Scapular body nonunion: A case report

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Scapular fractures are uncommon and usually associated with other injuries.[1,3-5,9,10] The fracture can usually be treated conservatively with a high healing rate.[7,8,11] The indications for surgery include significant displacement of the main fragments, displacement or angulation (or both) of the articular segment of the glenoid when it is involved, and fractures associated with dislocation; surgery is also indicated in patients who need to undergo vascular or neurologic exploration.

Scapular body nonunions are very rare. Some authors have reported coracoid process, scapular spine, and acromion nonunions,[1,6,8,11] but only one reported case of a scapular body nonunion was found in our search of the literature.[2]

We report on a case of symptomatic scapular body nonunion that was successfully treated by open reduction, rigid internal fixation, and bone grafting.

CASE REPORT

A 39-year-old man sustained a very comminuted fracture of his left scapula when his bicycle was struck by an automobile. At his initial evaluation after the accident, he had skin abrasions on the back with pain to palpation of the posterior aspect of his shoulder. Movement in all planes was painful. Slight weakness was noted. No other injuries were found, and his neurovascular function was normal. His original plain radiographs revealed a fracture of the body of the scapula extending to the neck. It was a displaced fracture, but the glenoid did not appear to be involved. A computed tomography (CT) scan showed that there was minor glenoid involvement, with no displacement of the articular component.

It was initially decided to proceed with treatment with the patient's arm in a sling for 3 weeks. After that, the patient underwent physical therapy but did not progress well. As a result of his persistent complaint of pain and clunking when lifting his arm, he was referred to us 1 year after the initial injury. He complained of pain and clunking in his shoulder that impaired his activities of daily living. Slight weakness was noted with resisted external rotation, but his main complaint was pain with motion. He had forward flexion to 180°, abduction to 180°, internal rotation to 90°, and external rotation to 60°. He had severe crepitus and pain at the extremes of abduction, forward flexion, and external rotation. Radiographs that revealed a scapu-

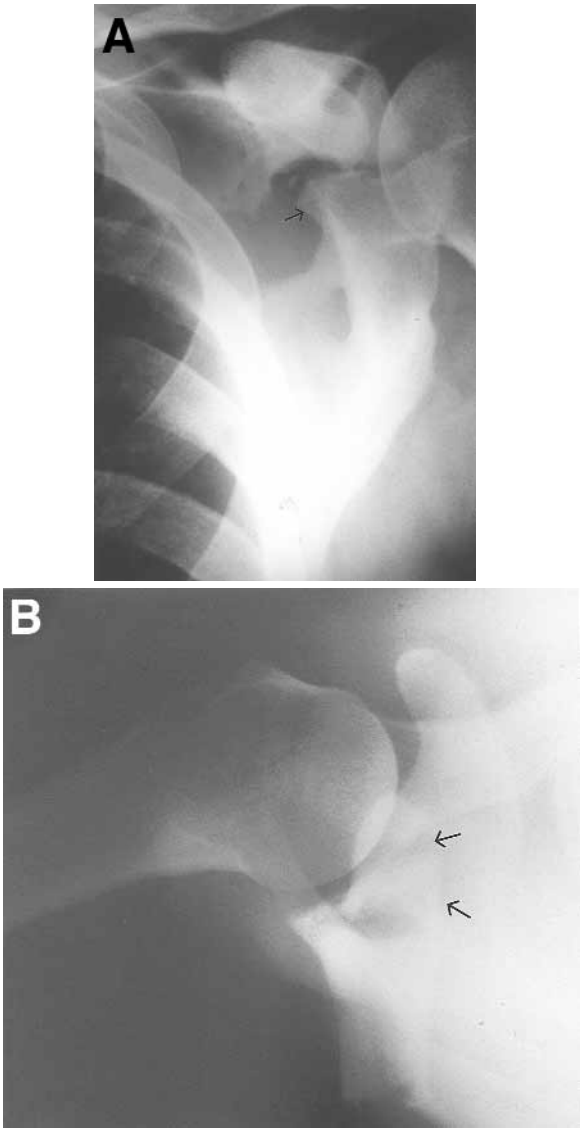

Figure 1 Fracture of the scapular body extending to the glenoid. **A,** Anteroposterior view. **B,** Axillary view. *Arrows* indicate fracture line through glenoid.

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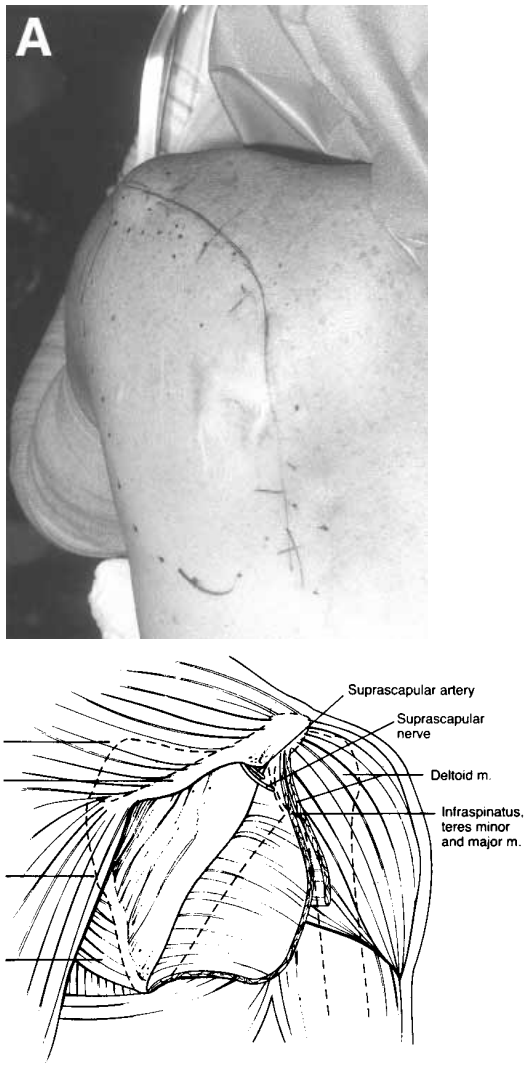

Figure 2 Judet approach. **A,** Skin marked. **B,** Infraspinatus, teres minor, and teres major muscles elevated off the infraspinous fossa. The neurovascular pedicle was identified at the spinoglenoid notch.

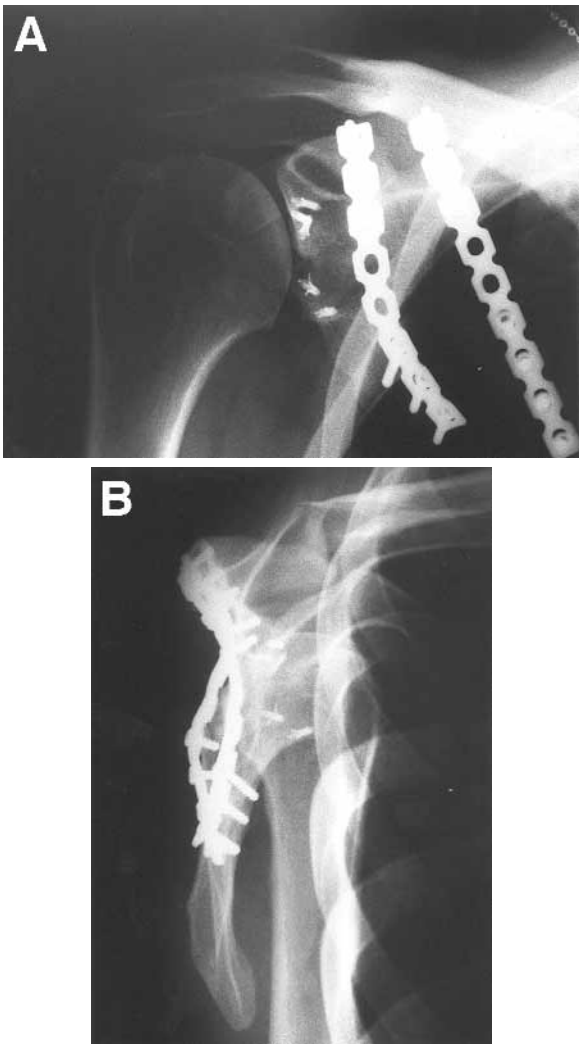

Figure 3 Postoperative radiographs showing the placement of reconstruction plates and bone anchors. **A,** True anteroposterior view. **B,** Lateral view.

lar body nonunion with intra-articular extension were obtained (Figure 1). A CT scan with 3-dimensional reconstruction was ordered for further study of the fracture. It revealed a nonunited scapular body fracture extending through the scapular neck and transversely through the inferior half of the glenoid. It was severely displaced and malrotated. We decided to repair this nonunion surgically based on the patient's complaint of pain and significant radiographic joint involvement.

Because of an insurance delay, he underwent surgery 1 year and 8 months after the initial injury. A Judet approach was used (Figure 2), curving from the vertebral border of the scapula over the spine in an inverted L fashion. The deltoid insertion was elevated subperiosteally off the scapula spine. The infraspinatus, teres minor, and teres major muscles were then elevated subperiosteally from the infraspinous fossa, exposing the nonunion site. The suprascapular nerve and artery were identified at the spinoglenoid notch and were protected throughout the procedure. The nonunion site was incongruent, rendering an anatomic reduction impossible. Marked heterotopic bone was noted throughout the area, which required removal from both the scapula and the glenoid. The glenohumeral joint was exposed by a posterior arthrotomy between the infraspinatus and teres minor muscles. It was necessary to elevate the posterior labrum to obtain good joint reduction. The glenoid intra-articular step off was found to be 7 mm. The patient had grade III cartilaginous erosion of the humeral head and the glenoid. The glenoid was reduced as much as possible and fixation achieved across the nonunion site with two 3.5-mm reconstruction plates. Iliac crest bone grafting was necessary to fill defects at the

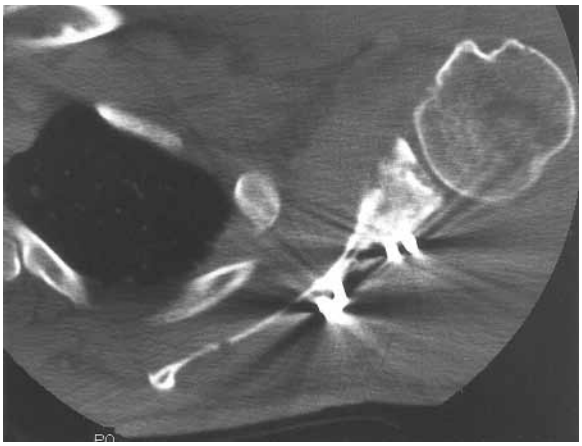

Figure 4 Postoperative CT scan at 4 months' follow-up. Healing of the nonunion site was noted.

nonunion site. A persistent 3-mm chondral surface defect persisted following reduction and grafting. The posterior glenoid labrum was repaired with bone anchors (Mitek; Ethicon, Inc, Somerville, NJ). The muscles were reattached to the bone through drill holes in the vertebral border of the scapula and through the scapular spine.

Postoperatively, the arm was maintained in an abduction pillow for 3 weeks to lessen stress on the rotator cuff musculature. After pillow removal, physical therapy was initiated to regain motion. Active range of motion (ROM) was permitted 1 month after surgery. The patient progressed very well during the rehabilitation period. He regained ROM and muscle strength very quickly after surgery. By 4½ weeks postoperatively, he had no pain. He had forward flexion to 180°, abduction to 180°, internal rotation to 90°, and external rotation to 60°, and excellent strength of the shoulder musculature was noted at the tenth week of follow-up. Slight crepitus with vigorous motion was noted until the fifth month after surgery.

At the patient's final follow-up visit 24 months after surgery, he still had a painless shoulder, full ROM, full muscle strength, and no crepitus. Postoperative imaging revealed healing of the scapula and good preservation of the glenohumeral joint. No signs of degenerative joint disease were noted (Figures 3 and 4).

DISCUSSION

Although nonunion is a very rare complication of scapular fractures, it should be considered when a patient complains of persistent shoulder pain after conservative treatment.

In 1998 Gupta at al[2] reported a case of symptomatic scapular body nonunion that was treated surgically with open reduction and internal fixation with 2 small reconstruction plates and bone grafting. Teres major muscle interposition was noted to be the cause of the nonunion. The outcome was a pain-free shoulder with excellent ROM in all planes.

In our patient we could not identify a factor responsible for the nonunion. The patient's fracture was displaced, but initially only minor glenoid involvement was present. The displacement of his original fracture may have ultimately led to nonunion, but many comminuted and displaced scapular fractures heal well, resulting in a pain-free shoulder. Although our patient had a severe nonunion involving half of the joint surface, with noted cartilage damage, and a 3-mm persistent postoperative chondral defect, he showed a very impressive outcome with complete return of function. At the final follow-up, no signs of degenerative joint disease were noted, but because of the intra-articular nature of his fracture, he was advised of the potential for glenohumeral arthritis.

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