

# Arthroscopic Prying Reduction and Fixation for the Greater Tuberosity Fractures

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## 14.1 Introduction

The incidence of greater tuberosity fracture of the humerus was 15 ~ 30% [1–3]. Anteroposterior shoulder joint radiography, and axial radiography can confirm the diagnosis (Fig. 14.1). Three-dimensional CT reconstruction is helpful to evaluate the condition of bone fracture displacement (Fig. 14.2), and shoulder joint MRI examination would be helpful to diagnosis of Bankart injury or rotator cuff injury [1, 3–5].

Accordingly the condition of bone fracture displacement can be divided into displaced fracture and undisplaced fracture. Neer use open surgical reduction internal fixation to treat greater tuberosity fracture of humerus which displacement >1 cm. Study shows even fracture fragments of greater tuberosity of humerus mild displacement; there will be acromion impingement syndrome when the shoulder joint is moving. Prying reduction and fixation under arthroscopy, operative wound smallness and would be helpful to early functional rehabilitation [6, 7].



**Fig. 14.1** Radiography shows anterior shoulder dislocation

## 14.2 Operative Technique

### 14.2.1 The Treatment of Greater Tuberosity Fracture of Humerus with Prying Reduction and Fixation Under Arthroscopy

After general anesthesia, the patients were posed at lateral position, limb abduction 60°, traction weight 3–4 KG. Before

surgery, mark acromion, coracoid process, bone landmarks of greater tuberosity of humerus and arthroscopic surgical portal. For operation field clear, arthroscopic perfusate contains 0.1% adrenaline 1 ml per 3000 ml normal saline, for continuous lavation.

Operative approach: Posterolateral corner of acromion downward 10 mm and then inward 10 mm, it's a “soft point” behind the shoulder joint, used as arthroscopic posterior portal (Fig. 14.3); the lateral or anterior side of the shoulder joint is the operating channel.

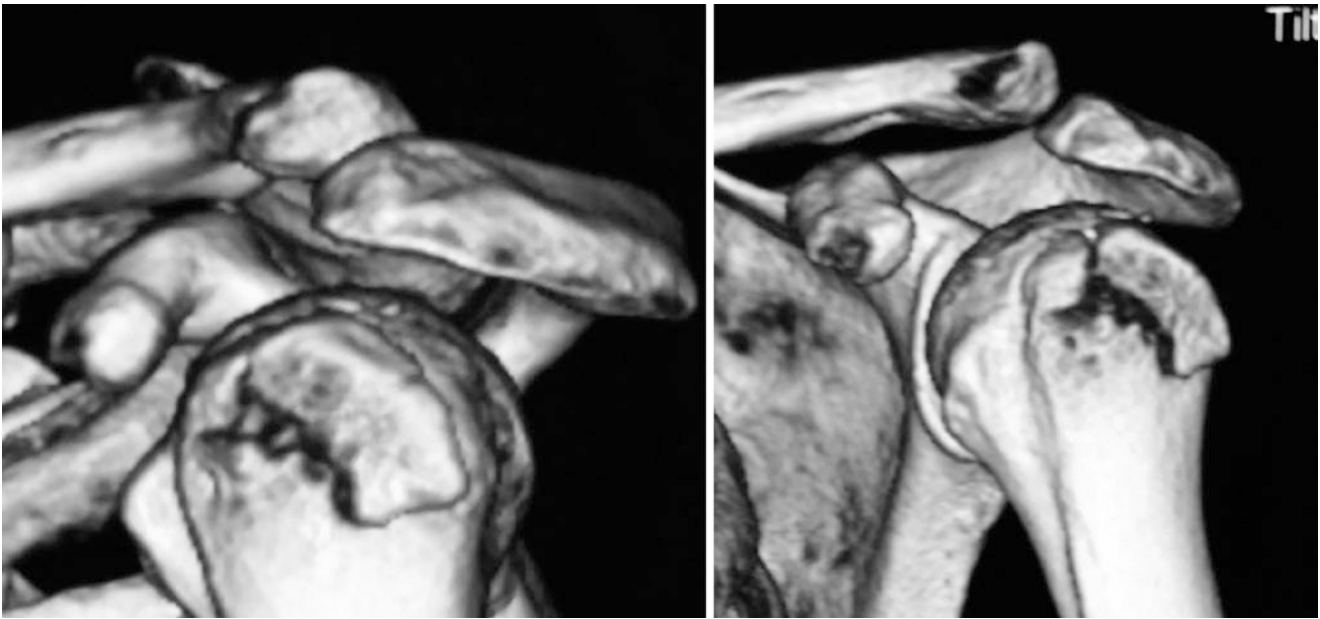
Routinely examine scapula glenoid, cartilage, and rotator cuff for any damage; probe the condition of bone fracture displacement (Fig. 14.5). Notice under the acromion 4–5 cm, there is axillary nerve (Fig. 14.4) prevent injury.

Clean up the bone chip, old hematocoele, and scar tissue, debridement was performed on the fracture surface, to make

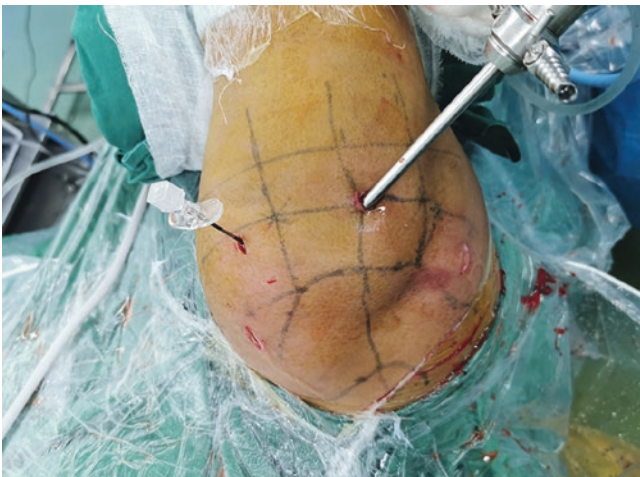
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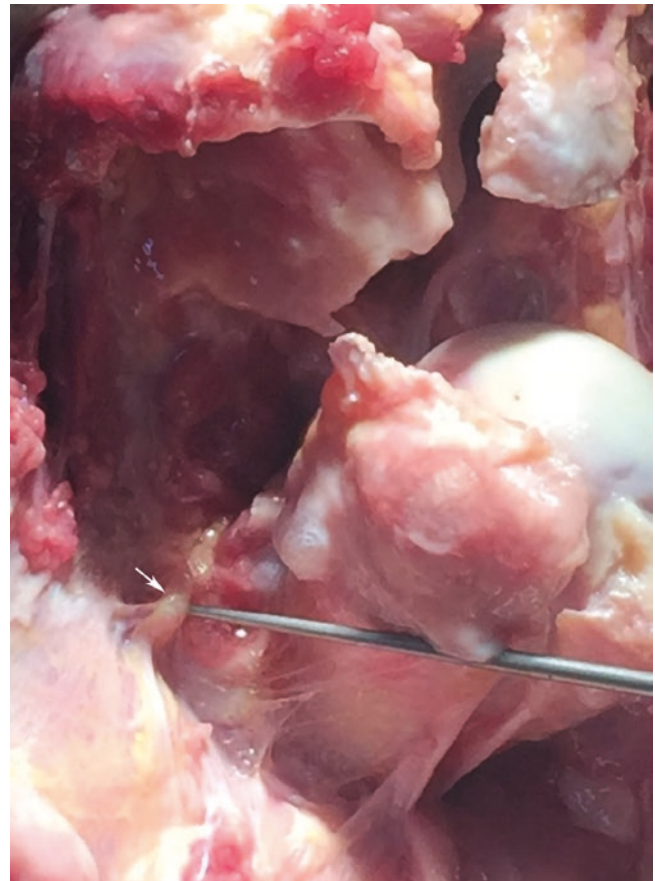


**Fig. 14.2** Three-dimensional CT reconstruction is helpful to evaluate the condition of bone fracture displacement

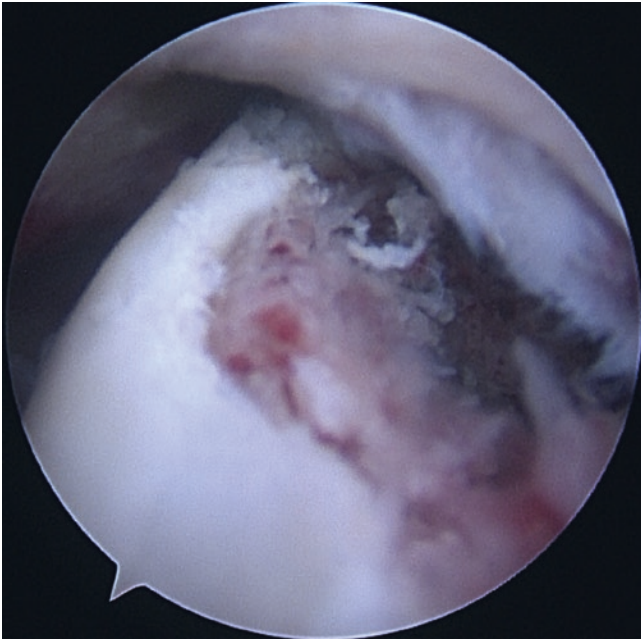


**Fig. 14.3** Posterior portal of shoulder arthroscopy

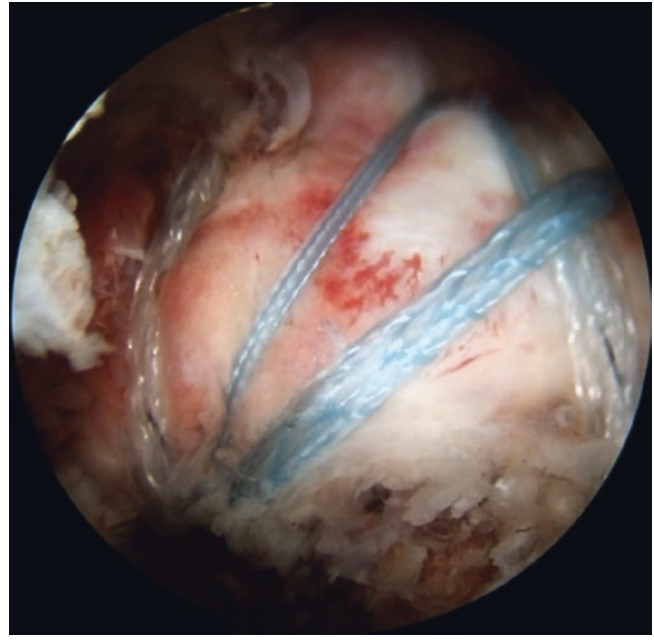
it fresher, and poking reduction of the fracture fragment was watched by arthroscopy (Fig. 14.5). Take care to protect rotator cuff tissue when prying reduction of the fracture fragment, in order to avoid damage. After anatomical reduction of the fracture, fixing the fracture fragment by percutaneous Kirschner wire fixation observing depth and angle of Kirschner wire entry into the bone by X-ray, hold the Kirschner wire at a 45-degree angle toward humeral shaft. Choose titanium alloy cannulated screws of suitable length or absorbable screws to fix fracture fragment (Fig. 14.6). Driving screws into bone along Kirschner wire, for increase adhesive ability of screws, screws must bite contralateral



**Fig. 14.4** Notice not to injure the axillary nerve, which pass under the acromion 4–5 cm



**Fig. 14.5** Poking reduction of the fracture fragment was watched by arthroscopy



**Fig. 14.7** Suture across the rotator cuff tissue, fixing the rotator cuff and fracture fragment in network



**Fig. 14.6** Choose titanium alloy cannulated screws of suitable length to fix fracture fragment

cortex of bone and guide pin and screws avoid injure articular cartilage and glenoid labrum tissue.

#### 14.2.2 Suture Anchor Fixation of Greater Tuberosity Fracture

After the reduction of fracture fragment, crossing the Kirschner wire into fracture fragment for temporary fixation, driving a suture anchor into the normal bone structure of

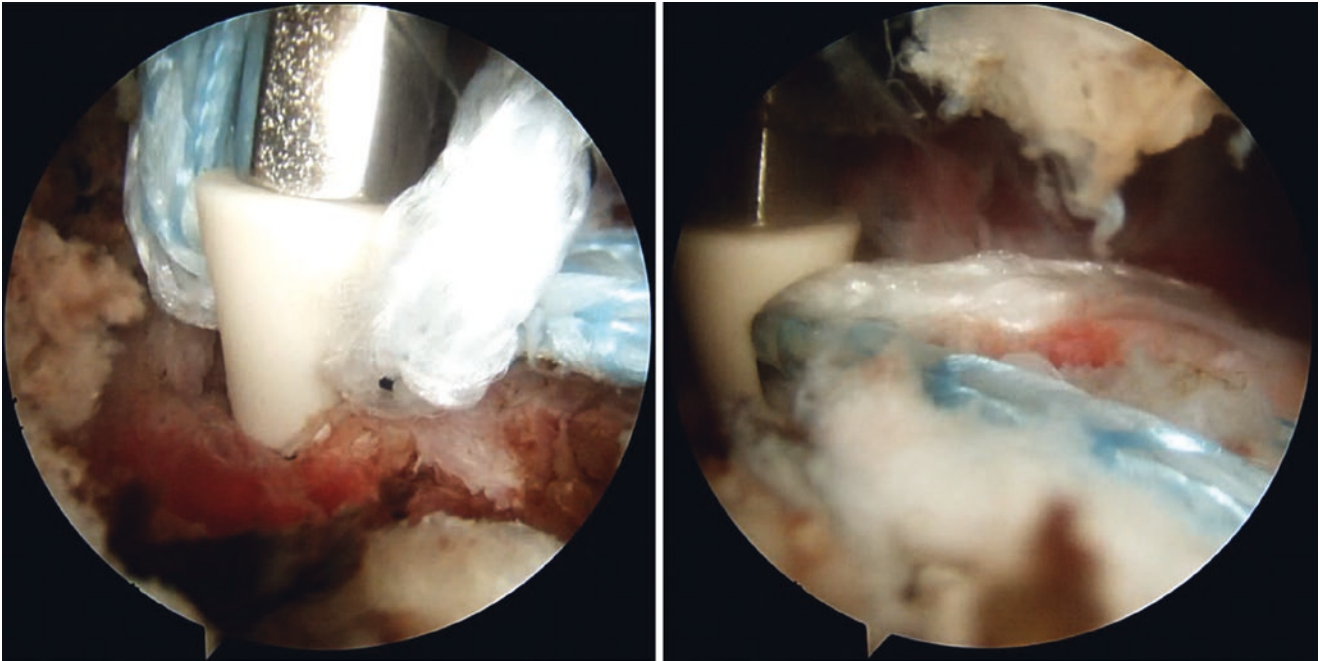
greater tubercles of the humerus, suture across the rotator cuff tissue, fixing the rotator cuff and fracture fragment in network (Fig. 14.7) and fixing the other end of the suture with outside suture anchor (Fig. 14.8). Check and confirm the anatomical reduction of fracture fragment, fixed rigidly, and then remove the arthroscope and instruments. After operation, use sling or brace to immobilize upper limb according to the situation. Radiography shows well reduction of fracture postoperatively (Fig. 14.9).

### 14.3 Postoperative Treatment

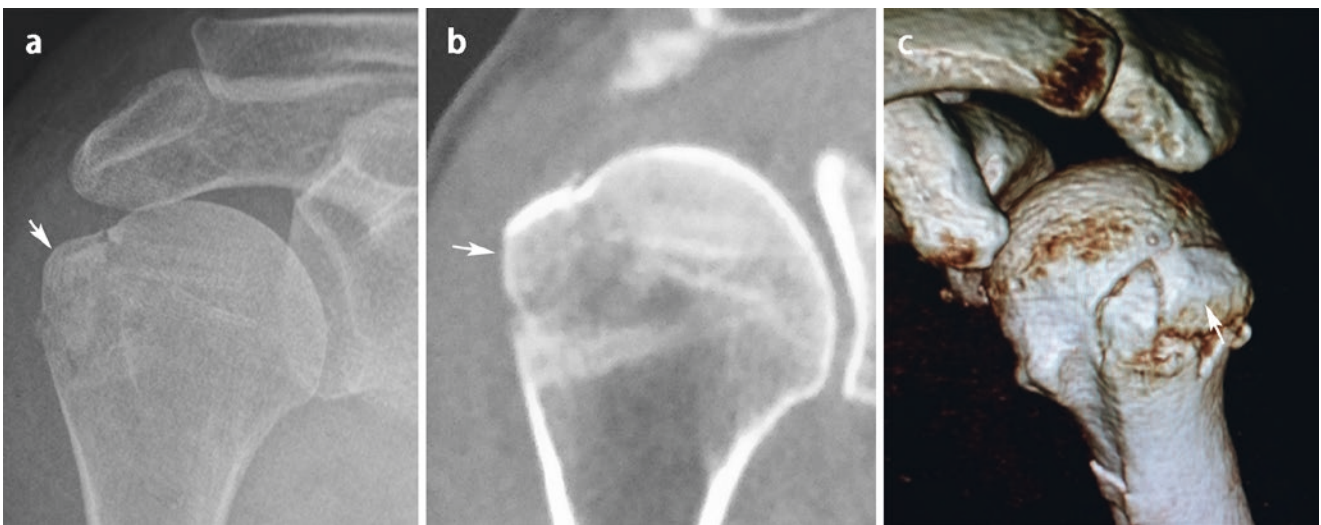
Routine affected limb suspension and immobilization 4 ~ 6 weeks after operation; during this period, patients can do shoulder joint abduction, lift, bend, and rotation passively. Do suspension pendulum motion at 7 ~ 10 days after operation, lift affected limb 30° ~ 45° passively. Patients should avoid shoulder joint abduction and lift forwardly within 6 weeks [1, 2, 8].

### 14.4 Critical Points

1. Intra-articular fracture must anatomical reduction, in order to avoid greater tuberosity fracture fragment moving and impact the acromion.
2. During prying reduction and fixation, avoid separating the fracture fragment and rotator cuff tissue.



**Fig. 14.8** Fixing the other end of the suture with outside suture anchor



**Fig. 14.9** X-ray (a) and CT (b, c) images show the fracture reduction as well

3. Anchor fixation should keep away from osteoporosis zone, in order to avoid pulling the anchor out.
4. It should prevent from anchor penetrating the articular surface of the humeral head, in order to avoid injure the bone cartilage.
5. During the implantation of outside anchor, you should avoid injure axillary nerve.

## References

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