

Surgical Treatment of Clavicular Malunion-A Case Report

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Received: October 15, 2019; Published: November 07, 2019

Abstract

Fractures of the clavicle are common in adolescents, accounting for 15% of the fractures in this population. Usually, these fractures are treated nonoperatively. We present a case of a 20-year-old male with a history of midshaft clavicular fracture that developed clavicular malunion after conservative treatment. We treated this patient with open reduction, a longitudinal osteotomy to restore collarbone length, osteosynthesis with locking compression plate and bone autograft. Two months after surgery, he presented a DASH score of 23.3 (pre-op score 45.7). X-ray showed a sustained reduction and visible bone callus. The patient reports a clear improvement in pain complaints. Recent studies revealed that patients treated conservatively have revealed a greater than expected incidence of residual pain, nonunion, malunion, shoulder weakness and decreased range of motion. Treatment of these fractures remains controversial. It is important to individualize the treatment taking into account the fracture characteristics and the patient profile.

Keywords: *Surgical Treatment; Clavicular; Malunion*

Introduction

Fractures of the clavicle are common in adolescents, accounting for 15% of the fractures in this population [1]. The majority of these fractures occur in the midshaft region and about one-half are displaced [1]. Traditionally, clavicle fractures have been treated nonoperatively, even when substantially displaced [1].

Surgical treatment is gaining importance nowadays, although the majority of clavicular fractures without deviation continue to be treated conservatively this day [1,2].

Recent studies have shown that open reduction and plate osteosynthesis in midshaft deviated fractures improve functional outcomes and have a lower rate of non-union and malunion compared with conservative treatment [3,4]. Non-union and malunion are rare complications but may be symptomatic [5]. The introduction of locking compression plates have increased the incidence of operative intervention in the management of these injuries [6-8].

Case Report

We present a case of a 20-year-old male with a history of a midshaft clavicular fracture at 17 years old. The fracture occurred after a fall from own height with direct trauma of right shoulder. At the time patient went to the Emergency Department and did an X-ray which revealed a midshaft clavicular fracture with deviation, the treatment was conservative - brachial suspension for 3 weeks. No relevant personal history.

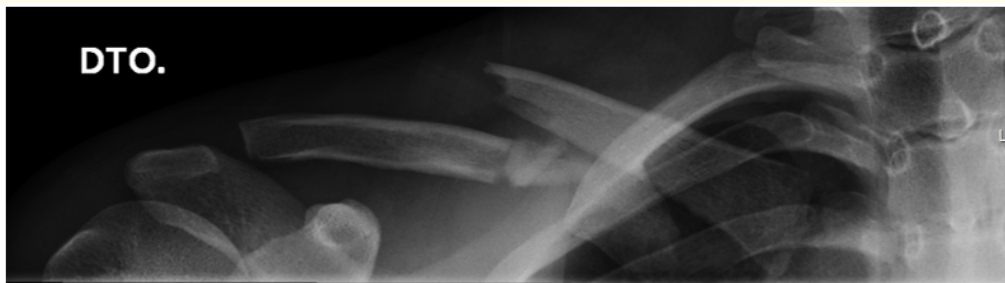


Figure 1: Initial X-ray.

Eighteen months after the fracture, he mentioned pain with limited range of motion, he was then forward for an appointment at our hospital. Radiography revealed a malunion with a shortening of 2.5 cm. The DASH score (Disabilities of the Arm, Shoulder and Hand Score) was used for the functional assessment.



Figure 2: X-ray: 18 months after fracture.



Figure 3

Results

The patient underwent surgical treatment 24 months after the fracture. The surgical technique that we have employed included administration of intravenous antibiotic (2g of cephazolin) one hour before the scheduled time of surgery. Also involved positioning the patient in a beach chair position. The skin incision was centered over the fracture extending from the sternal notch to the acromion. The platysma was dissected and clavipectoral fascia was incised along its attachment. Dissection was performed along the fragment and the fracture site was exposed. We made a longitudinal osteotomy, to restore collarbone length. The reduction was performed and held with bone clamps. A ten-hole clavicle locking compression plate was selected, a lag screw was used for fixation and we used also bone autograft. The postoperative protocol included immobilization of the patient on a brachial suspension for a period of two weeks. The patient was discharged 1 day after surgery. Suture removal was done on postoperative day 15. Shoulder mobilization and rehabilitation exercises started right after surgery. Regular reviews were done at postoperative week two, six and twelve. Review radiographs and assessment of shoulder function with DASH scoring system was used. No complications were observed. Two months after surgery, he presented a DASH score of 23.3 (pre-op score 45.7). X-ray showed a sustained reduction and visible bone callus. The patient reports a clear improvement in pain complaints.

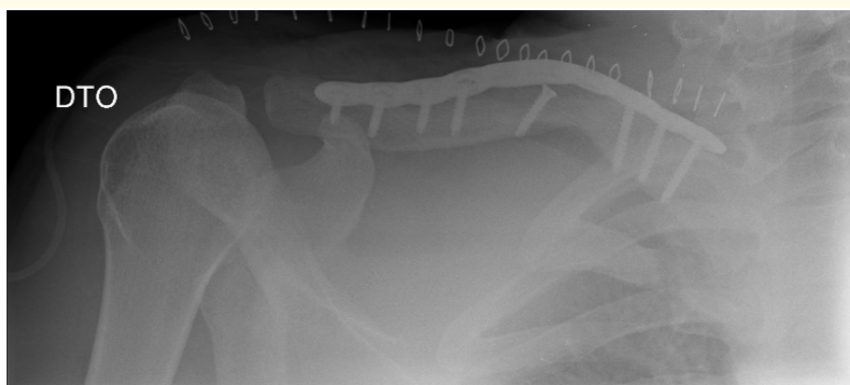


Figure 4: POST-OP.



Figure 5: 2M POST-OP.



Figure 6: Range motion, 2M POST-OP.

Discussion

Although the majority of midshaft clavicle fractures are displaced, nonoperative management, historically, has been the mainstay of treatment [4]. Recent studies revealed higher nonunion and malunion rates in displaced midshaft clavicle fractures treated nonoperatively (15%) than operatively (2.2%) with modern internal fixation techniques [1-7]. Patients treated conservatively have revealed a greater than expected incidence of residual pain, nonunion, malunion, shoulder weakness and decreased range of motion [1,2]. Studies emphasize pain as the main complaint of patients with non-union or malunion, when patients underwent surgical treatment pain complaints tend to dissipate.

Conclusion

Complications related to clavicle fractures can occur from nonoperative and operative treatment. Both treatments can result in malunion, nonunion, pain and decreased shoulder motion [1,2]. Late complications of nonoperative management have been reported, including delayed brachial plexus neuropraxias and thoracic outlet syndrome, typically in association with nonunions or malunions. Reported complications after primary ORIF for clavicle fractures include infection (0% to 18%), nonunion (2% to 15%), neurovascular injury (0% to 5%) and hardware prominence (95% to 100%) [2]. Symptomatic malunion is more frequent than previously thought. It is important to individualize the treatment of these fractures taking into account the fracture characteristics and the patient profile. Patients with 20mm or more of shortening were more likely to develop subjective complaints related to the malunion [1,2]. Osteotomy and osteosynthesis of these fractures restore length, alignment, decreases healing time, has low complication rates and resolve symptoms after malunion. Although good outcomes have been reported after operative treatment of acute diaphyseal fractures, it remains controversial whether we should aim for primary prevention or secondary reconstruction of symptomatic midshaft clavicle malunions [4-7]. Treatment options must be chosen on an individual patient basis, after careful consideration of the relative benefits and harms of each intervention and of patient preferences.

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Volume 10 Issue 12 December 2019

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