



13, 3, 2000 7

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2

- Ender -

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&lt; &gt;

: 가 2 Ender

2 가

: 1992 4 1996 4 2  
16: . 1 6 2  
10°, 100°  
: 1 8 Ender 2

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: , 2 , Ender

가 가 가<sup>2,3)</sup>.

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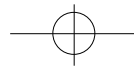
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가 8,12). (Table 1).

16 14 가 , 2 가 1

2 1

Ender 29 51 39 .

2 2 4 6 3

3 8 . 11 가 ,

. 5 가 .

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2 , 2 ,

1 . A-O

. 가 C

C1 2 , C2 11 , C3 3 (Fig. 1).

Gustilo-Anderson 가 IIIA

2 , IIIB 12 , IIIC 2 .

1. 3.

1992 4 1996 4

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Ender 1

2

15 16

1. A-O C 가 IIIB

IIIC (Fig. 2).

2. A-O C 가 IIIA

**Table 1.** Patients data

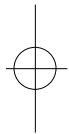
	Sex/Age	Mechanism of injury	A-O type	Open grade	Associated injuries	Follow up
1	M/24	motor cycle	C3	IIIB	MF <sup>*</sup> , spine Fx.	3Y 5Mo
2	F/25	motor cycle	C1	IIIB	MF	4Y 7Mo
3	M/31	motor vehicle	C2	IIIB	MF	3Y 2Mo
4	M/31	motor vehicle	C2	IIIB	MF	3Y 2Mo
5	F/35	motor cycle	C2	IIIA	MF, head injury	5Y 9Mo
6	M/37	motor vehicle	C3	IIIB	MF	2Y 11Mo
7	M/38	motor vehicle	C2	IIIB	MF	4Y 1Mo
8	M/41	motor cycle	C2	IIIB	MF	6Y 3Mo
9	M/41	motor vehicle	C3	IIIC	MF, femoral A. rupture	3Y 3Mo
10	M/43	motor vehicle	C2	IIIB	MF	3Y
11	M/45	motor vehicle	C2	IIIB	MF	4Y 9Mo
12	M/45	motor cycle	C2	IIIC	MF, femoral A. rupture	2Y 4Mo
13	M/46	motor vehicle	C2	IIIB	MF	3Y 3Mo
14	M/47	motor vehicle	C2	IIIB	MF	4Y 5Mo
15	M/49	motor vehicle	C2	IIIB	MF	2Y 8Mo
16	M/51	motor vehicle	C1	IIIA	MF, head injury	2Y 6Mo

\* MF : multiple fractures



**Fig 1A.** AO classification of supracondylar femur fracture.

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(Fig. 3).  
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dynamic  
condylar screw 14 , condylar blade plate 2 (Fig. 4).



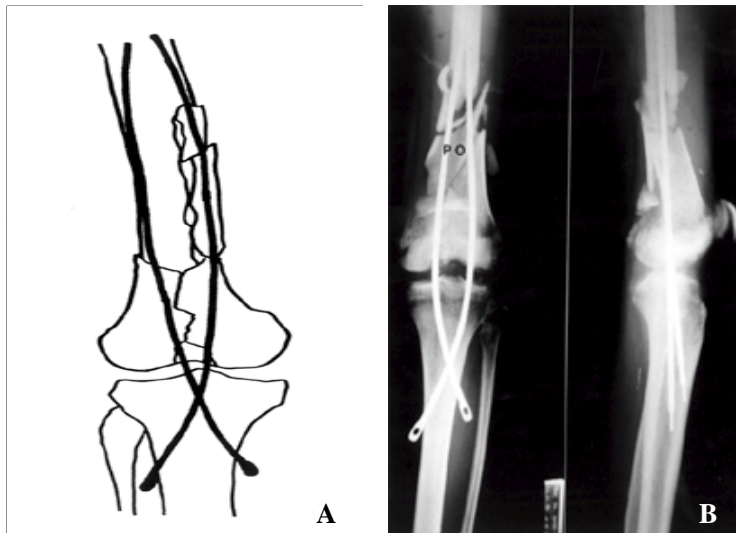
12 16 1  
1 6 2  
14 dynamic condylar screw , 2  
condylar blade plate . 16  
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4.  
1 Ender 가 C-arm 2 3



**Fig 2A.** Initial photograph of Type III C open fracture with femoral artery rupture.

**2B.** Initial radiography of AO classification type C2 comminuted fracture.



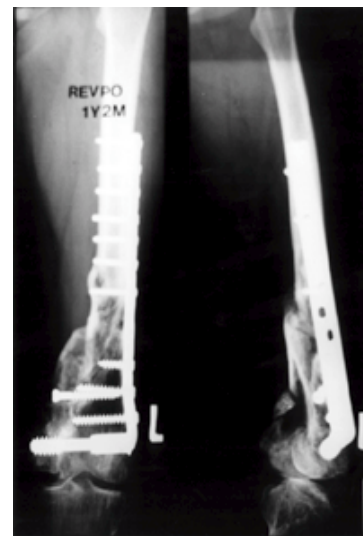


**Fig 3A.** Schematic drawing of the first stage operation method which represent two transarticular Ender nails from proximal tibia to proximal femur.

**3B.** Radiologic finding of the first stage operation which is temporary fixation with only two Ender nails.



**Fig 4.** Temporary Ender nail fixation is conversed to rigid internal fixation with dynamic condylar screw and autogenous bone graft is performed.



**Fig 5.** Solid bone union is achieved which allow full weight bearing at post operation 13 months.

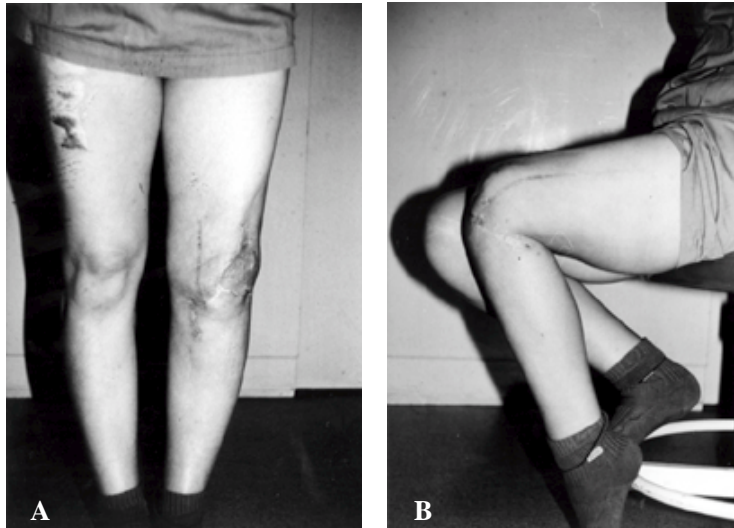
가 12 8 6 5 10 ° 100 ° 가 Hospital for Special

(Fig. 5).

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Brisment

(Fig. 6).



**Fig 6A.** Front view of the patient which represent full extension of knee and same leg length

**6B.** Side view of the patient which represent 115° flexion of knee.

**Table 2.** Results

	Sex/Age	2nd operation time (week)	Fixation devices	Union time (months)	Supplementary operation	ROM(°)	HSS score
1	M/24	6	DCS *	7	AA ‡	5 -110	78
2	F/25	6	DCS	6	-	0 -115	80
3	M/31	6	DCS	7	-	7 -100	76
4	M/31	6	DCS	7	-	5 - 90	76
5	F/35	4	CBP †	6	-	10 - 90	70
6	M/37	6	DCS	7	-	5 -130	80
7	M/38	6	DCS	10	QP §	15 -115	65
8	M/41	6	CBP	8	AA	10 -100	72
9	M/41	7	DCS	11	-	25 - 85	53
10	M/43	6	DCS	8	-	5 -120	78
11	M/45	6	DCS	9	-	10 - 90	78
12	M/45	7	DCS	12	-	20 - 90	58
13	M/46	6	DCS	8	AA	5 -100	78
14	M/47	6	DCS	6	-	10 - 90	76
15	M/49	6	DCS	7	-	12 -100	68
16	M/51	6	DCS	9	QP	15 - 90	65
average		6		8		10 -100	72

\*DCS : dynamic condylar screw

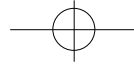
† CBP : condylar blade plate

‡ AA : arthroscopic adhesiolysis

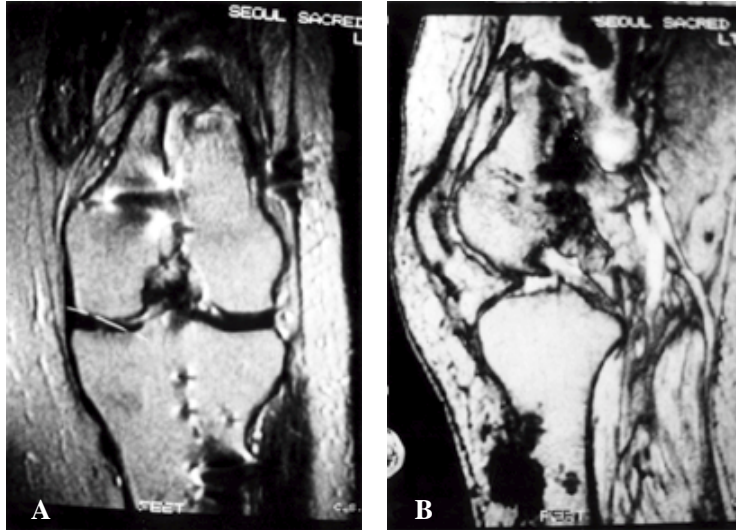
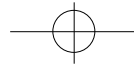
§QP : quadriceps plasty

**Table 3.** Results according to grade of open fracture

type	ROM(avr. °)	Knee score
IIIA	12.5 - 90	67.5
IIIB	7.4 -105	75.4
IIIC	22.5 - 87.5	55.5



Surgery 가 1,9,10,11,12).  
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(Table 2).  
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Gustilo-Anderson III B 가  
1 가  
Ender 184 Browner  
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**Fig 7A.** Coronal MRI finding of the patient after hard ware removal. It shows intact cruciate ligament.

**7B.** Sagittal MRI finding of the same patient. It shows intact cruciate ligament.

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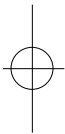
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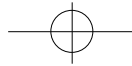
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## Abstract

## Two stage Operative Treatment of Supracondylar Open Comminuted Fracture of Femur -Temporary fixation with Transarticular Ender nails-

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**Purpose :** In many cases of open comminuted supracondylar fracture, it is very hard to apply traditional methods. So we have used Ender nails for temporary transarticular fixation. We thought that it could provide enough stability to control the wound and didn't promote further soft tissue damage or infection. We performed 2nd stage rigid fixation and bone graft after soft tissue healing. We have studied to prove this staged operation valuable to treat the very severe open comminuted supracondylar fracture of femur.

**Materials and methods :** We analysed 16 cases which have been treated with such staged operation method from April 1992 to April 1996 about complication, union time and functional result in retrospective method.

**Results :** We could prevent severe wound infection in all cases. We performed 2nd stage rigid fixation and bone graft average 6 weeks after first stage temporary fixation. The average union time was 8 months and average range of motion was 10° flexion contracture and 100° further flexion.

**Conclusion :** In patients with very severe open comminuted supracondylar fracture of femur, the temporary fixation with transarticular Ender nails allowed the successful initial management for the secondary rigid fixation and bone graft and time could be saved for management of concomitant injuries. So this new staged operation is considered as a good method for safety, union time and functional result.

**Key words :** fracture, supracondylar fracture, staged operation, transarticular, Ender nail

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