

# Evaluation of Clavicle Shortening in Clavicle Fractures Treated with “Arm Sling” or “figure of Eight Bandage”

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## Abstract

**Background:** Clavicle is the most common bone to fracture in humans. It is mainly managed by conservative treatments unless surgical intervention is must. Two main conservative options for clavicle fracture treatment are “Arm Sling” and “Figure of Eight Bandage”. These conservative methods may lead to shortening of clavicle which according to some studies may be related to shoulder dysfunction. This study measures and compares clavicular shortening in cases of clavicular fracture after treatment with “Arm Sling” or “Figure of Eight Bandage”.

**Material and methods:** This study was conducted on the patients of clavicle fracture coming to orthopaedic OPD/casualty. Total of 100 cases (50 each group) were included in this study, during the period of two year (May 2015 to May 2017). Total of 73 males and 27 females were included in this study. All clavicle lengths were measured after radiological union was seen using PACS system and was compared to normal side to measure shortening.

**Result:** This study shows average shortening of 1.4cm(1.0-1.8cm) in males treated with broad “arm sling” as compared to 1.8cm(1.7-2.10cm) shortening when treated with “figure of eight bandage”. Similarly there is average shortening of 1.6cm(1.10-1.7cm) shortening in females treated with broad “arm sling” as compared to 1.7cm(1.5-2.0cm) treated with “figure of eight bandage”.

**Conclusion:** In this study, patients showed lesser shortening of clavicle with “arm sling” as compared to “figure of eight bandage” which may have better results according to other studies comparing clavicle length with shoulder function.

**Keywords:** broad arm-sling, figure of eight bandage, clavicle, radiograph

## Background

The clavicle is a long, dual-curved bone that forms the only direct link between the axial and appendicular skeletons[1-3]. It is the first bone in the body to be ossified[3,4]. (begins at 5 to 6 weeks' gestation)[5]. and the last bone to complete ossification[4]. (the medial epiphysis completes ossification as late as age 27 years)[6]. It is a highly variable structure in terms of length, although many studies have shown the length to be approximately 140 to 150 mm (range, 118–162 mm)[7-9], The clavicle is the most commonly broken bone in the human body, accounting for up to 5% to 10% of all fractures seen in hospital emergency admissions. These injuries are most common in younger patients, often associated with direct trauma to the clavicle, as in contact sports and motor vehicle accidents. Males are affected more than females, and prevalence declines progressively with age [10]. Direct or direct blow to clavicle bone is the common cause to its fracture, most often falling directly onto shoulder with arm by side. Clavicle injuries can be grossly divided into

three distinct anatomical sites; the medial clavicle, shaft and lateral end. Mid-shaft clavicle[11,12], fractures are most common, with an incidence of up to 82% of all clavicle fractures. Medial and lateral end fractures account for approximately 18 and 2% respectively[12]. There are numerous conservative treatment options available, the most common being the use of a sling or 'figure-of-eight' bandage (also known as figure-of-eight splint, or backpack bandage), or a combination of these two methods[13,14]. Different surgical methods treating clavicle fracture include kirschner wire, plate fixation, interosseous wire or sutures and modified hooked Balser plate fixation[15-17]. In this study we treated all types of clavicle fractures conservatively either with “arm sling” or “figure of eight bandage” and measuring the length on radiograph through computer assisted PACS system. These lengths were compared to normal side to measure any shortening of clavicle.

## Material and Methods

This study was conducted on the patients coming to orthopaedic OPD/IPD at MGM medical college and hospital, Kamothe, Navi Mumbai. Total of 100 cases (50 each group) were included in this study, during the period of two year (May 2015 to May 2017). Total of 73 males and 27 females were included in this study.

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Figure 1: arm sling



Figure 2: fig. of eight bandages

### Inclusion Criteria

- 1) Patients suffering from all types of clavicle fractures.
- 2) All age groups
- 3) Unilateral clavicle.
- 4) Displaced and undisplaced.

### Exclusion Criteria:

- 1) Old malunited clavicle.
- 2) Pathological fractures.
- 3) Floating shoulder.
- 4) Bilateral clavicle fracture.

### Patient Data:

- Name Of The Patient,
- Age,
- Sex,
- Side,
- True length measurement of clavicle with X ray (non fractured side)

### Follow- up:

- 3 weeks with x ray
- 6 weeks x-rays
- 6 months attaining union of clavicle fracture
- Complications,if any



Figure 3: shortening after treatment with "Fig. of 8 Bandages"

### Post-Treatment Care:

- Immobilization of the affected side.
- Avoid any activities with affected side.
- Continue application of brace or sling.
- Follow up every week for revision of brace or sling.
- After six weeks, to start with physiotherapy.

### Follow up

Patients were asked to follow up every week for the first 3 weeks so that brace/sling can be tightened or corrected if loosened or incorrectly worn. First check xray taken at 3rd week, the brace/sling is removed and mobilisation was advised. Patient was asked to follow up after 3 weeks that is 6 weeks from injury. Second check xray taken at 6th week and patient was asked to follow up at 6th month. 3rd check xray done at 6th month and union of clavicle fracture is expected and clavicle length is measured. All fractured and non-fractured clavicle lengths were measured by computer assisted PACS system..

### Results

Total of 100 patients coming to OPD/ casualty of clavicle fractures were included in this study. Out of 100 patients, 50 patients were treated with "arm sling" and 50 patients were treated with "figure of eight bandage". Out of 100 patients, 27 were female and 73 were males. Out of 100 patients, 3 of them had nonunion. An average of 1.0 to 1.8 cm shortening is seen in males treated with "arm sling" as compared to 1.7-2.10cm shortening is seen in males treated with "figure of eight bandage". An average shortening of 1.0 to 1.7cm shortening is seen in females treated with "arm sling" as compared to shortening of 1.5-2.0cm in females treated with "figure of eight bandage".

### Discussion

The clavicle fracture represents 5% to 15% of all fractures. As many as 80% of clavicle fractures occur in the middle third. Many of these fractures occur in young and athletic individuals. Neer reported a nonunion rate of 0.1%<sup>18</sup>. Rockwood et al. showed that when a nonunion occurs, it almost always involves the middle third of the clavicle. In his series, 80% of nonunion occurred in the displaced and shortened mid-shaft clavicle fractures<sup>[19]</sup>. A literature reported a high rate of



Figure 4: Shortening after treatment with Arm sling



Figure 1: arm sling

good outcomes with a low rate of nonunions following nonoperative treatment, and there was no evidence of functional benefits resulting from surgery in comparison with nonoperative treatment[20-23]. McKee et al. observed a higher prevalence of dissatisfaction and residual disability in patients with a clavicle shortening of greater than 20 mm[24]. Chan et al. suggested a potential association between clavicle shortening and shoulder dysfunction. On the other hand, other authors have reported that permanent post-traumatic shortening of the clavicle has no clinical

relevance[25]. Some studies have observed fewer cases of consolidation defects after surgery (2.2%) as compared to conservative therapy (15.1%)[26]. whereas others reported a 37% risk of adverse events after a surgical procedure due to invasion of the periosteal structures that can lead to nerve damage in the bone shafts, blood loss and post-traumatic hematoma, which can delay healing[27].

### Conclusion

Clavicle fracture is quite common to be occurred in road traffic accidents with high and low energy trauma. It is also seen common among athletes, outdoor games due to fall directly on shoulder. It can be treated surgically and conservatively depending upon the orthopaedic surgeons choice of management. It is fracture of which treatment should be known by all medical staff as it is quite easy to be treated conservatively. In our study we have managed all type of clavicle fracture conservatively and measured the clavicle shortening. In our study we see that patients respond much well treated with broad arm sling as compared to figure of eight bandage as arm sling is easy to apply, convenient for the patients and also shows lesser shorting of clavicle after union.

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