

Association Between Subscapularis Trigger Point and Frozen Shoulder: A Cross Sectional Study

RABIA SHAIKH¹, FAKHRAH SAFDAR², ASIF GULZAR SHAIKH³

¹Lecturer, Moomal Institute of Physiotherapy & health sciences, Hyderabad.

²Lecturer, Institute of Physiotherapy & Rehabilitation Sciences, LUMHS, Jamshoro.

³Additional Director, Institute of Physiotherapy & Rehabilitation Sciences, LUMHS, Jamshoro

Corresponding author: Fakhrah Safdar, Email: fakhrahs@yahoo.com

ABSTRACT

Background: Uncertainty surrounds the relationship between subscapularis trigger sites and the development of frozen shoulder syndrome.

Objectives: The purpose of this study was to investigate the relationship between subscapularis trigger points and immobilized shoulder in patients from the Outpatient Physical Therapy Department at NMC Hyderabad.

Methods: This cross-sectional study was conducted from September 2022 to February 2023 and included 71 patients diagnosed with grade 1 or 2 frozen shoulder based on Codman's criteria and aged 35 or older. Using an axillary approach, subscapularis trigger points were identified manually, and their presence was evaluated on both the affected and unaffected sides. Using the Chi-square test in SPSS version 22, the relationship between subscapularis trigger points and immobilized shoulder was analyzed.

Results: 33 (46.5%) of the 71 participants were male, while 38 (53.5%) were female, with a mean age of 53.32 years. On the affected side, there was a significant association between frozen shoulder and subscapularis trigger points ($p = .001$). Intriguingly, a statistically significant difference was also observed in the unaffected shoulder joint ($p = .001$).

Practical Implications: It highlighted the importance of diagnosing and treating subscapularis trigger points in patients with frozen shoulder, potentially guiding new therapeutic strategies to improve shoulder mobility and reduce pain in these individuals.

Conclusion: Our findings indicate a considerable association between subscapularis triggers points and frozen shoulder, making these trigger points possible therapeutic targets. To investigate the underlying mechanisms and validate these results in larger populations, additional research is required.

Keywords: Frozen shoulder syndrome; Orthopedics; Subscapularis trigger points; Surgery

INTRODUCTION

Frozen shoulder is one of the most common shoulder pathologies in which there is painful progressive restriction of gleno-humeral joint motion leading to functional limitation of range of motion.¹ This progressive debilitating condition spontaneously resolves after 18 months (after completing its phases). Histological features of frozen shoulder are reminiscent of Dupuytren's disease in which proliferation of fibroblast occurs in coraco-humeral ligament, anterior capsule and rotator interval.² Frozen shoulder is also known as adhesive capsulitis, clinically it presents as restricted passive and active range of motion which is secondary to adhesion formation in glenohumeral joint capsule as the name suggests.³ Frozen shoulder is most commonly idiopathic and have high prevalence in middle aged women. It is associated with other endocrinological, autoimmune and rheumatological conditions. Arthrographic findings show reduction in capsular distension and axillary recess.⁴ It is mainly associated with diabetes, hyperlipidemia, hyperthyroidism, cardiac disease, Dupuytren's disease, hemiplegia and recovery after neurosurgery.²

It progresses through a classic continuum of four stages, however some books mention 3 stages of frozen shoulder. Stage 1 usually lasts less than 3 months and it is characterized by gradual onset of pain which increases with movement. Stage 2 lasts 3-9 months which is also referred as freezing stage and is characterized by more intense pain which occurs even at rest. Stage 3 lasts 9-15 months which is also referred as frozen stage in which patient have painful movement in addition to adhesions and compensatory scapular movements. Whereas stage 4 lasts 15 -24 months and it is called as thawing stage characterized by capsular restrictions with minimal pain.

Some structural and functional impairments are associated with Adhesive capsulitis such as night pain, painful motion, decreased joint play (external rotation, flexion, abduction most commonly affected), decreased arm swing and muscular weakness. Faulty postural compensations represented as anteriorly tilted and protracted scapula and elevated, rounded and protracted shoulder joint.⁵ Diagnosis of frozen shoulder is clinical based on presence of two main features: 1-painful restriction of movement in presence of normal x-ray 2-progression through its successive stages.²

One of the case series was carried out to find out the ultrasound features of frozen shoulder and to assess the correlation between clinical impairments which occurs in frozen shoulder and various ultrasound parameters. Results showed that coraco-humeral ligament, rotator interval and axillary recess were thicker in the affected shoulder with p value less than 0.05 which is considered as significant. Significant Correlation was found between coraco-humeral ligament thickness and passive range limitation $p < 0.05$. Regarding axillary recess significant correlation was found with passive forward elevation and internal rotation. Diagnostic values for frozen shoulder were 2.2 mm for CHL thickness and 4 mm for AR.⁶

Frozen shoulder's initial treatment includes analgesics, anti-inflammatory or combination of analgesics with intra and extra capsular steroid injections. Codman's pendulum also known as pendulum exercises are valuable in which there is slight distraction and joint oscillations which alleviates the pain related to the condition. Strengthening and mobilizations are usually indicated in frozen stage which is painless phase.⁷ Benefits of manipulation under anesthesia is unproven but still debatable. In MUA shoulder is moved into external rotation, abduction and then flexion. In the end methylprednisolone and lignocaine is injected. Other treatment option is to inject 50-200ml of sterile saline under pressure. Arthroscopic evidences shows that benefits from both treatment options occurs by rupturing the capsule. Arthroscopic capsular release is common surgical intervention used if conservative treatment fails.²

Trigger points are palpable, hyperirritable knots present in a taut band of skeletal muscle which cause referred pain on palpation. It was first described by Dr. Janet Travel in 1942. These cause stiffness and reduced range of motion. There are several treatment approaches to treat the trigger points which include ultrasonography, physical manipulation therapy, spray and stretch technique and injections.⁸

Presence of trigger points in anterior deltoid, pectoralis major and minor, latissimus dorsi and teres major can limit the joint play leading to frozen shoulder position. Formation of Subscapularis trigger point plays the significant role in limiting the external rotation and abduction of glenohumeral joint.⁹ Both active and latent trigger points cause muscular imbalance, inhibition,

weakness, enhanced motor irritability, spasm and altered motor recruitment¹⁰. Primary symptom of frozen shoulder and active subscapularis trigger point is same. In both of the cases pain and limitation of shoulder abduction as well as external rotation is common feature but the evidence of linkage between trigger point and frozen shoulder is obscure⁹.

While this study has provided significant insights into the relationship between subscapularis trigger points and frozen shoulder, there remains a research gap in understanding the underlying mechanisms driving this association. Specifically, how these trigger points directly contribute to the pathogenesis and progression of frozen shoulder is still unclear. Therefore this study was conducted, highlighting the importance of diagnosing and treating subscapularis trigger points in patients with frozen shoulder, potentially guiding new therapeutic strategies to improve shoulder mobility and reduce pain in these individuals.

METHODS AND MATERIAL

A cross-sectional study was conducted from September 2022 to February 2023 in physical therapy OPD of NMC Hyderabad. After the approval from departmental ethical review committee. The sample size was calculated with respect to record of enrolled frozen shoulder patients in past six month that is 86N. Further the sample size calculated by Rao soft software that results 71n. both male and female patients included age between 35 years or above. According to the Codman’s criteria of frozen shoulder, the diagnosed patients with grade 1 and 2 are included¹¹. And to identify a subscapularis trigger, manual approach was considered. That is Axillary approach, in which the patients were in supine position and the dorsal surface of his/her affected arm was placed on forehead for the facilitation of shoulder abduction and externally rotation that helps the scapula brought more laterally to optimize access to the muscles to easily palpate the subscapularis trigger point¹².

The data was analyzed by SPSS version 22 and descriptive statistics Percentage and are used to analyze the presence of trigger point in affected and non-affected side. And paired samples test was applied to identify the p-value to analyze the association between frozen shoulder and subscapularis trigger point.

RESULTS

This study encompassed 71 participants, comprising 33 (46.5%) males and 38 (53.5%) females, all diagnosed with frozen shoulder according to Codman’s criteria (Table 1). The mean age of participants was 53.32 years (Table 2).

To ascertain the relationship between frozen shoulder and the presence of subscapularis trigger points, a Chi-square test was utilized. Results demonstrated a highly significant association (p-value = .001) between the presence of subscapularis trigger points and frozen shoulder on the affected side. In addition, a significant difference was observed in the occurrence of subscapularis trigger points on the unaffected shoulder joint, exhibiting a p-value of .000, which emphasizes a noteworthy contrast to the affected joint (Table 3).

Table 1: Gender of Participants

	Frequency	Percent
Male	33	46.5
Female	38	53.5
Total	71	100.0

Table 2: Age of Participants

	N	Mean
Age	71	53.3239

Table 3: Test Statistics

Frozen Shoulder	Trigger point in affected Side	Trigger point in unaffected Side
Asymp. Sig	.001	.000

These findings suggested that in patients diagnosed with frozen shoulder, there is a strong association between the condition and the presence of subscapularis trigger points, particularly on the affected side of the body. This could potentially guide future therapeutic strategies to specifically address these trigger points to alleviate the symptoms and improve the outcomes for patients with frozen shoulder.

DISCUSSION

In this cross-sectional study, we examined the association between frozen shoulder and the presence of subscapularis trigger points. The results underscored a significant association between these two variables, which supports the hypothesis that subscapularis trigger points could play a role in the pathophysiology of frozen shoulder.

In the current study most of the data was collected from females (53%) whereas in one of the previous study most of the data was collected from males which accounts 54% of the total sample size of the previous study.

Results of the current study showed significant association between sub-scapularis trigger point and frozen shoulder with p-value 0.001 which is considered as significant. Whereas sub-scapularis trigger point and frozen shoulder are highly associated with each other, having p value <0.0001 in the previous study¹².

Sub-scapularis trigger point and unaffected shoulder joint are also highly associated with each other in the current study and in the previous study as well. P-value regarding the association between frozen shoulder and trigger point was 0.002 in the previous study which was conducted by Arjun MV, Rajaseker S et al. whereas p value of the current study was .000 regarding the association between trigger point and unaffected shoulder¹².

Interestingly, the analysis also demonstrated a significant difference in the presence of subscapularis trigger points between the affected and unaffected shoulder joints (p=.000). This suggests that the development of subscapularis trigger points might be a consequence or a contributory factor to the development of frozen shoulder, rather than a coincidental occurrence. However, more research is needed to fully elucidate the causal direction of this association¹³.

CONCLUSION

In conclusion, this study identified a significant association between subscapularis trigger points and frozen shoulder, both on the affected and unaffected side. These findings suggest that subscapularis trigger points may play a crucial role in the development or severity of frozen shoulder, warranting their consideration in the diagnosis and therapeutic strategy for this condition. Further research is needed to elucidate the precise underlying mechanisms, and to validate these findings in larger and more diverse populations.

REFERENCES

1. Franz A, Klose M, Beitzel K. Konservative Therapie der „frozen shoulder“. *Der Unfallchirurg*. 2019 Oct 24;122(12):934–40.
2. Solomon L, Warwick D, Selvadurai Nayagam, A Graham Apley. *Apley’s system of orthopaedics and fractures*. London: Hodder Arnold; 2010.
3. Redler LH, Dennis ER. Treatment of Adhesive Capsulitis of the Shoulder. *Journal of the American Academy of Orthopaedic Surgeons*. 2019 Jun;27(12):e544–54.
4. Fields BKK, Skalski MR, Patel DB, White EA, Tomasian A, Gross JS, et al. Adhesive capsulitis: review of imaging findings, pathophysiology, clinical presentation, and treatment options. *Skeletal Radiology*. 2019 Jan 3;48(8):1171–84.
5. Kisner C, Lynn Allen Colby, Borstad J. *Therapeutic exercise : foundations and techniques*. 7th ed. Philadelphia: F. A. Davis Company, Cop; 2018.
6. Do JG, Hwang JT, Yoon KJ, Lee Y-T. Correlation of Ultrasound Findings With Clinical Stages and Impairment in Adhesive Capsulitis of the Shoulder. *Orthopaedic Journal of Sports Medicine*. 2021 May 1;9(5):232596712110036.

7. Ralston SH, Penman ID, Strachan MWJ, Hobson RP. Davidson's principles and practice of medicine. 23rd ed. Edinburgh: Churchill Livingstone/Elsevier; 2018.
8. Hammi C, Schroeder JD, Yeung B. Trigger Point Injection [Internet]. PubMed. Treasure Island (FL): StatPearls Publishing; 2022. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK542196/>
9. Travell JG, Simons DG. Myofascial pain and dysfunction: the trigger point manual. Lippincott Williams & Wilkins; 1992.
10. Dommerholt J, Grieve R, Layton M, Hooks T. An evidence-informed review of the current myofascial pain literature – January 2015. *Journal of Bodywork and Movement Therapies*. 2015 Jan;19(1):126–37.
11. Shrestha-Taylor S, Clarke JL, Poulos A, Ginn K. Ultrasound Features for the Diagnosis of Adhesive Capsulitis/Frozen Shoulder: A Systematic Review. *Ultrasound in Medicine & Biology*. 2022 Sep 1.
12. Arjun MV, Rajaseker S. Association between subscapularis trigger point and frozen shoulder: A cross sectional study. *Journal of Bodywork and Movement Therapies*. 2021 Oct 1;28:406-10.
13. Arjun MV, Rajaseker S. Association between subscapularis trigger point and frozen shoulder: A cross sectional study. *J Bodyw Mov Ther*. 2021 Oct;28:406-410