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Maitland Mobilisation in Rehabilitation of a Cancer Survivor Patient with Frozen Shoulder: A Case Study

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ABSTRACT

Adhesive capsulitis, or frozen shoulder, is a progressively disabling condition characterised by pain and loss of glenohumeral motion. In elderly cancer survivors, rehabilitation requires caution due to comorbidities and oncology-related contraindications. A 77-year-old male cancer survivor with carcinoma of the prostate (treated with radiotherapy), pacemaker implantation, and coronary artery disease presented with adhesive capsulitis of the left shoulder following a traumatic fall. Examination revealed painful restriction in all planes of movement, muscle weakness (3-/5), a VAS pain score of 6/10 and significant functional impairment (SPADI: 64/100). A four-week rehabilitation program was administered in two phases. Maitland mobilisation techniques (antero-posterior and inferior glide, grades I-II) were combined with conventional physiotherapy exercises such as pendular movements, wall ladder tasks, mariner's wheel and thera-band strengthening. A structured home exercise program was prescribed. Electro-physical modalities were excluded owing to oncological risks. The patient showed clinically meaningful reductions in pain, increased capsular extensibility, improved shoulder range of motion, and enhanced daily functional capacity. Maitland mobilisation, integrated with structured exercises, appears to be a safe and effective rehabilitation strategy for managing adhesive capsulitis in elderly cancer survivors. Future controlled studies are warranted to establish standardised protocols and assess long term outcomes.

Keywords: Adhesive capsulitis, frozen shoulder, Maitland Mobilisation, cancer survivor rehabilitation physiotherapy, geriatric rehabilitation.

INTRODUCTION

The shoulder joint, owing to its complex structure and wide range of motion, is particularly vulnerable to dysfunction. Among the most common shoulder pathologies is adhesive capsulitis, widely known as frozen shoulder, which presents with pain, stiffness, and progressive loss of both active and passive mobility. The condition can arise insidiously, often following minor trauma or prolonged immobilization; though its precise aetiology

remains uncertain. Pathophysiological mechanisms implicated include capsular fibrosis, contracture, synovial inflammation, and reductions in synovial fluid, leading to increased intra-articular pressure, disorganisation of collagen fibres, and consequent restriction of joint movement and elasticity. [1]

Clinically, frozen shoulder is recognised by its characteristic stages—painful, stiffening, and recovery phases—that may extend over months to years. [2] The condition is more frequently observed in women, particularly those in middle to late adulthood, and is strongly associated with systemic comorbidities such as diabetes mellitus, thyroid dysfunction, and other metabolic or endocrine disorders. While diagnosis is largely clinical, imaging may be employed to exclude alternative causes of shoulder dysfunction. Management strategies typically include pain relief, structured physiotherapy, and, in refractory cases, corticosteroid injections or surgical interventions such as capsular release. [3]

Physiotherapists play an essential role in the rehabilitation of patients with frozen shoulder by working to restore mobility, functional independence, and overall quality of life. Their interventions span from manual therapy and functional retraining to the use of assistive technologies and patient education, with the ultimate goal of optimising physical performance and daily functioning. Among manual therapy approaches, Maitland mobilisation has been shown to be effective in reducing pain and improving shoulder mobility by applying graded oscillatory techniques to the gleno-humeral joint. [4]

This case study aims for the rehabilitation of a 77-year-old cancer survivor with adhesive capsulitis of the shoulder, and finding the role of Maitland mobilisation in reducing pain, improving joint mobility, and enhancing overall functional outcomes.

CASE STUDY

A 77-year-old male reported to the Physiotherapy Outpatient Department at CRCSRE, Guwahati, with complaints of persistent pain in the left shoulder and difficulty in performing shoulder movements and Activities of Daily Living (ADLs) for more than three months. The onset of symptoms followed a traumatic fall from a chair approximately two months prior to presentation. Since the injury, the patient noted progressive restriction of shoulder movements, pain at terminal ranges, and difficulty in activities such as bathing, dressing, and grooming.

The patient's medical history was significant. In 2011, he experienced a mild myocardial infarction that required permanent pacemaker implantation. He was subsequently diagnosed with carcinoma of the prostate in 2018, for which he underwent 34 fractions of external beam radiotherapy in 2019. In 2022, he developed coronary artery disease and was managed with percutaneous coronary intervention and stent placement. The following year, he underwent cystoscopy and subsequently developed urinary incontinence. In April 2025, after a fall, he sustained an un-displaced fracture involving the left shoulder region, which precipitated his current complaints.

On observation, the patient was of meso-morphic build, with normal posture and gait. Local examination revealed grade II tenderness and mild swelling over the left shoulder. On palpation, there was no abnormal rise in temperature. The patient was examined in a high sitting position. Neurological examination showed normal muscle tone, intact superficial and deep reflexes, preserved cortical sensations, and no dermatomal deficits.

Range of motion (ROM) testing demonstrated painful and restricted movement in all planes during both active and passive examination. Limitation was most marked in flexion, abduction, and rotations, with painful restriction at end ranges. The end feel was noted to be empty, suggestive of pain-limited mobility. A capsular pattern was observed, with external rotation limited to 40°, abduction to 90°,

and internal rotation to 50°. Muscle strength testing of the left shoulder flexors, extensors, abductors, adductors, and rotators showed a reduced grade of 3-/5. Pain assessment using the Visual Analogue Scale (VAS) indicated a score of 6/10, reflecting moderate pain intensity.

Resisted isometric testing revealed pain during concentric contraction of the left shoulder, suggestive of C5 myotome involvement. Special tests, including the Empty Can Test and Roos Test, produced positive findings. Functional disability was further quantified using the Shoulder Pain and Disability Index (SPADI), where the patient scored 64/100, indicative of severe pain and disability impacting daily function.

Based on clinical history, examination findings, and assessment outcomes, the possible diagnosis of adhesive capsulitis (frozen shoulder) of the left shoulder was established in this elderly cancer survivor.

MATERIALS & METHODS

According to current studies, the pathophysiology and neuroscience underlying the disease are the most successful ways to alleviate catastrophic pain symptoms in patients with frozen shoulders. [4] The primary goal of rehabilitation in the initial phase was to maintain the available range, increase the ROM and decrease the pain.

Based on previous study findings, Maitland mobilisation was introduced to the patient (Antero-posterior and inferior glides—grade 1 and 2 for 10 oscillations for 3 sets each)

In the first phase the following conventional exercises were performed:

1) Mariners Wheel (10 rounds clockwise, 10 rounds anticlockwise for 3 sets)
2) Wall washes (10 rounds for 3 sets)
3) Wall ladder (10 rounds for 3 sets)
4) Towel press (10 rounds for 3 sets)
5) Pendular exercise (10 rounds front, ten rounds back for 3 sets, 10 rounds clockwise,10 rounds anticlockwise for 3 sets)

A rest period of 2 minutes was given in between every exercise and the entire therapy session was performed for 5 days/week for 2 consecutive weeks.

The patient was advised to follow the same sets of exercises twice a day and was also advised to use thermotherapy (moist heat fomentation).

Fig. 1: Maitland Mobilisation grade 1 and 2 (anterior glide)

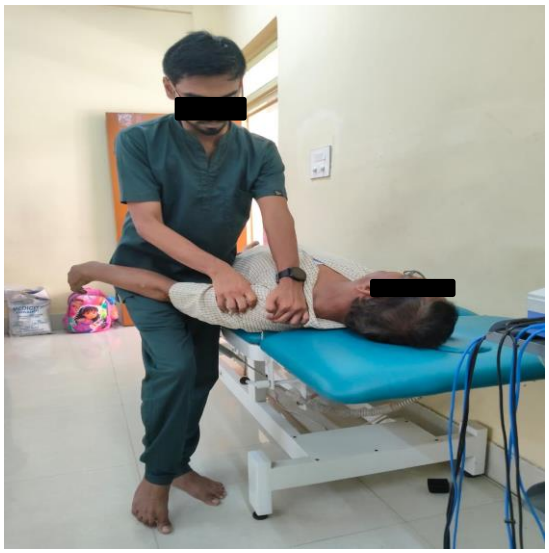

Fig. 2: Maitland Mobilisation grade 1 and 2 (Inferior glide)

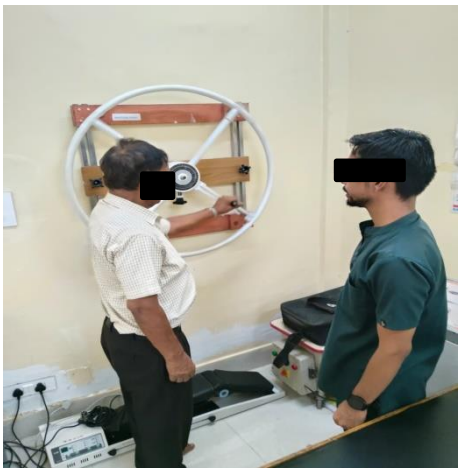

Fig. 3: Mariners Wheel exercise

Fig. 4: Wall stretch exercise

Fig. 5: Wall Wash exercise

Fig. 6: Thera-band exercise

Prior to initiation of the second phase of intervention, Maitland joint mobilization techniques were administered, consisting of antero-posterior (AP) and inferior glides at Grade II and Grade III oscillatory movements, delivered as 15 oscillations per set for 3 sets each.

The second phase included the following exercises—

1) Mariners Wheel (10 rounds clockwise, 10 rounds anticlockwise for 3 sets)
2) Wall washes (10 rounds for 3 sets)
3) Wall ladder (10 rounds for 3 sets)
4) Towel press (10 rounds for 3 sets)
5) Resisted flexion with red coloured theraband (10 rounds for 3 sets)
6) Resisted abduction with red coloured theraband (10 rounds for 3 sets)
7) Pendular exercise (10 rounds front, ten rounds back for 3 sets, 10 rounds clockwise,10 rounds anticlockwise for 3 sets)

A rest period of 2 minutes was given in between every exercise and the entire therapy session was performed for 5 days/week for next 2 consecutive weeks.

The patient was advised to follow the same sets of exercises twice a day and was also advised to use thermotherapy (moist heat fomentation)

Outcome Measures

The Shoulder Pain and Disability Index (SPADI) is a self-reported questionnaire designed specifically for individuals with shoulder problems. It consists of 13 items divided into two sections: a pain subscale with 5 questions and a disability subscale with 8 questions. Each item is scored on a 0–10. Likert scale, where 0 represents "no

pain" or "no difficulty," and 10 represents "the worst possible pain" or "so difficult that assistance was required," depending on the subscale. The overall SPADI score is obtained by adding the responses, averaging them within each subscale, and then converting the result to a 0–100 scale, where higher scores indicate greater shoulder pain and functional limitation. [5] Studies have shown that SPADI demonstrates good test–retest reliability, with intraclass correlation coefficients reported at 0.91 in surgical populations and 0.65 (95% CI: 0.42–0.80) in primary care settings. It has also been found to be responsive to clinical changes in shoulder conditions. [6]

The Visual Analog Scale (VAS) is a straightforward and widely used tool for measuring subjective characteristics such as pain intensity. It consists of a horizontal line, usually 10 centimeters long, with descriptive anchors at either end representing the extremes of the sensation or feeling being measured—for example, from "no pain" to "worst possible pain." Patients indicate their current state by marking a point on the line that best reflects their perception. The distance from the left endpoint to the mark is then measured, providing a quantitative value representing the intensity of the symptom. Due to its continuous scale, VAS allows for sensitive detection of small changes in symptoms and is used extensively in both clinical and research settings to monitor and assess treatment outcomes. [7] The Visual Analog Scale (VAS) shows strong reliability in assessing acute pain, as indicated by a high intraclass correlation coefficient (ICC). In fact, 90% of the reported pain scores were consistent within a 9 mm range. These findings indicate that VAS is a dependable tool for measuring pain levels. [8]

RESULT

Following the four-week rehabilitation period, the patient's post-intervention assessment showed improvement in both pain and shoulder function. The Shoulder Pain and Disability Index (SPADI) score decreased from 64/100 at baseline to 45/100 after treatment, indicating a shift from severe to moderate pain and disability according to established interpretation categories. Similarly, the Visual Analogue Scale (VAS) score for pain was reduced from 6/10 initially to 4/10 following therapy, reflecting a notable reduction in pain intensity. The intervention protocol was well tolerated, with no adverse effects reported throughout the duration of treatment.

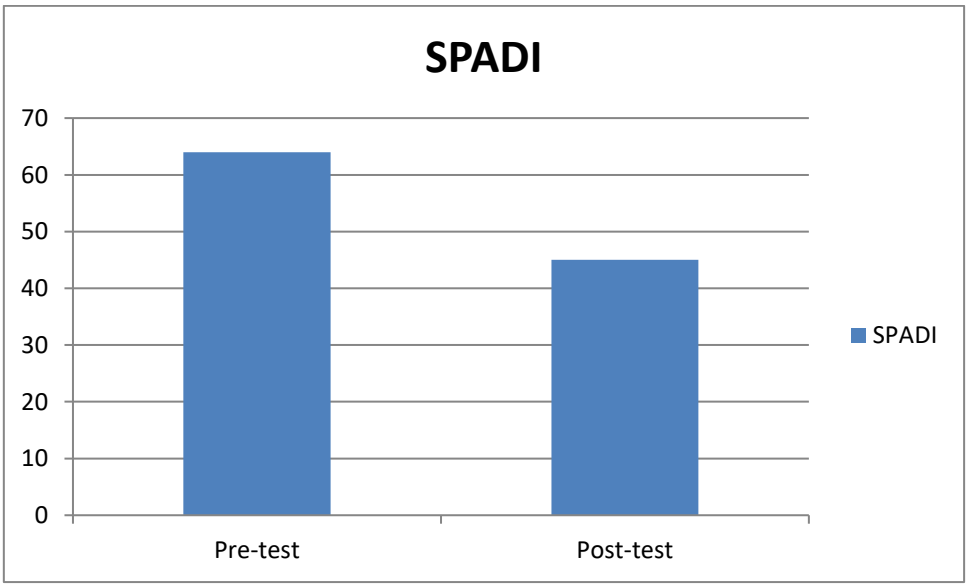

Fig. 7

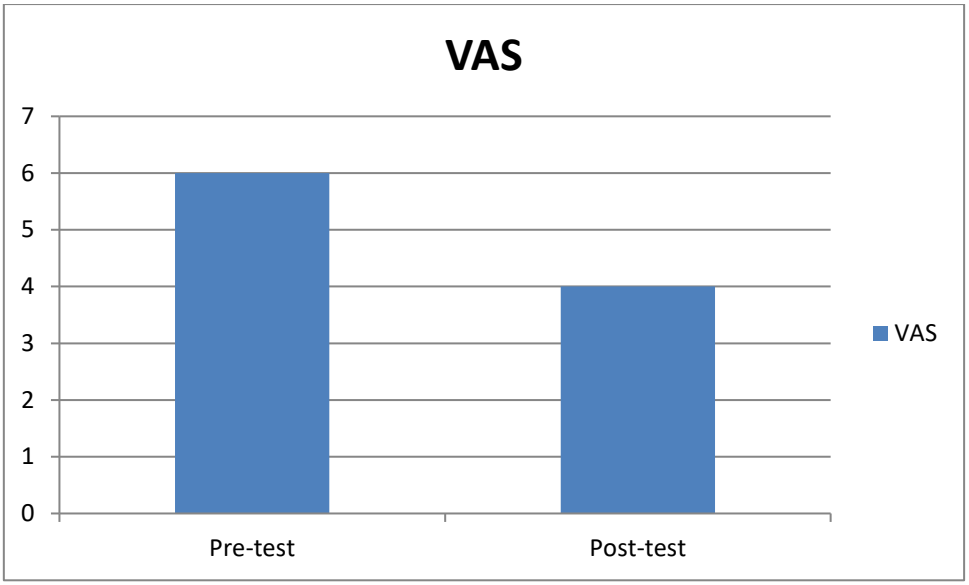

Fig. 8

DISCUSSION

In this case study, Maitland mobilization techniques were utilized in the management of a cancer survivor with possible diagnosed of adhesive capsulitis (frozen shoulder). The intervention was introduced with regards to its effects on pain reduction and improvement in joint stiffness. Additionally, the sustainability of therapeutic outcomes was assessed, given the high clinical concern regarding the relapse of capsular stiffness in this patient population. [9]

Adhesive capsulitis is most commonly managed through a combination of analgesics and physiotherapeutic interventions, particularly shoulder mobilization exercises. Physiotherapy is considered fundamental both in the prevention and in the resolution of this condition. The regular performance of specific joint movements has been shown to play a preventive role in primary adhesive capsulitis, whereas in secondary adhesive capsulitis, emphasis is placed on early, graded mobilization through the available range of motion (ROM) to not only preserve joint kinematics but also to derive the systemic benefits of therapeutic exercise. [10]

The primary goals of management in this patient were to alleviate pain, enhance capsular extensibility, improve muscular strength, and restore functional mobility of the shoulder joint. [11] To address these goals, superficial thermotherapy (e.g., moist hot packs) and gentle, relaxed passive mobilization techniques were employed to decrease pain perception and to increase the extensibility of peri-articular soft tissues. Muscular strength was targeted through isometric contractions and resistance-based exercises. [12]

Electro physical modalities such as Interferential Therapy (IFT) and Ultrasound Therapy (UST) were not administered, as these are contraindicated in oncology patients due to the risk of stimulating residual malignant cells or interfering with post-radiation tissue responses. [12]

To promote joint mobility, the patient was engaged in pendular exercises, wheel-and-axle training (mariner's wheel), wall ladder exercises, wall washing activities, stretching, and manual mobilization techniques. The extra-articular restrictions to motion were attributed primarily to peri-articular adhesions and collagen cross-linking within the capsule and ligamentous structures. These cross-linkages, which arise from a reduction in glycosaminoglycan (GAG) content, may be disrupted through Maitland mobilization techniques, thereby enhancing capsular excursion and joint play; it has been suggested that such mobilization exerts beneficial effects on both synovial

fluid dynamics and capsular tissue mechanics. [13]

The observed reduction in pain following mobilization can be explained by multiple neurophysiological mechanisms. These include the stimulation of type II mechanoreceptors, inhibition of type IV nociceptors, activation of Golgi tendon organs, and reflexive inhibition of peri-articular muscle activity at the end range of passive mobilization. Furthermore, mobilization has been associated with a decrease in muscle hyperactivity, leading to reductions in peri-articular tissue discomfort, muscle tension, and inappropriate concentric activation. [14]

CONCLUSION

This single-case study suggests that Maitland mobilization, integrated within an oncology-aware rehabilitation program, can be a safe and effective option for a cancer survivor with adhesive capsulitis. Across the therapy session, the patient demonstrated clinically meaningful reductions in pain, improved capsular extensibility, gains in active and passive shoulder range of motion, and observable functional improvements in activities of daily living. Benefits were achieved without the use of electro-physical modalities contraindicated in oncology care, underscoring the value of manual therapy combined with graded exercise, thermotherapy, and home practice.

While researches support the use of tailored Maitland grades and directions (AP/inferior glides) to address pain and stiffness, conclusions are limited by the single-subject design, absence of a control condition, and finite follow-up. Larger, controlled studies with standardized outcome measures and longer surveillance are warranted to confirm efficacy, define optimal dosing parameters, and evaluate durability of effects and relapse prevention. Nonetheless, this case highlights that individualized, phase-appropriate Maitland mobilization can meaningfully contribute to shoulder rehabilitation in cancer survivors when delivered within evidence-based safety precautions.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

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