

Functional evaluation of plate fixation for displaced mid-shaft clavicle fractures

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Citation: Gaurav Maddheshiya, Functional evaluation of plate fixation for displaced mid-shaft clavicle fractures. J Clin Exp Orthop Vol. 7 No. 8: 70.

Abstract

Clavicle fracture account for 2.6% of all fractures. >75% of these are midshaft fracture. Overlapping in multiple fragment fracture result in shortening of the shoulder girdle at the fracture site which leads to poor cosmetic and functional result. Classification of Clavicle Fractures: Group I: Middle third- Most common (80% of clavicle fractures), Group II: Distal third- 10-15% of clavicle injuries, Group III: Medial third-Least common (approx. 5%). Rockwood & Green's Fractures in Adults- As anyone who has treated this injury is aware, discussion of universal healing rates after clavicular fracture is overly optimistic. Recently, investigators have discovered that union after midshaft clavicle fracture is not as universal as once thought. Moreover, certain types of clavicular fractures have declared themselves to be problematic. Finally, there has been newfound interest in the treatment of problem fractures and nonunion. Recent data based on detailed classification suggests that incidence of nonunion in displaced clavicle fractures is between 10-15% Brinker MR, Edwards TB, and O'Connor DP.

The risk of nonunion following nonoperative treatment of a clavicular fracture is estimated. Malunion with shortening & rotational deformity can be debilitating for the patients and challenging for the surgeon as it does not remodel in adults.

Keywords: Clavicle fracture; Plate fixation; Midshaft

Received: Dec 07, 2021, **Accepted:** Dec 17, 2021, **Published:** Dec 27, 2021

Introduction

It is unknown whether acute plate fixation allows for a faster restoration to normal shoulder function after a displaced mid-shaft clavicular fracture when compared to nonoperative care when union occurs. The primary goal of this study was to determine whether acute plate fixation was linked with a greater recovery of normal shoulder function in patients who unite their fractures when compared to nonoperative treatment. The secondary goal was to see if there were any obvious predictors of recovery of normal shoulder function in patients who achieved union with nonsurgical therapy.

A randomised controlled trial's patient data was used to evaluate acute plate fixation to nonoperative care of united fractures. The return of shoulder function was based on the cohort's age- and gender-matched Disabilities of the Arm, Shoulder, and Hand (DASH) scores. A separate prospective cohort of consecutive nonoperative displaced mid-shaft clavicular fractures collected over a two-year period (aged 16 years) was used to evaluate independent predictors of early recovery of normal shoulder function. A systematic approach was used to assess patient demographics and functional recovery six months after the injury.

Acute plate fixation of mid-shaft clavicular fractures lowers nonunion after injury from roughly 15% with nonoperative treatment to less than 2% with surgery. When compared to nonoperative care, recent randomised trials have all indicated that acute fixation aids earlier recovery of shoulder function in the first three months following injury. This may be impacted, however, by the higher occurrence of nonunion following nonoperative management, which is associated with poorer functional recovery. Unless the influence of nonunion is accounted for, this may have a negative impact on the functional outcome of nonoperative management.

The patient demographic that sustains the injury should be considered when evaluating recovery from an upper limb fracture. The Disabilities of the Arm, Shoulder, and Hand (DASH) score is often used to assess upper limb recovery following injury in the clavicle, but this can be influenced by both the patient's gender and age

When examining the return of 'normal' shoulder function after a clavicular fracture, it is uncertain if all patients have a predictable recovery after nonoperative therapy when union occurs.

The risk of fracture nonunion has been thoroughly studied in terms of patient, injury, and fracture demographics. However, to the best of the authors' knowledge, no study has investigated the determinants of functional recovery in the future. Patients and surgeons may benefit from a better understanding of functional recovery following clavicular fracture care.

Power calculations were not performed explicitly for this investigation, and neither cohort was recruited with the primary goal of evaluating functional recovery in mind. We did not employ advanced clinical examination methods to assess range of motion, strength, or endurance, which restricts our findings.

The time spent in a sling and the initial treatment may have influenced early healing throughout the first six weeks, but we are unable to comment further on this based on our data. In terms of returning to training and competition, the population studied may not be directly similar to professional athletes. Although the evidentiary base for this is limited, acute plate fixation is regarded to be preferable in such instances.

Over a two-year period, a separate prospective cohort of consecutive patients who reported to our trauma unit with a mid-shaft displaced clavicular fracture was recruited. Inclusion criteria included totally displaced mid-shaft clavicular fractures with no residual cortical contact, with or without comminution (Edinburgh Type 2 fractures),¹³ age 16 at the time of injury, local resident, and an isolated injury with no known pre-existing shoulder pathology. All patients who satisfied the inclusion criteria were referred to a single specialised clinic and advised on surgical and nonsurgical therapy options. Patients who chose acute fixation were not included. The choice to do acute fixation was completely dependent on patient request, and only 3.7 percent of all eligible patients (n = 10/269) underwent acute surgical care during the study period. The nonoperative care strategy included wearing a sling for three weeks after the injury, followed by physiotherapy-supervised range-of-motion and strengthening activities.

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