



P-ISSN: 2394-1685  
E-ISSN: 2394-1693  
Impact Factor (RJIIF): 5.93  
IJPESH 2025; 12(4): 499-501  
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<https://www.kheljournal.com>  
Received: 21-06-2025  
Accepted: 22-07-2025

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## Effect of proprioceptive neuromuscular facilitation and maitland mobilization technique on pain management and range of motion improvement in frozen shoulder

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### Abstract

This study aimed to evaluate the effectiveness of Proprioceptive Neuromuscular Facilitation (PNF) and Maitland mobilization techniques in treating frozen shoulder. Thirty participants were divided into two groups: Group A received PNF with conventional therapy, and Group B received Maitland mobilization with conventional therapy, both over a 6-week period. Pain and Range of Motion (ROM) were assessed before and after treatment. Results showed that the Maitland mobilization technique was more effective than PNF in reducing pain and improving ROM. The study concluded that Maitland mobilization significantly improves outcomes in frozen shoulder patients based on VAS and ROM assessments.

**Keywords:** Proprioceptive neuromuscular facilitation, maitland mobilization technique, frozen shoulder

### 1. Introduction

Codman coined the term “frozen shoulder” in 1934, describing it as a painful condition that develops gradually and is marked by stiffness during forward elevation of the arm <sup>[1]</sup>. It involves several muscles including the rotator cuff group, deltoid, pectoralis major, and trapezius. The primary symptoms are shoulder pain, stiffness, and restricted Range of Motion (ROM).

The condition progresses through three stages:

- **Stage 1 - Freezing stage:** Lasts 3-9 months, with increasing pain and progressive limitation of motion due to severe glenohumeral synovitis <sup>[2]</sup>.
- **Stage 2 - Frozen/transitional stage:** Lasts 4-12 months, characterized by restricted use of the arm and significantly reduced external rotation, flexion, and internal rotation <sup>[2]</sup>.
- **Stage 3 - Thawing stage:** Lasts 12-42 months, marked by a gradual recovery of shoulder mobility <sup>[3]</sup>.

### Therapeutic approaches

- Proprioceptive Neuromuscular Facilitation (PNF) enhances ROM and muscle activation through mechanisms such as autogenic inhibition, reciprocal inhibition, stress relaxation, and the gate control theory <sup>[4]</sup>.
- Maitland Mobilization involves sustained manual mobilizations applied by a therapist to the glenohumeral joint, aimed at improving joint ROM <sup>[5]</sup>.

### 2.1 Materials required

- Universal goniometer
- Treatment table
- Chair
- Pillow
- Consent form
- Evaluation form
- Assessment tools

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**2.2 Study setting**

- Sri Ramakrishna Multispeciality Hospital

**2.3 Study design**

- Quasi-experimental study

**2.4 Sample size**

- Total of 30 subjects selected based on criteria
- Divided into:
- **Group A:** PNF techniques + conventional therapy
- **Group B:** Maitland mobilization + conventional therapy

**2.5 Sampling method**

- Convenient sampling

**2.6 Study duration**

- One year

**2.7 Treatment duration**

- 30 minutes per session
- Alternate days for 6 weeks

**2.8 Selection criteria****Inclusion criteria**

- Diagnosed frozen shoulder
- Age 40-50 years
- Both sexes included
- Restricted shoulder abduction

**Exclusion criteria**

- Rotator cuff tear
- Biceps tendonitis
- Osteoporosis
- Rheumatoid arthritis

**2.9 Outcome measures****Independent variables**

- PNF techniques
- Maitland mobilization techniques

**Dependent variables**

- Pain reduction
- ROM improvement

**2.10 Measurement tool**

- Visual Analog Scale (VAS)
- Goniometer

**2.11 Procedure**

- 30 participants selected and divided into two groups (A and B).
- Pre-treatment assessment of pain and ROM.
- **Group A:** Received PNF with conventional therapy (30 mins/session, alternate days for 6 weeks).
- **Group B:** Received Maitland mobilization with conventional therapy (2-3 glides/sec for 30 sec per glide, 5 sets, alternate days for 6 weeks).
- Post-treatment data collected at 6 weeks.
- Pre- and post-test data were compared.

**2.12 Treatment techniques****a) PNF techniques****Technique 1: Contract-Relax (CR)**

- **Position:** Supine
- **Procedure:** Passive stretch → isometric contraction → relaxation → further stretch

**Technique 2: Hold-Relax (HR)**

- **Position:** Supine
- **Procedure:** Stretch maintained during isometric hold → relaxation → move to new range

**Technique 3: Rhythmic stabilization**

- **Position:** Supine
- **Procedure:** Alternating resistance to produce isometric contractions → improve stability and reduce pain

**Technique 4: Rhythmic initiation**

- **Position:** Supine
- **Procedure:** Passive → active-assistive → active ROM to reduce pain and improve movement coordination

**Technique 5: Scapular PNF patterns**

- **Position:** Side-lying on unaffected side
- **Procedure:** Anterior elevation and posterior depression patterns to improve scapular mobility

**b) Maitland mobilization****Grades used**

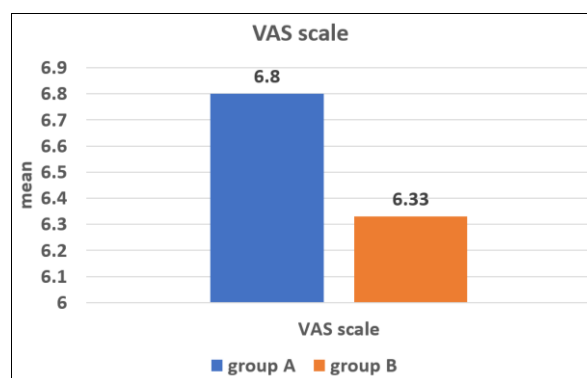
- **Grade III & IV:** High amplitude mobilizations for increasing ROM and stretching joint capsule

**Techniques**

- **Anterior glide:** Improves extension and external rotation
- **Posterior glide:** Enhances internal rotation and flexion
- **Inferior glide:** Increases abduction via inferior capsule mobilization

**3. Result**

Pre-test and post-test values of the study were collected and assessed for variations in improvement and their results were analysed using independent t test and paired t test. The statically analysis of the study showed that there is a significant difference between the groups in VAS scale and ROM with a t value VAS scale and ROM was 2.048.

**Comparison of results****Fig 1: VAS scale**

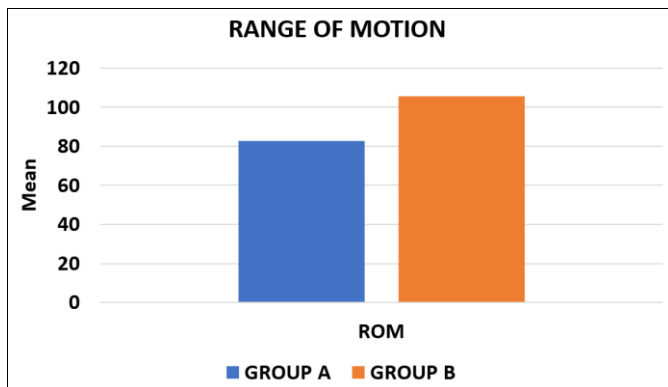


Fig 2: Range of motion

#### 4. Discussion

In this study, 30 patients with frozen shoulder were divided into two groups of 15 each. Group A received PNF techniques with conventional therapy, while Group B received Maitland mobilization with conventional therapy, both administered thrice a week for 6 weeks.

Pre- and post-treatment assessments were done using the Visual Analogue Scale (VAS) for pain and Goniometer for Range of Motion (ROM). Statistical analysis using the independent 't' test revealed that both groups showed clinically significant improvement, but Group B (Maitland mobilization) demonstrated a greater reduction in pain and greater improvement in ROM compared to Group A.

The calculated 't' values (2.97 for VAS and 2.05 for Goniometer) were higher than the table value (2.04), indicating statistically significant differences, confirming that Maitland mobilization is more effective than PNF in reducing pain and improving shoulder mobility in frozen shoulder patients.

#### 5. Conclusion

This study aimed to identify the most effective treatment strategy for frozen shoulder by comparing PNF technique with conventional therapy and Maitland mobilization technique. Based on statistical analysis, both interventions showed clinical improvements, but the Maitland mobilization technique was more effective in significantly reducing pain and improving range of motion.

Therefore, the null hypothesis was rejected and the alternate hypothesis accepted, confirming that there is a significant difference between the two techniques, with Maitland mobilization proving more beneficial for individuals with frozen shoulder.

#### References

1. Al Shehri A, Almureef SS. Maitland mobilization in frozen shoulder. 2018;22-27.
2. Malik M, Kaur J, Singh V, Punia S. Proprioceptive neuromuscular facilitation in frozen shoulder. 2019;2349-2369.
3. Jason JI, Sundaram GS, Subramani MV. Physiotherapy interventions for frozen shoulder. 2015;2321-2322.
4. Lin P, Yang M, Huang D, Lin H. Effect of proprioceptive neuromuscular facilitation in frozen shoulder. 2022;23:367.
5. Radzi NFM, Regan R. Effect of proprioceptive neuromuscular facilitation and mobilization in frozen shoulder. 2024;2633-828.
6. Sandor R. Adhesive capsulitis: optimal treatment of frozen shoulder. *Phys Sportsmed*. 2000;28:23-29.

7. Hanchard N, Goodchild L, Thompson J, O'Brien T, Davison D, Richardson C, et al. Evidence based clinical guidelines for the diagnosis, assessment and physiotherapy management of contracted (frozen) shoulder. London: Chartered Society of Physiotherapy; 2011.
8. Bunker TD. Frozen shoulder: unravelling the enigma. *Ann R Coll Surg Engl*. 1997;79:210-213.
9. Bunker TD. Time for a new name for frozen shoulder: contracture of the shoulder. *Shoulder Elbow*. 2009;1:4-9.
10. Hand GCR, Athanasou NA, Matthews T, Carr AJ. The pathology of frozen shoulder. *J Bone Joint Surg Br*. 2007;89:928-932.
11. Van der Windt DA, Koes BW, de Jong BA, Bouter LM. Shoulder disorders in general practice: incidence, patient characteristics, and management. *Ann Rheum Dis*. 1995;54:959-964.
12. Dawson J, Shepperd S, Carr A. An overview of factors relevant to undertaking research and reviews on the effectiveness of treatment for frozen shoulder. *Shoulder Elbow*. 2010;2:232-237.