

# Lateral Condylar Fractures Of Humerus In Children Following Varus Malunion Of Supracondylar Fracture

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## Citation

M Wani, A Sultan, M Wani, B Mir, A Bashir, M Halwai, M Malik, M Baba, N Masrat. *Lateral Condylar Fractures Of Humerus In Children Following Varus Malunion Of Supracondylar Fracture*. The Internet Journal of Orthopedic Surgery. 2009 Volume 17 Number 2.

## Abstract

Not much is written about lateral condylar fractures of humerus in children following a united supracondylar fracture except for a few case reports and series. We present a series of 7 such cases. There were 5 boys and 2 girls and left side was involved in 5 cases and right in 2. Lateral condylar fracture occurred at an average of about 2.72 years after sustaining initial supracondylar fracture. In all cases fresh fracture was treated by open reduction and k-wire fixation. The varus deformity required a second stage corrective osteotomy in 4 of 7 patients for cosmetic reasons. Further research is needed and special stress needs to be given to the biomechanics of occurrence of lateral condylar fracture following supra condylar fracture.

## INTRODUCTION

There is not much literature available regarding lateral condylar fracture following a united supracondylar fracture of humerus in children. In past some light on this topic has been showered by Herrin and Fitch (1) who reported one case, David's et al (2) reported 6 such cases and Takahara et al (3) added 9 more to the list. We over a period of 5 years from beginning 2003 to ending 2008 collected data

Of patients who had sustained a lateral condylar fracture following a united supracondylar fracture. Our study adds 7 more cases to the limited resource of knowledge we have about these fractures

## MATERIAL AND METHODS

From 2003 to 2008, we collected data of patients who had sustained a lateral condylar fracture subsequent to a united supracondylar fracture (Table 1). We had a total of 7 cases, 5 boys and 2 girls. Left side was involved in 5 cases and right in 2. The age at which patients suffered supracondylar fracture ranged from 4 to 8 years with an average of 5.85 years. Out of 7 patients, 4 had a type III supracondylar fracture and 3 had a type II fracture using Gartland classification (4). All type II fractures and 2 type III fractures were managed by closed reduction and long arm slab while as 2 type III fracture were managed by closed reduction and percutaneous pinning. All patients united in

some varus deformity with carrying angle ranging from 0 to -15 degrees with a mean of -9.14 degrees (Figure 1,2,3,4). Lateral condylar fracture occurred due to fall in all patients at an age range of 7 to 11 years with an average of 8.57 years. So lateral condylar fracture occurred at an average of about 2.72 years after sustaining initial supracondylar fracture. The lateral condylar fracture was classified on the basis of displacement and confirmed intraoperatively. All patients were treated by open reduction and k wire fixation.

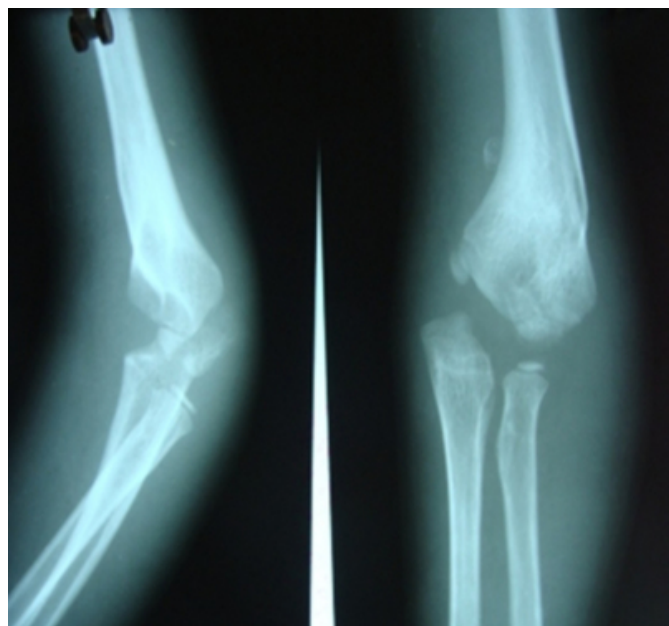
**Figure 1**

Figure 1



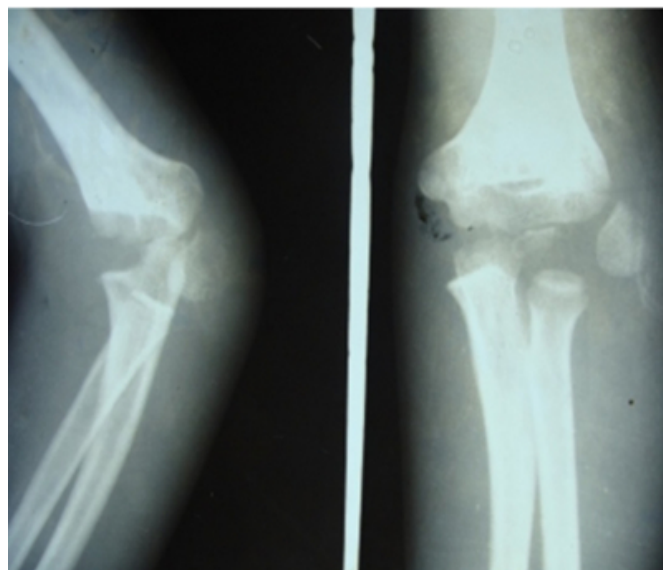
**Figure 2**

Figure 2



**Figure 3**

Figure 3



**Figure 4**

Figure 4



## RESULTS

All the patients had a lateral condylar fracture through the lateral metaphysis just above the distal humeral physis. All radiographs showed varus malunion, the sequelae of prior supracondylar fracture. The lateral condylar fracture was classified on the basis of displacement with 5 patients having moderate displacement and 2 having severe displacement. There was varus displacement of the distal fragment and the relationship of the capitellum to the radius was maintained.

All patients were treated by open reduction and k-wire fixation. All patients were followed till union. The radiographic examination at the time of union showed an increase in varus deformity in all patients to the extent of 5 degrees each on an average. The varus deformity required a second stage corrective osteotomy in 4 of 7 patients for cosmetic reasons.

## Figure 5

Table 1 Details of 7 children with lateral condyle fracture humerus following a malunited supracondylar fracture

| Case | Supracondylar fracture |        | Site of fracture | Type of fracture (Guthrie classification) | Treatment | Casting angle at the lateral elbow (degrees) | Second fracture of humeral condyle, lateral condyle |        |                  |           |
|------|------------------------|--------|------------------|---|-----------|--|---|--------|------------------|-----------|
|      | Age in years           | Sex    |                  |   |           |  | Age in years  | Sex    | Site of fracture | Treatment |
| 1    | 6                      | Female | LCF              | Type II                                   | OR, cast  | 25   | 8   | Female | LCF              | OR        |
| 2    | 6                      | Male   | LCF              | Type II                                   | OR, cast  | 25   | 14  | Male   | LCF              | OR        |
| 3    | 6                      | Male   | LCF              | Type II                                   | OR, cast  | 25   | 14  | Male   | LCF              | OR        |
| 4    | 6                      | Female | LCF              | Type II                                   | OR, cast  | 25   | 17  | Female | LCF              | OR        |
| 5    | 6                      | Female | LCF              | Type II                                   | OR, cast  | 25   | 17  | Female | LCF              | OR        |
| 6    | 6                      | Male   | LCF              | Type II                                   | OR, cast  | 25   | 17  | Male   | LCF              | OR        |
| 7    | 6                      | Male   | LCF              | Type II                                   | OR, cast  | 25   | 17  | Male   | LCF              | OR        |

OR, open reduction; LC, lateral condyle; OR, open reduction and percutaneous wiring  
LCF, lateral condyle fracture  
OR, open reduction and fixation

## DISCUSSION

We all are well versed with the complications of supracondylar fractures which range from acute neurovascular complications, compartment syndromes to varus deformities and myositis ossificans to name a few (5). Subsequent additions have been as tardy ulnar nerve palsy (6,7) avascular necrosis of the distal humeral epiphysis (8), posterolateral rotatory instability of the elbow (9). Lateral condylar fracture of humerus secondary to a malunited supracondylar fracture has received least attention in orthopaedic and relevant literature. David's et al (2) suggested that the varus residual deformity following a malunited supracondylar fracture may predispose a child to subsequent lateral condylar fracture. They studied the biomechanics of cubitus varus, and suggested that posttraumatic cubitus varus alignment could increase both the distraction and shear forces across the lateral condyle of the distal humerus generated by a routine fall on an outstretched upper arm. As was seen by Takahara et al (3) in their series, our patients had adduction avulsion fractures as described by Milch (10) which suggests that the cause had been predominantly a distraction rather than a compression force (11).

## CONCLUSION

Since much attention has not been paid to the occurrence of lateral condylar fracture following a malunited supracondylar fracture, further research is needed. Special stress needs to be given to the biomechanics of occurrence of lateral condylar fracture following supra condylar fracture. Cadaveric studies which are yet to be taken are needed to know the exact role of various distraction and compression forces which may contribute to this complication and modes of prevention need to be stressed.

## References

1. Herring JA, Fitch RD. Lateral condylar fracture of the elbow. J Pediatr Orthop 1986;6:724-7.
2. Davids JR, Maguire MF, Mubarak SJ, Wenger DR. Lateral condylar fracture of the humerus following posttraumatic cubitus varus. J Pediatr Orthop 1994;14:466-70.
3. Masatoshi Takahara, Isao Sasaki, Takumi Kimura, Hiroyuki Kato, Akio Minami, Toshihiko Ogino Second fracture of the distal humerus after varus malunion of a supracondylar fracture in children J Bone Joint Surg [Br] 1998;80-B:791-7.
4. Gartland, J. J (1959) Management of Supracondylar Fractures of the Humerus in Children. Surg., Gynec., and Obstet., 109: 145-154.
5. Wilkins KE. Supracondylar fracture of the distal humerus: complication. In: Rockwood CA, Wilkins KE, Beaty JH, eds. Fractures in children. Vol. 3. Fourth ed. Philadelphia: JB Lippincott Co, 1996:716-41.
6. Ogino T, Minami A, Fukuda K. Tardy ulnar nerve palsy caused by cubitus varus deformity. J Hand Surg [Br] 1986;11-B:352-6.
7. Abe M, Ishizu T, Shirai H, Okamoto M, Onomura T. Tardy ulnar nerve palsy caused by cubitus varus deformity. J Hand Surg [Am] 1995;20:5-9.
8. Morrissy RT, Wilkins KE. Deformity following distal humeral fracture in children. J Bone Joint Surg [Am] 1984;66-A:557-62.
9. Abe M, Ishizu T, Morikawa J. Posterolateral rotatory instability of the elbow after posttraumatic cubitus varus. J Shoulder Elbow Surg 1997;6:405-9.
10. Milch H. Fractures and fracture dislocations of the humeral condyles. J Trauma 1964;4:592-607.
11. Jakob R, Fowles JV, Rang M, Kassab MT. Observations concerning fractures of the lateral humeral condyle in children. J Bone Joint Surg [Br] 1975;57-B:430-6.

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