**Original Research Article**

# Functional and radiological outcome in non-operative versus operative management of fracture clavicle

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International Archives of Integrated Medicine, Vol. 3, Issue 3, March, 2016.

**Available online at http://iaimjournal.com/**
**ISSN: 2394-0026 (P)** **ISSN: 2394-0034 (O)**
**Received on:** 28-02-2016 **Accepted on:** 05-03-2016
**Source of support:** Nil **Conflict of interest:** None declared.
**How to cite this article:** Koramutla Harsha Kumar, Jaya Someswar Narreddy. Functional and radiological outcome in non-operative versus operative management of fracture clavicle. IAIM, 2016; 3(3): 95-98.

## Abstract

**Background:** Clavicle fractures are one of the most common bone injuries seen in adult population. Generally all the fracture clavicles were treated non-surgically by figure-eight bandage and surgical intervention like plating with cortical screws is infrequently required. Non-union rates, strength and endurance deficits are familiar in cases treated conservatively. We evaluated functional and radiological outcomes in non operative versus operative management of fracture clavicle, in patients visiting to orthopedic OPD in a tertiary care hospital in Andhra Pradesh.

**Material and methods:** In a prospective clinical trial study of 80 patients, with displaced mid-shaft fractures of the clavicle were referred to Orthopedic OPD in a tertiary care hospital. These patients were deliberately placed into two treatment groups: non-surgical (with figure-eight bandage) and surgical (with DCR plate fixation). All patients of the surgical group underwent ORIF. Clinical examination, fracture radiography and shoulder scores were recorded for all patients at the end of 12 weeks. Shoulder function is measured by the constant shoulder score which includes the pain score, functional assessment, range of motion and strength measures. Patient satisfaction according to strength, shoulder function and pain was also assessed.

**Results:** There were 32 patients in operative in which 23 males and 9 females whereas in non-operative group (figure of eight) there were 35 males and 13 females. The mean age of the patient was 23±3.4 years in operative and 19±2.5 years in non-operative group. 61 fractures occurred on the right side and 10 on the left side. In the Surgical group mean time to reunion was 8±1.8 weeks where as it was 11.±2 weeks in non surgical group. The overall Constant shoulder score was 93.75% in surgical

group where as it was 87.50% in nonsurgical group. Additionally the percentage of patients with excellent results was more in surgical group than non- operative group (figure of eight).
**Conclusion:** In both figure of eight bandage and plating, there was satisfactory union of clavicle but due to appropriate bone proximity in cortical screw and plating, excellent functional outcome in the terms of early mobilization and quick union was much appreciated.

## Key words

Clavicle fracture, Figure of eight, DCR plate fixation, Functional outcome.

## Introduction

Clavicle fractures is one of the common bone injuries in body and frequently seen in adult men accounting for about 2% of total body fractures and 34-45% of shoulder girdle injuries [1]. The majority of fracture clavicle is in the middle one-third, which is the thinnest part [2]. Generally all the fracture clavicles were treated non-surgically by figure-eight bandage and surgical intervention like plating with cortical screws is rarely required [3]. However, Non-union rates, strength and endurance deficits are common in cases treated conservatively [4]. Thus, recently there is a growing tendency toward surgical treatment due to quick and faultless union [5]. In this context, we evaluated functional and radiological outcomes in non operative versus operative management of fracture clavicle, in patients visiting to orthopedic OPD in a tertiary care hospital in Andhra Pradesh.

## Material and methods

In a prospective clinical trial study of 80 patients, with displaced mid-shaft fractures of the clavicle were referred to the Narayana Medical College and Hospital, Nellore and enrolled in our study during February 2014 to December 2014. These patients were deliberately placed into two treatment groups: non-surgical (with figure-eight bandage) and surgical (with DCR plate fixation).

### Inclusion criteria

All the patients with age between 18-60 years with closed isolated acute, displaced or angulated (fracture type was based on Robinson 2A2, 2B1, 2B2), fractures of the middle third of the clavicle [6].

### Exclusion criteria

Open fractures, neurological compromise, fracture of the medial or lateral third of the clavicle, pathologic fractures, severe injury of soft tissue, multiple traumas, injury of the same side upper organ and medical disease.

Study protocol has been approved by ethical committee and patient informed consent was obtained. All patients of the surgical group underwent ORIF (open reduction and internal fixation) under general anesthesia using a 3.5 millimeter DCP plate with at least six cortical screws. 2 grams of Cefazolin was administered as prophylactic antibiotic to all of the patients in the surgical group half an hour before surgery. Antibiotic was continued for 24 hours after surgical operation. Both groups of patients were followed up at weeks 2 and at end of 12 weeks. Clinical examination and fracture radiography and Shoulder Scores were recorded for all patients at the end of 12 weeks. Healed fracture was defined as radiologically bony callus formation across the fracture fragments.

Shoulder function was measured by the Constant Shoulder Score [7] which included the pain score, functional assessment, range of motion and strength measures. Patient satisfaction according to strength, shoulder function and pain was also assessed [8].

### Statistical analysis

Mean, Standard Deviation numbers and percentages were used to describe the data. Chi-square and unpaired “t” test were used appropriately as inferential tools. P value <0.0.5 was considered statistically significant.

## Results

There were 32 patients in operative in which 23 males and 9 females whereas in non-operative group there were 35 males and 13 females. The mean age of the patient was 23±3.4 years in operative and 19±2.5 years in non-operative group. 61 fractures occurred on the right side and 10 on the left side. According to Robinson classification, 2A2 were 25, 2B1 were 33 and 2B2 were 13. None of the patient had associated neurovascular deficits. In the Surgical group mean time to reunion was 8±1.8 weeks where as it was 11.±2 weeks in non surgical group. 2 patients had superficial infection, 2 patients had hardware prominence and no patient had nonunion, implant failure. 2 patients had scar hypertrophy. 1 patient had frozen shoulder needed little more time. All these patients were resumed to prior professional activity and were satisfied with the result. The overall Constant shoulder score was 93.75% in surgical group where as it was 87.50% in nonsurgical group. Additionally the percentage of patients with excellent results was more in surgical group than nonsurgical. (**Table - 1**)

**Table – 1:** Clinical Characters and outcome

| **Clinical characters** | **Operative group** | | **Non-operative** | |
|---|---|---|---|---|
| | **N = 32** | **%** | **N = 48** | **%** |
| Male | 23 | 71.88 | 35 | 72.92 |
| Female | 9 | 28.13 | 13 | 27.08 |
| Right hand | 20 | 62.50 | 41 | 85.42 |
| Left hand | 3 | 9.38 | 7 | 14.58 |
| Fracture type 2A2 | 10 | 31.25 | 15 | 31.25 |
| Fracture type 2B1 | 9 | 28.13 | 24 | 50.00 |
| Fracture type 2B2 | 4 | 12.50 | 9 | 18.75 |
| Injury from traffic accidents | 9 | 28.13 | 20 | 41.67 |
| Injury from direct trauma | 9 | 28.13 | 9 | 18.75 |
| Injury from falling down | 5 | 15.63 | 19 | 39.58 |
| Constant Score (P<0.05) | | | | |
| Poor | 2 | 6.25 | 6 | 12.50 |
| Fair | 6 | 18.75 | 25 | 52.08 |
| Good | 10 | 31.25 | 15 | 31.25 |
| Excellent | 14 | 43.75 | 2 | 4.17 |

## Discussion

Clavicle fractures traditionally treated conservatively even though substantially displaced, but in recent studies suggest surgical intervention is increasingly considered to be an acceptable line of surgical treatment [9, 10]. Hill, et al. [11] noted an unsatisfactory patient oriented outcome which was around 31% when treated conservatively for displaced mid shaft clavicle fractures.

Our study results were also supported by Sivananda Patri, et al. [12] plate fixation to clavicle gives excellent functional outcome in terms of early mobilization, satisfactory union, complete range motion and early return to daily activity.

## Conclusion

In both the methods of figure of eight bandage and DCP plating, there was satisfactory union of clavicle but due to appropriate bone proximity in screw and plating it was an excellent functional outcome in terms of early mobilization, quick union and complete range of motion was very much appreciated.

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