

. . . .

< >

: , , 가 , , 가 가

가 가

: 1995 5 2000 5

15 8 2 (6-12 , 9 , 6) 가

가

: , , 7 24 10.9 , 10mm 15mm

11.7mm 5 -3mm + 10mm 2.1mm

12.1 (9-24)가 29.4 (21-48)

1

4 2.1mm 1

: 14

: 1090-1 (780-350)

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* 2001
* 2002

가 가 15 12 6
가 12 8 2 가
3,4,13,17) , , 가 12
가 가 2 ,
가 가 6,7) 1
3 , 10 , 2
1 , 6 , 5
4 Gustilo Anderson 1
A 1 3
12 AO fixator , 3
Orthofix
가

1995 5 2000 5

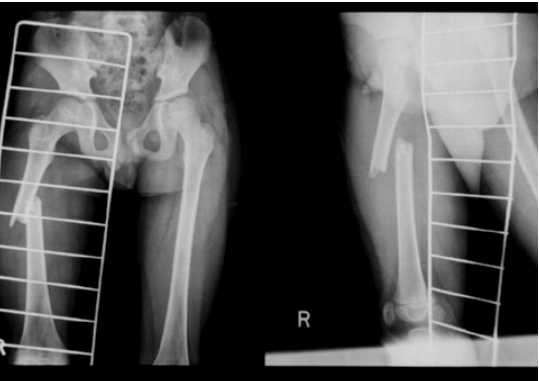


Fig. I-A : Initial AP and lateral view of mid 1/3 femoral shaft fracture. He was head injured 8 year-old male patient.

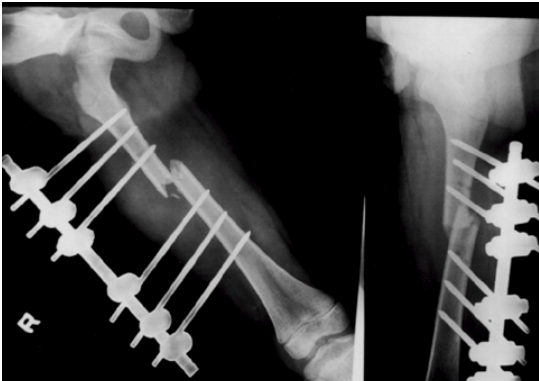


Fig. I-B : AP and lateral radiographs after external fixation. Reduction and stabilization obtained with AO external fixator.

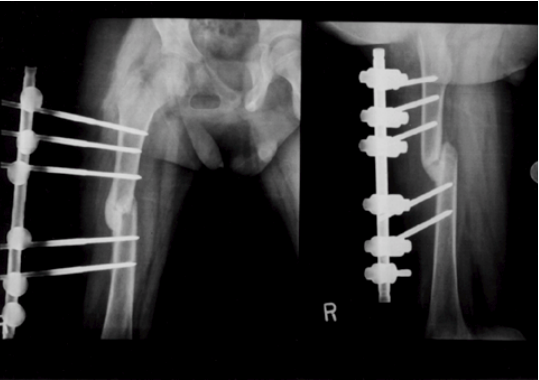


Fig. I-C : The fracture was united at 10 weeks.

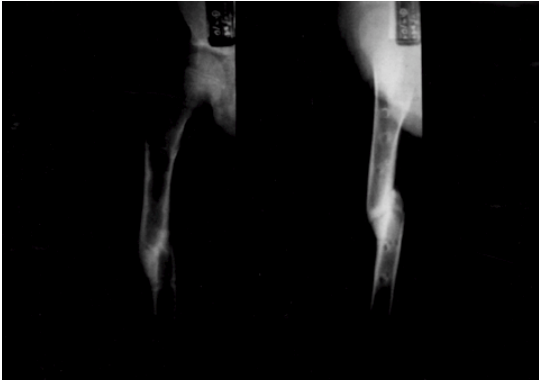


Fig. I-D : 12 weeks postoperatively, the fracture appeared to be healed and the external fixator was removed.

21 48 29.4

2
(Fig. 1).

가 2 (Table 1).

12 Scanogram
가

가가

(Table 1).

9,13)

7 24

10.9

5 가 3,4,14,18)

10mm

Table 1. Case analysis

Case No.	Frontal plane angulation (POD*#1Yr)	Sagittal plane angulation (POD*#1Yr)	Over-riding (mm)	Over-growth(mm) (POD*#1Yr)	Bony union time (wk)	E-F removal time (wk)	H.D (day)	Cx.	Hip, Knee ROM (POD*#1Yr)
1.	varus 3	ant.4	10	0	7	9	24		full
2.	varus 5	post.5	12	0	8	10	32	RF	full
3.	varus 4	post.5	10	0	16	16	24		full
4.	0	ant.5	10	0	9	12	31	In [¶]	full
5.	varus 4	post.5	15	+7	10	12	32		full
6.	varus 5	post.4	12	0	10	10	24		full
7.	varus 5	ant.5	10	-3	24	24	48	In [¶]	full
8.	varus 3	ant.5	15	+9	8	9	24		full
9.	varus 3	post.3	12	0	8	10	36	In [¶]	full
10.	varus 5	post.5	13	+9	9	10	24		full
11.	0	ant.5	11	0	7	9	28		full
12.	varus 5	post.5	10	0	10	11	21		full
13.	varus 3	ant.4	13	+10	8	9	30		full
14.	varus 5	ant.5	10	0	12	13	28		full
15.	varus 5	post.5	15	0	18	18	35	In [¶]	full
			11.87	2.13	10.93	12.13	29.40		

POD* : post-operation day / E-F : external fixater / H.D : hospital day / Cx. : complication
/ R.F : refracture / In[¶]:Infection / + : lengthening / - : shortening

15mm 11.7mm
-3mm +5mm 가 가 7,8)
2.1mm
9 24 12.1 가

2), CPM(continuous passive motion)
 2,11), 22)
 , 가
 , 가
 6,10,15) . 15 1 .
 , 가 2 - 3
 3,4,14,18)
 , ,
 16) . 5-11 , 2
 , ,
 20)
 가 1).
 1), 17), 15 2.1mm
 1,12,19,21), . Aronson
 Tursky 1) , 1 14
 18 38% 2 - 10mm (5.8mm)
 , 가 ,
 12 33.3% -3 - +5mm (, , ,
 2.1mm) . Aronson
 Tursky 1) ,
 .
 (2.1mm)가
 Aronson Tursky 1) (5.8mm)
 .
 . Skaggs 17) 66 12%
 15
 1 (6.6%)
 .
 0 - 72%
 1,12,19,21)
 4 (26.6%)
 .
 Evanoff⁵⁾
 15 .

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Abstract

Treatment of Femoral Shaft Fracture with External Fixator in Children

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Purpose: Children with femoral shaft fractures in association with other injuries such as head injuries, abdominal injuries, open fractures, multiple fractures, or unstable displaced fractures require operative treatment rather than being treated in conservative methods. In this study, we compare the surgical result of femoral shaft fracture using external fixator in children, and evaluate the complications and the related factors as well as the advantage over the other management described in the literature.

Materials and Methods : We reviewed 15 cases of femoral shaft fractures in children admitted between May, 1995 and May, 2000. The mean age was 8 years and 2months old (range: 6-12 year-old, 9 boys, 6 girls). All the evaluations were based on the postoperative radiologic studying and clinical findings. In the radiologic evaluations, bony union time, angular deformity, and leg length discrepancy in both sagittal and coronal plane were evaluated, and in the clinical evaluations, we analyzed the duration of external fixation, hospital day, range of motion in both hip and knee joint, and post-operative complications.

Results : The average bony union time based on the radiologic studying was 10.9 weeks (ranging from 7 to 24 weeks). Angular deformity at the fracture site was less than 5 degrees and no rotational deformity was found in all 15 cases. The average length of overriding fracture fragment was 11.7 mm (ranging from 10 to 15 mm) and average leg length discrepancy was 2.1 mm (ranging from -3 to +10mm). Duration of external fixation averaged 12.1 weeks (ranging from 9 to 24 weeks) and average hospital day was 29.4 day (ranging from 21 to 48 day). None of the patient had limitation in hip or knee joint movement. There were 1 case of refracture (case of pathologic fracture) and 4 cases of pin tract infection(superficial infection).

Conclusion : At our institution, we observed average overgrowth of 2.1 mm and no severe complications excepts in 1 case of refracture due to pathologic fracture. Thus we concluded that closed reduction and external fixation is effective in treating open, or unstable displaced fracture of femoral shaft with other associated injuries in pediatric population, and it is also believed to be effective means in treating closed femoral fractures.

Key words : Femoral Shaft fracture in children, External fixator.