

Ultrasound-Guided Hydro Dissection: A Novel Treatment Approach for Intersection Syndrome

Yvonne Maura Murphy, Dominic Frances O'Shea, Maura Gerardine O'Dea, Dominic Colman Harmon

Department of Anaesthesia and Pain Medicine, University Hospital Limerick, Dooradoyle, Limerick, Ireland
Email: harmondominic@gmail.com

How to cite this paper: Murphy, Y.M., O'Shea, D.F., O'Dea, M.G. and Harmon, D.C. (2025) Ultrasound-Guided Hydro Dissection: A Novel Treatment Approach for Intersection Syndrome. *Pain Studies and Treatment*, 13, 8-13.

<https://doi.org/10.4236/pst.2025.131002>

Received: December 2, 2024

Accepted: December 28, 2024

Published: December 31, 2024

Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Wrist pain is prevalent. Activities such as dexterous sports, prolonged use of personal handheld devices, and extensive desktop keyboard usage are common contributors to wrist pain. Intersection syndrome, a form of inflammatory tenosynovitis, occurs at the intersection of the first and second dorsal compartments of the wrist. The first dorsal compartment is comprised of the tendons of abductor pollicis longus and extensor pollicis brevis, while the second dorsal compartment contains the tendons of extensor carpi radialis longus and extensor carpi radialis brevis. Intersection syndrome is diagnosed by pain localized to the dorsoradial forearm, approximately five cm proximal to the wrist joint, which worsens with resisted wrist and thumb extension. To date, the use of hydro dissection with 5% dextrose under ultrasound guidance as a treatment for Intersection syndrome has not been reported. This case report presents the first report on ultrasound-guided hydro dissection as a therapeutic approach for intersection syndrome. **Methods:** A case report, with informed consent, involving a 32-year-old male athlete. The patient, a hurling player, presented with chronic right wrist pain diagnosed as intersection syndrome. The condition significantly affected his work, sporting activities, and daily living activities. Previous conservative management and physiotherapy had failed to alleviate his symptoms. To confirm the diagnosis, relevant imaging was performed, supplemented by dynamic ultrasound assessment. The procedure was performed aseptically. Continuous ultrasound guidance was employed to ensure accurate needle placement. Once the needle tip position was confirmed, an initial injection of 5 mL of 0.25% chirocaine was administered. 10 mL of 5% dextrose was injected under ultrasound guidance for hydro dissection, with good visualization of the solution's distribution. **Conclusion:** Ultrasound-guided hydro dissection has not previously been documented as a treatment

option for intersection syndrome. In this case, it proved to be an effective pain-relieving therapy with sustained effect at three-month clinical follow-up. Further studies are required.

Keywords

Wrist Pain, Intersection Syndrome, Sports Injury, Hydro Dissection, Ultrasound

1. Introduction

Wrist pain is prevalent, often resulting from repetitive movements and overuse associated with sports, work-related tasks, and the frequent use of personal handheld devices such as mobile phones and desktop keyboards [1]. Classified as a type of musculoskeletal pain, wrist pain is widespread in the UK, with an annual consultation prevalence rate of 58 per 10,000 patients in primary care [2]. This makes the wrist the fourth most common site of musculoskeletal pain in the upper limb, following the shoulder, hand, and elbow respectively [2].

Intersection Syndrome (IS), a form of inflammatory tenosynovitis, occurs at the intersection of the first and second dorsal compartments of the wrist. The first dorsal compartment is comprised of the tendons of the abductor pollicis longus and extensor pollicis brevis, while the second dorsal compartment contains the tendons of the extensor carpi radialis longus and extensor carpi radialis brevis.

Intersection syndrome is an overuse injury frequently encountered by sportspeople that necessitates a thorough clinical assessment for accurate diagnosis. In some cases, magnetic resonance imaging may be required to rule out other tissue abnormalities, alongside ultrasound and patient-reported symptoms [3]. Clinically, IS is diagnosed based on pain located in the dorsoradial forearm, approximately five cm from the wrist joint, which is exacerbated by resisted wrist and thumb extension.

Accurate diagnosis is crucial to ensure that the appropriate treatment is provided, leading to the best possible outcome for the patient. In cases of wrist pain, it is essential to rule out other similar presentations. Differential diagnoses to consider include: De Quervain's tenosynovitis (which primarily affects the first extensor compartment and is more localized at the radial styloid), osteoarthritis of the carpometacarpal joint, entrapment of the dorsal radial sensory nerve (Wartenberg's syndrome) and extensor pollicis longus tendinitis. Simple strains, sprains, and fractures must also be considered [4] [5].

Conservative treatment for IS typically includes rest, the use of a splint or hand support, analgesics such as non-steroidal anti-inflammatory drugs (NSAIDs), and physiotherapy focused on strength and conditioning. If these measures fail to promote healing and alleviate symptoms, corticosteroid injections may be administered to reduce inflammation. If the condition persists despite these interventions,

surgical options may be considered [3].

Hydrodissection involves injecting a local anaesthetic, saline, or a 5% dextrose solution with the goal of separating nerves or other anatomical structures from adjacent tissues, fascia, or surrounding structures [6]. The therapeutic benefits of hydrodissection are thought to arise from the alleviation of compression on the *nervi nervorum* or *vasa nervorum* [6]. Accurate identification of these structures and precise injection into the correct anatomical sites are best achieved using ultrasound guidance.

The aim of this study was to assess the role of hydrodissection in the treatment of intersection syndrome using ultrasound guidance.

2. Case Report

A 32-year-old male presented with severe, chronic pain in his right wrist. The patient, who was an active hurling player, experienced exacerbation of pain during certain manoeuvres in the sport. Clinical diagnosis was confirmed based on pain localized to the dorsoradial forearm, approximately five cm from the wrist joint, which worsened with resisted wrist and thumb extension. The pain significantly affected his work, athletic performance, and daily activities. Conservative management, consisting of physiotherapy and splinting support, failed to control his symptoms.

Dynamic ultrasound scanning of the affected area was conducted to examine the anatomical structures, identify any hypoechoic areas indicating localized pathology, and compare them with the left wrist. The skin was prepared with Chlorprep, and ultrasound guidance was used throughout the procedure to ensure continuous visualization. Aseptic technique was strictly maintained as the needle was carefully positioned at the targeted sites. After confirming the accurate placement of the needle tip, 5 mL of 0.25% chirocaine was injected, which had an immediate analgesic effect. Subsequently, 10 mL of 5% dextrose was administered for hydrodissection, with clear visualization of the distribution of the solution (Figure 1). No adverse effects or complications were noted during or after the procedure.

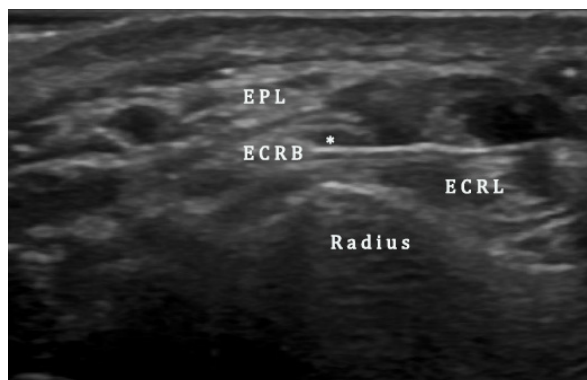


Figure 1. Distal cross-over point with extensor pollicis longus (EPL) passing over the extensor carpi radialis brevis (ECRB) and the extensor carpi radialis longus (ECRL). Asterix (*) indicates hydro dissection.

The patient reported a sustained analgesic effect at three months, with continued improvement and a return to sports activities. Further follow-up is scheduled.

3. Discussion

This is the first documented case of using ultrasound-guided hydrodissection for the therapeutic management of intersection syndrome (IS). This novel approach provides a promising non-operative option for treating this overuse injury, potentially reducing the need for surgical intervention and decreasing rehabilitation time. The case highlights that combining hydrodissection with a structured physiotherapy rehabilitation program can yield optimal patient outcomes. Additionally, this method may decrease reliance on oral analgesics and other repetitive non-operative treatments, such as steroid injections.

Ultrasound is a valuable tool for assessing tissue health in the upper limb, especially when comparing it to the unaffected limb. It offers several advantages: it is efficient, non-invasive, and does not involve radiation. Moreover, patient mobility does not affect image quality or accessibility, making it a reliable option. Ultrasound can decrease the reliance on other imaging modalities, such as MRI, which can be stressful and anxiety-inducing for patients, and may elucidate artifacts that compromise image quality [7]. Additionally, ultrasound minimizes the need for CT and X-ray imaging, thereby limiting radiation exposure.

In the context of IS, ultrasound serves a dual purpose: it provides dynamic real-time imaging and facilitates therapeutic intervention. Consequently, a patient with IS can be scanned, diagnosed, and treated in a single visit, making this approach both time-efficient and cost-effective.

4. Conclusions

The aim of this study was to evaluate the effectiveness of hydrodissection in treating intersection syndrome. In this case, we observed a significant improvement in the patient's symptoms following hydrodissection. This minimally invasive intervention, may present a viable alternative to surgical options, particularly for patients who do not achieve optimal results with traditional conservative treatments. Further research is needed to assess its efficacy. As a novel and promising method in pain medicine, hydro dissection represents an exciting area for future therapeutic investigation.

Learning Points

- Intersection syndrome frequently affects athletes engaged in dexterous sports, such as hurling, tennis, and rowing. It is crucial to differentiate it from other conditions that may present with similar symptoms to ensure appropriate treatment and management. Differential diagnoses to consider include: De Quervain's tenosynovitis (which primarily affects the first extensor compartment and is more localized at the radial styloid), muscle strain or sprain, entrapment of the dorsal radial sensory nerve (Wartenberg's syndrome), carpometacarpal joint

arthritis and extensor pollicis longus tendinitis.

- While physical therapy and rehabilitation should remain the cornerstone of managing intersection syndrome, hydrodissection offers a promising new, minimally invasive treatment option for patients who do not respond to conventional methods.

Availability of Data and Material/Data Transparency

This case report is an honest, accurate, and transparent account of the case being reported. No important aspects of the report have been omitted. Any queries should be directed to the corresponding author via email. Requests for reprints should also be addressed to the corresponding author.

Ethics Approval

This study is fully compliant with the ethical guidelines of the Research Ethics and Clinical Trials Committee of the University of Limerick Hospitals Group.

Consent to Participate

The patient consented to participation and publication of the report as described.

Acknowledgements

We would like to extend our gratitude to the patient for his consent to publish this report.

Conflicts of Interest/Competing Interests

There were no other competing interests involved in this research. There was no support from any organisation for the submitted work and no other relationships or activities that could appear to have influenced the submitted work.

References

- [1] Coggon, D., Ntani, G., Walker-Bone, K., Felli, V.E., Harari, F., Barrero, L.H., *et al.* (2019) Determinants of International Variation in the Prevalence of Disabling Wrist and Hand Pain. *BMC Musculoskeletal Disorders*, **20**, Article No. 436. <https://doi.org/10.1186/s12891-019-2791-x>
- [2] Jordan, K.P., Kadam, U.T., Hayward, R., Porcheret, M., Young, C. and Croft, P. (2010) Annual Consultation Prevalence of Regional Musculoskeletal Problems in Primary Care: An Observational Study. *BMC Musculoskeletal Disorders*, **11**, Article No. 144. <https://doi.org/10.1186/1471-2474-11-144>
- [3] Balakatounis, K., Angoules, A.G., Angoules, N.A. and Panagiotopoulou, K. (2017) Synthesis of Evidence for the Treatment of Intersection Syndrome. *World Journal of Orthopedics*, **8**, 619-623. <https://doi.org/10.5312/wjo.v8.i8.619>
- [4] Chatterjee, R. and Vyas, J. (2016) Diagnosis and Management of Intersection Syndrome as a Cause of Overuse Wrist Pain. *BMJ Case Reports*, **2016**, bcr2016216988. <https://doi.org/10.1136/bcr-2016-216988>
- [5] Hanlon, D.P. and Luellen, J.R. (1999) Intersection Syndrome: A Case Report and

Review of the Literature. *The Journal of Emergency Medicine*, **17**, 969-971.

[https://doi.org/10.1016/s0736-4679\(99\)00125-0](https://doi.org/10.1016/s0736-4679(99)00125-0)

- [6] Lam, K.H.S., Hung, C.Y., Chiang, Y.P., Onishi, K., Su, D.C.J., Clark, T.B., *et al.* (2020) Ultrasound-Guided Nerve Hydrodissection for Pain Management: Rationale, Methods, Current Literature, and Theoretical Mechanisms. *Journal of Pain Research*, **13**, 1957-1968. <https://doi.org/10.2147/jpr.s247208>
- [7] Tazegul, G., Etcioğlu, E., Yildiz, F., Yildiz, R. and Tuney, D. (2015) Can MRI Related Patient Anxiety Be Prevented? *Magnetic Resonance Imaging*, **33**, 180-183. <https://doi.org/10.1016/j.mri.2014.08.024>