

**COMPARISON OF FUNCTIONAL OUTCOME OF
BOXERS FRACTURE TREATED WITH ANTEGRADE
PREBENT K WIRE AND THOSE TREATED
CONSERVATIVELY**

❖ **ABSTRACT**

Introduction:- A prospective study of boxer's fracture treated with antegrade prebent K wire and conservatively in young adults.

Material and method:- In Krishna Institute of Medical Science Karad Satara from July 2017 to July 2019, 20 patients of 5th metacarpal neck fracture were studied, 10 were treated with antegrade prebent K wire and 10 were treated conservatively, children younger than 15 yrs and fracture involving articular surface were excluded.

Observation:- Boxers fracture are 20% of fracture encountered in hand. Majority of patients are male with right hand involvement ,majority of cases were due to hitting an hard object with closed fist.

22 **Conclusion:-** Percutaneous fixation with prebent K wire in antegrade
23 direction gives better results ,as compared to conservative management which is
24 usually associated with shortening and angular deformities.

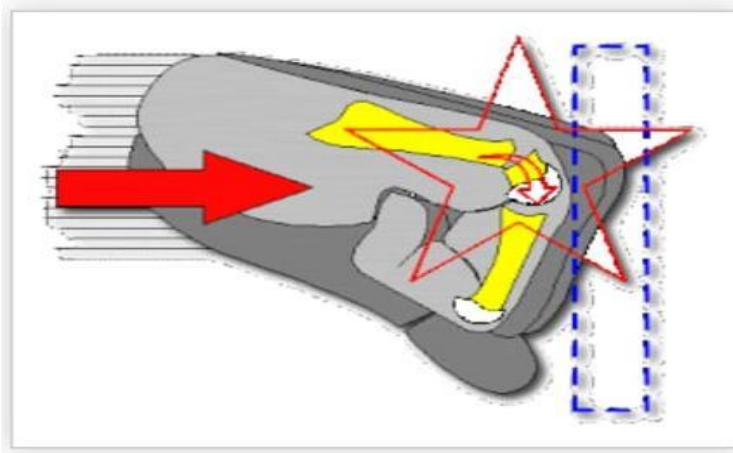
25
26
27
28 **❖ Introduction**

- 29 • Among all metacarpal fracture, fracture of 5th metacarpal neck is
30 commonest.
- 31 • Also known as scrappers fracture, bar room fracture, street fighters
32 fracture.

33
34 **Pathomechanics**

35 Impact of clinch fist to an hard object like skull or wall. Punch with improper form
36 ,forces act at an angle towards the palm, Dorsal bent in bone which causes
37 fracture.

38 **Fracture of 4th & 5th metacarpal more common than 2nd and 3rd metacarpal**
39 **because:**



40 Normally :- Boxers punches with
41 proper form, Knuckles of 2nd & 3rd metacarpal align linearly with articulating
42 radius followed with humerus thus force travel across joints without injury.
43
44

45 Fig 1: Emergency Management

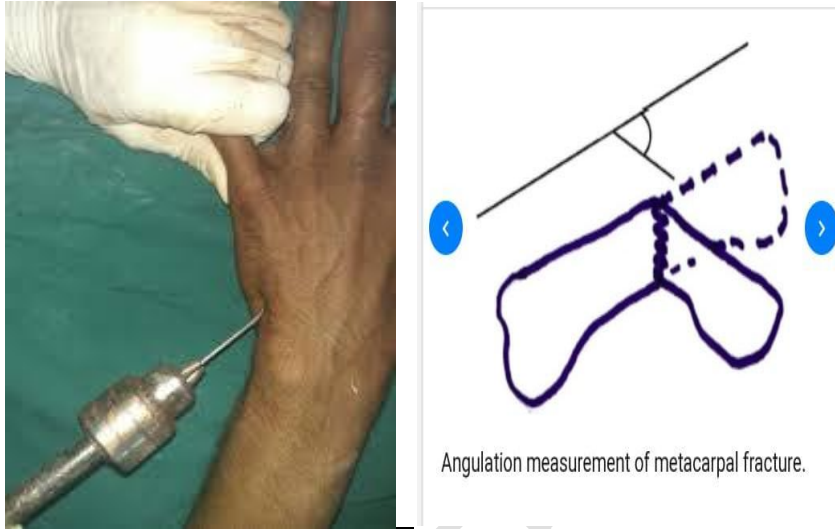
- 46 1. Rest
- 47 2. Ice pack
- 48 3. Sling
- 49 4. Elevation

50 ❖ Material & Methods:-

- 51 • 20 patients of fracture of 5th metacarpal were studied in Department of
52 Orthopaedics , Krishna Institute of Medical Science Karad, Satara from
53 July 2017 to July 2019.
54
55
- 56 • 10 were treated with antegrade k wire and 10 were treated
57 conservatively.
58
- 59 • Children younger than 15 yrs were excluded.

- Articular fracture were exclude.

Fig 2: METHOD



- For 5th metacarpal, entry point of k wire or awl or drill is dorsoulnar at metacarpal base without damaging the carpo-metacarpal joints & respecting the insertion of extensor carpi ulnaris tendon.



Fig 3:EXTENSOR CARPIULNARIS TENDON

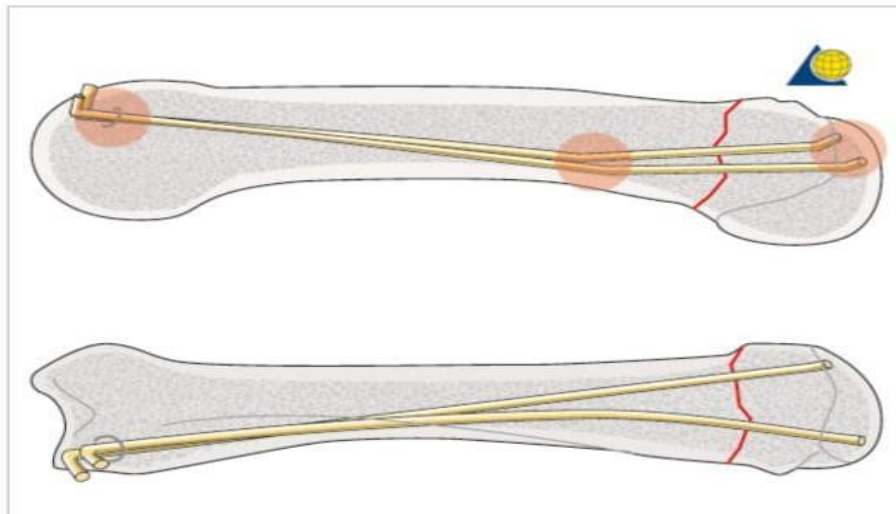
- Care must be taken that the protruding end of K wire or bone awl or drill does not interfere with the gliding extensor tendon.
- Pre bending of K wire :-
Distal tip of K wire s bent to about 20° about 2 cm from there the wire is bent to about 10°.
- Fixation using 2 K wire gives 2 point fixation thus increasing the stability & prevent back out of K wire from proximal end.

•

•

- Fig 4: Complete fixation

Complete fixation



- Conservative treatment included splinting as follows: mild wrist extension, 70 to 90 degrees of flexion at MCP joint, and slight flexion at the DIP and PIP joints. Flexion of these joints is important to prevent shortening of the collateral ligaments and subsequent loss of range of motion and functional impairment.

FOLLOW UP:

Post operative the patient were assessed at 4th week, 6th week, 8th week and 12th week.

- At every follow up TAM (Total Active Movement) was noted at metacarpophalangeal joint & interphalangeal joint.
- Rotation deformity was noted at neck shaft angle preoperatively & postoperatively and was compared with that of neck shaft angle in conservative treatment.

❖ RESULT

Table 1: Demography

Mean Age	32 ± 2.2
Sex Male/Female	6:1
Right/Left	16/4

Table 2: TREATMENT USING ANTEGRADE K-WIRE

Pt No.	TAM of affected hand on last follow up	TAM of unaffected hand on last follow up	% of improvement	Preop neck shaft angle	Post of neck shaft angle
1	270	275	98	65	25
2	255	260	98	60	18
3	300	305	98	68	16
4	290	290	100	70	20
5	278	282	98	55	16
6	295	300	98	52	22
7	278	282	98	64	20
8	270	275	98	58	24
9	260	265	98	65	15
10	300	305	98	60	20
MEAN	279	283	98	61	19

- The mean TAM of affected hand on last follow up was recorded and was compared with unaffected hand, percentage of improvement was compared with percentage of improvement of TAM in conservative management with respect to neck shaft angle.

126

127

128

Table 3: CONSERVATIVE MANAGEMENT

PT no	Tam of affected hand on last follow up	Tam of un-affected hand on last follow up	Percentage of improvement	Neck shaft angle	Neck shaft angle at end of 3 months
1	252	280	90	64	55
2	262	282	93	65	49
3	268	280	96	30	25
4	282	300	94	45	35
5	266	280	95	35	25
6	276	282	98	35	20
7	268	280	96	35	20
8	255	300	85	64	50
9	285	300	95	30	24
10	280	286	98	32	18
MEAN	269	287	94	43	32

129

130

131

132

133

134

135

136

137

138

139

- We found that at last follow up (3rd month) there was no significant difference in TAM (Total Active Movement) of affected and unaffected hand in patients treated with antegrade k wire technique.
- Conservative management was associated with shortening and malrotation.
- We also found out that person having neck shaft angle more than 45 degrees shows better result when treated with antegrade k wire.
- People having neck shaft bangle less than 30 degrees can be treated conservatively.

140
141
142
143
144
145
146 ❖ **Discussion**
147

- 148 • Neck Shaft angle more than 45° produces significant muscle
149 restriction that can limit movements of 5th digit but a fracture angle
150 of 30° is compatible with normal function.
- 151 • Displacement of head in direction of flexion tends to heel poorly
152 as a result of deforming forces of intrinsic muscles.
- 153 • Surgery is indicated when there is clinical malrotation of 5th finger
154 & shortening.
- 155 • Fixation with antegrade k wire can also be considered better than
156 open reduction as it does not include complications like adhesions
157 and wound infection.
158

159
160 ❖ **Conclusion :-**
161

- 161 • Boxers Fracture are common type fracture in young adults.
- 162 • Antegrade prebent K wire help in angular correction and gives better
163 result when compared with conservative management especially in
164 patients having clinical malrotation and shortening.
- 165 • Use of two K-wires helps in good fixation and stability to fracture site.
- 166 • Fractures having neck shaft angle less than 30 degrees can be treated
167 conservatively but conservative management of fractures having neck
168 shaft angle more than 45 degrees can result in shortening and decrease
169 in hand grip thus antegrade k wire should be consider better modality for
170 treatment of boxers fracture.
171
172

REFERENCES

1. Mohammed R, Farook MZ, Newman K. Percutaneous elastic intramedullary nailing of metacarpal fractures: surgical technique and clinical results study. *J Orthop Surg Res.* 2011;6:37.
2. Yamine K, Harvey A. Antegrade intramedullary nailing for fifth metacarpal neck fractures: a systematic review and metaanalysis. *EurJ Orthop Surg Traumatol.* 2014;24:273-8.
3. Hunter JM, Cowen NJ. Fifth metacarpal fractures in a compensation clinic population: a report on one hundred and thirty-three cases. *J Bone Joint Surg Am.* 1970;52:1159-65.
4. Gudmundsen TE, Borgen L. Fractures of the fifth metacarpal. *Acta Radiol.* 2009;50(3):296-300.
5. Ali A, Hamman J, Mass DP. The biomechanical effects of angulated boxer's fractures. *J Hand Surg Am.* 1999;24:835-44.
6. Cepni SK, Aykut S, Bekmezci T, Kilic A. A minimally invasive fixation technique for selected patients with fifth metacarpal neck fracture. *Injury.* 2016;47(6):1270-5.
7. Diaz-Garcia R, Waljee JF. Current management of metacarpal fractures. *Hand Clin.* 2013;29:507-18.
8. Kim JK, Kim DJ. Antegrade intramedullary pinning versus retrograde intramedullary pinning for displaced fifth metacarpal neck fractures. *Clin Orthop Relat Res.* 2015;473(5):1747-54.
9. Wong TC, Ip FK, Yeung SH. Comparison between percutaneous transverse fixation and intramedullary K-wires in treating closed fractures of the metacarpal neck of the little finger. *J Hand Surg Br.* 2006;31:61-5.
10. Facca s, Ramdhian R, Pelissier A, Diaconu M, Liverneaux P. Fifth metacarpal neck fracture fixation: locking plate versus K-wire? *Orthop Traumatol Surg Res.* 2010;96:506-12.

UNDER PEER REVIEW