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The Effects of Shoulder Mobilization Technique and Positional Release Technique v/s Only Positional Release for Pectoralis Minor Tightness in Forward Shoulder Patients: A Comparative Study

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Abstract: ***Background**: Forward shoulder posture (FSP) [10] is a common musculoskeletal deviation, often linked to pectoralis minor (PMi) tightness and decreased shoulder function. Manual therapy interventions like positional release technique (PRT) [3] and shoulder mobilization (SMT) [1] are widely used in clinical practice. **Objective**: To compare the effectiveness of PRT alone versus a combined intervention of SMT and PRT in reducing PMi tightness and improving shoulder function in individuals with FSP. **Methods**: A total of 30 participants with FSP and PMi tightness were randomly allocated into Group A (PRT only, n=15) and Group B (SMT+PRT, n=15) [4]. Interventions were administered thrice weekly for 6 weeks. Outcome measures included PMi length Test/ Table Top Test (cm) [8], shoulder range of motion (flexion and external rotation in degrees) [6], and SPADI (Shoulder Pain and Disability Index) [5]. Pre - and post - intervention data were statistically analyzed using paired and unpaired t - tests. **Results**: A total of 30 participants with FSP and PMi tightness were randomly allocated into Group A (PRT only, n=15) and Group B (SMT+PRT, n=15). Interventions were administered thrice weekly for 6 weeks. Outcome measures included PMi length (cm), shoulder range of motion (flexion and external rotation in degrees), and SPADI (Shoulder Pain and Disability Index). Pre - and post - intervention data were statistically analyzed using paired and unpaired t - tests. **Conclusion**: While PRT alone is effective, combining SMT with PRT yields superior improvements in shoulder mobility, posture correction, and pain reduction in FSP patients.*

Keywords: Shoulder Mobilization, Positional Release Technique, Pectoralis Minor Tightness, Forward Shoulder Posture, SPADI.

Clinical Relevance and Indian Healthcare Context

In India, the prevalence of postural syndromes such as forward shoulder posture has increased notably among adolescents and young adults due to the widespread use of smartphones, prolonged screen time, poor ergonomic practices, and sedentary academic or work environments. These musculoskeletal issues are often underreported and undertreated due to lack of awareness, accessibility, and prioritization of physiotherapy services, particularly in semi - urban and rural regions.

This study is highly relevant in the Indian healthcare context where cost - effective, non - invasive, and practical treatment options are vital. Techniques such as positional release and shoulder mobilization are manual therapy - based, require minimal equipment, and can be implemented even in resource - constrained clinical settings. They offer rapid symptom relief and functional improvement, reducing the dependency on pharmacological pain management or surgical intervention.

By demonstrating the superior efficacy of a combined SMT and PRT approach, this study provides a replicable model for physiotherapists in India to adopt integrated therapeutic interventions in their practice. Furthermore, incorporating such protocols in undergraduate and postgraduate physiotherapy curricula can strengthen evidence - based practice nationwide.

1. Introduction

Forward shoulder posture (FSP) [10] is characterized by anterior displacement and downward rotation of the scapula, commonly seen in sedentary populations. A major contributing factor is the shortening of the pectoralis minor muscle, which restricts normal scapular motion, resulting in functional limitations, pain, and increased risk of shoulder injuries.

Manual therapy techniques such as positional release therapy (PRT) [2] and shoulder mobilization technique (SMT) [1] aim to restore biomechanical balance and joint function.

This study explores whether combining SMT with PRT offers superior benefits over PRT alone in treating PMi tightness and related impairments in individuals with FSP.

2. Methodology

2.1 Study Design and Participants:

A comparative interventional study was conducted on 30

patients aged 15–30 years diagnosed with FSP and PMi tightness. Participants were randomly assigned to:
Group A (n=15): PRT only
Group B (n=15): SMT + PRT

2.2 Inclusion Criteria:

- Linear distance from treatment table to acromion >2.6 cm
- Restricted shoulder flexion (>150°) and external rotation
- Age 15–30 years

2.3 Exclusion Criteria:

- Diabetes, pregnancy, cardiac/respiratory/dermatologic issues
- History of surgery or upper limb fracture

2.4 Intervention Protocol:

Participants received their respective interventions thrice weekly for 6 weeks. SMT involved inferior and posterior glides of the glenohumeral joint, while PRT targeted PMi tender points.

2.5 Duration

6 weeks; 3 sessions/week.

2.6 Outcome Measures

- Pectoralis Minor Length Test/ Table Top Test
- Goniometric ROM: Shoulder flexion and external rotation
- SPADI scale

2.7 Statistical Analysis

Paired and unpaired t - tests were used. A p - value <0.05 was considered statistically significant.

3. Results

Table 1: Average Improvement, t - value, p - value, and result for comparison of Pre and Post Treatment in Group - A

Variable	Period	Average Improvement	t - Value	p - Value	Result
PMi length	Pre - 6 weeks	1.40	7.36	0.000	P<0.05sig
Flexion ROM	Pre - 6 weeks	16.27	12.14	0.000	P<0.05sig
External Rotation ROM	Pre - 6 weeks	9.07	7.65	0.000	P<0.05sig
SPADI Score	Pre - 6 weeks	20.33	20.46	0.000	P<0.05sig

Table 2: Average Improvement, t - value, p - value, and result for comparison of Pre and Post Treatment in Group - B

Variable	Period	Average Improvement	t - Value	p - Value	Result
PMi length	Pre - 6 weeks	1.73	14.60	0.000	P<0.05sig
Flexion ROM	Pre - 6 weeks	25.60	22.51	0.000	P<0.05sig
External Rotation ROM	Pre - 6 weeks	15.33	18.55	0.000	P<0.05sig
SPADI Score	Pre - 6 weeks	38.40	31.93	0.000	P<0.05sig

Table 3: Comparison of average improvement in Group - A and Group - B

Variable	Period	Average Improvement Group - A	Average Improvement Group - B	t - Value	p - Value	Result
PMi length	Pre - 6 weeks	1.40	1.73	1.6733	0.000	p<0.05sig
Flexion ROM	Pre - 6 weeks	16.27	25.60	10.7161	0.000	p<0.05sig
External Rotation ROM	Pre - 6 weeks	9.07	15.33	6.2707	0.000	p<0.05sig
SPADI Score	Pre - 6 weeks	20.33	38.40	10.3576	0.000	p<0.05sig

4. Discussion

The present study was designed to compare the effectiveness of two treatment approaches in addressing pectoralis minor tightness and forward shoulder posture: Positional Release Technique (PRT) alone and a combination “of Shoulder Mobilization Technique with Positional Release Technique (SMT+PRT). The clinical significance of this research lies in the increasing prevalence of postural deviations, especially among young adults, due to sedentary lifestyles and poor ergonomic practices. Forward shoulder posture, often linked to pectoralis minor tightness, can impair musculoskeletal function, decrease range of motion (ROM), and increase the risk of chronic pain and disability.

Forward shoulder posture is characterized by the anterior positioning of the shoulders, leading to muscular imbalances that typically involve tightness in the pectoralis minor and weakness or lengthening of the posterior shoulder muscles. The pectoralis minor, in particular, plays a vital role in scapular motion, and its tightness restricts normal shoulder kinematics, contributing to dysfunctions in upper limb mobility. Addressing this issue through appropriate physiotherapeutic intervention is essential to restoring function, improving posture, and alleviating pain.

The study enrolled 30 participants between the ages of 15 and 30, all of whom exhibited symptoms of forward shoulder posture and pectoralis minor tightness. Participants were divided equally into Group A (PRT only) and Group B (SMT+PRT). Both groups underwent their respective interventions three times per week for six weeks. Pre - and post - treatment measurements were taken for pectoralis minor length, shoulder flexion ROM, external rotation ROM, and the SPADI score.

Results demonstrated statistically significant improvements across all variables within each group. In Group A, the average improvements were: pectoralis minor length by 1.4 cm, flexion ROM by 16.27 degrees, external rotation by 9.07

degrees, and SPADI score by 20.33 points. These findings confirm that PRT alone can be effective in reducing muscle tightness, increasing ROM, and improving functional outcomes in individuals with forward shoulder posture. However, the improvements were notably more significant in Group B, where the addition of shoulder mobilization techniques yielded superior outcomes.

In Group B, the pectoralis minor length improved by an average of 1.73 cm, flexion ROM by 25.6 degrees, external rotation by 15.33 degrees, and SPADI score by 38.4 points. The t - values and p - values for comparisons between the two groups confirmed that these differences were statistically significant ($p < 0.05$ for all variables). This highlights the added benefit of incorporating joint mobilization techniques to complement soft tissue release approaches.

Shoulder mobilization techniques aim to restore normal arthrokinematics of the shoulder joint. In this study, specific mobilizations such as inferior and posterior glides were used, which target key components of shoulder motion that are typically restricted in forward shoulder posture. Mobilizations help in decompressing the joint, enhancing synovial fluid circulation, and reestablishing capsular mobility, which ultimately leads to improved ROM and reduced discomfort.

The SPADI score, a validated outcome measure assessing both pain and disability, showed the greatest improvement in Group B. This reflects not only biomechanical improvements but also the patient's perceived reduction in symptoms and functional limitations. The dual focus on joint and soft tissue interventions in Group B appears to offer a more holistic approach, addressing both muscular and capsular restrictions simultaneously.

The findings are supported by existing literature. Studies such as those by Fani et al. and Manske et al. have emphasized the importance of combining mobilization with stretching or soft tissue techniques for optimal outcomes. "Similarly, research by Selkow and Roman demonstrated the short - term benefits of PRT, although they noted that its effects might not be long - lasting without continued intervention. In contrast, adding mobilization as seen in Group B may contribute to more sustained improvements.

The study also validated the measurement tools used. The pectoralis minor length test, goniometric ROM assessments, and SPADI scores demonstrated consistent results with high reliability. These tools were appropriate for capturing the subtle changes associated with postural correction and functional recovery.

The demographic distribution, with a mix of both male and female participants and a reasonable age spread within the young adult bracket, increases the external validity of the study. While the sample size of 30 may limit generalizability, the consistency in outcomes and statistical significance across multiple variables strengthen the study's conclusions.

Limitations: The short follow - up period and lack of blinding, which could introduce observer or performance bias. Additionally, lifestyle and external factors such as activity levels, sleep posture, and daily ergonomics were not controlled, which might have influenced the outcomes.

Despite these limitations, the findings underscore the value of a combined intervention strategy. In clinical practice, incorporating both mobilization and positional release may provide a more comprehensive treatment approach for patients with forward shoulder posture. Given the functional and postural improvements observed in Group B, therapists should consider integrating these techniques into standard" rehabilitation protocols.

Scope: This study contributes to the growing body of evidence supporting multimodal treatment strategies for musculoskeletal dysfunctions. It confirms that while PRT is effective on its own, its combination with shoulder mobilization techniques significantly enhances clinical outcomes in patients with pectoralis minor tightness and forward shoulder posture

5. Conclusion

Combining SMT with PRT is significantly more effective than PRT alone in treating FSP associated with PMi tightness. Both the interventions significantly improve PMi tightness, ROM, and SPADI scores. However, the addition of SMT to PRT yielded superior outcomes, highlighting the synergistic effect of joint mobilization in addressing mechanical restrictions.

This multimodal strategy is recommended for clinical practice to enhance postural alignment, range of motion, and functional capacity.

6. Summary Box

What is already known on this topic

- Forward shoulder posture is commonly associated with pectoralis minor tightness and reduced shoulder mobility.
- Positional release technique is effective for muscle relaxation and reducing myofascial tightness.
- Shoulder mobilization technique restores joint play and improves range of motion in hypomobile joints.

What this study adds

- Combining SMT with PRT yields significantly greater improvements in pectoralis minor length, shoulder ROM, and SPADI scores than PRT alone.
- Addressing both soft tissue and joint dysfunctions results in more comprehensive and clinically meaningful correction of FSP.
- This combined approach is effective, accessible, and suitable for clinical implementation in young adults with posture - related dysfunction.

Competing Interests
The authors declare no conflicts of interest

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Ethics Declaration
Ethics Approval and Consent to Participate: This study was approved by the Institutional Ethics Committee of Pacific Medical University, Udaipur (Approval No: PMU/IEC/286/2024). All participants provided written informed consent prior to participation in the study.

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Abbreviations
FSP: Forward Shoulder Posture
PMi: Pectoralis Minor
PRT: Positional Release Technique
SMT: Shoulder Mobilization Technique
SPADI: Shoulder Pain and Disability Index
ROM: Range of Motion