

# Clavicular Fractures: A Retrospective Study of 60 Cases

Saurabh Agarwal<sup>1</sup>, Ankur Das<sup>2</sup>

## ABSTRACT

**Introduction:** Clavicle fractures are very common injuries in adults and children and represent the 44-66% of all shoulder fractures. This study was conducted to investigate and analyze the epidemiology of clavicle fractures.

**Material and methods:** This study was conducted in the department of orthopaedics from June 2015 to may 2016. Records of 60 clavicle fractures were retrieved from department.

**Results:** Out of 60 clavicle fractures, 48 (80%) were seen in males and 12 (20%) were seen in females. The difference was statistical significant. Fractures were seen in middle 1/3<sup>rd</sup> (60%), middle (20%), lateral 1/3<sup>rd</sup> (11.6%) and compound (8.4%). Maximum cases were involving middle third of clavicle and least cases were seen involving compound fractures (8.4%). 24 (40%) cases were seen in right side and 36 (60%) cases were seen in left side. The difference was not significant. 36 cases were due to road traffic accident, 21 cases were of fall and 15 cases occurred due to work place injury.

**Conclusion:** Clavicle fractures are common in young adults. Therefore proper care should be taken to avoid fracture of clavicle.

**Keywords:** clavicle, fracture, middle third

## INTRODUCTION

Clavicula means "key" and is the diminutive of clavis in Latin. Clavicle fractures are very common injuries in adults (2-5%) and children (10-15%) and represent the 44-66% of all shoulder fractures.<sup>1</sup> Its prevalence of fracture is highest among the young population. Males are affected approximately twice as often as females. Females show higher prevalence in the sixth decade of life as a result of osteoporosis.<sup>2</sup>

The clavicle is the first bone in the human body to begin intramembranous ossification directly from mesenchyme during the fifth week of fetal life. The clavicle has both a medial and lateral epiphysis.<sup>3</sup> It has S-shaped double curve. This contouring allows the clavicle to serve as a strut for the upper extremity, while also protecting and allowing the passage of the axillary vessels and brachial plexus medially. The growth plates of the medial and lateral clavicular epiphyses do not fuse until the age of 25 years. Hence young adults are more prone to developed fractures. This change of contour, which is most acute at the junction of the middle and outer thirds, may explain the frequency of fractures seen in this area.<sup>4</sup>

With the exception of the rare pathologic fracture due to clavicle fractures are typically due to trauma, however metastatic or metabolic diseases can also lead to pathological fracture. Moderate to high-energy mechanisms such as motor vehicle accidents or sports injuries in younger individuals and sequelae of a low-energy fall in elder individual leads to clavicle fracture.<sup>5</sup> Although a fall onto an outstretched hand was traditionally considered the common mechanism, it has been found that the clavicle most often fails in direct compression from force applied directly to the shoulder. In a study of 122

consecutive patients, clavicle injuries resulted from a fall onto the shoulder (87%), from a direct blow (7%), and from a fall onto an outstretched hand (6%).<sup>6</sup> This study was conducted to investigate and analyze the epidemiology of clavicle fractures.

## MATERIAL AND METHODS

This study was conducted in the department of orthopaedics from June 2015 to may 2016. Records of 60 clavicle fractures were retrieved from department.

To classify clavicle fractures Allman classification was used.<sup>7</sup>

### Allman Classification

Group I-middle 1/3

Group II-lateral 1/3 (acromial)

Group III-medial 1/3 (sternal)

Neer made a significant revision to the Allman classification scheme. Group II (distal clavicle) fractures were further divided into 3 types based on the location of the clavicle fracture in relation to the coraco-clavicular ligaments. These are

**Type I Fractures:** Minimally displaced and occur lateral to an intact coraco-clavicular ligament complex; these fractures may be treated non-operatively and symptomatically

**Type II Fractures:** Occur when the medial fragment is separated from the coraco-clavicular ligament complex; the medial fragment is displaced cephalic by the pull of the sternocleidomastoid muscle, and the distal fragment is displaced caudally by the weight of the upper extremity, with the intact coraco-clavicular ligament complex; the resulting deformity leads to marked displacement of the fracture ends, predisposing this fracture type to a higher prevalence (up to 30%) of nonunion.

**Type III Injuries:** Minimally displaced or non-displaced and extend into the acromioclavicular (AC) joint; as with type I fractures, these injuries can be treated symptomatically; the development of late AC degenerative changes can be treated with distal clavicular excision.

## STATISTICAL ANALYSIS

The results thus obtained were subjected to statistical analysis. Descriptive statistics like mean and percentages were used to interpret results. Chi square was used to interpret the difference.

<sup>1</sup>Department of Orthopaedics, Career Institute of Medical Sciences and Hospital Lucknow, <sup>2</sup>Department of Orthopaedics, Mayo Institute of Medical Sciences, Barabanki, Uttar Pradesh, India

**Corresponding author:** Saurabh Agarwal, Department of Orthopaedics, Career Institute of Medical Sciences and Hospital Lucknow, Uttar Pradesh, India

**How to cite this article:** Saurabh Agarwal, Ankur Das. Clavicular Fractures: A Retrospective Study of 60 Cases. International Journal of Contemporary Medical Research 2016;3(10):3025-3026.

Total- 60			
Gender	Male	Female	P value
Number	48	12	0.04
Percentage	80%	20%	

**Table-1:** Distribution of fracture on the basis of gender

Location	Middle 1/3 <sup>rd</sup>	Middle	Lateral 1/3 <sup>rd</sup>	Compound
Number	36	12	7	5
Percentage	60%	20%	11.6%	8.4%
P value	0.01			

**Table-2:** Distribution of fracture on the basis of site (based on allman classification)

Side	Right	Left
Number	24	36
Percentage	40%	60%
P value	0.3	

**Table-3:** Distribution of cases on the basis of side

Etiology	Road traffic accident	Fall	Work place injury
Number	24	21	15
Percentage	40%	35%	25%
P value	0.02		

**Table-4:** Distribution of cases on the basis of etiology

## RESULTS

Table 1 shows that out of 60 clavicle fractures, 48 (80%) were seen in males and 12 (20%) were seen in females. The difference was statistical significant. Table 2 shows that distribution of fracture on the basis of location. Fractures were seen in middle 1/3<sup>rd</sup> (60%), middle (20%), lateral 1/3<sup>rd</sup> (11.6%) and compound (8.4%). Maximum cases were involving middle third of clavicle and least cases were seen involving compound fractures (8.4%). Table 3 shows distribution of clavicle fracture on the basis of side. 24 (40%) cases were seen in right side and 36 (60%) cases were seen in left side. The difference was not significant. Table 4 shows distribution of cases depending upon etiology. 36 cases were due to road traffic accident, 21 cases were of fall and 15 cases occurred due to work place injury.

## DISCUSSION

Clavicle fractures are most commonly seen in young adults. It the most common of all pediatric fractures, can present even in the newborn period, especially following a difficult delivery.<sup>8</sup> Most common sign is echymosis and a prominence over the fracture site. Skin breaks or skin tenting must be seen. Palpation along the subcutaneous border of the bone should reveal an area of tenderness and potential step-off of the normally smooth contour.<sup>9</sup> Other obvious signs are pain and even palpable crepitus and attempted range or motion of the shoulder will be limited. A neurovascular examination is essential. Motor and sensory function of the radial, ulnar, median, and axillary nerves should be confirmed.<sup>10</sup> Out of 60 clavicle fractures, 48 (80%) were seen in males and 12 (20%) were seen in females. The difference was statistical significant.

Robinson et al<sup>11</sup> found the male: female ratio to be 2.6:1.

Nordqvist<sup>12</sup> reported an annual incidence of clavicular fractures in men between 15-19 years at about 150 per 100000 and in females about 50 per 100000. Fractures were seen in middle 1/3<sup>rd</sup> (60%), middle (20%), lateral 1/3<sup>rd</sup> (11.6%) and compound (8.4%). Maximum cases were involving middle third of clavicle and least cases were seen involving compound fractures (8.4%). Kendall et al<sup>13</sup> reported a fatality from an isolated clavicle fracture from transection of the subclavian artery. 24 (40%) cases were seen in right side and 36 (60%) cases were seen in left side. 36 cases were due to road traffic accident, 21 cases were of fall and 15 cases occurred due to work place injury. Our results are in agreement with the study by Hill et al<sup>14</sup> reported a pre-dominance of injuries of the left clavicle with a right-left distribution of 36.5% and 63.5%, respectively.

## CONCLUSION

Clavicle fractures are common in young adults. Therefore proper care should be taken to avoid fracture of clavicle.

## REFERENCES

1. Edelson JG. The bony anatomy of clavicular malunions. J Shoulder Elbow Surg. 2003;12:173-8.
2. Khan LA, Bradnock TJ, Scott C, Robinson CM. Fractures of the clavicle. J Bone Joint Surg Am. 2009;91:447-60.
3. Rowe CR. An atlas of anatomy and treatment of midclavicular fractures. Clin Orthop Relat Res. 1968; 58:29-42.
4. Sguazzini VC. Simultaneous bi-lateral fracture of the clavicle. Arch Ortho. 1967;80:351-6.
5. Jeray KJ. Acute midshaft clavicular fracture. J Am Acad Ortho Surg. 2007;15:239-48.
6. Eskola A, Vainionpää S, Myllynen P, Pätäälä H, Rokkanen P. Outcome of clavicular fracture in 89 patients. Arch Orthop Trauma Surg. 1986;105:337-8.
7. Andersen K, Jensen PO, Lauritzen J. Treatment of clavicular fractures. Figure-of-eight bandage versus a simple sling. Acta Orthop Scand. 1987;58:71-4.
8. Böstman O, Manninen M, Pihlajamäki H. Complications of plate fixation in fresh displaced midclavicular fractures. J Trauma. 1997;43:778-83.
9. Crenshaw AH. Fractures of the shoulder girdle arm and forearm. In: Crenshaw AH, editor. Campbell's operative orthopaedics. 8th ed. St. Louis: Mosby Year book; 1992; 989-1053.
10. Lester CW. The treatment of fractures of the clavicle. Ann Surg. 1929;89:600-6.
11. Robinson CM. Fractures of the clavicle in the adult. Epidemiology and classification. Journal of Bone and Joint Surgery. 1998;80:476-84.
12. Nordqvist A, Petersson C. The incidence of fractures of the clavicle. Clin Orthoped and Rel Res. 1994;300:127-32.
13. Kendall KM, Burton JH, Cushing B. Fatal subclavian artery transection from isolated clavicle fracture. J Trauma. 2000;48:316-8.

**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 13-09-2016; **Published online:** 24-10-2016