



Multidimensional physiotherapy approach for proximal humerus fracture: A Case Report

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Abstract

Greater tubercle fracture is frequently caused by a shoulder dislocated anteriorly or a deforming injury to the shoulder. A postero-superior deformity is caused by the teres minor as well as the supraspinatus attaching distally on the greater tubercle. The focus of concern should be on functional rehabilitation and pain management. Conservative treatment includes analgesics as well as a period of sling immobilization, and numerous rehabilitative as well as physical therapy regimens. Early physical therapy, commencing two weeks after an injury, has been related to greater functional outcomes than prolonged immobility. Case description -This report includes a case of a 34-year-old male patient who was referred to physiotherapy with the complaints of pain in his left shoulder. X-ray revealed fracture of the greater tuberosity of the left humerus. He was given a shoulder sling for 45 days and was advised physiotherapy. In this case study, the physiotherapy rehabilitation programme implemented significantly reduced pain, increased shoulder joint mobility, muscle strength, and endurance, and greatly aided the patient in regaining functional independence at home and at work.

Keywords: Greater tuberosity Humerus Fracture, Physical therapy Rehabilitation, Conservative management.

1. Introduction:

Proximal humerus fractures are a reasonably common injury in adults, accounting for 4–5% of all fractures seen in the trauma department(1). Isolated fractures of the greater tuberosity account for approximately 20% of all proximal humerus fractures(2). These are all quite common in young and healthy males, whereas other proximal humeral fractures are more common in elderly females who frequently had accompanying health conditions(3). This is frequently caused by shoulder dislocated anteriorly or a deforming injury to the shoulder(2). With a fracture of the humeral greater tuberosity, the arm of the rotator cuff tendon is obliterated. The subacromial space is reduced when the fracture block is displaced, causing the shoulder to impact when it abducts, impairing shoulder joint function (4). A posterosuperior deformity is caused by the teres minor as well as the supraspinatus attaching distally on the greater tubercle (5). The focus of care should be on functional rehabilitation and pain



management(6). Many fractures are only slightly displaced and can be managed without surgical intervention. Conservative treatment typically includes analgesics as well as a period of sling immobilisation, and numerous rehabilitative and physical therapy regimens. Early physical therapy, commencing two weeks after an injury, has been related to greater functional outcomes than prolonged immobility(1). Intramedullary nails, locking plates, percutaneous methods, or arthroplasty are the most common operative treatments for dislocated and severe fractures (7). Postoperative motion recovery is rapid because patients begin passive movement as soon as they manage the pain (8). Despite the lack of definitive Proximal humerus fracture rehabilitation regimens, physical therapy (PT) is regarded as an important component in treatments regardless of fracture type or treatment strategy (9).

2. Patient Information:

A 34-year-old male patient was referred to physiotherapy with the complaints of pain in left shoulder since a month. He had a fall from a vehicle on left side with his left arm externally rotated on 13th sept 2021. He had severe pain with minimal swelling at anterolateral shoulder joint complex and no deformity seen for which he took homeopathic medications for 10 days, but the pain did not subside. Then, he was advised X-ray which revealed greater tuberosity fracture of the left humerus, for which he was given shoulder sling for 45 days and was advised physiotherapy. He has no significant personal or family history of co-morbidities.

3. Clinical Findings:

Following the written consent of the patient, he was explained about the physical examination and the investigations. While examining, he was conscious, cooperative and well oriented to time, place and person, with stable vitals and no signs of cyanosis, icterus, clubbing, edema. Patient was examined in sitting position, on observation no scar and bandages were present, with no edema and wasting of muscle. On palpation, the temperature of the local area was normal, and grade 2 tenderness was present at the site. Shoulder movements were painful and range of motion of upper extremity has been mentioned in (Figure 1). Muscle strength was evaluated on the basis of Resisted Isometric Contraction and mentioned in (Figure2), On neurological examination, all the sensations were intact.

Figure 1 Pre and post treatment ROM of left upper extremity

Joint	Pre-treatment ROM		Post treatment ROM (at the end of 6 weeks)	
	Active ROM	Passive ROM	Active ROM	Passive ROM
SHOULDER JOINT				
Flexion	10°	10°	90°	100°
Extension	5°	5°	45°	45°
Abduction	10°	10°	90°	95°
Adduction	10°	10°	50°	50°
Internal Rotation	5°	5°	60°	60°
External Rotation	5°	5°	60°	60°
ELBOW JOINT				
Flexion	115°	115°	130°	135°
Extension	115°-0°	115°-0°	130°-0°	135°-0°
FOREARM				
Pronation	70°	70°	85°	90°
Supination	70°	70°	85°	90°
WRIST JOINT				
Flexion	70°	75°	70°	75°
Extension	60°	65°	60°	65°

Figure 2 Resisted Isometric Contraction testing for muscles of affected extremity

MUSCLES	GRADING
Shoulder flexors	Weak and painful contraction
Shoulder extensors	Weak and painful contraction
Shoulder abductors	Weak and painful contraction
Shoulder adductors	Strong and painful contraction
Shoulder internal rotators	Weak and painful contraction
Shoulder external rotators	Weak and painful contraction
Elbow flexors	Strong and painless contraction
Elbow extensors	Strong and painful contraction
Wrist flexors	Strong and painless contraction
Wrist extensors	Strong and painless contraction

Timeline-

13 September 2021: Date of incidence. 24 September 2021: Investigations left shoulder joint x-ray was done. 20 October 2021: Physiotherapy rehabilitation started.

Diagnostic assessment-

An AP view radiological examination was done which revealed greater tubercle fracture of the humerus (figure 3).



Figure 3 X ray AP view left shoulder

Diagnosis-

The results revealed the fracture of greater tubercle of left humerus.

Therapeutic intervention-

Physiotherapy rehab was started after a month from the day of injury and patient was treated for 6 weeks.

Short term goals: It aimed at alleviating pain, decreasing swelling, enhancing shoulder joint functional range of motions and strength of scapular muscles.

Long term goals: It intended at enhancing full range of motions of shoulder joint, maintaining strength of scapular muscles, increasing endurance and assisting the patient in gradually returning to functional activities.

MAXIMUM PROTECTION PHASE (0-2 WEEKS):(Figure 4)

Initial stage of management was focused on alleviating pain and encouraging range of motion activities of the distal upper limb joints.

Home exercise programmed – Cryotherapy is advised for 10 minutes to alleviate pain and One-handed functional activities with the non-affected extremity were encouraged with no weight-bearing on the affected extremity.

Figure 4

Intervention	Dosage	Rationale
Ultrasound Therapy	1 MHz, 7 minutes	To promote healing
Shoulder isometrics	10 reps with 10 seconds hold	To strengthen shoulder muscles
Shoulder -Active assisted range of motion exercises	10 reps	To maintain joint mobility
Range of motion exercises- cervical, elbow and wrist joint	10 reps	To maintain joint range of motion

Table : Maximum Protection Phase

MODERATE PROTECTION PHASE (2-4 WEEKS):(Figure 5)

This stage of management is focused on encouraging shoulder joint assistive movements and isometrics (Figure 6).

Home exercise programmed – Cryotherapy is advised for 10 minutes to alleviate pain and one-handed functional activities with non-affected extremity were continued with no weight bearing on the affected extremity.

Figure 5

Intervention	Dosage	Rationale
Isometrics – shoulder, scapular muscles, elbow and wrist.	10 reps with 10 seconds hold	To strengthen scapular muscles and muscles of the upper limb
Cervical isometrics	10 reps with 10 seconds hold	To strengthen cervical muscles
Shoulder – active range of motion exercises	10 reps	To maintain joint mobility
Resistance band exercises- scapular muscles	10 reps	To increase scapular muscle strength

Table : Moderate Protection Phase



Figure 6 Shoulder and scapular isometrics

MINIMUM PROTECTION PHASE (4-6 WEEKS):

In this stage, management proceeds with restoring the functional range of shoulder motions and strengthening of the shoulder muscles (Figure 7).

Home exercise programmed- Affected extremity used for functional activities as tolerated.

Figure 7

Intervention	Dosage	Rationale
Shoulder – active range of motion exercises	10 reps	To maintain joint mobility
Shoulder and scapular muscles-Isometric TheraBand exercises	10 reps with 10 seconds hold	To strengthen shoulder and scapular muscles
Elbow and Wrist joint- Isometric and isotonic exercises	10 reps	To strengthen forearm and hand muscles

Table : Minimum Protection Phase

Follow up and outcome of interventions-

Disabilities of the Arm, Shoulder and Hand Scale:

Pre- treatment score – 95/105

Post- treatment score -47 /105

4. Discussion:

The greater tuberosity fracture is a common proximal humerus fracture in young males. Greater tuberosity fractures should be taken into consideration in the differential diagnosis of any patient with a history of shoulder dislocation or blow injury, especially if they report with chronic pain and limited range of motion weeks after the incident(2). The rotator cuff tendon is damaged when the greater tubercle of the humerus fractures.(4). Non-operative care has been linked to improved functional results in fractures that are stable, minimally displaced, or with certain types of displacement(1).

Based on the literature review on proximal humerus rehabilitation, treatment should begin as soon as possible to minimize the adverse effects of immobilization(10). Timely treatment and rehabilitation can aid in the independent resumption of functional efficiency of a fractured upper limb (6).

Patient perspective-

‘I had a fall from bike two months back and had severe pain in my left shoulder and I was unable to move my arm, for which I took some medicines and x-ray was done and it was diagnosed as fracture of left shoulder. My arm was in sling for one month after which physiotherapy was advised. I was given some exercises daily which helped me reduce my pain and gain shoulder movements.’

Informed consent-

The patient was informed about the study, and his informed consent was taken.

5. Conclusion:

This study concluded that after six weeks of rehabilitation, strengthening exercises and other physical therapy procedures resulted in significant improvements in joint range of motion, muscle strength, and functional independence. This case report illustrates the significance of systematic physical rehabilitation after proximal humerus fracture in order to ensure a good recovery for the patient.

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Competing interests –

The authors declare no competing interest.

Authors' contributions –

DMB suggested the design of the study. DMB wrote the manuscript of the study. DMB read and approved the final manuscript for publication.

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