

**[CASE REPORT]****Return to Job of a Construction Worker by Comprehensive Functional and Vocational Rehabilitation****Dr. Sandeep Shinde (PT)<sup>1</sup>, Dr. Pradnya Ghadage (PT)<sup>2</sup>**<sup>1</sup>Associate Professor, <sup>2</sup>PG Student, Department of Musculoskeletal Sciences, Krishna College of Physiotherapy, Krishna Institute of Medical Sciences Deemed to be University, Karad**ABSTRACT :**

**Background:** Employees in the construction industry perform a variety of tasks. In order to accomplish this work, individuals must repeatedly lift and carry objects overhead. To perform this work efficiently complete shoulderrange of motion and strength of the rotator cuff musclesare importantcomponents.Here a patient with displaced two-part fracture of greater tuberosity and rotator cuff tear treated surgically has already reduced shoulder ROM and strengthit is leading cause of absenteeism from work. This imposes a greater socioeconomic burden on patient. The purpose of this study was to improve range of motion and rotator cuff muscle strength as he has to resume his work as soon as possible.

**Case description:** The patient was a 37 years old male construction worker who sustained a shoulder injury as the result of fall. After the investigations, he was diagnosed with an isolated greater tuberosity fracture and rotator cuff tear. He was treated conservatively for 4 weeks, without success. Later, hewas undergoing surgical treatment and referred for physiotherapy. Patient came with complaint of shoulder pain while performing shoulder movement and difficulty in initiating shoulder movement. Early physiotherapy management was done can be done to reduce the pain, tenderness, improve strength of rotator cuff muscles and regain the range of motion and vocational rehabilitation.

**Keywords:** Overhead activities, Rotator cuff tear, muscular imbalance, Gleno-humeral force couple, joint stiffness.

**Introduction:**

A fracture of greater tuberosity occurs as isolated fractures or in combination with anterior dislocation of glenohumeral joint. The mechanism of injury is commonly reported as fall, direct blow to side of the shoulder results in comminuted fracture<sup>(1)</sup>. This fracture subgroup according to Neer's classification system categories these fracture as one-, two-, three- or four-part fracture based on displacement and angulation of the parts which are head, shaft, greater tuberosity and lesser tuberosity<sup>(2)</sup>. Most common displacement are superiorly and/or posteriorly displaced. The typical displacement is posterosuperior. Isolated fracture of the greater tuberosity of humerus accounts for approximately 20% of all proximal humerus fracture. Radiographs are standard in the

investigations of shoulder pain after fall but may fail to identify an isolated, nondisplaced fracture, given the presence of bony overlap or inadequate positioning. In such cases, the advanced practice provider needs to consider advanced imaging of the shoulder to assess for fracture or rotator cuff tear.

More than 95% of these fractures are nondisplaced or minimally displaced and successfully treated nonoperatively with immobilization followed by early mobilization. Displaced two-part fractures of greater tuberosity that need surgical intervention are extremely rare and literatures shows only few data of the functional results after surgery.<sup>(3)</sup> The choice of treatment in displaced greater tuberosity fracture is surgical treatment which may result in impairment of shoulder function. Limitation of motion and disability are mainly due to a malfunction of the

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rotator cuff muscles and to impingement caused by superior or posterior displacement. The rationale for open reduction and internal fixation of greater tuberosity is to prevent imminent impingement of the greater tuberosity beneath the acromion and to ensure physiologic functions of rotator cuff<sup>(10-11)</sup>

According to previous research physiotherapy management after the surgical and conservative management of greater tuberosity fracture include joint range of motion exercise to elbow, wrist and fingers also mobilization to shoulder joint as pain permit. Some evidence suggests that friction massage and ultrasonic over the area of tendon helpful to treat the adhesion formation.

Here is presented a case, with associated imaging findings of a posteriorly displaced isolated greater tuberosity fracture of the right humerus.

**History:**

37 yearsold male,a construction worker (daily wage labourer) withright-hand dominance presented to the orthopaedic clinic with a complaint of shoulder pain and limited range of motion after sustaining a fall, reported as a slip and fall on a door. He explained that he accidentally struck his rightshoulder on the door latch. He was conscious at that time and had immediate onset of shoulder pain, specifically to the proximal aspect of right humerus that resulted in the inability to raise his arm. So, he went to the orthopaedic doctor where radiographs of right shoulder were taken and subsequently interpreted as a greater tuberosity fracture of the right humerus which was nondisplaced and there was no distal neurovascular deficit. Since it was nondisplaced fracture, he was treated conservatively for 3 weeks using sling and swath thereafter for follow-up, he again consulted an orthopaedic doctorwhere radiographs were taken and doctor recommended him to continue wearing the sling for another week. After four weeks of conservative management sling and swath was removed. Despite removal of sling after 2 weeksthe patient reported continuing lateral shoulder pain and weakness in right hand. Pain was mild and dull aching at rest. Symptoms aggravated with attempted movements of shoulder and difficulty in initiation of the activities with the right shoulder. This pain was described as sharp and focal to lateral shoulder. Patients consulted orthopaedician after the investigations were done, they found the displaced fracture fragment posteriorly (fig no 1,2).

As per the advice he underwent for surgical intervention were with open reduction and internal fixation (fig no 3) and immobilized for 2 months.

His examination revealed there was pain in right shoulder which was assessed by NPRS

At rest	On activity
2/10	6/10

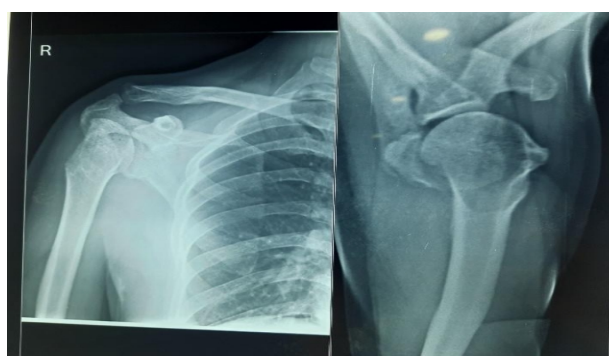
**Table 1:** Range of Motion – Right Shoulder

Right Shoulder	Active ROM	Passive ROM
Flexion	0-15 <sup>0</sup>	0-30 <sup>0</sup>
Extension	0-20 <sup>0</sup>	0-22 <sup>0</sup>
Abduction	0-15 <sup>0</sup>	0-17 <sup>0</sup>
Internal rotation	0-25 <sup>0</sup>	0-30 <sup>0</sup>
External rotation	0	0-5 <sup>0</sup>

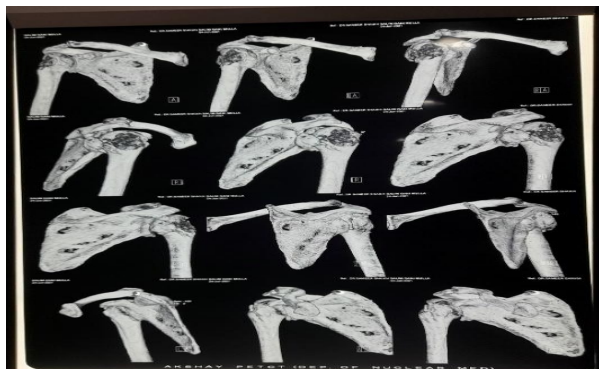
**Table 2:** Manual Muscle Testing[5]

Right Shoulder	Grades
Shoulder flexor	1
Shoulder extensor	1
Shoulder abductor	1

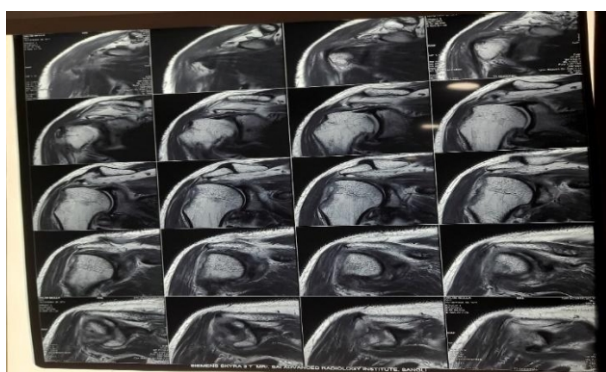
There was grade 1 tenderness overlying the greater tuberosity. Range of motion of elbow and wrist were complete. Grip strength was slightly reduced. He was screened for the functional assessment according to ICIDH2 with these findings there was significant impact on his activity limitation (E.g., right shoulder overhead activities, lifting loads and moving one place to another), participationlimitations (limitations at work place), participation restriction it is leading cause of absenteeism from work. This imposes a greater socioeconomic burden on patient. Based upon these findings’ physiotherapy management was started on 7th September 2021 which was continued for12 weeks.



**Fig. 1 :** Plane Radiographs Findings Revealed a Displaced Fracture of the Greater Tuberosity



**Fig.2-** 3D CT findings – Greater Tuberosity Fracture and Displaced Posteriorly



**Fig. 3-** MRI Findings of Right Shoulder Revealed that Displaced Fracture of Greater Tuberosity.

**Physiotherapy Intervention<sup>4,8,9</sup> –**

**Early stage - week 1-4**

- Patient education
- Hot moist pack
- Gentle Maitland grade – I II
- Active assisted exercise within pain free range
- Isometric exercise, Desensitization program.
- Wand exercise (fig no)
- Home exercise programme

**Intermediate stage – week 5-8**

- Hot moist pack
- Maitland grade- III IV, Movement with Mobilization (MWM)
- Active exercise in side lying (gravity elimination) shoulder flexion and external rotation (fig no 5,6)
- Multiple angle isometrics – 5 sec holds at 30, 60, 120 degrees
- Shoulder range of motion exercises in scaption
- Grip strengthening exercise
- Home exercise program

**□ Late stage – 8- 12 weeks**

- Above all intervention
- Scapular stabilization exercise – prone T

- Rowing
- Active assisted resisted exercise to shoulder flexors and abductors
- Strengthening of scapular stabilizers
- Grip strengthening exercises
- Endurance exercise for shoulder using low load with maximum repetition
- Home exercise program

**□ Vocational rehabilitation – 12- 20weeks [10]**

**Work specific activities**

1. Overhead activities of shoulder
2. Manual handling of load
3. Static posture
4. Repetitive work

In order to monitor the training intensity, the Borg General Scale was used. The scale was explained to the patient before the task was performed. After completing the training session, he was asked to give a rating based on the scale.



**Fig. 5 :**



**Fig. 5, 6 :** Active exercise in side lying (gravity elimination) shoulder flexion and external rotation



**Fig. 7 :** Shoulder Isometrics



**Fig. 8 :** Wand exercise



**Fig. 11:** Overhead activities using weight

### Result:

By 24 weeks post-surgery the patient demonstrated functional range of motion of right shoulder i.e., 160° of shoulder abduction (fig no 9), 170° of shoulder flexion (fig no 10) extension 300, internal rotation 600, external rotation 500. Strength (4/5) of his rotator cuff muscles. He was relatively pain free. Now, he can successfully perform overhead activities with necessary strength. In addition to meeting the criteria for returning to work.



**Fig. 9 :** Shoulder abduction



**Fig. 10 :** Shoulder flexion

### Discussion :

A worker's readiness to work with work-related musculoskeletal disorders can be conceptualized as a complex behavioural change, including physical recovery, motivation, behaviour and being affected by a variety of medical factors, professional and personal as well as insurance systems. It is even more of a financial problem for the worker who is on long-term sick leave. There is evidence to suggest that to facilitate the return-to-work process, clinical interventions need to be linked to the workplace<sup>(15)</sup>. Vocational rehabilitation program appeared to be more effective in facilitating the return-to-work process of the injured worker as assessed immediately following intervention. The results of our study revealed good functional outcome after physiotherapy intervention. Generally, fractures of the greater tuberosity requiring surgical intervention are rare and depend upon the amount of displacement of fracture fragment and account for less than 2% of operatively treated proximal humeral fractures.<sup>(4,10)</sup> Only few authors have published follow-up data about the surgical treatment of displaced greater tuberosity fractures till date. Flotow et al. assessed 12 patients at an average of 4.5 years after open reduction and internal fixation and reported on six good and six excellent functional results within 6-8 weeks. 11 As it was the case for this patient, radiographs may not show a greater tuberosity fracture if it was not displaced. The use of advanced imaging technique like PET CT and MRI allowed for an accurate diagnosis of the displaced fracture, which assisted orthopaedic surgeon to structure a surgical intervention that would allow for adequate healing. The only non-imaging assessment that has been

reported as clinically effective in identifying an isolated nondisplaced greater tuberosity fracture is the presence of tenderness and pain on the lateral wall of the greater tuberosity and reduced ROM of affected shoulder<sup>(12)</sup>. One could say that greater tuberosity tenderness could also be the result of inflammation of the supraspinatus and infraspinatus tendon at its attachment, either from overuse or as the result of a tear. The presence of adhesive capsulitis, an anterior labral tear, glenohumeral arthritis, as well as the presence of a tumour may also cause tenderness in this region. Post-operative management for this patient, focusing on arthroscopic surgery for reduction of displaced fracture fragment, rest, maintenance of ROM, symptom-driven progression of rotator cuff strengthening, and eventual restoration of shoulder function, resulted in a good initial outcome. The patient maintained functional ROM, had no pain at rest, and was able to complete all of his activities of daily living without difficulty. This program revealed a significant deficit in abduction and external rotation strength. Hence, strengthening exercises are important in improving the functions.<sup>(13,14)</sup> The overall outcome was positive because of appropriate treatment strategies and collaboration with the referring surgeon and staff provided for an accurate diagnosis with a timely and appropriate treatment plan. Workplace based rehabilitation program was done during the 12 to 16 weeks. After 16 weeks rehabilitation was continued with a home exercise program 3-4 times/ week. He was returned for reassessment 24 weeks postoperatively. His range of motion was near normal and was relatively pain free with overhead movements, also he has gained strength and he had started his work. Now he is fulfilling the criteria for doing his work at construction site successfully requiring repeated lifting heavy weight.

#### **Conclusion:**

In this case report of a 37 years male, Construction worker with a displaced right greater tuberosity fracture and rotator cuff complete tear. Postoperatively the comprehensive rehabilitation program consisted of a functional and vocational physiotherapy rehabilitation that decreased its post-operative complications, improved shoulder mobility and strength. All these effects enhanced patients overall shoulder function. He was able to resume his routine pre-operative activities at

construction work place successfully.

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