CASE SERIES

Long-term comparative study of internal fixation with Kirschner wires or cannulated screws for displaced medial epicondyle fractures of the humerus in children: A 10-year follow-up of 42 cases

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ABSTRACT

BACKGROUND: The rationale behind the decision-making on which type of fixation to use in displaced medial epicondyle fractures is not well elucidated. This study aims to compare the long-term clinical and radiographic outcomes of internal fixation with either Kirschner wires (K-wires) or cannulated screws in children with displaced medial epicondyle fractures.

METHODS: In this study, 42 consecutive children who underwent surgical treatment for medial epicondyle fractures displaced more than 5 mm were categorized into two groups as follows: group A, 22 children undergoing fixation with K-wires and group B, 20 children undergoing fixation with a screw. The mean age was nine (median, 10.5; range, 6–14) years in group A and 15 (16, 10–17) in group B. The overall follow-up was 10 (median, 10; range, 5–15) years. To assess patients' clinical outcomes, the Mayo Elbow Performance Scores (MEPS) were used in addition to the elbow range of motion (ROM) at the last follow-up. During the radiographic assessment, possible deformities secondary to the epicondyle fracture were examined on final follow-up radiographs.

RESULTS: The main MEPS were 95 (median, 95; range, 85–100) and 93 (94, 85–100) in groups A and B, respectively (p=0.18). In ROM, no significant differences were observed (p=0.43). In the radiographic assessment, one patient from each group developed a fibrous union, and one from each group had hypoplasia. There was no significant relationship between the deformity and fixation type (p=0.34, χ^2 test).

CONCLUSION: Two smooth K-wires for younger children and screw fixation for children near skeletal maturity may provide favorable clinical and radiological outcomes at long-term follow-up, with low morbidity and radiographic deformity.

Keywords: Fracture fixation; Kirschner wire fixation; medial epicondyle humerus fracture; pediatric elbow fracture; screw fixation.

INTRODUCTION

Although medial epicondyle fractures of the humerus constitute approximately 12% of all pediatric elbow fractures, the literature is controversial regarding the management of these pediatric fractures.[1] The disagreement lies particularly in identifying the suitable treatment method for children with considerable displacement (>5 mm). Traditional knowledge suggests that displaced medial epicondyle fractures can be nonoperatively treated with satisfactory outcomes despite a high rate of pseudarthrosis.[2,3] However, in recent years, there is an emerging consensus that such patients may benefit more from open reduction and internal fixation.[1,4]

The most commonly used methods for the fixation of displaced fractures include Kirschner wires (K-wires) in younger

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patients with open physis and screws with or without a washer in children near skeletal maturity.[5] However, as per our literature review, the rationale behind the decision-making on which type of fixation to use in such fractures has not been well elucidated in the literature.

To contribute to the relevant literature, in this study, we aim to investigate the rationale behind the decision on the type of fixation in such fractures, by comparing the long-term clinical and radiographic outcomes of surgical treatment using either K-wires or cannulated screws in children with displaced medial epicondyle fractures.

MATERIALS AND METHODS

After obtaining approval from the institutional review board, 51 consecutive patients who underwent open reduction and internal fixation for the treatment of displaced fracture of the medial humeral epicondyle from 2003 to 2013 were retrospectively reviewed in this study. Based on the eligibility criteria (Table 1), nine children were excluded from this study; the remaining 42 (31 male and 11 female) patients were included and invited for a final follow-up examination. Parents were informed that medical records will be used for scientific purposes only, and written informed consent was obtained at the final visit.

Patients were categorized into two groups based on the fixation method as follows: group A and group B. Internal fixation was performed with 2 K-wires in group A and a screw in group B. Group A comprised 22 children (16 male and six female), and group B comprised 20 children (15 male and 5 female; Fig. 1). During the initial operation, the mean age of the children was nine (median, 10.5; range, 6–14) in group A and 15 (16, 10–17) years in group B. The mean follow-up was 10 (median, 11; range, 6–15) in group A and 10 (9.5, 5–15) years in group B. Children in either group were comparable concerning demographic data (p>0.05 for gender, side, number of participants, and duration of follow-up; Table 2).

The primary indication for surgical treatment was fractured with a displacement of more than 5 mm (Fig. 2). The choice of fixation type, i.e., K-wires or a screw, was determined based on the age and skeletal maturity of the patients. K-wires were used in younger children with years of growth remaining, whereas a screw was used in children near skeletal maturity.

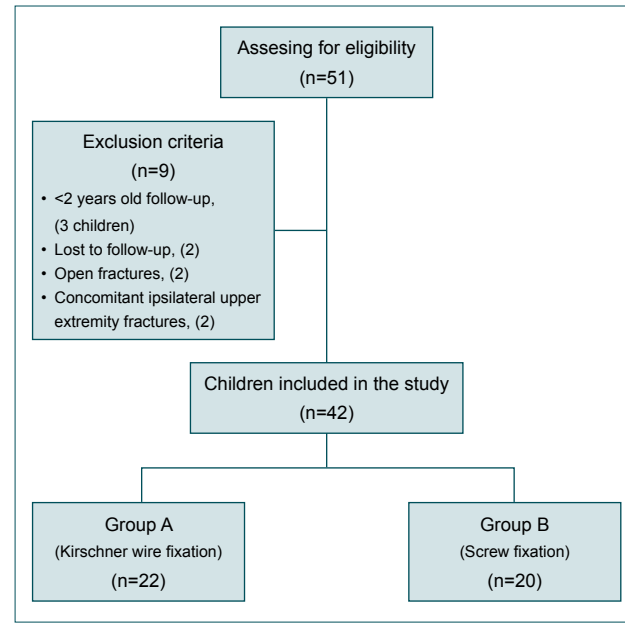

Figure 1. Flow diagram of the study participants.

Relevant dislocations of the elbow (n=2 and 3 in groups A and B, respectively) were reduced at the time of admission. Concomitant fragment entrapment in the elbow joint (n=3 and 4; Fig. 3), ulnar nerve palsy (n=1 and 2), and severe valgus instability on fluoroscopy under general anesthesia during the operation (n=6 and 5 in groups A and B, respectively) were recorded.

Outcome Measures

During the clinical assessment, the elbow range of motion (ROM) and valgus angle of the elbow were measured using a universal standard goniometer by the senior resident at the final follow-up. In addition, the Mayo Elbow Performance Scores (MEPS) were performed for functional assessment of the following four items: pain (max 45 points, from no pain to severe pain), stability (max 10 points, from stable to grossly unstable), ROM (max 20 points, from >100° to <50°), and daily activities (max 25 points).

Table 1. Eligibility criteria for inclusion and exclusion of the study participants

Inclusion criteria	Exclusion criteria
• A diagnosis of displaced fractures of the medial humeral epicondyle	• <2 years of follow-up
• Age <18 years at the time of surgery	• Lost to follow-up
• Cases which underwent open reduction and internal fixation with either Kirschner wires or a screw with or without a washer	• Open fractures
	• Concomitant ipsilateral upper extremity fractures
• Being willing to participate in this study	• Being unwilling to participate in this study

Table 2. Demographic characteristics of the study participants

	Group A (22 children, 22 elbows)	Group B (20 children, 20 elbows)	p
Mean age at surgery, year			
Min-Max (Median)	6–14 (10.5)	10–17 (16)	<0.01[a]
Mean	9	15	
Gender			
Female	6	5	1.00[b]
Male	16	15	
Side			
Dominant	5	7	0.49[b]
Nondominant	17	13	
Follow-up duration, year			
Min-Max (Median)	6–15 (11)	5–15 (9.5)	0.18[a]
Mean	10	10	

[a]Student's T-test; [b]Fisher's exact test; *p<0.05. Min: Minimum; Max: Maximum.

During the radiographic assessment, according to the deformity classification of Skak et al.,[6] possible deformities secondary to the epicondyle fracture were examined on the final follow-up anteroposterior elbow radiographs by the senior orthopedic surgeon. Furthermore, postoperative complications were documented from medical records. Skak et al. described the five types of postoperative radiographic deformities for the medial epicondyle fractures by comparing both the elbows on equivalent AP elbow radiographs: fibrous union or pseudarthrosis, a double-contoured epicondyle, an ulnar sulcus, and hypoplasia or hyperplasia of the epicondyle.

Surgical Technique

All operations were performed under general anesthesia within four days after the injury by two senior orthopedic surgeons. Children were positioned in the supine position with the injured elbow on an arm board. Prophylactic antibiotics were administered as a single dose 30 min before skin incision and continued up to 48 hours after the operation at 6-hour intervals. After a pneumatic tourniquet was applied, the fracture site was exposed via a posteromedial incision over the medial epicondyle in all children. The ulnar nerve was routinely identified and protected but not transposed. The ulnar nerve was anteriorly transposed in only three children with ulnar nerve symptoms (n=1 and 2 in groups A and B, respectively).

In group A, the fracture was fixed with two non-threaded smooth K-wires in a parallel configuration. In group B, the fragment was fixed with a 4.5-mm cannulated screw in large children and a 3.5-mm cannulated screw in smaller elbows. In three children with a fragmented epicondyle, a washer

Figure 2. The radiograph demonstrates a medial epicondyle fracture, with a considerable displacement (>5 mm).

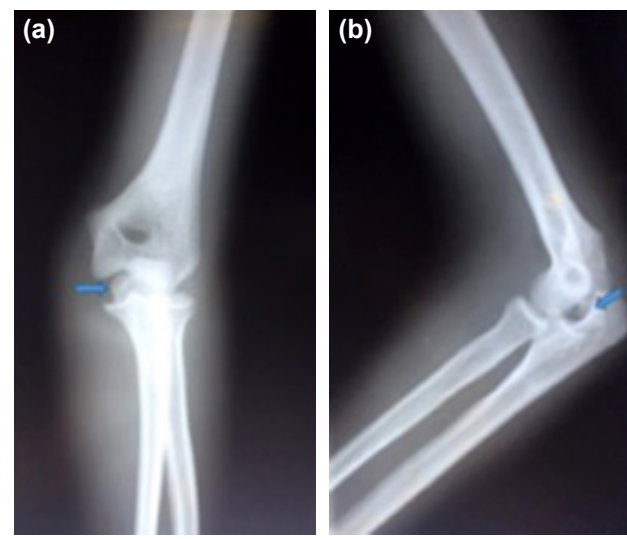

Figure 3. (a, b) Radiographs show an incarcerated medial epicondyle in the elbow joint (blue arrows), with valgus instability.

Table 3. Clinical and radiographic outcomes of the children in both groups

	Group A	Group B	p
Range of motion degree (°), Min-Max (Median), Mean			
Flexion	110–140 (127.5)	115–140 (127.5)	0.43[a]
	127	128	
Extension loss*	5–10 (5)	5 –10 (5)	0.95[b]
	7	6	
Supination loss*	3–10 (5)	5–10 (5)	0.53[b]
	5	6	
Mayo Elbow Performance Score, Min-Max (Median), Mean	85–100 (95)	85–100 (94)	0.18[a]
	95	93	
Radiographic deformities** (n)			
Fibrous union	1	1	0.34[c]
Hypoplasia	1	1	
Hyperplasia	1	0	
Ulnar sulcus deformity	0	1	
Postoperative complications (n)			
Pin-track infection	2	0	0.33[c]
Superficial wound infection	0	1	

*Descriptive and comparative statistics were performed for only children with extension and supination loss. **Radiographic deformities were evaluated based on the classification of Skak et al. [a]Student's T-test; [b]Mann-Whitney U test; [c]Chi-square test p<0.05. Min: Minimum; Max: Maximum.

was added to enhance the fixation surface area and minimize the risk of more fragmentation of the epicondyle with compression. Directions of the K-wires or screws were controlled using fluoroscopy, and no olecranon fossa penetration was detected. The construct and stability were evaluated with direct observation and fluoroscopic imaging intraoperatively.

Postoperative Rehabilitation Protocol

Postoperatively, the elbow was immobilized at 90° flexion and neutral rotation with an above-elbow splint (well-padded dorsally) for three weeks. During this period, wrist and hand exercises were permitted if the pain was tolerable. From three to six weeks following the operation, all children were encouraged free elbow mobilization, using a hinge brace to preserve the elbow from valgus and varus forces. At six weeks, the brace was removed, and the children were encouraged to attend noncontact activities. At 12 weeks, returning to previous activities was permitted. The K-wires were removed under general anesthesia between the 4th and 8th weeks postoperatively.

RESULTS

The clinical outcomes of patients are shown in Table 3. At the final follow-up, with favorable elbow function, all children returned to their daily life with no limitations. Regarding the MEPS, both groups exhibited similar results (p=0.18). Moreover, all children exhibited a satisfactory elbow ROM, and no significant differences were observed between the two groups (p=0.43). Six and eight children in groups A and B had an extension loss with a mean degree of seven (median, 5; range, 5–10) and six (5, 5–10), respectively. Furthermore, eight and seven children in groups A and B developed supination loss with a mean degree of five (median, 5; range, 3–10) and six (5, 5–10), respectively. Additionally, physical examination revealed no cases of valgus instability.

The radiographic results are presented in Table 3. Based on the method of Skak et al., one patient from each group developed a fibrous union, and one patient from each group had hypoplasia. Furthermore, one patient in group A developed epicondylar hyperplasia, and one patient in group B had nonsymptomatic ulnar sulcus deformity. No significant relationship was observed between the deformity and fixation type (p=0.34, χ^2 test). In both groups of children, the radiographic solid union was obtained at an average of six (range, 4–10) and seven (range, 5–10) weeks in groups A and B, respectively (p=0.65) (Figs. 4 and 5).

Concerning postoperative complications (Table 3), two patients in group A suffered from pin track infections that resolved with regular pin track dressing and antibiotics. One patient in group B developed a superficial wound infection that resolved with local wound care and oral antibiotics. No late neurological or other complications were observed at the final follow-up. No significant difference was observed in complications between groups A and B (p=0.33).

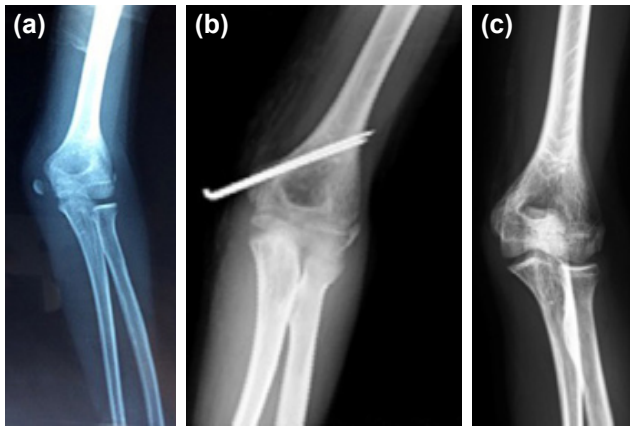

Figure 4. An 8-year-old boy suffered from a fracture of the right medial humeral epicondyle because of a simple fall. **(a)** The initial radiograph demonstrates the displared fragment pulled by the ulnar collateral ligament. **(b)** The fragment was fixed with K-wires from the medial side in an anatomic position. **(c)** The final follow-up radiograph shows a solid union.

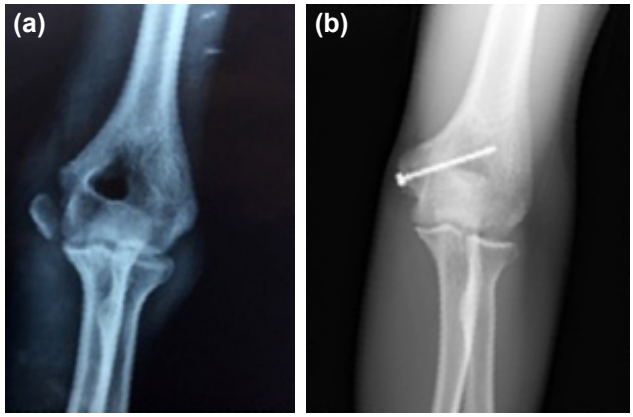

Figure 5. A 14-year-old adolescent sustained a fracture of the right medial humeral epicondyle after falling on the outstretched upper extremity. **(a)** The initial radiograph shows the displaced fragment. **(b)** The fragment was fixed with a cannulated screw from the medial side in an anatomic position and the final follow-up radiograph shows solid union.

DISCUSSION

Operative treatment with open reduction and internal fixation has a crucial role in avoiding the painful nonunion and minimizing the risk of symptomatic valgus instability.[5] The present study provides additional evidence that fixation with either K-wires or screws could confer proper fracture reduction and maintain stabilization for fracture healing with similar clinical and radiographic outcomes at long-term follow-up. Besides, several authors prefer K-wires in younger patients with open physis, whereas screws are mostly used for children near skeletal maturity.[1,7–9] However, to our knowledge, the rationale behind this preference has not been investigated well. We, therefore, clarified this rationale by directly comparing the clinical and radiographic outcomes of both fixation types in children with displaced medial epicondyle fractures.

Ip and Tsang[9] reviewed 24 consecutive children with the medial humeral epicondylar fracture displaced greater than 5 mm who underwent operative treatment by one of the three methods, including two parallel K-wires, two parallel K-wires plus a tension band, and a screw plus an anti-rotation K-wire. The author suggested that two parallel K-wires plus tension band should be performed for younger children who still have growth potential because this approach minimizes the risk of developing cubitus varus deformity due to a screw across the growing apophysis. Consistently with Ip and Tsang's approach, we mostly preferred a screw with or without a washer for children near skeletal maturity and K-wires for younger children with years of growth remaining. We observed no cubitus varus or valgus deformity with satisfactory ROM and MEPS.

Skak et al.[6] classified the radiological deformities following displaced medial epicondyle fractures treated conservatively or surgically using K-wires, sutures, or palmar nails as follows: pseudarthrosis or a fibrous union, a double-contoured epicondyle, an ulnar sulcus, and simple hyperplasia or hypoplasia of the epicondyle. Two of these deformities were associated with the fixation type used in their study. Pseudarthrosis was noted after treatment with plaster or suturing, and hypoplasia was observed after pin fixation. Accordingly, the authors suggested that nailing causes extra damage to a likely injured growth plate, whereas inserting K-wires by drilling may cause less damage. However, they did not specify which fixation type they applied for which age group. At our institution, the choice of fixation type for displaced medial epicondyle fractures was determined based on the age and skeletal maturity of the patient. We observed four types of deformities, including a fibrous union, hypoplasia, hyperplasia, and ulnar sulcus deformity; there was no significant relationship between the deformity and fixation type. Therefore, we considered that the choice of fixation type according to skeletal maturity was likely to reduce the risk of development of such deformities.

Approximately 50% of such fractures may be accompanied by elbow dislocation, and the fragment may be incarcerated within the joint with an incidence of at least 15%.[7,10] In some children, the concomitant dislocation of the elbow may spontaneously reduce and accordingly be unrecognized.[11] Compared with the literature, the present study revealed a similar rate of fragment entrapment (group A, 3/20; group B, 4/22) and a low rate of concomitant elbow dislocation (group A, n=2/20; group B, n=3/22). This low rate may be attributable to the spontaneous reduction of the elbow dislocation after the trauma.

The management of coexisting ulnar nerve palsy is equivocal.[4] Most authors[12–14] suggest that routine exploration or transposition of the ulnar nerve is not essential because the nerve may be more sensitive to partial devascularization following transposition in current trauma versus that in an

elective nontraumatic case.[14] We transposed the ulnar nerve in three children with ulnar nerve symptoms (group A, n=1; group B, n=2) and obtained complete neurological recovery. Therefore, we support the notion that anterior transposition should be only performed for children with nerve compression signs.[14]

Concerning postoperative complications, three modern series reports of pediatric medial epicondyle fractures[7,9,15] were operatively treated using either K-wires or screws reported a postoperative infection rate of less than 1% (1/188, superficial wound infection). However, in contrast with these studies, we recorded two-pin track infections following K-wire fixation and one superficial wound infection following screw fixation. Other complications have not been reported in these surgical series.[7,9,15] The operative treatment of such fractures raises a concern regarding iatrogenic nerve injury. Lately, Marcu et al.[16] reported two cases of severe iatrogenic radial nerve injuries secondary to the guidewire of the cannulated fixation systems. In our case series, we did not experience such a complication.

Stiffness represents the most frequent complication following elbow injuries when treated by splint immobilization. Therefore, early active elbow motion is a vital part of the postoperative rehabilitation protocol following the operative treatment.[17] Louahem et al.[15] stated that six of 139 children (4%) developed extension deficits of <20°. Similar to our postoperative rehabilitation protocol, the authors immobilized the elbow at 90° flexion and neutral rotation for a mean of four weeks and then allowed elbow mobilization. In our study, three children after K-wires fixation and two after screw fixation suffered from extension loss of <10°. Accordingly, it seems that both fixation methods can provide satisfactory elbow ROM despite a 3–4-week postoperative immobilization period to secure fixation.

This study has several important limitations. The first limitation is the retrospective nature of data collection, which may raise the concern of recall bias. Another potential limitation was its relatively small sample size, including 42 fractures although our cohort size was large compared with most of the studies that we have cited. This may limit the power of the results, and therefore further studies with larger samples may identify significant differences in all the variables analyzed in the present study. Last, surgeries were performed by three different surgeons, which may have provided biased results due to the surgeon's experience. Additionally, results in selection bias may cause differences in complication rates between the two techniques. However, as previously mentioned, the choice of fixation type was mostly determined based on skeletal maturity. Despite these limitations, this is a preliminary study to directly compare the long-term clinical and radiographic outcomes of internal fixation with either Kirschner wires or cannulated screws in children with displaced medial epicondyle fractures.

Conclusion

We recommend operative treatment for children with medial epicondylar fractures displaced more than 5 mm. The early use of two smooth K-wires for younger children and delayed use of screw fixation for children near skeletal maturity might provide favorable clinical and radiological outcomes during long-term follow-up, with low morbidity and radiographic deformity.

Informed Consent: Written informed consent was obtained from the patients for the publication of the case report and the accompanying images.

Peer-review: Internally peer-reviewed.

Authorship Contributions: Concept: F.B.; Design: Ö.N.E., M.D. Supervision: F.B., Ö.N.E.; Materials: M.D., F.Ş.; Data: F.Ş.; Analysis: Ö.N.E.; Literature search: M.D.; Writing: M.D.; Critical revision: F.B., Ö.N.E..

Conflict of Interest: None declared.

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REFERENCES

1. Kamath AF, Baldwin K, Horneff J, Hosalkar HS. Operative versus non-operative management of pediatric medial epicondyle fractures: a systematic review. J Child Orthop 2009;3:345–57. [CrossRef]
2. Josefsson PO, Danielsson LG. Epicondylar elbow fracture in children: 35-year follow-up of 56 unreduced cases. Acta Orthopaedica Scandinavica 1986;57:313–15. [CrossRef]
3. Duun PS, Ravn P, Hansen LB, Buron B. Osteosynthesis of medial humeral epicondyle fractures in children: 8-year follow-up of 33 cases. Acta Orthop Scandinavica 1994;65:439–41. [CrossRef]
4. Pathy R, Dodwell ER. Medial epicondyle fractures in children. Curr Opin Pediatr 2015;27:58–66. [CrossRef]
5. Patel NM, Ganley TJ. Medial epicondyle fractures of the humerus: how to evaluate and when to operate. J Pediatr Orthop 2012;32:S10–3.
6. Skak S, Grossmann E, Wagn P. Deformity after internal fixation of fracture separation of the medial epicondyle of the humerus. J Bone Joint Surg Br 1994;76:297–302. [CrossRef]
7. Lee HH, Shen HC, Chang JH, Lee CH, Wu SS. Operative treatment of displaced medial epicondyle fractures in children and adolescents. J Shoulder Elbow Surg 2005;14:178–85. [CrossRef]
8. Bulut G, Erken HY, Tan E, Ofluoglu O, Yildiz M. Treatment of medial epicondyle fractures accompanying elbow dislocations in children. Acta Orthop Traumatol Turc 2005;39:334–40.
9. Ip D, Tsang WL. Medial humeral epicondylar fracture in children and adolescents. J Orthop Surg 2007;15:170–3. [CrossRef]
10. Wilson N, Ingram R, Rymaszewski L, Miller J. Treatment of fractures of the medial epicondyle of the humerus. Injury 1988;19:342–4. [CrossRef]
11. Woods GW, Tullos HS. Elbow instability and medial epicondyle fractures. Am J Sports Med 1977;5:23–30. [CrossRef]
12. Gottschalk HP, Eisner E, Hosalkar HS. Medial epicondyle fractures in the pediatric population. J Am Acad Orthop Surg 2012;20:223–32.
13. Glotzbecker MP, Shore B, Matheney T, Gold M, Hedequist D. Alternative technique for open reduction and fixation of displaced pediatric medial epicondyle fractures. J Child Orthop 2012;6:105–9. [CrossRef]
14. Anakwe RE, Watts AC, McEachan JE. Delayed ulnar nerve palsy after

open reduction and internal fixation of medial epicondylar fractures. J Pediatr Orthop 2010;19:239–41. [CrossRef]

15. Louahem DM, Bourelle S, Buscayret F, Mazeau P, Kelly P, Dimeglio A, et al. Displaced medial epicondyle fractures of the humerus: surgical treatment and results. A report of 139 cases. Arc Orthop trauma Surg 2010;130:649–55. [CrossRef]
16. Marcu DM, Balts J, McCarthy JJ, Kozin SH, Noonan KJ. Iatrogenic Radial Nerve Injury With Cannulated FixationofMedial Epicondyle Fractures in the PediatricHumerus: A Report of 2 Cases. J Pediatr Orthop 2011;31:e13–6. [CrossRef]
17. Ireland M, Andrews J. Shoulder and elbow injuries in the young athlete. Clin Sports Med 1988;7:473–94.

OLGU SERİSİ - *ÖZET*

Pediatrik deplase mediyal epikondil kırıklarının cerrahi tedavisinde Kirschner teli veya kanüllü vida ile internal tespitin uzun dönem sonuçlarının karşılaştırmalı çalışması: 42 olgunun 10 yıllık takip sonuçları

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AMAÇ: Literatürde, deplase mediyal epikondil kırıklarının cerrahi tedavisinde hangi tip tespit materyalinin kullanılacağına karar vermenin ardında yatan gerekçe yeterince araştırılmamıştır. Çalışmamızda, deplase mediyal epikondil kırığı olan çocuklarda Kirschner teli (K-teli) veya kanüllü vida ile internal tespitin uzun dönem klinik ve radyografik sonuçlarını karşılaştırıldı.

GEREÇ VE YÖNTEM: 5 mm'den daha fazla yer değiştirmiş mediyal epikondil kırıkları için cerrahi tedavi uygulanmış toplam 42 çocuk iki gruba ayrıldı. Grup A, K-telleri ile internal tespit uygulanmış 22 çocuk içerirken, grup B kanüllü vida ile tespit uygulanmış 20 çocuktan oluşuyordu. Ortalama yaş grup A'da 9 yıl (ortanca, 10.5; aralık, 6–14) iken, grup B'de 15 yıldı (16, 10–17). Toplam takip süresi 10 (ortanca, 10; aralık, 5–15) yıl olarak hesaplandı. Hastaların klinik sonuçlarını değerlendirmek için, son takipteki dirsek hareket açıklığına (ROM) ek olarak Mayo Dirsek Performans Skorları (MEPS) kullanıldı. Radyografik değerlendirme sırasında, son takip radyografileri üzerinde epikondil kırığına ikincil olası deformiteler incelendi.

BULGULAR: Ortalama MEPS, A ve B gruplarında sırasıyla 95 (ortanca, 95; aralık, 85–100) ve 93 (94, 85–100) olarak tespit edildi (p=0.18). ROM'da anlamlı bir fark gözlenmedi (p=0.43). Radyografik incelemede her gruptan birer hasta fibröz kaynama saptanırken, her gruptan birer hastada hipoplazi mevcuttu. Deformite ve tespit tipi arasında anlamlı ilişki saptanmadı (p=0.34, χ^2 testi).

TARTIŞMA: Deplase mediyal epikondil kırıklarının cerrahi tedavisinde, iskelet olgunluğuna yakın çocuklar için vida ile tespit, daha küçük çocuklar için iki adet K-teli ile internal tespit düşük morbidite ve radyografik deformite oranları ile uzun süreli takiplerde olumlu klinik ve radyolojik sonuçlar sağlayabilir.

Anahtar sözcükler: Humerus mediyal epikondil kırığı; Kirschner teli ile tespit; pediatrik dirsek kırığı; vida ile tespit.

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