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ORIGINAL ARTICLE

The inter-teres approach to glenoid neck fractures: an alternative approach to glenoid fixation

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Background: Scapula fractures are rare injuries that are generally treated nonoperatively. When surgery is performed, it is commonly undertaken through the posterior approach, which can be invasive and unforgiving on the soft tissues. We describe an alternative safe approach between teres major and minor that remains deep to a fascial sling formed by the combined infraspinatus and teres minor fasciae and deep to the primary nerve to teres minor, which is a terminal branch of the axillary nerve.

Methods: Between January 2008 and June 2014, there were 22 patients who underwent scapula fixation with this approach who were retrospectively identified and prospectively invited for clinical review by the American Shoulder and Elbow Surgeons (ASES) evaluation form and Constant score. Postoperative external rotation (ER) power in both abduction and adduction was also assessed.

Results: Five patients were lost to follow-up. All of the remaining patients were male with a mean age of 44.5 years (28-66 years). Mean follow-up time was 34.7 months (3-72 months). The mean ASES score for the 17 patients was 86.6 (41.6-100); the mean Constant score was 89.3 (22-100). The only significant factor affecting the ASES score was an ipsilateral neurologic upper limb injury. ER power was improved or equivalent to the contralateral side in 8 of the 10 patients assessed for ER; it was weaker in 2 patients, both of whom had surgical fixation of the vertebral border of the scapula.

Conclusion: The inter-teres approach may be a safe alternative approach in glenoid fixation, although the loss of ER strength needs further evaluation.

Level of evidence: Level IV; Case Series; Treatment Study

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Keywords: Inter-teres approach; glenoid neck fracture; posterior approach to the shoulder; scapula fracture; Judet approach; glenoid fixation

The study was undertaken at Waikato Hospital, Hamilton, New Zealand. Our hospital's Ethical Committee was consulted about the need for ethical approval; they classified this study as an audit more than research and consequently advised that no ethical approval was necessary. Furthermore, the technique described is the standard practice of the senior author in dealing with glenoid neck fractures.

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Scapular fractures are a rare entity representing <1% of fractures and are usually the result of direct trauma with significant force.⁵ The majority of these fractures involve the scapula neck and body.^{1,12} Malunion is well tolerated because of compensatory movements, and nonoperative treatment is therefore commonplace. When indicated, surgery is commonly undertaken by the posterior approach originally described by Judet and involves working in the interval between infraspinatus and teres minor.¹⁰ This allows access to the entire posterior scapula body but is invasive and unforgiving on the

soft tissues, especially the infraspinatus. The modified Judet approach omits dissection of the infraspinatus free from its fossa, meaning that it is of little use in performing surgical fixation of the scapula.¹³ Other approaches to the scapula that have been described include Brodsky's subdeltoid approach, in which the portion of the deltoid attached to the spine of the scapula is mobilized, allowing access to the infraspinatus–teres minor interval.⁴ Wirth described a posterior approach involving splitting of the posterior deltoid in line with its fibers.¹⁵ A triceps tenotomy can further augment any of these exposures.⁸ Minimally invasive approaches have also been described.⁹

In this paper, we aimed to describe another approach to the scapula involving the interval between teres minor and major without releasing the deltoid. We also report on the outcomes from a series of 17 patients who were treated with this technique and evaluated by the American Shoulder and Elbow Surgeons (ASES) and Constant scores as well as clinically assessed for external rotation (ER) strength.

Methods

This was a retrospective case series review of 22 patients who had undergone scapula fixation under the care of the senior surgeon between January 2008 and June 2014.

Surgical technique

Patients are positioned in the lateral position with the arm draped free. A 10-cm longitudinal skin incision is made over the lateral aspect of the scapula. Dissection is carried down to the level of the deltoid fascia (Fig. 1), and the deltoid epimysium is split in line with the fibers along its lower border, thus allowing the muscle to be retracted cephalad. The underlying infraspinatus and teres major and minor muscles are identified, and the inter-teres interval is developed using blunt dissection (Fig. 2). Identification of the plane of dissection is fairly easy as the infraspinatus and teres minor are enveloped in a dense fascia, whereas the teres major is not. The circumflex scapular vessels are identified on the lateral border of the scapula in the major-minor interval and cauterized (Fig. 3).

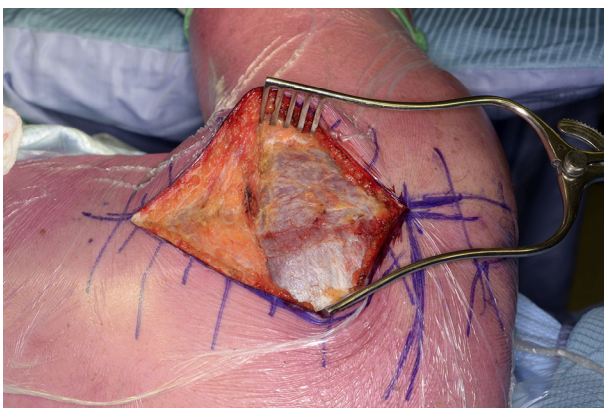


Figure 1 A 10-cm incision is made along the lateral aspect of the scapula. The deltoid is seen in the superior half of the wound.

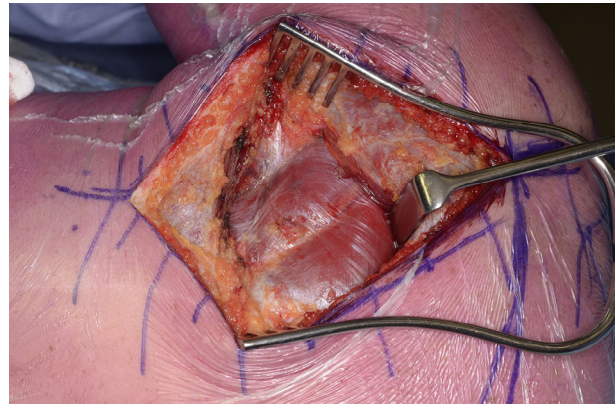


Figure 2 The deltoid is retracted cephalad, exposing the underlying teres minor and infraspinatus muscles. The teres major is noted at the inferior aspect of the wound.

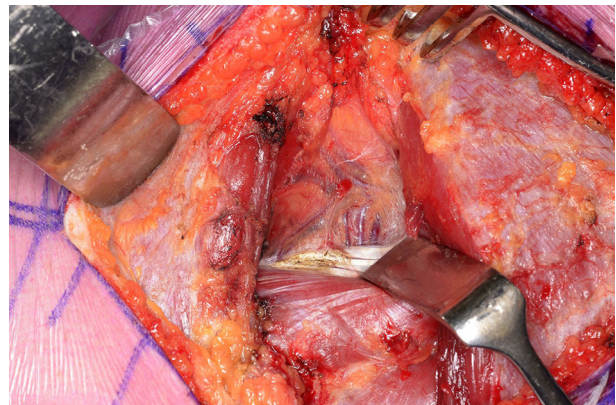


Figure 3 The plane is developed between teres major and minor muscles, exposing the circumflex scapular vessels over the lateral border of the scapula.

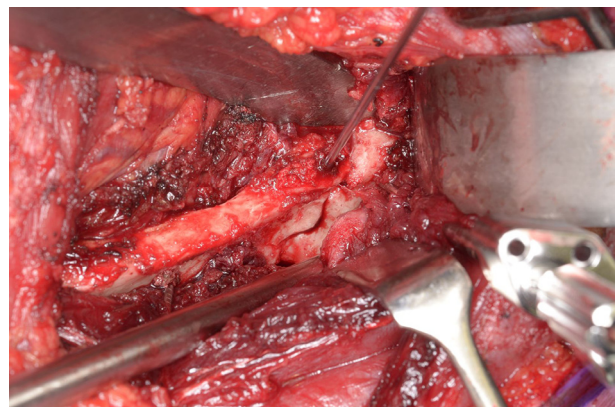


Figure 4 Extrafascial dissection along the lateral scapula border exposes the inferior glenohumeral joint capsule, allowing fracture reduction and fixation.

Dissection is then done extrafascially on the lateral scapular border until the inferior glenohumeral joint capsule is visualized just lateral to the long head of the triceps (Fig. 4). The arm is abducted, and the dissection follows the scapula bone posterior to the long head of the triceps, ensuring the protection of the axillary nerve. As the

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