



Comprehensive rehabilitation of Supraspinatus tear: A case study of post-op fracture stiffness

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ABSTRACT

The disorders of the upper extremity and the shoulder is extremely common accounting for 30% of people who experience shoulder pain and stiffness at some stage of their ageing. A high incidence of shoulder dysfunction is seen in people in recent trends. Shoulder stiffness is the main complication after fracture shoulder immobilization, and Diabetes Mellitus contribute to the frozen shoulder, which is the most typical complication in Diabetes mellitus patients. A case of lateral clavicle fracture with chief complaints of pain on the right shoulder, stiffness around the joint and reduced range of motion was reported to the outpatient physiotherapy department for rehabilitation. A proper assessment was done, and the differential diagnosis was frozen shoulder with supraspinatus tendon tear was reported. The patient also had a reduced range of motion of shoulder abduction and lateral rotation due to frozen shoulder. The investigation of MRI report stated that there is a partial supraspinatus tendon tear. Medical examination of the frozen shoulder confirms the diagnosis. A combination of non-pharmacological treatment with exercises, NSAID and exercise therapy, was planned. He was successfully treated with the combination of physical therapy treatment with the electrotherapy modalities and shoulder girdle mobilization. Comprehensive therapeutic exercises include mobilization of soft tissue using Cyriax technique, peripheral joint mobilization to improve controlled ROM. Mobilization of soft tissue along with home exercise supports patients suffering from frozen shoulder. The treatment primarily aimed at relieving pain and increasing range of motion and thus improving the quality of life in the patient. Only manual therapy alone does not give satisfactory results along with electrotherapeutic modality with proper dose work on the patient.

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INTRODUCTION

Shoulder stiffness is the main complication after fracture shoulder immobilization, and Diabetes Mellitus contribute to the frozen shoulder, which is the most typical complication in Diabetes mellitus patients (Cucchi *et al.*, 2017). There are three stages of which the first phase of adhesive capsulitis is for 2-9 months, the second phase comprising of 4-12 months and third phase of 5-26 months (Chan *et al.*, 2017). During the initial phase of adhesive capsulitis, patients may typically perform activities of daily living despite the pain, at

which time patients can also experience from sleeping disorder (Yip *et al.*, 2018). Pain reduces typically during the second phase; however, minimal movement and the affected patient is unable to perform an everyday exercise. A comprehensive Physiotherapy intervention improves symptoms with patients of the frozen shoulder by almost 90 per cent. A Physiotherapeutic intervention consists of physical therapy and behavioural exercises (Beutler, 2018). The treatment aims at pain relief, improving range of motion and movement normalization. An electrotherapy intervention of Ultrasound therapy induces vasodilation effect that eliminates metabolites from affected tissues and relieves muscle spasm of the shoulder group of muscles. Transcutaneous stimulation of electrical nerves is proficient in relieving pain. Therapeutic exercises include mobilization of soft tissue using Cyriax technique, peripheral joint mobilization to improve controlled ROM (Hagiwara *et al.*, 2019). In stage 2, Frozen shoulder joint mobilization, i.e. Glenohumeral joint passive ROM mobilization along with active-assisted ROM, strengthening and stretching exercises are aimed to improve the functional independence and activities of daily living.

Patient Information

A case of a 55-year-old male with right-hand dominance and with body mass index of 29 kg/m² and came with chief complaints of pain on the right shoulder, stiffness around the joint and reduced range of motion. The patient had a history of fall from the bike as the bike skid, the patient allied to fall on the right side and was not able to move and complaint of severe pain. Post the accident patients hand was supported by a sling and was brought to the hospital where the investigations were carried out. The x-ray revealed discontinuity of lateral 1/3rd clavicle. The patient has diagnosed with fracture lateral 1/3 clavicle and was managed conservatively with the help of sling for two months. The patient has a history of Diabetes mellitus for 12 years and Hypertension. Due to a prolonged period of immobilization, patients complain of shoulder stiffness, reduced ROM and inability to perform functional activities. A provisional diagnosis of right-sided frozen shoulder with lateral 1/3rd clavicle fracture.

The patient was initially able to perform elbow, wrist and finger ROM typically after two months removal of shoulder sling patient experiences extreme pain around the shoulder when shifting sides while sleeping and thus it interrupts the sleep. Pain is typically at night time because of ache and patient's fear of no longer having to do both elbow

and wrist movement.

Clinical Findings

A Musculoskeletal assessment which consisted of a clinical test of drop arm test, Apley's scratch test, Hawkins and NEER impingement tests. A pre-post Upper limb Range of motion assessment by Goniometry (Table 1). The post 2-week assessment showed shoulder flexion-80 Degree, Extension-20-degree, Abduction -60degree, Medial rotation- 20degree and lateral rotation - 15 degrees. We found that Hawkins- Kennedy test, Apley's test, NEER impingement tests were positive during the assessment.

Diagnostic Assessment

The patient showed lateral 1/3rd clavicle fracture on X-ray, which was managed conservatively. There was impingement over Supraspinatus tendon causing mild oedema which might suggest tearing of the Supraspinatus. The MRI of the patient showed some degenerative changes in the Acromioclavicular joint.

Therapeutic Intervention

Therapeutic ultrasound, transcutaneous electrical nerve stimulation, interferential therapy, Russian current is most effective, eight-week low-level laser therapy (Page *et al.*, 2014b) can be more efficient than exercising alone in four weeks, and work for up to two months.

Plan of care decide as per week

Week 1-2

Therapeutic ultrasound in continuous mode, interferential therapy in the cloverleaf pattern causes profound tissue effect, which reduces pain and synchronized muscle tissue modality given to the patient 3-time day each modality for 7-8 minute.

In the second week, isometric exercise starts shoulder isometric and grade 1 mobilization for 5 minutes 4 times a day.

Week 3-4

A low-level laser therapy (Page *et al.*, 2014b) and Russian current start for 8 minutes also interferential therapy given for 8 minutes for four times a day along with grade 1 mobilization for ten repetition finger ladder up to the pain-free movement for 5-6 repetition and three times a day effective in the reduction of pain, increase the shoulder abduction range in adhesive capsulitis (Johnson and Vinoth, 2018).

Week 5-6 week

Patient treated through shoulder mobilization grade 1-2 along with therapeutic ultrasound and TENS (Page *et al.*, 2014a). Different exercises like

Table 1: Range of motion measurement

| Shoulder movement | First day | Two weeks | Four weeks | Six weeks | Eight weeks |
|-------------------|-----------|-----------|------------|-----------|-------------|
| Flexion | 60° | 80° | 110° | 134° | 165° |
| Extension | 10° | 20° | 25° | 35° | 47° |
| Abduction | 30° | 60° | 80° | 140° | 165° |
| Internal rotation | 10° | 20° | 40° | 55° | 72° |
| External rotation | 5° | 15° | 25° | 37° | 50° |

Codman's and finger ladder and mechanotherapy by shoulder wheel exercise. Shoulder isometrics active-assisted, pectoral muscle stretches along with mobilization each isometric hold for 10 sec and 20 repetitions each 3-4 times a day (Zavala-González *et al.*, 2018).

Week 7-8 week

Therapeutic ultrasound and low-level laser therapy three times a day for 7-8 minutes. Shoulder isometrics 10-sec hold and times a day, shoulder wheel 20 repetition and four times a day. Finger ladder ten repetitions each exercise 4 times a day it gives a significant result to achieve normal range of motion and pain relief. Pectoral muscle stretch, scapular rotation, shoulder flexion, extension, rotation supination-pronation, medial and lateral rotation for ten times and home exercise program (Chan *et al.*, 2017).

Follow Up/ Outcome

Patient's follow up for treatment two months regularly as shown in Table 1.

DISCUSSION

Mobilization of soft tissue, along with home exercise, supports patients suffering from frozen shoulder (Hawk *et al.*, 2017). In this case of frozen shoulder patient had been able to return his previous work and ADL after getting combine regime for eight weeks. TENS, and medical ultrasound, IFT, have been shown to help relieve pain (Johnson and Vinoth, 2018). Exercise and home program helps to boost strength and endurance and to render flexible joints. It's time for a cycle to take time, and there are several challenges to recover the full range of frozen shoulder.

This case shows remarkable improvement in the treatment of frozen shoulder combining electrotherapeutic modality with manual therapy, mobilization and home exercise. The best evidence and patient effort in physiotherapy and exercise at home provide successful results (Chan *et al.*, 2017).

CONCLUSION

Most of the evidence shows that after 45 years of illness, females are more likely to develop frozen shoulder than males. The pain usually presents symptoms, mainly abduction and external rotation limiting movement, tenderness, pain limiting the activity. Physiotherapy plays an essential role in the treatment of patients suffering from frozen shoulder. The treatment primarily aims at relieving pain and increasing range of motion. Only manual therapy alone does not give satisfactory results along with electrotherapeutic modality with proper dose work on the patient.

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Conflict of interest

The authors declare that they have no conflict of interest.

Informed Consent

Written and Oral informed consent was obtained from the participant included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Author's contribution

All author made the best contribution for the concept, assessment and evaluation, data acquisition and analysis and interpretation of the data.

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