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# Trapezius Muscle and Spinal Accessory Nerve Hydrodissection: A Case Report

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## Abstract

**Background:** Neck pain is common. Joint and muscle source of neck pain is common. Hydro dissection is a minimally invasive technique involving injection of fluid to separate fascial layers and release entrapped nerves and tendons. Its use in trapezius hydro dissection has been reported. The spinal accessory nerve innervates the trapezius muscle. Simultaneous hydro dissection of the trapezius muscle and spinal accessory nerve has not been reported. The simultaneous technique may offer benefit in this patient cohort. **Methods:** Case Presentation: A 42-year-old female presented with chronic unilateral neck and shoulder pain, which was minimally responsive to first-line treatment. She had undergone physiotherapy and was on regular oral analgesics. Intervention: In a theatre setting, under monitoring and sterile conditions, the patient underwent an ultrasound-guided procedure. 15 ml of 5% Dextrose was injected to release pressure on the nerves and surrounding tissue, by spreading apart layers of fascia of the trapezius muscle and the spinal accessory nerve. **Results:** The patient reported immediate relief from symptoms on palpation and lateral neck stretch. She was followed up at eight weeks and disclosed no complications; in fact, she obtained a significant improvement in pain scores (6/10 to 2/10 NRS), quality of life and was able to complete activities of daily living with increased ease. No regular analgesics were required at follow-up. **Conclusions:** We report this case as an example of how a simultaneous hydrodissection of the trapezius and spinal accessory nerve may be used as a minimally invasive therapeutic intervention for long-term relief of refractory, debilitating trapezius related myofascial neck pain.

## Keywords

Hydro Dissection, Myofascial, Neck Pain, Trapezius: Spinal Accessory Nerve, Ultrasound

## 1. Introduction

Neck pain is one of the most common chronic pain conditions and an important cause of disability worldwide. It is often associated with functional impairment and a reduced quality of life placing a substantial burden on affected individuals and healthcare systems [1].

Neck pain may arise from several anatomical structures, including muscles and fascia, ligaments, intervertebral discs and cervical facet joints [2]. Myofascial pain syndrome is a regional musculoskeletal pain disorder characterised by myofascial trigger points. These are hypersensitive areas within taut bands of skeletal muscle that produce local tenderness and may result in referred pain when stimulated [3]. The development of myofascial pain is multifactorial. Repetitive mechanical loading, muscle overuse and direct trauma are well-established contributing mechanisms [4], while postural dysfunction and psychosocial factors including stress, anxiety and depression have also been implicated [5]. These factors may be particularly relevant to the cervical and shoulder musculature, where prolonged postural loading and repetitive activity have been associated with myofascial trigger point development [6] with the upper trapezius being one of the most frequently implicated muscles [7].

The pathophysiology of myofascial trigger points remains incompletely understood. According to the integrated trigger-point hypothesis, excessive acetylcholine release at dysfunctional motor endplates may produce sustained localised sarcomere contraction. The associated increase in metabolic demand and compression of the local microcirculation may result in local ischaemia and impaired ATP availability. It's proposed that this altered biochemical environment promotes the accumulation of nociceptive and sensitising mediators, contributing to activation and sensitisation of muscle nociceptors [8].

Management of myofascial pain is typically multimodal and includes physical therapy, exercise therapy, pharmacological treatment and manual trigger point therapy. In patients with persisting symptoms despite conservative measures, minimally invasive interventions, such as dry needling and trigger points injections can be considered [9]. However, there is emerging evidence to support the use of ultrasound-guided interfascial hydrodissection for the treatment of myofascial pain [10].

Hydrodissection involves the injection of fluid under ultrasound guidance to separate adjacent tissue planes. Injectates described in clinical practice include saline, local anaesthetic solutions and dextrose solutions. Its therapeutic mechanism in myofascial pain remains incompletely understood but may involve mechanical separation of fascial layers, disruption of adhesions, improved fascial gliding and modulation of peripheral nociceptive input [11] [12].

Perineural hydrodissection involves the injection of fluid under ultrasound guidance to separate a peripheral nerve from adjacent tissues. Proposed therapeutic mechanisms include the release of fascial adhesions, reduction of mechanical irritation and improved nerve gliding [13].

The spinal accessory nerve, which provides the principal motor innervation to the trapezius, can be visualised within the interfascial plane between the trapezius and levator scapulae muscles [14]. A case report [15] and a small case series [16] have described temporary pain relief following ultrasound-guided spinal accessory nerve blockade in patients with refractory trapezius-related myofascial pain. These observations suggest that the spinal accessory nerve may represent an additional therapeutic target in selected patients, although its precise contribution to myofascial pain remains uncertain [15] [16].

We present the case of a 42-year-old female who presented with refractory, longstanding (greater than two years) unilateral neck and shoulder pain (NRS 6/10). On examination there was trapezius tenderness and pain exacerbated by lateral neck stretch. There were no signs of scapular winging, indicating spinal accessory entrapment. Good shoulder movement and no cervical radicular signs. Patient was previously treated with physiotherapy and dry needling. The patient required regular analgesics (Paracetamol and Non-steroidal analgesics). The patient was treated with a novel approach; simultaneous hydrodissection of the trapezius and spinal accessory nerve.

## 2. Case Report

Theatre procedure. The patient was placed in a supine position. A liner high frequency ultrasound was used. A 21 g hypodermic needle was used and aseptic conditions. Following the injection of 15 mL of 5% dextrose with a hypodermic needle under ultrasound guidance (linear high frequency transducer) to hydrodissect the trapezius muscle (10 mls) and the spinal accessory nerve (5mls) (Figure 1), the patient reported an immediate relief of neck pain on palpation and stretch. There were no immediate nor delayed complications and improvements to symptoms (Pain score 6/10 to 2/10 NRS) and quality of life were sustained at 8 weeks post-intervention. No analgesics were required at follow-up. She obtained a significant improvement in quality of life and was able to complete activities of daily living with increased ease. These findings suggest that a combined approach

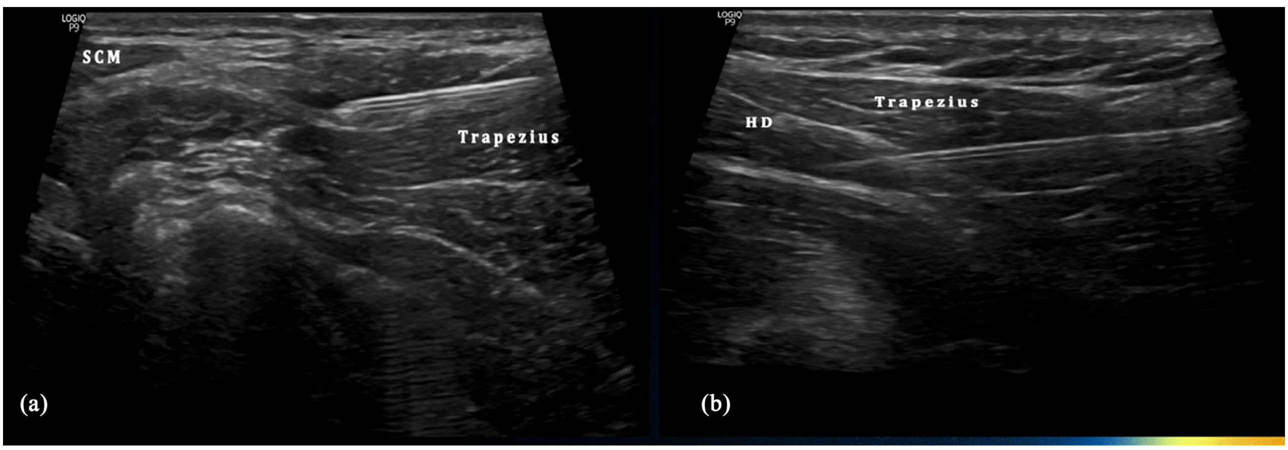


**Figure 1.** SCM = Sternocleidomastoid muscle. (a) Spinal Accessory nerve hydrodissection. (b) Trapezius hydrodissection.

targeting myofascial and neural elements of refractory neck pain may be of therapeutic benefit in selected patients.

## 3. Discussion

There is emerging evidence to support ultrasound-guided interfascial hydrodissection for upper-trapezius myofascial pain, although the injectates and comparator interventions have varied between studies. Suarez-Ramos *et al.* found that hydrodissection using a saline-lidocaine solution and dry needling, each combined with self-stretching exercises, both reduced pain, with greater immediate pain reduction following hydrodissection [11]. Hsu *et al.* reported greater pain reduction at 12 weeks following interfascial injection of 10% dextrose compared with a subcutaneous sham injection, although no differences between the groups were demonstrated in range of motion, pressure-pain threshold or neck and shoulder function [10]. More recently, Chen *et al.* found that hydrodissection using normal saline and lidocaine trigger-point injection produced comparable improvements in pain and function over 12 weeks [17].

In addition to the previously discussed mechanical effects of hydrodissection, the choice of injectate may influence therapeutic outcomes. In this case, 5% dextrose was used for both myofascial and perineural hydrodissection. 5% dextrose has been investigated as an injectate for peripheral nerve hydrodissection in cases of entrapment neuropathy, particularly in carpal tunnel syndrome. It is postulated that 5% dextrose may exert an independent analgesic effect through modulation of nociceptive signalling, including a possible effect on transient receptor potential vanilloid 1 (TRPV1)-mediated pathways although the exact mechanism remains incompletely understood [13]. Therefore, it is possible that the observed improvements in this case resulted from a combination of the mechanical effects of hydrodissection and an independent effect of 5% dextrose on nociceptive signalling, however the present case cannot distinguish between the two.

The inclusion of perineural hydrodissection of the spinal accessory nerve may represent an additional target in trapezius-related myofascial pain. Previous reports have demonstrated temporary pain relief following ultrasound-guided spinal accessory nerve blockade [15] [16], suggesting that neural modulation of motor input to the trapezius muscle may contribute to symptom generation. The incorporation of spinal accessory nerve hydrodissection within combined interventions for refractory myofascial pain has previously been described, as part of a "5-in-1 technique", with encouraging outcomes in two retrospective studies examining interscapular/periscapular pain [18] [19] and a further technique report describing a similar combined approach [20]. This so-called "5-in-1 technique", which demonstrated significant reductions in pain scores at 2 and 12 weeks [18], and at 3 months [19], combined intramuscular trigger-point injections targeting the trapezius, levator scapulae and rhomboid muscle, with hydrodissection of the spinal accessory and dorsal scapular nerves. In contrast the present case employed hydrodissection at both targets—perineural hydrodissection of the spinal accessory nerve combined with myofascial hydrodissection of the trapezius fascial planes, without conventional trigger-point injection. An all-hydrodissection approach may also offer a practical advantage over combined injection-hydrodissection protocols: because hydrodissection avoids repeated direct needle passes into the muscle belly required for intramuscular trigger-point injection, it may be associated with less post-procedural muscle soreness and a more straightforward technique, though this potential benefit has not been directly compared and would need to be evaluated in future studies.

Unlike conventional nerve blockade, perineural hydrodissection mechanically separates a peripheral nerve from its surrounding fascia and connective tissues. Although the precise mechanisms are uncertain, this has been proposed to improve neural mobility and reduce mechanical compression of neural structures. The improvement observed in the patient may therefore reflect a combined effect of targeting both myofascial and neural components of trapezius-related pain.

In the present case, ultrasound guided hydrodissection with 15 mL of 5% dextrose was well tolerated with no immediate or delayed complications. This is consistent with the existing literature where complications are infrequently reported [17]. Ultrasound guidance permits real-time visualisation of the nerve, needle tip and injectate spread which allows accurate administration whilst minimising inadvertent injury to surrounding structures.

This report shares the inherent constraints of any single case description. Without a control group or blinded assessment, we cannot rule out contributions from concurrent medication, a placebo response, regression to the mean, or the natural fluctuation typical of chronic pain presentations.

As both the trapezius fascial planes and the spinal accessory nerve were treated concurrently, their individual contributions to the observed clinical response cannot be determined. Nevertheless, the combined approach of ultrasound guided hydrodissection, targeting both myofascial and neural components of trapezius-related pain has not been previously reported. The degree to which symptoms were alleviated and the resultant initial and sustained improvement in quality of life observed in this case warrants further evaluation.

## 4. Conclusion

This case indicates that combined ultrasound-guided hydrodissection of the trapezius myofascia and the spinal accessory nerve, using 5% dextrose, may offer a feasible and minimally invasive treatment avenue for selected patients with refractory trapezius-related neck pain. Confirming its efficacy, refining the optimal technique, and establishing its safety and durability will require further prospective investigation.

## 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 her consent to publish this report.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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