early remodelling phases of the healing process. Both manual therapies and modalities such as acupuncture play a role in biophysical stimulation of the tissues. They can promote blood flow and aid with the expansion of the extracellular matrix and collagen synthesis while also providing mechanical tension to enhance the integrity and density of collagen. At the same time, biologics such as PRP and stem cells have the potential to further augment the same phases of healing and potentially do so at a faster rate.[31] Although these processes can aid in healing, these known actions in tissue remodelling are not as potent before six weeks. With respect to the early success at week three, the peripheral and central neural adaptations to resistance training in allowing more force generation were more likely the main contributor.[32] In contrast, the marked success at the six-week mark is more difficult to explain as both neural and physiological adaptations to exercise and cellular processes augmenting tissue remodeling are both possible.

Limitations

There are several limitations that affect the generalizability and applicability of this case report. Notably, an MRI was not performed for the initial diagnosis of the UCL injury, limiting the accuracy of the initial clinical assessment. While musculoskeletal ultrasound has demonstrated sensitivity ranging from 0.86-1.00 for conditions such as UCL tears, the variability in imaging sensitivity may have impacted the accuracy of diagnoses in this athlete, potentially influencing treatment decisions and outcomes.[33] Furthermore, although follow-up imaging was reportedly performed after stem-cell and PRP treatment, we were unable to obtain or review these images or imaging reports. The lack of access to the imaging and reports restricts our ability to objectively evaluate the impact of the patients structured rehabilitation program in the athlete's recovery. Additionally, we were unable to receive specific details surrounding the stem cell treatment, more specifically, the type of stem cells used, whether they were autologous or externally sourced, or the dosage administered, all of which could have a significant impact on the treatment outcomes.

Regarding the orthopaedic tests used, the dynamic valgus stress test is currently considered the gold standard for diagnosing UCL injuries. It has demonstrated excellent sensitivity (1.00) and strong specificity (0.75), and has been shown to produced greater elongation of the UCL compared to static testing.[34] This test provides biomechanical evidence supporting its validity as an examination technique for UCL injuries. However, additional limitations are present for the other provocative tests used, such as the milking maneuver, which – while helpful in reproducing symptoms- lacks specificity and may

be confounded by other elbow pathologies.[35] MRI with articular contrast is still required to confirm UCL tears due to its superior sensitivity and specificity.[36] Lastly, Yergason's test, although commonly used for diagnosing biceps or SLAP lesions, lacks relevance in confirming UCL injuries, as its sensitivity (0.43) and specificity (0.79) for biceps pathologies do not provide adequate diagnostic utility for UCL-specific injuries.[37]

Summary

To our knowledge, this is the first case report which examines the use of PRP and MSC in a non-operative UCL intervention. Given the difference in repetitive strain and overall demand of the medial elbow in non-throwing athletes, PRP and MSC may be valuable adjuncts to the non-operative management of incomplete UCL tears in this athletic population. In professional sports, time is of the essence and stress is placed on the medical team to get an athlete back to play as fast as possible. Further research is needed to determine the benefits of combination therapy using traditional rehabilitation, PRP, and MSC on ligament healing time, return to performance, and to help inform sports clinicians on optimal rehabilitation strategies to help athletes return to play efficiently. Although there is significant bias with a single case report and multiple variables in such an intervention, the radical improvement in strength and functional parameters just three to four weeks after injection is notable and warrants more exploration in larger study populations.

References

1. Gopinatth V, Batra AK, Khan ZA, et al. Return to sport after nonoperative management of elbow ulnar collateral ligament injuries: a systematic review and meta-analysis. Am J Sports Med. 2023; 51(14): 3858-3869.
2. DeFroda SF, Goodman AD, Gil JA, Owens BD. Epidemiology of elbow ulnar collateral ligament injuries among baseball players: national collegiate athletic association Injury Surveillance Program, 2009-2010 Through 2013-2014. Am J Sports Med. 2018; 46(9): 2142-2147.
3. Joyner PW, Bruce J, Hess R, Mates A, Mills FB, Andrews JR. Magnetic resonance imaging–based classification for ulnar collateral ligament injuries of the elbow. J Shoulder Elbow Surg, 2016; 25(10): 1710-1716.
4. Apostolakos JM, Lin KM, Carr JB, Bedi A, Camp CL, Dines JS. The role of biologic agents in the non-operative management of elbow ulnar collateral ligament injuries. Curr Rev Musculoskelet Med. 2020; 13(4): 442-448.
5. Gandbhir VN, Cunha B. Goniometer. StatPearls, 2020.
6. Naqvi U, Margetis K, Sherman AL. Muscle strength grading. Statpearls. 2023.
7. Karbach LE, Elfar J. Elbow Instability: Anatomy, Biomechanics, Diagnostic Maneuvers, and Testing. J Hand Surg. 2017; 42:118-126.
8. Hing W, Hall T, Mulligan B. The mulligan concept of manual therapy. 2nd. Ed. Elsevier. 2019.
9. Active Release Techniques. What is ART. Active Release Techniques [Internet]. 2024.
10. Ellenbecker TS, Wilk KE, Altchek DW, Andrews JR. Current concepts in rehabilitation following ulnar collateral ligament reconstruction. Sports Health. 2009; 1(4): 301-313.
11. Li NY, Goodman AD, Lemme NJ, Owens BD. Epidemiology of elbow ulnar collateral ligament injuries in throwing versus contact athletes of the national collegiate athletic association: analysis of the 2009-2010 to 2013-2014 seasons. Orthop J Sports Med. 2019; 7(4).
12. Cascia N, Picha K, Hettrich CM, Uhl TL. Considerations of conservative treatment after a partial ulnar collateral ligament injury in overhead athletes: a systematic review. Sports Health. 2019; 11(4): 367-374.
13. Buckley PS, Morris ER, Robbins CM, et al. Variations in blood supply from proximal to distal in the ulnar collateral ligament of the elbow: a qualitative descriptive cadaveric study. Am J Sports Med. 2019; 47(5): 1117-1123.
14. Frangiamore SJ, Lynch TS, Vaughn MD, et al. Magnetic resonance imaging predictors of failure in the nonoperative management of ulnar collateral ligament injuries in professional baseball pitchers. Am J Sports Med. 2017; 45(8): 1783-1789.
15. Hevesi M, LaPrade M, Saris DBF, Krych AJ. Stem cell treatment for ligament repair and reconstruction. Curr Rev Musculoskelet Med. 2019; 12(4): 446-450.
16. Hernigou P, Homma Y, Flouzat Lachaniette CH, et al. Benefits of small volume and small syringe for bone marrow aspirations of mesenchymal stem cells. Int Orthop. 2013; 37(11): 2279-2287.
17. Lim JK, Hui J, Li L, Thambyah A, Goh J, Lee EH. Enhancement of tendon graft osteointegration using mesenchymal stem cells in a rabbit model of anterior cruciate ligament reconstruction. Arthroscopy. 2004; 20(9): 899-910.
18. Ju YJ, Muneta T, Yoshimura H, Koga H, Sekiya I. Synovial mesenchymal stem cells accelerate early remodeling of tendon-bone healing. Cell Tissue Res. 2008; 332(3): 469-478.
19. Teng C, Zhou C, Xu D, Bi F. Combination of platelet-rich plasma and bone marrow mesenchymal stem cells enhances tendon–bone healing in a rabbit model of anterior cruciate ligament reconstruction. J Orthop Surg Res. 2016; 11(1): 96.

20. Chen X, Jones IA, Park C, Vangsness CT. The efficacy of platelet-rich plasma on tendon and ligament healing: a systematic review and meta-analysis with bias assessment. Am J Sports Med. 2018; 46(8): 2020-2032.
21. Podesta L, Crow SA, Volkmer D, Bert T, Yocum LA. Treatment of partial ulnar collateral ligament tears in the elbow with platelet-rich plasma. Am J Sports Med. 2013; 41(7): 1689-1694.
22. Dines JS, Williams PN, ElAttrache N, Conte S, Tomczyk T, Osbahr DC, Dines DM, Bradley J, Ahmad CS. Platelet-rich plasma can be used to successfully treat elbow ulnar collateral ligament insufficiency in high-level throwers. Am J Orthop. 2016; 45(5): 296-300.
23. Deal JB, Smith E, Heard W, O'Brien MJ, Savoie FH. Platelet-rich plasma for primary treatment of partial ulnar collateral ligament tears: MRI correlation with results. Orthop J Sports Med. 2017; 5(11).
24. Yuan T, Zhang CQ, Wang JHC. Augmenting tendon and ligament repair with platelet-rich plasma (PRP). Muscles Ligaments Tendons J. 2013; 3(3): 139–149.
25. Mirghaderi SP, Valizadeh Z, Shadman K, et al. Cell therapy efficacy and safety in treating tendon disorders: a systemic review of clinical studies. J Exp Orthop. 2022; 9(1): 85.
26. Wang Y, Shimmin A, Ghosh P, et al. Safety, tolerability, clinical, and joint structural outcomes of a single intra-articular injection of allogeneic mesenchymal precursor cells in patients following anterior cruciate ligament reconstruction: a controlled double-blind randomised trial. Arthritis Res Ther. 2017; 19(1): 180.
27. Cho WS, Chung SG, Kim W, et al. Mesenchymal stem cells use in the treatment of tendon disorders: a systematic review and meta-analysis of prospective clinical studies. Ann Rehabil Med. 2021; 45(4): 274–283.
28. Bialosky JE, Bishop MD, Price DD, Robinson ME, George SZ. The mechanisms of manual therapy in the treatment of musculoskeletal pain: a comprehensive model. Man Ther. 2009; 14(5): 531–538.
29. Tang CT, Song B. Acupuncture and dry needling for sports performance and recovery. Curr Sports Med Rep. 2022; 21(6): 213–218.
30. Lundeberg T. Acupuncture mechanisms in tissue healing: contribution of no and cgrp. Acupunct Med. 2013; 31(1): 7–8.
31. Leong NL, Kator JL, Clemens TL, James A, Enamoto-Iwamoto M, Jiang J. Tendon and ligament healing and current approaches to tendon and ligament regeneration. J Orthop Res. 2020; 38:7-12.
32. Škarabot J, Brownstein CG, Casolo A, Del Vecchio A, Ansdell P. The knowns and unknowns of neural adaptations to resistance training. Eur J Appl Physiol. 2021; 121:675-685.
33. Wood N, Konin JG, Nofsinger C. Diagnosis of an ulnar collateral ligament tear using musculoskeletal ultrasound in a collegiate baseball pitcher: a case report. N Am J Sports Phys Ther. 2010; 5:227-223.
34. O'Driscoll SWM, Lawton RL, Smith AM. The "moving valgus stress test" for medial collateral ligament tears of the elbow. Am J Sports Med. 2005; 33:231-239.
35. Seiber K, Bales C, Wörner E, Lee T, Safran MR. Assessment of the reliability of a non-invasive elbow valgus laxity measurement device. J Exp Orthop. 2020; 7:74.
36. Campbell RE, McGhee AN, Freedman KB, Tjoumakaris FP. Diagnostic imaging of ulnar collateral ligament injury: a systematic review. Am J Sports Med. 2020; 48:2819-2827.
37. Holtby R, Razmjou H. Accuracy of the speed's and yergason's tests in detecting biceps pathology and SLAP lesions: comparison with arthroscopic findings. Arthroscopy. 2004; 20:231-236.