



## A COMPARATIVE STUDY BETWEEN DIFFERENT MODALITIES OF TREATMENT OF FRACTURE LATERAL END OF CLAVICLE

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### ABSTRACT

**Introduction:** Fractures of the clavicle is one of the most common injuries of human skeleton. It has been traditionally treated non-operatively. The present study was undertaken to compare the results between fractures treated conservatively and surgically. **Methods:** Fifty adult patients with clavicular fractures (Robinson Classification Type 3B) were included in this study. 27 (group-1) lateral end clavicle fractures, were fixed with reconstruction plate & screws, K-wires and TBW and 23 (group-2) Type 3B were treated conservatively with shoulder arm pouch and immobilizer. **Results:** In Group-1, 27 fractures united at 6-10 weeks. 1 patient had a superficial infection, 2 had hypertrophic scar and 2 patients had an implant breakage and 1 patient had restriction of shoulder range of motion ( $< 120^\circ$  forward flexion). In Group-2, 12 fractures united at 12 weeks, 8 had nonunion, and 3 had delayed union. 7 patients had malunion with visible external deformity. 7 patients had restriction of shoulder ROM ( $< 120^\circ$  forward flexion) 5 improved over a period of 6 months after vigorous physiotherapy and 2 had continued restriction. The functional outcome according to Constant and Murley score after fracture union were excellent, good and fair in 22, 3 and 2 patients respectively in group-1, while 13, 7 and 2 patients in group-2. **Conclusion:** This study shows rigid fixation for fresh lateral end clavicle fracture gives immediate pain relief, prevents the development of shoulder stiffness and non union and is cosmetically more acceptable.

### KEYWORDS :

#### Introduction:

Clavicle fracture is a common traumatic injury around shoulder girdle due to its subcutaneous position. It is caused by either low energy or high energy impact. Fracture of clavicle accounts for approximately 5-10% of all fractures and up to 44% of injuries to the shoulder girdle. About 70-80% of these fractures are in middle 1/3<sup>rd</sup> of the bone and less often in lateral third (12-15%) and medial third (5-8%).<sup>[1]</sup>

Fractures of clavicle have traditionally been treated non-operatively. Although many methods of closed reduction have been described, it is recognised that the reduction is practically impossible to maintain, the causes are mechanical and anatomical. The trapezius and sternocleidomastoid pull the medial fragment superiorly and posteriorly and the weight of the arm displaces the lateral fragment distally. The small size of the distal fragment and the planar shape of the clavicle make bone contact difficult and impede consolidation.<sup>[1][2][3][4]</sup>

In past few years several publications have described about poor outcomes like malunion and non union (15%) after conservative treatment of severely displaced clavicle fractures.<sup>[5][6][7]</sup> For lateral third clavicular fractures operative treatment include use of Kirschner wires, use of tension bands, coracoclavicular fixation using sutures or screws, acromioclavicular fixation and, lastly, costly plates that have been specifically developed for these fractures, such as hook plates and locked plates. Despite the high consolidation rates achieved, most of these techniques are associated with complications and several of these routinely require removal of the material. The most frequent complications are infection, skin irritation, degenerative acromioclavicular alterations and periprosthetic fractures.<sup>[8][9][10][11][12]</sup>

The proponents of early fixation of fresh clavicular fractures to

prevent complications like mal union and non union emphasize the value of accurate reduction and rigid fixation in affording quick pain relief and promoting early functional recovery.<sup>[13]</sup>

#### Materials And Methods:

We did a comparative study of management of fracture lateral end of clavicle, Robinson type 3b, from July 2014 – Sept 2016 with 50 patients.

- Inclusion criteria
  - Adult male and female patients above 18 years of age.
  - Displaced lateral third clavicle fracture.
  - Closed fracture.
- Exclusion criteria
  - Patients less than 18 years of age.
  - Patients medically unfit for surgery.



SHOULDER ARM POUCH WITH IMMOBILISER

INSTRUMENTS IN SURGICAL TECHNIQUE

- Compound fractures of clavicle.
- Fractures involving medial or middle 1/3<sup>rd</sup> of clavicle.
- Pathological fractures.

#### • Materials

- Shoulder arm pouch with shoulder immobiliser. (for

conservative management)

- 3.5 mm reconstruction plate, 2.5 mm drill bit, power drill, 3.5 mm cortical screws of various size, screw driver, general instruments. (for screw fixation and plating)

- Kirshners wire, 18 gauge stainless steel wire, wire cutter, plliar, hammer. (for tension band wire)

**Methods**

- For patients not willing for surgery, shoulder immobilizer with shoulder arm pouch was used after an attempt at closed reduction, check xray was done to check the reduction. Patient was evaluated at 4, 6, 8 and 12 weeks followup, for tenderness, physiotherapy and bone formation.

- For patients willing and fit for surgery, pre operative xray and patient was evaluated and plan was decided accordingly. All blood investigations required for medical fitness was done and patient was operated. Post operatively IV antibiotics were given till suture removal, after which patient was followed up in OPD basis on 4th, 6th, 8th, 12th week. Recovery was graded over Constant And Murley Scoring.[14]

**Result & Discussion:**

Age of incidence (in years)	No.	Percentage
19-29	27	54
30-39	13	26
40-49	5	10
50-59	5	10

Sex incidence	No.	Percentage
Male	42	84
Female	8	16

Robinson Classification (Type)	No.	Percentage
Type III	50	100
A undisplaced	0	0
A1extraarticular	0	0
A2 Intraarticular	0	0
B Displaced	50	100
B1extra-articular	44	88
B2Intra articular	6	12

Type of treatment	No.	Percentage
Group A (Surgical)	27	54
Group B (Conservative)	23	46

Type of implants used	No.	Percentage
Reconstruction Plate	6	12
TBW + K wire	38	76
K wire	6	12

Duration of Union	Surgical	%	Conservative	%
8-12 weeks	25	92.5	12	52.2
>12 weeks (delayed union)	2	7.4	3	13
>6 months ( non union)	0	0	8	34.7

Type of complication	Surgical	Conservative
Non union	0	8
Ml union with cosmetic deformity	0	7
Hypertrophic scar	2	0
Plate prominence	2	0
Superficial infection	1	0
Restriction of shoulder ROM at 12 weeks	1	7

Complication Rate	No.	Percentage
Surgical	6	22.2
Conservative	14	60.8

Functional Outcome	Surgical	%	Conservative	%
Excellent	22	81.4	13	56.5
Good	3	11.1	7	30.4
Fair	2	7.4	2	8.6
poor	0	0	1	4.3

- Clavicle fractures are usually treated conservatively. Conservative treatment of displaced clavicle fracture has higher rate of non union and residual shoulder dysfunction. [15][16][17] In our study 8 patients out of 23 patients treated conservatively (34.7%) landed into non union.
- In Rokito study fractures of type II distal clavicle fractures, treated surgically achieve union within 6-10 weeks whereas non operative treatment results in several non unions, although non union had no significant effect on functional outcome. [18] A systematic review of lateral clavicle fractures, published in 2010, reported a 33.3% non-union rate in conservatively managed injuries and a 6% non union rate in those treated operatively. [19] In our study surgically managed patients did not have any episode of non union whereas conservatively managed patients, 8 patients (34.7%) landed in non union.
- In this study 24 patients(48%) of lateral third clavicle fracture was caused by fall from motorcycle, 15 patients(30%) due to RTA, 8 patients due to a simple fall and 3 patients due to fall on outstretched hand. In Kao study 12 patients (100%) were due to motorcycle accident. [20]
- The patients age with lateral third clavicle fracture range from 20 – 59 years and average age was 32 years. Majority of the fractures were seen in between 19 and 29 years of age. In Kao study patients age range from 13 to 58 years and average age was 31.7 years.[20] In Jose Carlos study the mean age was 34.3 years.[21]
- Lateral third clavicle fracture were commonly seen in males. Kao and Jose Carlos study also showed male preponderance. [20][21]
- In lateral third clavicle fracture 87% are Robinson type 3B1 and 13% are Robinson type 3B2. In Kao study all patients belonged to Robinson type 3B1. [20]
- Type of treatment: In this study, lateral third of clavicle, 27 patients (54%) were treated surgically and 23 patients (46%) were treated conservatively. In Kao study all 12 fractures were treated surgically.[20]
- Complications: The complication rate in the surgical group was 22% with 2 patients having a hypertrophic scar, 1 patient having a superficial infection, 2 patients had a plate prominence and 1 had restriction of shoulder movements. In Kao study patients suffered from more communitated fracture because of a fall 2 months after operation.[20]
- Complications in conservative group were malunion with a cosmetic deformity in 7 patients (33%).
- Restriction of shoulder movement in conservatively treated patients was 7(33%), 5 of which improved to full ROM at 6 months after vigorous physiotherapy and 2 continued to have restriction of movements.
- The functional outcome in this study was excellent in 81.4% of those treated surgically.
- The functional outcome in patients treated conservatively, 56.5% achieved an excellent functional score, 30.4% had a good functional outcome. 1 patient had a poor outcome due to nonunion and severe tenderness at the fracture.





### Conclusion:

Clavicle fractures are usually treated conservatively but there are specific indications for which operative treatment is needed like comminuted and displaced lateral third clavicle fracture. This study shows rigid fixation with plate and screws, K wire and TBW and K wire only for fresh lateral end clavicle fracture gives immediate pain relief, prevents the development of shoulder stiffness and nonunion and is cosmetically more acceptable.

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