

Rethinking the Treatment of Clavicle Fractures

Courtney M Boucher, PA-S and Christopher P Forest MSHS, DFAAPA, PA-C

Keck School of Medicine of USC • Division of Physician Assistant Studies



PATIENT PRESENTATION

- 24yo female presented to ED following a bicycle accident, falling over the handlebars
- Pain in left shoulder and clavicle region
- Past Medical History:
 - Right clavicle fracture repair in 2013

PHYSICAL EXAMINATION

- Alert and oriented, well-developed
- No gross deformities of upper extremities
- No skin tenting
- Superficial abrasions on the anterior aspect of the left hip, right hip, lateral aspect of left elbow, and the dorsal aspect over the PIP joints of the middle, ring, and index finger
- Detailed sensory and vascular exam was negative
- Left clavicle and shoulder: tender to palpation
- ROM: Full range from left elbow to fingers; no passive or active shoulder ROM due to pain

WHAT IS YOUR DIAGNOSIS?

Radiographs reveal a markedly displaced mid-shaft clavicle fracture with a vertical comminuted “zed” fragment. (See Figure 1)

RADIOGRAPHY

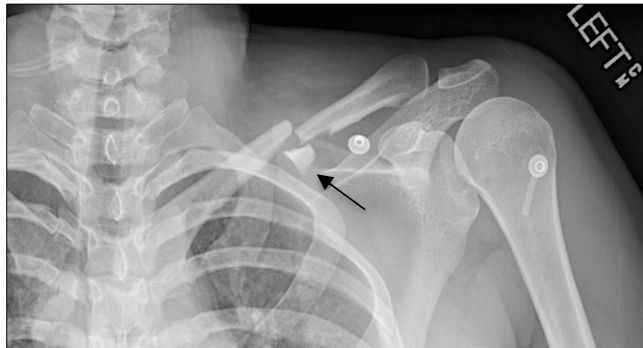


FIGURE 1. Left Shoulder X-Ray (AP View) revealing a “zed” fragment

BACKGROUND

Clavicle fractures are common:

- 2.6-4% of adult fractures; 35% of shoulder girdle injuries¹

Conservative treatment:

- Arm sling, analgesia, and figure of eight brace for 6 weeks

Locations for clavicle fractures:

- 1. Medial:** rare, not treated surgically unless significant displacement due to posterior neurovascular structures
- 2. Lateral:** high rate of nonunion so treated surgically unless stable, without displacement, or if low demand for use
- 3. Midshaft:** most common (70-80%); treated conservatively unless: open fracture, skin tenting, neurovascular injury or simultaneous shoulder girdle injury

DISCUSSION

- High rate of nonunion or malunion without operative repair, 29% and 36%, respectively²
- Issues with malunion: Weakness, decreased endurance, paresthasias, fatigue
- Operative consideration should be given if there is significant distraction > 1.5 cm, displacement >100% or presence of a “zed” fragment³
- Surgical risks: Wound infection, irritation, prominence, plate failure
- Surgical fixation is only way to prevent malunion
- Operative and nonoperative results are similar with most patients reaching full function, and adequate union rates at 6 mos⁴

CONCLUSION

Surgical treatment is best in young active patients who need function back quickly

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ABSTRACT

A 24-year-old female presented to the ED with a complaint of left shoulder pain following a bicycle accident, in which the patient fell over the handlebars. The patient reported pain in the left clavicle and shoulder region, but denied numbness, tingling, or weakness. Her past medical history was significant for a right clavicle fracture repair 2 years ago. Physical examination revealed an alert and oriented, well-developed female in moderate discomfort. There were no gross deformities of the left upper extremity and no skin tenting was present. Detailed sensory and vascular examination findings were within normal limits. The patient's upper torso was nontender to palpation with the exception of the left clavicle to shoulder. She had full range of motion from the left elbow to fingers, but did not have passive or active range of motion of the shoulder secondary to pain. Radiographs revealed a markedly displaced midshaft clavicle fracture with a vertical comminuted fragment ("zed" fragment). The patient was taken to the operating room for surgical repair of the fracture.

Clavicle fractures are a common injury, accounting for 2.6-4% of adult fractures and 35% of injuries to the shoulder girdle. The most important aspects of clavicle fracture management are pattern of injury and location, of which there are three anatomical sites: medial, lateral, and midshaft (most-common). The treatment has historically been conservative, especially for lateral and midshaft, but recent studies suggest that surgical treatment leads to a decreased rate of complications, better functional outcomes, and greater patient satisfaction. Conservative treatment consists of an arm sling, analgesia, and a figure eight brace for six weeks. While medial end clavicle fractures are rare, they can be dangerous due to neurovascular structures found posteriorly and therefore, operative fixation is only considered if there is significant displacement. Lateral clavicle fractures have a high rate of nonunion and therefore, surgical treatment should be considered unless they are not displaced, stable, or if the patient is elderly or without high demands for use.

The midshaft clavicle fractures, which are the most common type (70-80%), have traditionally been treated non-operatively. Surgery was only considered if there was an open fracture, skin tenting, neurovascular injury, or a simultaneous shoulder girdle injury. More recent studies indicate a higher rate of nonunion or malunion without operative repair, as high as 29% and 36% respectively. Malunion could become symptomatic, leading to issues with shoulder movement with patients reporting weakness, decreased endurance, paresthesias, and increased fatigability. Due to this, operative consideration should also be given if there is significant distraction greater than 1.5 cm, displacement greater than 100% or presence of a "zed" fragment.

Surgery is not without the risk of complications, such as wound infection, irritation, prominence, and plate failure, all of which should be discussed with the patient. However, the only way to prevent a malunion of a midshaft clavicle fracture is through surgical fixation. Surgical treatment is best in young, active patients who need function back in the shortest time possible, as the results of nonoperative and operative were similar 6 months out, with most patients reaching full function.