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= Abstract =

Fracture-separation of the Distal Humeral Epiphysis in Children

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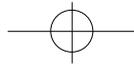
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We retrospectively reviewed twelve cases of the fracture-separation of the distal humeral epiphysis, which were treated during the period from 1989 to 1996. The incidence of this injury was about 3 % from 266 pediatric elbow fractures. Four cases were remained misdiagnosed as the lateral or medial humeral condylar fracture until the authors reviewed their radiographs. Though eleven fractures were extension type injury with typical posteromedial displacement, we identified a rare flexion type injury with anterolateral displacement. This case was a 12+7 year old boy, who was the oldest in our series. Cubitus varus deformity of more than 10° developed in five patients, and cubitus rectus in two patients. One patient underwent osteotomy for the correction of cubitus varus deformity. We feel this injury is not uncommon as previously noted in the literature. The major problem of this fracture was the possibility of misdiagnosis. Whichever treatment modality one may choose, careful evaluation of the carrying angle after reduction is mandatory to avoid residual cubitus varus deformity.

Key Words Fracture-separation, Distal humeral epiphysis

67170 (110-126)

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가 , C

Hoffman⁶⁾ de Jager 3 가 K-

1) ;2) K- 7 가 (가2

line) 가 (anterior humeral K- ,2

;3) 가 (4) K-

;4) cut osteotomy) (step-

(humerus-elbow-wrist angle)(HEW)¹²⁾

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. DeLee⁷⁾ 10 12 7

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, 1 (1)가 . B) (Table 1).

12 3 , 7 (2-8)가 ; -

C 3 4 1989 1991

Salter-Harris II , 4 (9- 가11 , 가1 .

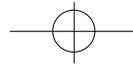
12)가 가가 (12 7) 3

12 (Fig 1). 5 , 7 가 (Fig 2). 7 2 9

가 (4) ,

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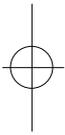


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Table 1 Clinical details of 15 patients who had fracture-separation of the distal humeral epiphysis.

Group	Case	Age at Injury (yr+mo)	Sex	Displacement	Initial Diagnosis	Treatment	Final Carrying Angle*	Remarks
A	1	0+10	M	posteromedial	fracture-separation of distal humeral epiphysis	open reduction, pin fixation	-5/+5	
B	2	1+5	M	posteromedial	fracture-separation of distal humeral epiphysis	closed reduction, cast	-3/+5	
	3	1+6	M	posteromedial	fracture-separation of distal humeral epiphysis	open reduction, pin fixation	0/+4	
	4	1+8	M	posteromedial	fracture-separation of distal humeral epiphysis	closed reduction, cast	-15/+7	delayed in treatment
	5	2+2	M	posteromedial	lateral condylar fracture of humerus	open reduction, pin fixation	-10/+5	
	6	2+4	M	posteromedial	fracture-separation of distal humeral epiphysis	closed reduction, cast	normal	
	7	2+9	M	posteromedial	lateral condylar fracture of humerus	(1st) closed reduction, cast (2nd) open reduction, pin fixation	-15/+7	45° loss of extension
	8	2+10	F	posteromedial	medial condylar fracture of humerus	open reduction, pin fixation	normal	
C	9	4+0	M	posteromedial	fracture-separation of distal humeral epiphysis	open reduction, pin fixation	-19/+3	
	10	6+8	M	posteromedial	lateral condylar fracture of humerus	open reduction, pin fixation	normal	
	11	7+7	M	posteromedial	fracture-separation of distal humeral epiphysis	open reduction, pin fixation	normal	
	12	12+7	M	anterolateral	fracture-separation of distal humeral epiphysis	open reduction, pin fixation	normal	flexion type injury

* Injured side/uninjured side. Degrees. Minus (-) indicates cubitus varus.



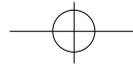


Fig 2. Case 7. A 2+9 year-old boy who sustained a typical fracture-separation of the distal humeral epiphysis on his left elbow. **A.** Initially, it was misdiagnosed as the elbow dislocation. **B.** Radiographs, showing severe varus and rotational displacement within the long arm cast. **C.** After two months, it healed with severe deformity. **D.** Even after open reduction this injury was still misdiagnosed as the lateral condylar fracture. **E.** Six years later, it developed avascular necrosis of the lateral condyle, cubitus varus of 22° as well as flexion contracture of 45°.

3 가 22

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K-

2 (4)

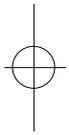
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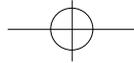
DeLee B
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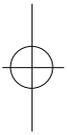
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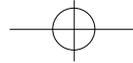
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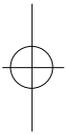
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 6 ¹³. DeLee ⁷⁾
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 7 . 11
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 110 , 5 . 가
 5 McIntyre ⁹⁾
 4 . 10
 7 7 ,5 . 가 가 가
 7 5 10 (, 10-22⁹⁾
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 가 (cubitus rectus) 7 , 12 12 7
 7 5
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 . (4) 10 가 ,
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 가 , 가
 Mizuno ¹⁰⁾ Akbaria ⁵⁾
 1980 DeLee ⁷⁾ 16 ,
 , CT MRI
 Wilkins¹³⁾
 . Holda ⁸⁾ . Holda ⁸⁾
 273 7 (2.5%)가
 7 266 . 7
 8 3% 5 . 가
 (dicondylar fracture)
 13 de Jager Hoffman⁶⁾ 가

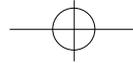




(6-7)

가가 ,
 .DeLee 7) 16 가
 .McIntyre 9) Wilkins¹³⁾ 가
 (distraction)
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 - 12 , 3% , 가
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