

Ultrasonography-Substantiated Fate of Myofascial Trigger Point Post Intramuscular Manual Therapy (IMMT) Intervention in the Treatment of Trapezitis: A Case Report

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Received: 28th Feb, 2026; Revised: 6th March 2026; Accepted: 7th April, 2026; Available Online: 20th April, 2026

How to cite this article: Basu S, Deshpande M, Subhedar M. Ultrasonography-Substantiated Fate of Myofascial Trigger Point Post Intramuscular Manual Therapy (IMMT) Intervention in the Treatment of Trapezitis: A Case Report. *Int J Drug Deliv Technol.* 2026;16(53s): 442-447. DOI: 10.25258/ijddt.16.53s.92

Source of support: Nil.

Conflict of interest: None

SUMMARY

Myofascial Trigger Points (MTrPs) in the upper trapezius are a prevalent yet under-investigated cause of cervicalgia and trapezitis. While Intramuscular Manual Therapy (IMMT) is increasingly used to deactivate MTrPs, objective imaging evidence confirming structural change post-intervention remains sparse. This case uniquely contributes by demonstrating ultrasonographic (USG) evidence of MTrP resolution following a structured IMMT programme, bridging the gap between clinical outcomes and imaging confirmation. A young adult male presented with a one-month history of right-sided neck and shoulder pain, progressive cervical stiffness, and functional limitations, with no prior physiotherapy due to financial and geographic barriers. Examination revealed restricted cervical range of motion (ROM) bilaterally, palpable taut bands with active MTrPs in the right upper trapezius, reduced muscle strength, and USG-confirmed increased muscle width with a hypoechoic focal area consistent with an active MTrP. A four-week multimodal programme: IMMT/dry needling, stretching, active ROM exercises, isometric strengthening, postural correction with biofeedback, and patient education reported bilateral ROM improvement, increased muscle strength, and USG-confirmed MTrP resolution. These findings support USG as a valuable objective adjunct in physiotherapy MTrP outcome assessment.

BACKGROUND

Myofascial Pain Syndrome (MPS) is one of the most prevalent musculoskeletal conditions encountered in physiotherapy practice worldwide. It is characterised by Myofascial Trigger Points (MTrPs), which are hyperirritable nodules within palpably taut bands of skeletal muscle, which generate both local and referred pain patterns.¹ The reported prevalence of MTrPs in middle-aged adults (30–60 years) ranges from 37% in males to 65% in females.^{1,2} When MTrPs are active, they produce spontaneous pain and contribute to MPS; latent MTrPs, though clinically silent at rest, are susceptible to activation through repetitive overuse or prolonged postural stress.³

The upper trapezius is among the most frequently affected muscles, with occupational and postural overload being key aetiological factors. 'Trapezitis,' a clinical syndrome of upper trapezius myofascial pain and dysfunction, is commonly encountered in individuals with sedentary or desk-based occupations.⁴ Despite its prevalence, objective imaging confirmation of MTrP status, both at baseline and following intervention is rarely incorporated into physiotherapy case documentation, creating a knowledge gap regarding structural changes induced by treatment.

Intramuscular Manual Therapy (IMMT), also termed dry needling, involves the insertion of a filiform needle into the MTrP to mechanically disrupt the taut band and elicit a

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local twitch response (LTR).⁵ Evidence supports IMMT in rapidly improving range of motion, pressure pain threshold, and muscle tone.^{5,6} The 'injury pool theory' posits that cumulative micro-trauma to muscle fibres predisposes them to MTrP activation under sustained stress.⁷ However, most published case reports rely solely on subjective outcome measures, with ultrasonography (USG) infrequently used to confirm structural changes post-IMMT in routine physiotherapy settings, particularly in resource-limited contexts.

This case report addresses this gap by presenting a patient with USG-confirmed active MTrP in the upper trapezius, managed with a structured IMMT-centred physiotherapy programme, and followed up with post-intervention USG to objectively document structural resolution. The contextual setting, a government outpatient physiotherapy department serving patients with prior financial and geographic barriers to care, further adds to the case's clinical and social relevance.

Case Presentation

A young adult male presented with a one-month history of dull, aching pain in the right neck and shoulder region, progressive cervical stiffness, and difficulty performing activities of daily living (ADL), particularly household tasks and prolonged sitting. Symptoms worsened over time and were attributed to long-term poor posture associated with her sedentary work. She reported a prior diagnosis of 'Myofascial Trigger Point in the Trapezius

Muscle' made at a local hospital approximately one month before this presentation. No prior physiotherapy treatment had been received. Attempts to access specialist physiotherapy care at a comprehensive hospital in a neighbouring city were abandoned due to prohibitive treatment costs. No pharmacological or surgical interventions had been undertaken for this condition. The patient reported a sedentary occupation involving prolonged desk-based work, which she identified as the primary postural stressor. No relevant family history of musculoskeletal or neurological conditions was documented. Patient goals included return to full ADL participation, pain-free cervical movement, and return to comfortable occupational functioning without postural pain.

On observation, the patient demonstrated a forward head posture with elevated right shoulder. Palpation revealed a palpable taut band with an active MTrP in the right upper trapezius muscle, producing both local and referred pain on palpation, consistent with the patient's chief complaint. Skin overlying the taut band was tender. The patient was alert, cooperative, and oriented to time, place, and person. Anthropometric data: height 165 cm; weight 61 kg; mesomorphic build. The motor examination was conducted, which included the manual muscle testing by using the medical research council (MRC) scale and cervical range of motion (ROM) using universal goniometer (Table 1).

Table 1: Motor Examination

Cervical Range of Motion (Universal Goniometer)		
Movement	Identified range (degrees)	Normal range (degrees)
Cervical Flexion	0-50	50-60
Cervical Lateral Flexion (Right)	0-40	0-45
Cervical Lateral Flexion (Left)	0-25	0-45
Cervical Rotation (Right)	0-85	0-80
Cervical Rotation (Left)	0-70	0-80
Manual Muscle Testing (MRC Scale)		
Movement	Identified grade	Normal grade
Cervical Flexion	3	5
Cervical Lateral Flexion (Right)	3	5
Cervical Lateral Flexion (Left)	2	5
Cervical Rotation (Right)	3	5
Cervical Rotation (Left)	1	5

Activity limitations and participation restrictions were mapped to the International Classification of Functioning, Disability and Health (ICF) at initial assessment (Table 2).

Table 2: ICF evaluation

ICF Domain	ICF Category	Qualifier (Capacity/Performance)
Body Function	b280 - Pain in head & neck	2 - Moderate impairment
Body Function	b710 - Mobility of several joints	1-2 - Mild-moderate impairment
Body Structure	s760 - Upper trapezius muscle	2 - Moderate impairment as structural anomaly (taut band, MTrP)
Activity	d475 - Driving (riding bicycle and motorbike, driving car, etc.)	2 - Moderate limitation
Activity	d640 - Doing housework	2 - Moderate limitation
Participation	d850 - Maintaining employment (desk work)	1 - Mild restriction

Investigations, if Relevant

Ultrasonography (USG) of the trapezius muscle was performed pre- and post-intervention using B-mode imaging to assess: (i) trapezius muscle width (in millimetres); and (ii) the size and echogenicity of the focal MTrP area. Pre-intervention USG of the right upper trapezius revealed increased muscle width compared to contralateral normative values and a focal hypoechoic area at the MTrP site. Hypoechoic zones on B-mode USG are consistent with oedema, reduced tissue density, and localised ischemia associated with active MTrPs.⁸⁻¹⁰ These findings corroborated the clinical palpation findings and confirmed the physiotherapy diagnosis of active MTrP causing trapezitis. Differential diagnoses considered and excluded included: cervical radiculopathy (no neurological deficit or dermatomal radiation), cervical facet joint dysfunction (absence of end-range pain pattern), and myositis ossificans (no calcific change on imaging).

Access to USG was available at this institution; however, the patient's prior inability to access specialist care at comprehensive hospitals, due to financial constraints and geographic distance, had delayed diagnosis and intervention by approximately one month. This barrier is clinically relevant as prolonged MTrP activity may

contribute to central sensitisation, potentially complicating treatment response. Pre-intervention USG images of the right trapezius muscle are presented below (Figure 1).

Treatment, if Relevant

A multimodal physiotherapy programme was delivered in the outpatient physiotherapy department over a four-week period. The primary intervention was IMMT / dry needling using a sterile, single-use, solid filiform needle (0.30 mm × 40 mm) inserted into the palpated MTrP in the right upper trapezius belly. Complementary interventions included therapeutic exercise, postural correction, ergonomic training, and structured patient education (Table 3). IMMT was selected as the primary intervention based on evidence demonstrating its effectiveness in reducing pain intensity, improving pressure pain threshold (PPT), and restoring range of motion in individuals with active upper trapezius MTrPs.^{5,6} The mechanical disruption of the taut band by needle insertion elicits a local twitch response (LTR), which is associated with normalisation of the dysfunctional end-plate activity and reduction in nociceptive discharge at the MTrP site. Complementary exercise therapy was indicated to address the secondary cervical muscle weakness and postural dysfunction contributing to the persistent overloading of the trapezius.

Table 3: Therapeutic intervention

Intervention	Frequency	Intensity	Time	Type	Volume	Progression
IMMT (dry needling)	2×/week	Needle insertion to LTR elicitation	15–20 min/session	Intramuscular needling	1–3 needle insertions/session	Depth and number of insertions titrated to LTR
Trapezius stretching	Daily	Comfortable end-range	30 s hold	Static stretch	3 sets × 10 reps	Increased hold duration at week 3–4
Active cervical ROM exercises	2–3×/day	Within pain-free range	10–15 min	Active cervical movement	10 reps per direction	Full range targeted as pain allowed
Isometric strengthening	Daily	Submaximal (pain-free)	10-second holds	Isometric exercises for trapezius, Levator scapulae muscle	1 set × 10 reps	Progressed to isotonic at week 3
Ergonomic/postural correction	3–5×/day	Corrective posture sustained	20–30 s per set	Postural re-education with biofeedback	3–5 sets/day	Biofeedback cues faded at week 4
Patient education	2×/week	N/A (counselling)	20–30 min/session	Didactic and interactive	4 sessions total	Self-management strategies introduced at week 2

Session attendance was monitored by therapist records. Home exercise programme compliance was assessed via self-report at each session. IMMT needle depth was adjusted based on the patient's body habitus and the depth of the taut band as palpated and confirmed by pre-intervention USG. Cervical exercises were initiated within pain-free range and progressed to full active range as ROM improved across the four-week period. Postural

correction exercises incorporated biofeedback cues (verbal and mirror) in early weeks, which were faded progressively as the patient demonstrated automatic postural correction by week four. Isometric exercises were advanced to isotonic resistance at week three following improvement in MMT grades. A detailed chronological timeline of the patient's clinical course is provided in online supplemental table 1.

Time point	Event / Milestone
4 weeks prior	Onset of right neck and shoulder pain; attributed to prolonged poor posture
3 weeks prior	Visited local hospital; diagnosed with MTrP in trapezius; unable to access specialist physiotherapy due to cost and geographic barriers
Day 0 (Baseline)	Presented to outpatient physiotherapy department; baseline USG, goniometry, MMT conducted; physiotherapy diagnosis confirmed
Week 1–2	Initiated IMMT (2×/week), stretching, active ROM exercises, and patient education; mild post-needling soreness reported (resolved within 24 hours)
Week 2	Isometric strengthening commenced; postural correction with biofeedback initiated
Week 3	Isometric exercises progressed to isotonic; improvement in MMT and ROM noted clinically
Week 4	Completion of 4-week programme; post-intervention USG conducted; cervical ROM and MMT re-assessed; significant improvements documented
Post-discharge	Home exercise programme prescribed; patient advised on ergonomic management for occupational posture

Outcome and Follow-up

Pre- and post-intervention outcomes are summarised below (Table 4). Data were collected prospectively at baseline (Day 0) and at programme completion (Week 4).

Table 4: Outcomes assessment post-intervention

Cervical Range of Motion (Universal Goniometer)			
Movement	Pre-intervention Identified range (degrees)	Post-intervention Identified range (degrees)	Normal range (degrees)
Cervical Flexion	0-50	0-55	50-60
Cervical Lateral Flexion (Right)	0-40	0-45	0-45
Cervical Lateral Flexion (Left)	0-25	0-40	0-45
Cervical Rotation (Right)	0-70	0-75	0-80
Cervical Rotation (Left)	0-75	0-80	0-80
Manual Muscle Testing (MRC Scale)			
Movement	Pre-intervention Identified grade	Post-intervention Identified grade	Normal grade
Cervical Flexion	3	4	5
Cervical Lateral Flexion (Right)	3	4	5
Cervical Lateral Flexion (Left)	2	3	5
Cervical Rotation (Right)	3	4	5
Cervical Rotation (Left)	1	3	5

Post-intervention USG of the right trapezius demonstrated a measurable reduction in muscle width and near-resolution of the hypochoic focal area previously identified at the MTrP site (Figure 2). These changes are consistent with mechanical disruption of the taut band, improved local microcirculation, and reduction in localised oedema following IMMT.^{5,6} Formal follow-up was not conducted beyond the four-week supervised programme. A home exercise programme was prescribed, but no structured follow-up appointment was scheduled. The patient attended all scheduled IMMT sessions (representing 100% attendance). Home exercise programme compliance was assessed via self-report at each session; the patient reported completing prescribed exercises on ≥ 5 days/week across the programme duration.

DISCUSSION

The present case was reported adhering to the Physiotherapy Case Report guidelines (PhyCARE).¹¹ This case demonstrates that a structured, multimodal physiotherapy programme centred on IMMT produced clinically meaningful improvements in cervical range of

motion and muscle strength in a patient with USG-confirmed active MTrP in the upper trapezius. Crucially, post-intervention USG confirmed structural changes, reduction in muscle width and resolution of the hypochoic MTrP zone, providing objective imaging corroboration of clinical findings. This is consistent with the mechanistic literature: IMMT is hypothesised to disrupt the dysfunctional motor end-plate, restore local microcirculation, and reduce localised ischemia and sensitisation at the MTrP site.^{5,6}

The USG findings in this case align with prior work by Akhbari et al.⁹ and Sikdar et al.¹⁰, who demonstrated associations between USG-detected muscle properties and pain, ROM, and pressure pain threshold in upper trapezius MPS. The current case adds to this body of evidence by showing that these USG-measurable changes are reversible following IMMT, supporting USG as a feasible outcome tool in physiotherapy MTrP management.^{9,10}

These findings suggest that IMMT, integrated within a comprehensive physiotherapy programme, may produce both subjective and objective structural improvements in

patients with active upper trapezius MTrPs. The use of USG as an adjunct outcome measure adds diagnostic and prognostic value beyond traditional clinical measures alone. Physiotherapists practising in settings with USG access are encouraged to incorporate it as a pre- and post-intervention assessment tool for MTrPs, particularly when documenting treatment efficacy for publication or audit purposes. The case also highlights the clinical and social impact of delayed care due to financial and geographic barriers, which resulted in symptom chronification. Early access to physiotherapy for MTrP conditions, particularly in resource-limited outpatient settings, may prevent the transition from acute to chronic MPS.⁸⁻¹⁰

The strengths of this case report involve use of USG prospectively as an objective outcome measure, providing structural corroboration of clinical findings; a multimodal intervention was documented with FITT-VP parameters; the case captures a socially relevant real-world context of delayed access to care. However, the limitations include presentation as single-case design which limits causal inference and generalisability; and no structured long-term follow-up was conducted.

In conclusion, IMMT integrated within a structured multimodal physiotherapy programme produced clinically significant and ultrasonographically confirmed resolution of an active MTrP in the upper trapezius, with associated improvements in cervical ROM and muscle strength. Future research should investigate the minimum effective

dose of IMMT for MTrP resolution in the upper trapezius, as confirmed by USG, and USG-confirmed structural changes following IMMT for long-term functional and pain outcomes at 12-week follow-up.

LEARNING POINTS / TAKE HOME MESSAGE

- *USG can serve as a reliable, non-invasive adjunct to confirm structural MTrP changes, providing objective imaging corroboration beyond subjective clinical measures alone.*
- *Intramuscular Manual Therapy effectively deactivates active MTrPs in the upper trapezius by mechanically disrupting taut bands and restoring local microcirculation, producing measurable improvements in cervical ROM and muscle strength.*
- *IMMT alone is insufficient; integrating stretching, isometric strengthening, postural correction with biofeedback, and patient education addresses the underlying biomechanical contributors and reduces the risk of MTrP recurrence.*
- *In occupationally-driven trapezitis, addressing the precipitating postural stressor through ergonomic modification and biofeedback is critical to sustaining treatment gains and preventing relapse.*
- *Structured counselling of the patient enhances motivation, reinforces home exercise compliance, and supports a smoother recovery trajectory.*

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Patient Perspective

I was struggling with pain and stiffness in my neck and shoulder for the past few months. The pain often feels like a dull ache but at times it becomes sharp, especially when I turn my head or try to lift objects. It interferes with my daily routine, particularly with household chores and

prolonged sitting at work. I also feel a constant tightness in my upper back that makes it difficult to relax or sleep comfortably. After the physiotherapy programme, I feel a significant reduction in pain and can move my neck much more freely.