



Quality of reduction and fixation in pediatric medial humeral epicondyle fractures

Abstract 187
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BACKGROUND

Medial humeral epicondyle fractures (MHEF) are common elbow fractures in skeletally immature patients. These fractures typically occur in children aged 9 to 14 years¹. A concomitant elbow dislocation is common.

Management of MHEF in children is one of the most controversial topics in pediatric fracture care. Historically fractures have been treated nonoperatively with good results². However, there has been a trend towards surgical fixation of this injury in the belief that it might improve grip strength and prevent elbow instability.

There is consensus for fixation in cases of open fractures and entrapment of the epicondyle within the joint space. MHEF in conjunction with dislocation of the elbow favors fixation at many institutions. Fixation can be achieved with either K-wires or screws.

AIM

1. Describe fracture classification according to Wilkin.
2. Describe fixation implant.
3. Investigate if adequate reduction was obtained during surgery.



Figure 1 – Displaced medial humeral epicondyle fracture. Notice the fracture gap and the medial soft tissue swelling

METHOD

We retrospectively reviewed all cases of operatively managed MHEF in children at Herlev Hospital from 2017-2020.

Age, gender, Wilkin's classification, fixation implant and reduction quality were investigated.

Wilkin classified fractures in four types: 1) nondisplaced, 2) minimally displaced (<5 mm), 3) significantly displaced (>5 mm), 4) incarcerated in the joint.

Satisfactory reduction was defined as ≤ 5 mm displacement.

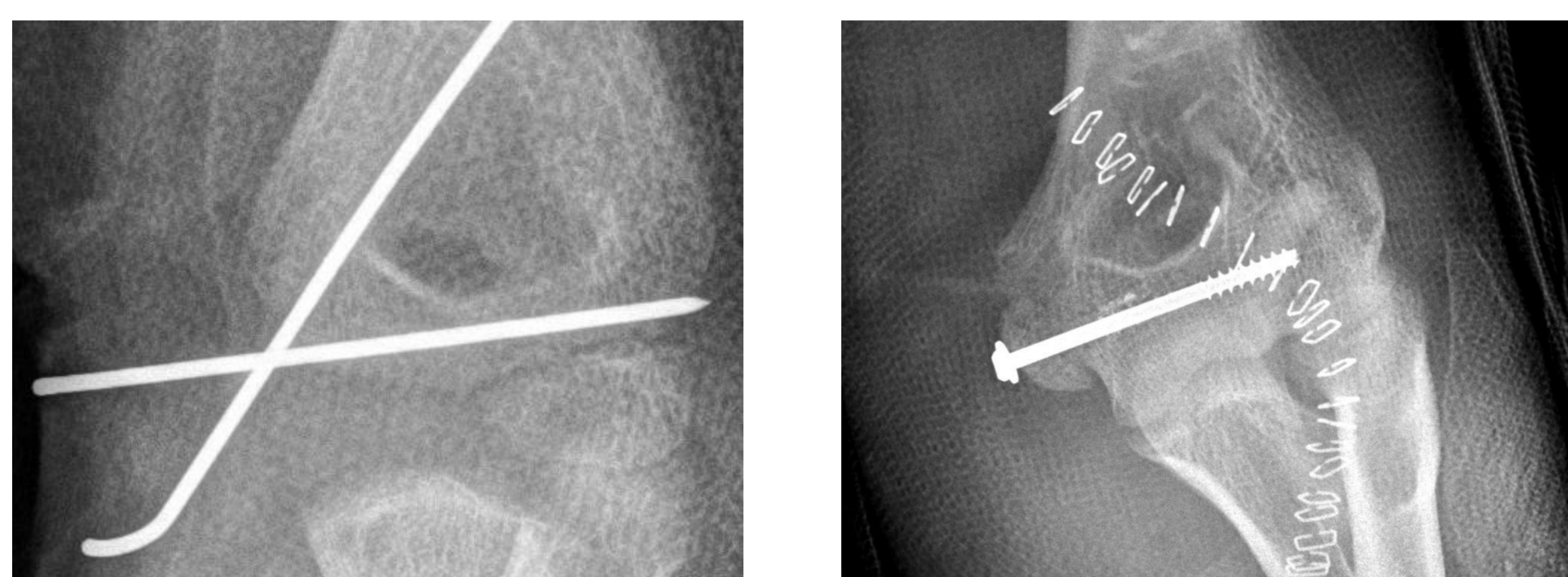


Figure 2 – Fixation types. Left) The apophysis is reduced anatomically and fixed with divergent K-wires, which make for a more stable construct than parallel wires. Right) Screw fixation, notice that the epicondyle is not anatomically reduced, and a horizontal screw may enter the olecranon fossa. A very extensile approach has been used.

RESULTS

We reviewed 44 fractures. Results are displayed in **Table 1**. 10 (23%) fractures occurred together with a dislocation of the elbow on primary radiographs.

Age (mean years, range)	11, (6-17)	
K-wires	10, (6-14)	
Screw	13, (9-17)	
	Absolute frequency (n)	Relative frequency (%)
Gender		
Girls	28	63
Boys	16	37
Wilkin type		
Nondisplaced	4	9
Minimally displaced (<5 mm)	18	41
Significantly displaced (>5 mm)	13	30
Incarcerated in the joint	9	20
Fixation type		
K-wires	18	41
Screw	25	57
None	1*	2
Reduction quality		
Adequate (<5 mm)	37	84
Inadequate (>5 mm)	7	16

Table 1 – Absolute and relative frequencies (n=44) * One fracture was reduced along with a joint dislocation and not fixed with an implant.

DISCUSSION

We found that 50% of fractures were displaced less than 5mm preoperatively. The amount of displacement has not been shown to influence outcome and the best treatment for displaced MHEF has yet to be revealed.

Fixation by screws were slightly favored. Screw fixation has the obvious advantage of early mobilization; however, in younger children the apophysis might not be too small to carry a screw. In this case suture anchors is also a possible internal solution.

In 6/22 (27%) non- or minimally displaced fractures surgery failed to provide a better position of the apophysis after reduction and fixation.

CONCLUSION

- The apophysis was appropriately reduced in 84% of cases.
- 50% of surgically managed fractures had less than 5 mm of displacement preoperatively.
- Screw fixation was slightly favored over K-wires, more so in older children.

The shift towards operative management of MHEF has not been documented. Further high-quality studies are needed to assess surgical indications.

REFERENCES

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