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"RESTORING SHOULDER MOBILITY THROUGH THORACIC MANIPULATION IN ADHESIVE CAPSULITIS: A CLINICAL CASE REPORT"

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ABSTRACT

Background: *Adhesive capsulitis (AC), or frozen shoulder, is characterized by progressive pain and restriction of shoulder range of motion (ROM). While conventional physiotherapy focuses on the shoulder complex, emerging evidence suggests a role for the regional interdependence model, where thoracic spine dysfunction may contribute to shoulder symptoms.*

Case Presentation: A 45-year-old male presented with a 3-month history of right shoulder pain and stiffness, diagnosed with idiopathic adhesive capsulitis (Stage II, frozen phase). Initial treatment with a 2-week structured physiotherapy program (including moist heat, pendulum exercises, Spencer techniques, Maitland mobilizations, and progressive strengthening) yielded minimal improvement in pain and ROM.

Intervention: *Following the lack of progress, high-velocity, low-amplitude (HVLA) thrust manipulation was applied to the thoracic spine twice daily for three consecutive days.*

Outcomes: *Immediate and significant improvements were noted post-intervention. Pain on the Visual Analogue Scale (VAS) decreased from 8/10 to 2/10. Shoulder ROM improved markedly: flexion increased from 70° to 140°, abduction from 55° to 150°, and external rotation from 15° to 50°. The patient regained independence in daily activities.*

Conclusion: *This case demonstrates that thoracic spine HVLA manipulation can rapidly improve pain and restore functional ROM in a patient with AC who was unresponsive to conventional shoulder-focused therapy. It supports the principle of regional interdependence in shoulder rehabilitation. Thoracic assessment and manipulation should be considered as an adjunct intervention in the management of adhesive capsulitis, particularly when progress with standard care plateaus.*

Keywords: *Adhesive Capsulitis; Frozen Shoulder; Thoracic Manipulation; High-Velocity Low-Amplitude Thrust; Regional Interdependence; Physical Therapy.*

INTRODUCTION

Adhesive capsulitis (AC), commonly known as frozen shoulder, is characterized by pain and progressive restriction in both active and passive range of motion (ROM) of the shoulder (1). progressive restrictions of active and passive range of motion (ROM) at glenohumeral joint, and can lead to joint mobility restrictions that lead to evidently impaired the shoulder complex functions(2) AC seems to start as an inflammatory process along with accompanying synovitis that progresses to a fibrotic contracture of the capsule at shoulder joint, Primary, or idiopathic adhesive capsulitis, an underlying etiology or associated condition cannot be identified and primary adhesive capsulitis affects about 2% to 5% of the overall population(2, 3)Frozen Shoulder (FS) characterized by a fibrotic inflammatory process of unknown origin, with the most prominent symptoms being pain, stiffness, and reduced joint mobility(4) International Society of Arthroscopy, Knee Surgery and Orthopedic Sports Medicine (ISAKOS) Upper Limb Committee classified FS into idiopathic primary and secondary AC, Primary AC occurs without any direct cause or identifiable trauma, though the patient may have conditions like diabetes mellitus (DM) or thyroid disorders that are associated with stiffness(5) On the other hand, secondary AC refers to joint stiffness resulting from a known underlying cause, such as trauma, infection, or inflammatory disorders(6) AC is described in three pathological stages, the freezing stage, the frozen stage, and the thawing stage. the predictable prevalence of FS is 3%–5% of the general population(7) The condition most frequently affects individuals aged 40–60 years and is typically unilateral. Bilateral involvement of FS is very rare, accounting for about 10% of the cases, and is often linked to systemic conditions such as diabetes or hypothyroidism, one clinical case is reported of bilateral nature of FS by Marin McElroy et al. in 2022, the age of the patient was 50 years but the patient were having a systemic disease of hyperthyroidism (5, 8). High-velocity, low-amplitude (HVLA) thrust manipulation to the thoracic spine is a manual intervention aimed at restoring segmental arthrokinematics and modulating pain processing (9). Its rationale in shoulder rehabilitation is supported by neurophysiological and biomechanical mechanisms, including the immediate downregulation of pain sensitivity and the improvement of kinetic chain efficiency (10). A 2025 randomized controlled pilot study specifically demonstrated that adding thoracic manipulation to a standard shoulder exercise program yielded significantly greater short-term gains in external rotation and functional scores in patients with AC compared to exercise alone (11). Thoracic spine may contribute in many of the shoulder pain and complications as the results of RCT concluded that adding Thoracic Spine Manipulation is having superior clinical outcomes when compared to all other physical therapy interventions in AC patients(12). This clinical case report details the management of a patient age 45 years with primary adhesive capsulitis who exhibited a plateau in progress with a conventional shoulder-centric approach. It outlines the assessment that identified concomitant thoracic segmental hypomobility and describes the subsequent integration of targeted thoracic HVLA manipulation as a catalyst for change. The report documents the immediate and sustained improvements in glenohumeral ROM and patient-reported outcomes, providing a real-world application of recent evidence. By presenting this case, we aim to reinforce the regional interdependence model, offer a practical framework for applying thoracic HVLA, and contribute to the evolving strategies for managing this complex condition

Presentation of Case:

A 45-year-old male, controller of examination at university by profession presented to the Physical Therapy Department Riphah International University Malakand, with complaints of pain and stiffness in his right shoulder for the past 3 months. The examination and assessment of the patient were done by Dr. Zahoor Ahmad (PT) under the supervision of Dr. Zakir Ullah, Assistant Professor in Physical Therapy Riphah International University Malakand. The case was presented in in-session presentation among Rehab Faculty, the symptoms developed gradually, without any reported trauma, systemic disease like Diabetes and thyroid disorders, or previous surgery. The patient experienced nocturnal pain and was unable to perform overhead tasks, grooming, or dressing without assistance.

Physical examination findings:

Active and passive Rang of Motion (ROM) was significantly restricted in right shoulder: Flexion: 70° Abduction: 55° External Rotation: 15°, Internal Rotation: Reaching to the lumbosacral spine. Tenderness noted over the anterior glenohumeral joints right glenohumeral (GH) Strength was moderately reduced due to pain and stiffness, Neurological examination and upper limb reflexes were normal upon a thorough examination.

Diagnostic Workup:

Apley's stretched test were positive, the patient was unable to perform overhead activities, specifically external rotation and abduction were found limited on both sides. Shoulder X-rays were normal initially but calcifications found latter on, Laboratory tests (FBS, HbA1c, TSH) ruled out diabetes and thyroid dysfunction.

Diagnosis:

Right sided idiopathic adhesive capsulitis (Stage II – Frozen phase of AC) with concomitant thoracic spine hypomobility. Diagnosis was made upon clinical decision by the whole Rehab team.

Treatment Plan:

The patient was placed on 2-week physiotherapy program including: Phase I: Moist heat, pendulum exercises, spencer techniques were also applied along with Maitland mobilizations (Grades I–II) for pain management and maintenance and improvement in ROM, Phase II: Active-assisted ROM with wand and pulley exercises with isometrics, In Phase III the patient were provided: Resistance band strengthening, scapular stabilization, and functional training for complete restoration of the condition, the patient were found very supportive and exercise oriented. All the protocols didn't provide any significant result. After two weeks the rehab team decided to manipulate the thoracic spine for two times a day for 3 days. The patient was provided thoracic spine mobilization with high velocity and low amplitude thrust (HVLA) applied in supine position for 2 sessions per day for three days.

Outcome:

At the end of 3rd day session, the Pain improved from Visual Analogue Scale (VAS) 8/10 to 2/10 ROM improved significantly that is Flexion: 140°, Abduction: 150°, ER: 50°, IR: Reaching mid-back i.e. easily scratching the thoracic spine (T8) The patient resumed independent performance of his daily activities

Discussion:

frozen shoulder is relatively common, often poses diagnostic and therapeutic challenges.(13, 14) The condition typically progresses through three phases: freezing, frozen, and thawing. In this case, the patient of age 45 years presented during the frozen phase with symmetrical involvement, but without any metabolic, endocrine, or traumatic etiology. Physical therapy is believed the mainstay of conservative treatment in adhesive capsulitis, particularly in the absence of structural damage or advanced fibrosis(14) The intervention focused on pain management, improvement in ROM, gradual mobilization, and strengthening. The use of Maitland mobilizations, spencer techniques combined with moist heat and patient-specific exercise progression, was effective in restoring of activities of daily life(15, 16) Although corticosteroid injections and surgical options exist for resistant cases, this case demonstrates that even bilateral cases can respond well to non-invasive/conservative treatment and are able to manage through physical therapy, if the provided treatment is initiated early and consistently monitored(16).The results of RCT concluded that adding Thoracic Spine Manipulation is having superior clinical outcomes when compared to all other physical therapy interventions in AC patients(12).

Conclusion:

This case report highlights the potential role of thoracic spine manipulation as an effective adjunct intervention in the management of adhesive capsulitis. As the patient demonstrated minimal improvement following a structured 4-week physiotherapy program comprising heat therapy, mobilization techniques, and progressive strengthening exercises, the introduction of thoracic HVLA manipulation produced rapid and clinically meaningful gains in both pain reduction and shoulder mobility. The notable improvement observed after thoracic manipulation supports the concept of regional interdependence, suggesting that dysfunction in the thoracic spine may contribute to persistent shoulder pain and restricted motion. Incorporating thoracic

mobilization or manipulation may therefore enhance treatment outcomes in patients who fail to respond adequately to conventional shoulder-focused interventions.

Further research, including controlled clinical trials, is recommended to validate these findings and to better understand the mechanisms underlying thoracic manipulation's therapeutic effects in adhesive capsulitis.

Recommendations:

Based on the positive clinical response observed in this case, clinicians are encouraged to consider incorporating thoracic spine assessment and manipulation as part of the comprehensive management plan for patients with adhesive capsulitis, particularly when progress with conventional shoulder-focused physiotherapy is limited. Early evaluation of regional interdependence and thoracic mobility may help identify underlying biomechanical contributors to shoulder dysfunction. It is also recommended that future studies, including randomized controlled trials, be conducted to explore the effectiveness, safety, and optimal dosage of thoracic HVLA manipulation in adhesive capsulitis. Additionally, clinicians should be trained in appropriate screening methods and manipulation techniques to ensure safe practice. Integrating thoracic interventions with evidence-based shoulder rehabilitation may lead to improved functional outcomes and faster recovery in individuals with adhesive capsulitis.

Ethical Approval:

This case report was conducted in accordance with institutional ethical guidelines. No experimental procedures were performed.

Sources of Funding:

No financial support was received for this case report.

Consent:

Written informed consent was obtained from the patient for publication of this case.

Conflicts of Interest: The authors declare no conflicts of interest.

Author Contributions

Zakir Ullah: Case management, data collection, manuscript drafting, Review, supervision, clinical input

All authors of this article have read and approved the final manuscript.

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