

Effect of Fascial Distortion Models (FDM) along with Conventional Physiotherapy on Functional Mobility in individuals with Frozen Shoulder - A Case Report

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DOI: <https://doi.org/10.52403/ijhsr.20250512>

ABSTRACT

Introduction: The purpose is to find the effectiveness of FDM along with conventional physiotherapy on function and mobility in individuals with Frozen Shoulder. The study provides the insights regarding the current practice of FDM on pain and restricted ROM among the physiotherapist's professionals in individuals with Frozen Shoulder.

Method: Study design is a case report of an individual with frozen shoulder. A 72-year-old female presented with right shoulder pain and restricted movement and had difficulty in performing daily activities such as dressing, reaching overhead, combing hair and lifting objects for last 11 months. Physical examination revealed pain limits active and passive range of motion, especially in flexion, abduction and internal rotation of Shoulder. The subject was intervened with Fascial Distortion Models (FDM) technique along with conventional physiotherapy for 5 sessions a week for the duration of 3 weeks. Pre- and post-assessment were done using NPRS, Goniometry and SPADI (Shoulder Pain and Disability Index).

Results: The patient demonstrated a significant reduction in pain (NPRS score decreased from 8.5 to 1), improvement in ROM (Flexion increased from 115° to 170°, Abduction increased from 110° to 160° and Internal Rotation increased from 20° to 50°) and a 70% improvement in SPADI Scores after 3 weeks of intervention.

Conclusion: This case report concluded that FDM along with conventional physiotherapy was found to be an effective treatment for individuals with Frozen Shoulder. The approach appears to be effective in reducing pain, improving ROM and enhancing functional performance.

Keywords: FDM, Frozen Shoulder, Adhesive Capsulitis, Fascia, Conventional Physiotherapy

INTRODUCTION

Frozen shoulder also known as “Adhesive Capsulitis”, that results in development of thickened, fibrosed joint capsule, contraction of the joint and reduced intra-articular

volume which causes pain, restricted range of motion and decreased upper arm functions [1,2]. The condition was first clinically recognized as “peri-arthritis scapula-humerae” in 1872 by Du-play. Then it is

described as ‘Frozen Shoulder’ in 1934 by Codman. Adhesive Capsulitis was coined by Neviaser indicating a pathology in the Glenohumeral capsule [3].

It is more prevalent in the 40-60 years age group; females are more effected and it is estimated that 3%-5% of general population is affected with this pathology [2]. The risk factors that contribute to frozen shoulder categorized into primary and secondary factors. Primary factors are idiopathic include gradual onset of pain and stiffness at GH Joint without a specific cause and secondary factors include systemic (Diabetes mellitus, Thyroid dysfunction, Hypoadrenalism), intrinsic (rotator cuff pathologies, tendinitis, calcific tendinitis, Acromioclavicular arthritis) and extrinsic

factors (cardiopulmonary dysfunctions, stroke, cervical disc disease, Parkinson’s disease, humeral fracture) [3].

Frozen shoulder develops in four distinctive stages include: Stage 1 Inflammatory can last for about 3 months and individual may experience sharp, acute pain at the end ROM as well as at rest; Stage 2 Freezing can last for about 3 to 9 months in which individual may experience pain at night, movements are limited in the forward flexion, abduction, internal and external rotation; Stage 3 Frozen can last for about 9 to 15 months in which individual may experience pain at the end ranges and restricted ROM and Stage 4 Thawing in which pain is diminished with progressive improvement of movements [2].

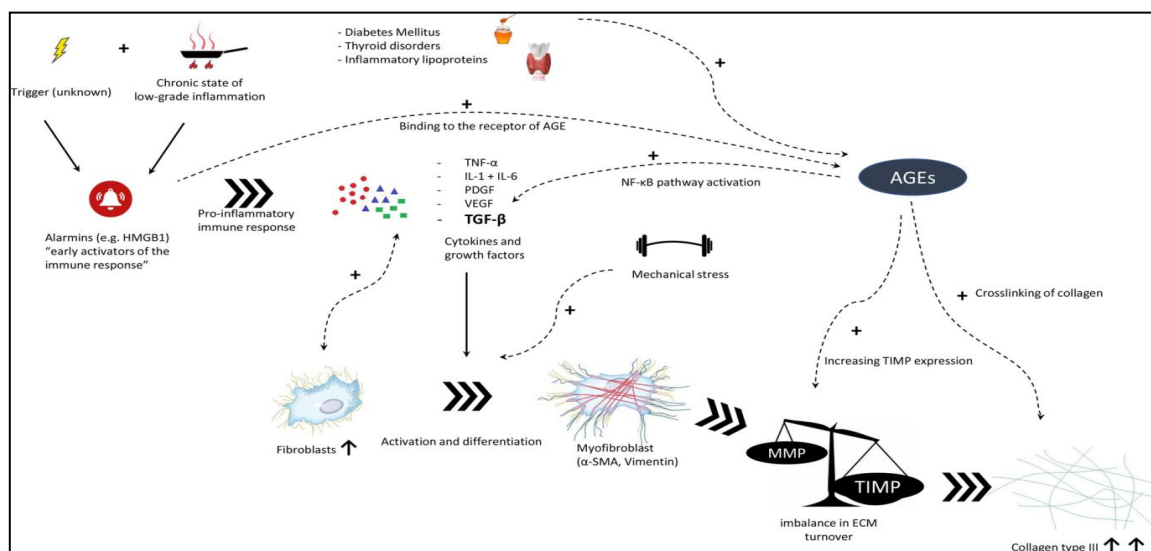


Fig.1 Pathophysiology of Frozen Shoulder (Kraal et al., 2021)

The complexity of the pathophysiology of frozen shoulder includes a state of low-grade inflammation which is associated with secondary risk factors such as Diabetes Mellitus, Cardiovascular diseases, predisposes its development. An early immune response with elevated levels of alarmins such as HMGB1 (High Mobility Group Box 1) and binding to the receptor of AGE (Advanced Glycation End products) starts the cascade of inflammation. Activation of the NF-κB pathway together with mechanical stress stimulates release of inflammatory cytokines, of which TGF-β has

a prominent role. Fibroblasts proliferate, become activated and differentiate into myofibroblasts. This results in an imbalance of ECM turnover and a stiff and thickened glenohumeral capsule with abundance of type III collagen [3].

Frozen Shoulder is a condition based on clinical findings but to confirm the diagnosis we can recommend X-Ray, MRI and Ultrasound. One of the methods used for examination and treatment is a poorly known Fascial Distortion Model (FDM) invented by the Stephen Philippe Typaldos in 1991. The subject’s verbal and physical description

coupled with the mechanism of injury and relevant orthopedic tests leads the therapist to proper technique of soft tissue treatment. Assessment aids identification of one or more of the 6 fascial distortions which include Trigger bands, Continuum Distortions, Cylinder Distortions, Herniated Trigger points, Folding Distortions and Tectonic Fixations. Many therapeutic methods and systems target fascia but FDM is the only method whose basic assumption is to eliminate the densification of fascia [4]. Conservative management approaches to treat Frozen Shoulder includes Drug Therapy such as NSAIDs (non-steroidal anti-inflammatory drugs) and Intra-articular steroidal injections. However conventional physiotherapy methods include electrotherapy modalities (TENS, Ultrasound, LASER), Cryotherapy, Therapeutic exercises (Stretching and Strengthening), Manual Therapy (Mobilizations, Manipulations, Muscle energy techniques). Conventional physiotherapy can able to manage the symptoms but for better and long-term effects we need to adopt new advanced technique like Fascial Distortion Models (FDM) which can use to release fascial restrictions and hence pain, restricted shoulder ROM and functional independence can improve.



Fig.2 Supraclavicular HTP
(FDM diagnosis according to the Subject's body language)

On observation, there was slightly redness, swelling, forward head posture and right shoulder elevated was noticed. On palpation there was tenderness over GH, AC joint and medial border of scapula. Also, her upper trapezius, pectoralis major, Sternocleidomastoid and middle deltoid of

Hence, the present study aims to investigate the effect of Fascial Distortion Models (FDM) along with conventional physiotherapy on function and mobility in individuals with Frozen Shoulder.

CASE DESCRIPTION

A 72 years old female presented complaining of right shoulder restricted movement and pain while performing daily activities such as dressing, reaching overhead, combing hair and lifting objects from last 11 months, which increased gradually. There is no history of fall. She had no remarkable medical history and underlying diseases. Her pain gets worse at night in right shoulder, neck, upper back and disrupted her sleep which radiates up to right arm and aggravate when she slept at right side, lifting objects and relieved when she slept straight in supine lying, doing self-massage and icing. The pain was measured based on the NPRS which was 8.5 out of 10.

The subject described the location and nature of her pain by drawing a line from trapezius region and anterior Glenohumeral Ligament to the anterior of the middle arm and reported the tightness and restrictions. In addition, she pushed her index finger of one hand into a painful point over the medial border of the scapula between the superior angle and the root of the spine.



Fig.3 Trigger band

right side were tight. Physical examination findings were significant for both active and passive ROM measured by a Goniometry which decreased to 115° flexion, 35° extension, 110° abduction, 20° internal rotation and 60° external rotation. The ROM of neck was slightly reduced in left rotation

(75°) and side bending (30°). Most of the muscles in the shoulder girdle were strong and painless, except supraspinatus, subscapularis and anterior deltoid muscles (4 out of 5). All reflexes and sensations were normal. Special tests for assessing neck revealed normal. The evidence of shoulder joint instability or impingement was found normal. The empty can test was positive for the right shoulder and other special tests for rotator cuff tear were negative. Functional outcome was done using SPADI (Shoulder Pain and Disability Index) which scored 80%.

Based on the symptoms and physical examination findings, the subject was diagnosed as *Frozen Shoulder*.

GOALS OF TREATMENT

The short-term goals were to reduce pain, muscle spasm, increase ROM, improve muscle strength. The long-term goals focused on achieving minimal to no pain during daily tasks, to maintain full ROM, to regain full muscle strength, improve posture and maintain functional independence.

TREATMENT

The treatment included manual therapy (Fascial Distortion Models Technique) along with conventional physiotherapy (TENS,

Ultrasound Therapy, Isometric Exercises) for 5 sessions a week for a duration of 3 weeks. The conventional physiotherapy included a TENS modality for pain reduction with a pulse frequency of 100 Hz and pulse duration of 80µs for 12 minutes, Ultrasound therapy for swelling reduction at frequency around 1 MHz and intensities of 0.5-1.5 W/cm² for 5 minutes and exercise protocol included Shoulder Isometrics (10 repetitions with 10 second hold 3 times a day) and shoulder bracing exercises (20 repetitions with 10 second hold 2 times a day). Manual Therapy included Fascial Distortion Models (FDM) technique which is based on subject's body language to increase ROM and to reduce muscle spasm. The subject pushed her index finger into the middle of the supraspinatus and upper trapezius this means HTP (Herniated Trigger Point) then the therapist exerted a direct pressure on the target tissue with the tip of right thumb and maintain it until the tissue went back through the fascial plane. The subject also drew a line from the trapezius region and anterior glenohumeral ligament to the anterior middle arm, this means trigger band (TB) then the therapist applied firm pressure with tip of right thumb in the opposite direction to re-align the fascial fibers [5].



Fig. 4 FDM for HTP



Fig. 5 FDM for TB

RESULTS

The subject underwent five treatment sessions per week for three consecutive weeks, combining Fascial Distortion Models (FDM) techniques with conventional physiotherapy. Results shown-

- Pain: Pain intensity assessed using the Numerical Pain Rating Scale (NPRS),

which decreased significantly from 8.5 to 1 after three weeks, indicating an 88% reduction in pain levels.

- Range of Motion (ROM): Shoulder joint mobility improved markedly, as measured by Goniometry-

Shoulder Movement	Pre-treatment ROM (Day-0)	Post Treatment ROM (Day-15)
Flexion	115°	170°
Extension	35°	50°
Abduction	110°	160°
Internal Rotation	20°	50°
External Rotation	60°	80°

- **Functional Outcome:** The subject's Shoulder Pain and Disability Index (SPADI) scored 24% which was improved by 70%, indicating a significant enhancement in daily functional activities, including dressing, grooming and overhead reaching.

Cervical ROM returned to normal and muscle strength improved to grade 4+/5 in previously affected muscle (Supraspinatus, Subscapularis and Anterior Deltoid). No adverse effects or complications were reported during or after the treatment period.



Fig.6 Shoulder Abduction ROM (Day 0)



Fig.7 Shoulder Flexion ROM (Day 0)



Fig.8 Shoulder Abduction ROM (Day 15)

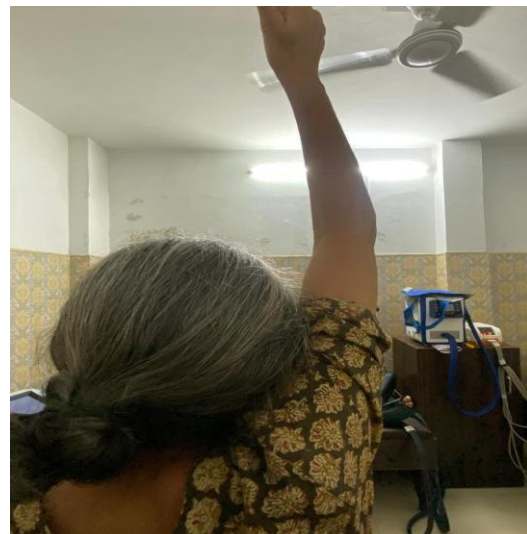


Fig.9 Shoulder Abduction ROM (Day 15)

DISCUSSION

Frozen shoulder, clinically known as Adhesive capsulitis disorder, is a progressive painful shoulder condition characterized by stiffness and functional restriction of both active and passive shoulder motion. Conventional physiotherapy often provides symptomatic relief; however, for better outcomes it is important to incorporate advanced techniques such as the Fascial Distortion Models (FDM).

The results of this case report indicate that FDM techniques can significantly reduce pain, improve shoulder range of motion and quality of life in the individuals with frozen shoulder. Although pain relief may result from a combination of interventions (modalities and exercises) but based on the recent studies suggest that fascial dysfunction may be one of the underlying causes of frozen shoulder.

Recent evidence also suggests that incorporating FDM techniques may provide better outcomes compared to conventional mobilization methods.

Fascia originates from mesoderm and permeates the whole body. It contains elastin, reticulin fibers, inhomogeneous intertwined collagen fibers, water, ions, glycosaminoglycans, chondroblasts, osteoblasts, undifferentiated mesenchymal cells, adipocytes, macrophages, muscle spindles, free-nerve endings, lamellar bodies, telocytes, blood and lymphatic vessels which makes it a mechanically sensitive system. Due to its complexity, it seems that it should be taken into the diagnostic process [6].

In fascial dysfunction there is the accumulation of fibroblasts or contractile myofibroblasts in periarticular fascial layers during the inflammatory process which causes fascial restrictions and disturb function and mobility of the shoulder [7]. Due to its complexity, it seems that it should be taken into the diagnostic process. One of the methods used for examination and treatment of the fascial dysfunctions is the *Fascial Distortion Models (FDM)* which is poorly known in the physiotherapy.

FDM assessment aids identification of 6 *fascial distortions* by observing the subjects body language, nature and location of pain. This method has a conservative and immediate effect of managing musculoskeletal disorders such as Frozen Shoulder. So, to understand the mechanism of action in FDM it seems that the fascia should be considered as a complex structure. The focus of this case report was to describe the effect of FDM along with conventional physiotherapy on function and mobility in individuals with frozen shoulder. The subject reported significant pain reduction with NPRS decreasing from 8.5 to 1 over 15 days, marking an 88% improvement, this suggests that FDM techniques may have a meaningful effect on pain modulation in frozen shoulder likely due to release of fascial restrictions and improved tissue mobility; marked improvement in ROM or shoulder joint mobility, shoulder flexion increased from 115° to 170° and internal rotation improved from 20° to 50°, these gains imply that FDM can enhance capsular mobility and neuromuscular function; functional gains showed by 70% improvement in SPADI score which indicates that not only the structural limitations addressed, but also the patient's quality of life and functional independence improved significantly.

CONCLUSION

This study concluded that Fascial distortion model (FDM) is a non-invasive, different and effective hand-on technique used for examination and treatment of fascial restrictions and positively influence the fascial dysfunctions and along with conventional physiotherapy it can aid in reducing pain and improve shoulder function and mobility in individuals with Frozen Shoulder.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

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

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How to cite this article: Harmanpreet Kaur, Ishu Verma, Divya Midha, Narkeesh Arumugam, Manpreet Singh. Effect of fascial distortion models (FDM) along with conventional physiotherapy on functional mobility in individuals with frozen shoulder – a case report. *Int J Health Sci Res*. 2025; 15(5):88-94. DOI: <https://doi.org/10.52403/ijhsr.20250512>
