CASE REPORT

Case Report: At Rare Case of Ulnar Sided Wrist Pain Secondary to Extensor Carpi Ulnaris Split Tear Respond Well to Prolotherapy

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ABSTRACT

This is the first case report that describes the successful treatment of an extensor carpi ulnaris (ECU) split tear using prolotherapy. Our objective is to outline our comprehensive rehabilitation approach in a non-athlete population. A 43-year-old preschool school presented with ulnar-sided wrist pain for 1 month and did not respond well to initial physiotherapeutic modalities and oral analgesics. Clinical examination revealed tenderness over the ECU tendon, underneath the ulnar styloid, with a positive synergy test. Ultrasound of her right wrist revealed a swollen ECU with a split tear and tenosynovitis. She initially received tendon sheath steroid injection, followed by prolotherapy 2 weeks later. We initiated a comprehensive rehabilitation programme for her that consisted of activity modification, brace, physiotherapeutic modalities, range of motion, and strengthening exercises. The details of the rehabilitation programme are outline in the case report. After 6 months of treatment, she successfully returned to work with minimal pain. Prolotherapy combined with comprehensive rehabilitation provided a good outcome for our patients.
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INTRODUCTION

Extensor carpi ulnaris (ECU) split tear is an uncommon cause of ulnar-sided wrist. ECU lesions are commonly described in sportsmen using bats, sticks, and clubs, where repetitive loaded prono-supination leads to friction of the ECU within the small fibroosseous tunnel. We report a case of a pre-school teacher who presented with a constrained type of ECU split tear and was successfully treated with prolotherapy and rehabilitation. This is the first case report to describe the successful treatment of an ECU split tear using prolotherapy. Our objective is to outline our comprehensive rehabilitation approach in a non-athlete population.

CASE REPORT

This is a 43-year- old pre-school teacher, a right hand dominant, who presented to a family medicine specialist with ulnar-sided right wrist pain for 1 month. She described it as throbbing in nature, moderate in intensity, non-radiating, aggravated by rotatory movement of the wrist, initially relieved after a few hours of rest, but worsened until she required oral Celebrex 200 mg when she developed severe pain. She sometimes felt severe pain at night after performing heavy work during the day, which disturbed her sleep. She denies any history of trauma. Being a pre-school teacher, she did have repetitive lifting of heavy children, and sometimes, she needed to cook for a large number of people, which is the predisposing factor for the pain. The pain also worsened with prolonged writing, especially when teaching the children, which affected her daily routine activities. She denies any numbness, weakness of the hand and grip strength, clumsiness, or snapping sensation. She denies any systemic symptoms suggesting rheumatological disease, such as rashes, multiple joint pain, swelling and deformities, ulcers, or axial spine pain. She was referred to physiotherapy and was prescribed with heat therapy and electro modality, with minimal improvement. After 2 months of physiotherapy, she was referred to a sports medicine clinic for further management.

Our assessments revealed a limited range of motion of supination and pronation, with marked tenderness over the extensor carpi ulnaris (ECU) tendon, below the ulnar styloid. There was no subluxation of the ECU tendon.

She had a negative sign for triangular fibrocartilage complex (TFCC), a negative foveal sign, piano key sign, and TFCC compression test. She also demonstrated normal sensation and motor power of the ulnar nerve, and the Tinel sign were negative. Upon assessment of strength, she had reduced right hand grip strength (right: 22 kg and Left: 26kg). For the modified Barthel index, she scored 100 and had limitations on personal hygiene and self-bathing.

She has a normal ulnar variant, with no sign of chondromalacia or osteoarthritis on the ulnar component. Ultrasound of her wrist showed a thickened ECU with a split tear, associated with surrounding tenosynovial fluid accumulation suggestive of tenosynovitis as in Figure 1. This is confirmed by the MRI finding of the wrist as in Figure 2. There is no ECU subluxation seen, and TFCC appears to be normal. Her inflammatory markers were normal; erythrocyte sedimentation rate was 12 and C-reactive protein was 5 mg/dl. We decided to give prolotherapy to enhance proliferative phase of tendon healing. However, prolotherapy is not suitable to be given during inflammation. Thus, inflammation need to be controlled. She initially received ultrasound-guided steroid injection, using 20 mg of triamcinolone inside the tendon sheath to reduce inflammation. Immediately after injection, we protected her wrist using a muenster brace during the day and night for 2 weeks to avoid pronation, supination, flexion, and extension of the wrist. She was given a medical certificate to rest from work for 2 weeks, and activity modification, avoiding pronation and supination, and lifting weight. We started her on passive and active assisted range of motion exercises, aiming to achieve full pain-free range of motion. She was also prescribed isometric hand grip exercise.

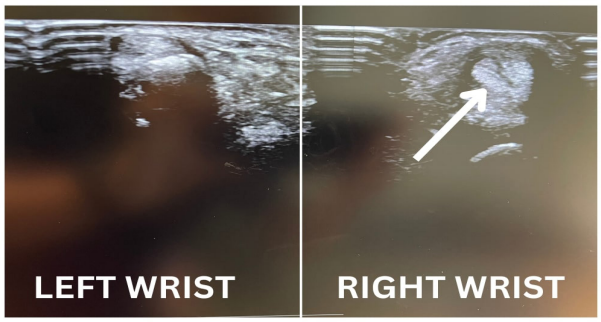

Figure 1: Ultrasound comparison of extensor carpi ulnaris (ECU) tendon below the ulnar styloid during first visit to sports medicine clinic. Noted the right ECU is swollen with surrounding fluids suggestive of tenosynovitis and presence of split tear. The synovial sheath also appears thicken. Noted that small fluids surrounding left ECU is normal.

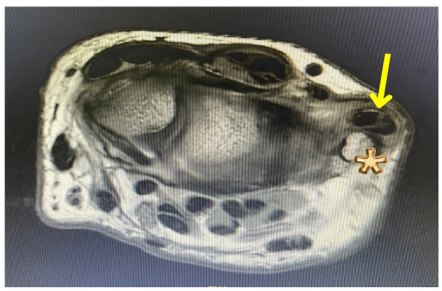

Figure 2: This is an axial view of right wrist Magnetic Resonance Imaging (MRI) showing the split tear of the ECU (yellow arrow) at the level of ulnar styloid (asterisk). Noted that there is surrounding tenosynovitis. There is no external compression noted towards ECU. TFCC is normal during MRI examination.

At 2nd week, she had her second follow-up, showing reduction in tenosynovitis with pain score drop from 7 to 4, and relieves her night pain. She then received a prolotherapy injection over the ECU tendon. We used D25% (mixture of 1mls of D50% and 1mls of water for injection) and injected 1 ml into the area. Her rehabilitation continued. In an early phase of rehabilitation, we aim to achieve full pain-free range of motion and reactivation of hand grip using isometric hand grip strength. We also started isometric wrist flexion, extension, ulnar deviation, radial deviation, pronation, and supination. We added ultrasound therapy with electro modalities to her physiotherapeutic modalities. Once the early phase rehabilitation objective was achieved, we progressed the exercise into an isotonic strengthening exercise of the hand grip. We delayed isotonic wrist flexion and extension and maintained isometric strengthening exercise to avoid tendon lengthening up to 6 weeks post prolotherapy. Her tendon reduced in size with reduction in doppler signal (figure 3). When perform dynamic assessments of the ultrasound, the ECU tendon glide smoothly, without subluxation. The ECU also showed no opening of gap, indicating possible fibrosis occur in between the tear.

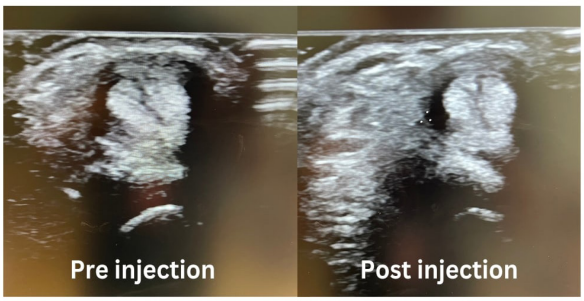

Figure 3: Demonstrated the pre injection and post injection. The post injection image was taken after 1 month prolotherapy. Noted that the tendon size is smaller, with lesser fluid surrounding tendon sheath. During sono-palpation post procedure, ECU is not tender.

At 3rd month post injection, she has no pain at rest and minimal pain on movement. We gradually removed her brace and advised her to wear it during the day during weight lifting, and slowly reduced the usage whilst progressing the strengthening exercise. At 6 months post-injection, she was nondependent on the brace, with minimal pain on heavy activities. Clinical examination revealed no more tenderness in the ECU. Her hand grip strength was equivocal (right 27.4kg, left 26.7kg). Her rehabilitation progress is outlined in Table I.

Table I: Comprehensive rehabilitation of ECU tear

Component	POST STEROID INJECTION (WEEK 0-2)		POST PROLOTHERAPY INJECTION (WEEK 2-8)		PROGRESSIVE STRENGTENING (WEEK 8-12)		ECCENTRIC ECU STRENGTENING (WEEK > 12)	
	Rehabilitation /modalities	Goal	Rehabilitation /modalities	Goal	Rehabilitation /modalities	Goal	Rehabilitation /modalities	Goal
Pharmacological pain management	• Topical NSAIDs • Oral NSAIDs PRN	Aim for pain score < 3	• Topical NSAIDs • Avoid oral NSAIDs	Aim for pain score < 3	• Topical NSAIDs PRN	Aim for pain score < 3	• Topical NSAIDs PRN	Aim for pain score < 3
Protect	• Muenster brace wear for 24 hours	Protect ECU from increased tension and rupture	• Muenster brace wear for 24 hours	Protect ECU from increased tension and rupture	• Gradual removal of usage brace		• Off brace	
Physio modalities	• Ice therapy	To reduce swelling	• Ultrasound therapy • Electro modalities • Heat therapy	To improve blood flow and facilitate healing	• Ultrasound therapy • Electro modalities • Heat therapy	To improve blood flow and facilitate healing	• Home modalities such as hot pack 2 times per day	To improve blood flow and facilitate healing
Range of motion	• Passive and active assisted wrist flexion, extension, radial deviation, ulnar deviation, pronation and supination	To get pain free range of motion	Passive, active assisted, and active wrist flexion, extension, radial deviation, ulnar deviation, pronation and supination	To get pain free range of motion	• Maintenance of range of motion	Maintenance of pain free range of motion	• Maintenance of range of motion	Maintenance of pain free range of motion
Strengthening	• Isometric hand grip strengthening exercise	Reactivation of hand muscle	• Isometric hand grip strengthening exercise. • Add isometric wrist flexion, extension, pronation, supination, radial deviation, ulnar deviation	Reactivation of hand muscle, and wrist flexor and extensor	• Isotonic hand grip strengthening exercise • maintain isometric wrist extension, radial deviation, ulnar deviation • isotonic wrist pronation supination and flexion	Progressive increasing strength training ECU strengthening exercise is kept isometric to avoid tendon lengthening.	• Add eccentric wrist extension, radial and ulnar devieation	Progressive increasing strength training
Activity modification	• Avoid lifting heavy weight • Avoid repetitive prono-supination	Avoid tendon tear	• Avoid lifting heavy weight • Avoid repetitive prono-supination • Perform activity using brace	Avoid tendon tear	• slowly allowing lifting weight • avoid repetitive prono-spunation	Pain free daily activity	• Gradually allowing repetitive prono-supination. Ensure the repetition does not cause pain after 24 hours. Monitor load and frequency.	Pain free daily activity

DISCUSSION

The extensor carpi ulnaris (ECU) serves as an important dynamic stabiliser for the distal radioulnar joint, while the ECU subsheath is part of the triangular fibrocartilage complex. At the wrist joint, the ECU lies within the bony groove of the dorsal surface of the ulnar, passing through a fibroosseous tunnel, maintained by a retinaculum and subsheath. The ECU tendon is maximally taut during forearm pronation, wrist flexion, and ulnar inclination, and repetitive loaded prono-supination stresses the tendon at the fibroosseos tunnel, leading to overuse tendinopathy. In this case study, heavy cooking and lifting weight were potential predisposing factors.

When assessing ulnar-sided wrist pain, assessing TFCC is an integral part of the diagnosis of ECU tendinopathy. ECU tenosynovitis can create swelling over 6th compartment and ECU synergy test, reverse Finkelstein test, and resisted wrist extension and ulnar deviation will suggest a lesion in the ECU (1). Limitations in pronation and supination are common findings in ECU pathology. Ultrasound of the wrist has several advantages over MRI, as it provides a real-time image, is able to provide dynamic assessments, especially in ECU subluxation, is low cost, can be performed during serial follow-up, and

has low radiation. However, MRI being an objective assessment of radiological examination, it reduces the inter-examiner reliability and has a better advantage in assessing concomitant injuries such as TFCC, which has difficult accessibility through ultrasound examination.

Dextrose prolotherapy is emerging as a modality in the treatment of tendinopathies and tendon tear. Dextrose is an ideal proliferant for prolotherapy because it is water soluble, a normal constituent of blood, and has a safer profile (2). Although the exact mechanism is unknown, potential effective treatment for such pathology, due to increasing neovascularization, promotes inflammatory cytokines, cell proliferation, and collagen production during the proliferative phase (3, 4). To the authors' knowledge, this is the first case reporting the use of prolotherapy in ECU tears and demonstrating a good outcome.

However, the success of prolotherapy should be supported by a comprehensive rehabilitation plan. This is the first case report to describe in detail the conservative ECU rehabilitation programme. The initial phase of rehabilitation is to protect the ECU from repetitive prono-supination by applying a munster brace (1, 5). Once pain has improved, gradual range of motion exercise should be prescribed with the aim of achieving pain-free range of motion and isometric strengthening exercise. Once a pain-free range of motion is achieved, gradual progressive strengthening exercises can be prescribed. However, we delayed eccentric strengthening exercise because ECU function isometrically to stabilise the distal radioulnar joint and prevent lengthening (1).

CONCLUSION

ECU tear is uncommonly reported in the non-athlete population. An occupation with predisposed loaded repetitive prono-supination can lead to ECU tendon tear. The synergy test is a sensitive provocative maneuver for ECU tendon tear. Ultrasound can be used in an office setting to diagnose ECU tendon tear early, thus initiating an appropriate rehabilitation plan earlier. Prolotherapy has shown a good outcome in the management of ECU tendon tear, and it is often supported with good and compliant rehabilitation programme.

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