



13, 1, 2000 1

The Journal of the Korean Society of Fractures  
Vol.13, No.1, January, 2000

.

&lt; &gt;

:

가

: 1995 3 1998 11  
가 가 48, 49

67

27

, 27 ,

21, 22 .

가

:

1

14.4 ,

14.2 ,

가

가

가

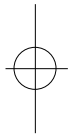
85%,

90% .

:

가

: , ,



,

,

가

가 가

,

1-4).

(Interlocking

compression nail, ICN)

,

가

,

,

1-3).

가

가

:

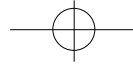
1 280-1 (139-231)

Tel : (02) 970-8257, 8036, 8260

Fax : (02) 972-0068

E-mail : bsw2402@eulji.or.kr





가 (Fig.1).

, 가 40.4 ,

, 가 36.5 .

가 21 , 4 , 1 , 1

가 , 21 14 가

, 4 , , ,

1 .

, -

, 3 , 1/3 가 16 , 4 ,

1/3 가 3 ,

1/3 1 , - 2 , 1/3 11 ,

- 5 , 1/3 3 (Table 1).

1995 3 1998 11

67 , 69

가가 48 , 49

.67 16

, 2

, 76

1

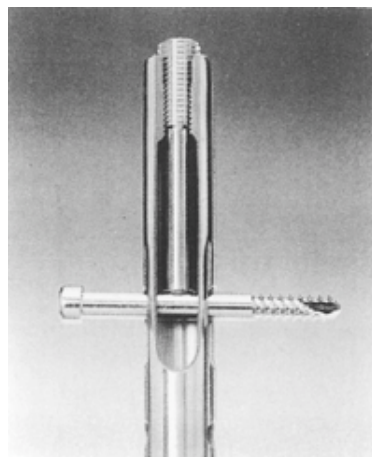
49 27 , 27

, 21 , 22 .

27 가 21 , 가 6

21 16 ,

5 .



**Fig 1.** Proximal part of the interlocking compression nail demonstrating internal compression device with the permission of Osteo company

가

가 36.5 .

27

가 21 , 4 , 1 , 1

, 21 14 가

, 4 , , ,

1 .

, -

, 3 , 1/3 가 16 , 4 ,

1/3 가 3 ,

1/3 1 , - 2 , 1/3 11 ,

- 5 , 1/3 3 (Table 1).

5 ,

3 , 5 , 13 ,

1 , 1 Melis <sup>9)</sup>

3 . 13 Winquist-Hansen

<sup>11)</sup> 2 2 , 3 9 , 4 2 3 가

. 2 ,

2 , 4 , 13 ,

1 , 1 Melis <sup>9)</sup>

4 , 13 Winquist-Hansen

<sup>11)</sup> 1 2 , 2 4 , 3 6 , 4 1

3 가 (Table 2).

27 5 가

, Gustillo I 4 , II 1 .

22 3 가 ,

Gustillo I .

50% , 50% 100%

, 100%

, 15 ,

**Table 1.** Level of fractures

	ICN	Ordinary nail
Proximal one-third	0	1
Proximal-middle	3	2
Middle one-third	16	11
Middle-distal	4	5
Distal one-third	3	3
Total	*26	22

\*ICN Melis 3 1 .



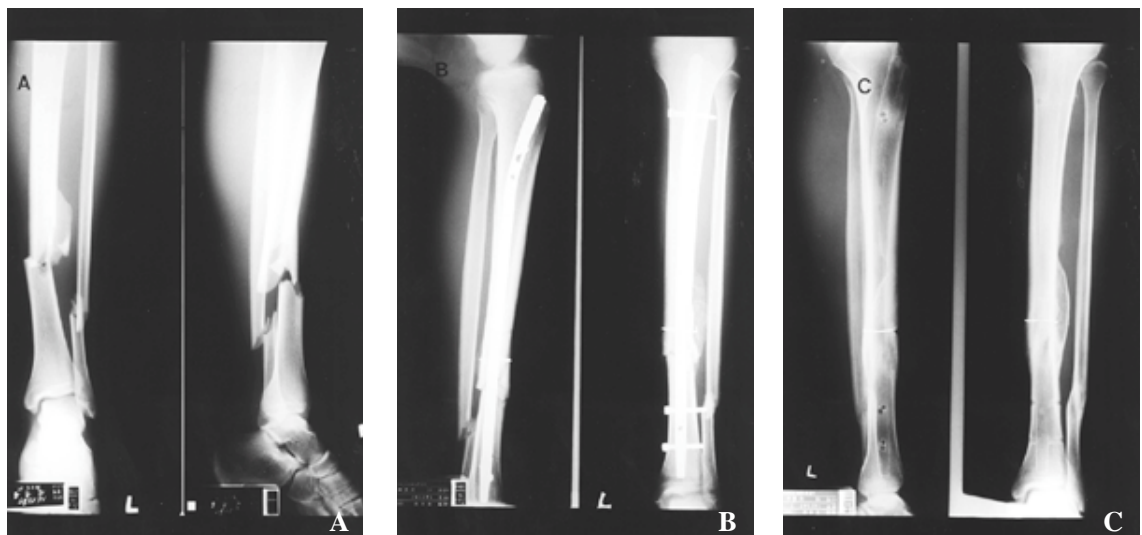
76 •

/ 13 1

**Table 2.** Pattern of fractures

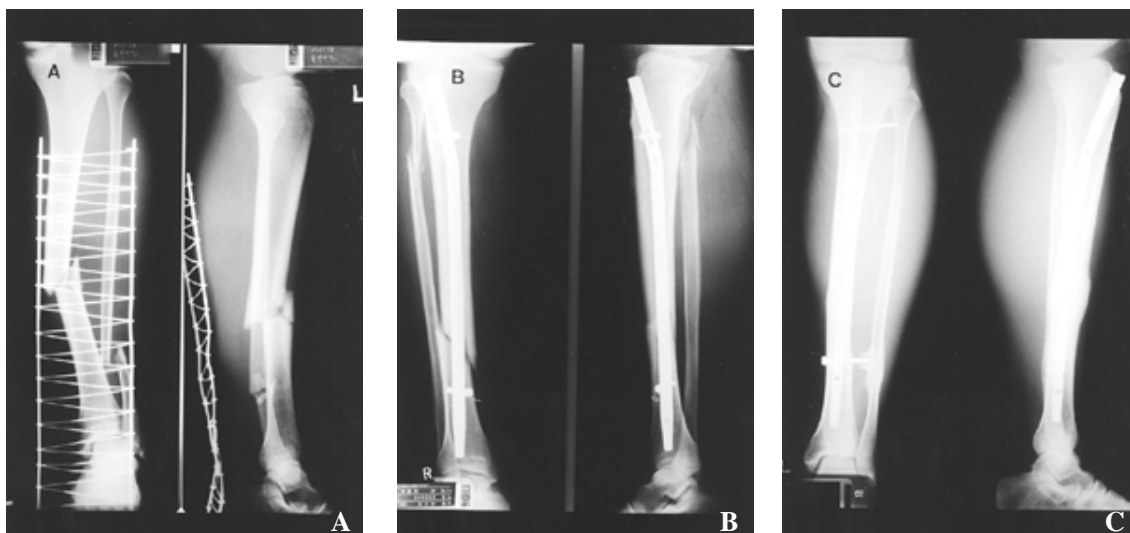
	ICN	Ordinary nail
Transverse	5	2
Oblique	3	2
Spiral	5	4
Comminuted		
grade 1	0	2
grade 2	2	4
grade 3	9	6
grade 4	2	1
Segmental	1	1
Total	27	22

1  
Osteo ( , Osteo IC-  
Nail) , ACE 12  
, Howmedica 6 , AO 4  
27 가 13  
(compression locking)(Fig.2)  
(dynamic-oscillating compression)(Fig.3) ,  
14 (static locking)  
가 3/4  
가 Klemm Borner<sup>8)</sup> 가  
(Table 4)  
chi-square  
3 ,  
1 , 1 , 가  
, 4 , 3  
, 3 ,  
2 , , 8 14 가 12 , 14  
가 2 , 2 , 가 2 . 8

**Fig 2-A.** Middle-distal fracture with grade 3 comminution and moderate displacement.

**B.** Interlocking compression nail with compression locking. Large fragment was fixed with circumferential wire and bone graft was added. Postoperative 15th week.

**C.** At postoperative 15th month, nail was removed.



**Fig 3-A.** Middle one-third fracture with grade 2 comminution and mild displacement.

**B.** Interlocking compression nail with dynamic-oscillating compression.

**C.** At postoperative 1 year, solid bone union was seen.

**Table 4.** Functional results by Klemm and Borner

Excellent	Full knee and ankle motion No muscle atrophy Normal radiographic alignment
Good	Slight loss of knee or ankle motion Less than 2-cm of muscle atrophy Angular deformity less than 5 degrees
Fair	Moderate loss of knee or ankle motion More than 2-cm muscle atrophy Angular deformity 5-10 degrees
Poor	Marked loss of knee or ankle motion Marked muscle atrophy Angular deformity more than 10 degrees



78 • / 13 1

14.7 (Table 5). 22 16 , 4  
가 (p>0.005). , 1 , 1 , 1 1/3  
, 10  
(Table 7).  
가 15 12.3  
10 17.0 가 ,  
2 17.2 가 85%,  
가 90%  
(p>0.005).  
13 12.8 , 1 , 3  
8 15.3 가  
1 24  
(Table 6). 4-6  
Klemm Borner 가  
27 16 , 27 3  
7 , 3 , 1 , 1 . 1  
6  
, 3 1  
, 5 . 22  
1 10 , 1

**Table 5.** Radiographic union according to fracture patterns

	ICN	Ordinary nail
Transverse, Oblique, Spiral	13.2	13.4
Comminuted, Segmental	15.5	14.7
Average	14.4	14.2

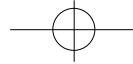
**Table 6.** Radiographic union according to initial displacement

	ICN	Ordinary nail
Mild	12.3	12.8
Moderate	17.0	15.3
Severe	17.2	24.0
Average	14.4	14.2

**Table 7.** Functional results by Klemm and Borner

	ICN	Ordinary nail
Excellent	16	16
Good	7	4
Fair	3	1
Poor	1	1
Total	27	22

가  
1960 ,  
가 6,7),  
. Gonschorek<sup>4)</sup> ,  
가  
(Osteo IC-Nail)  
Osteo ,  
402 가  
(locking method) 3가  
(compression  
locking) ,  
(compression screw)  
가 .



(dynamic-oscillating compression)

1995 3 1998 11

27

22

14.4 ,

14.2 ,

1

가

가

가

가

가

85%,

90%

가

가

가

가

가

## REFERENCES

(telescoping)

가

가

가

가

가

,

가

1

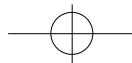
가

. Gonschorek<sup>4)</sup>

, 5mm

2%

- 1) **Blachut PA, O'Brien PJ, Meek RN and Broekhuyse HM** : Interlocking intramedullary nailing with and without reaming for the treatment of closed fractures of the tibial shaft. *J Bone Joint Surg*,79-A:640-646,1997.
- 2) **Bostman O, Vainionpaa S and Saikku K** : Infra-isthmal longitudinal fractures of the tibial diaphysis : Results of treatment using closed intramedullary compression nailing. *J Trauma*,24:964-969,1984.
- 3) **Choi WS, Shin HD, Kim HJ, Lee KW, Park TW** : Management of tibia fracture by closed intramedullary nailing. *J Korean Orthop Surg*, 29:1255-1262,1994.
- 4) **Gonschorek O, Hofmann GO, Buhren V** : Interlocking compression nailing: A report on 402 applications. *Arch Orthop Trauma Surg*,117:430-437,1998.
- 5) **Ha SH, You JW, Lee BH** : Treatment of fracture of distal tibial with the intramedullary nailing. *J Korean Orthop Surg*, 29:711-719,1994.
- 6) **Huckstep RL** : The Huckstep intramedullary compression nail. *Clin Orthop* 212:48-61,1986.
- 7) **Hutter CG, Oden R and Kirk R** : The intramedullary compression rod. *Clin Orthop*, 122:165-173,1977.
- 8) **Klemm KW and Borner M** : Interlocking nailing of



complex fractures of the femur and tibia. Clin Orthop, 212:89-100,1986.

9) **Melis GC, Sotgiu F, Lepori M and Guido P** : Intramedullary nailing in segmental tibial fractures. J Bone Joint Surg,63-A:1310-1318,1981.

10) **Song HR, Cho SH, Koo KH, Park HB, Jung YC, Hwang SC et al** : Treatment of tibial fractures with

the Ilizarov method. J Korean Orthop Surg, 29:655-661,1994.

11) **Winqvist RA, Hansen ST and Clawson DK** : Closed intramedullary nailing of femoral fractures. A report of five hundred and twenty cases. J Bone Joint Surg,66-A:529-539,1984.

#### Abstract

## Interlocking Compression Nails for the Treatment of Acute Tibial Shaft Fractures

**Sang-Wook Bae, M.D. and Ho-Yoon Kwak, M.D.**

*Department of Orthopedic Surgery, Nowon Eulji Hospital, Eulji University School of medicine*

**Purpose** : To evaluate the differences between interlocking compression nail and ordinary compression nail in the treatment of acute tibial shaft fractures

**Material and Methods** : From March, 1995 to November, 1998, 67 patients were treated with intramedullary nail for the acute tibial shaft fractures. Among them, 27 cases treated with interlocking compression nails and 22 cases, with ordinary interlocking nails were analyzed in terms of average union time, complications and functional results.

**Results** : One tibial shaft treated with interlocking compression nail failed to unite. Average union time was 14.4 weeks in the group treated with interlocking compression nails, 14.2 weeks, with ordinary interlocking nails. Functional results were graded as excellent and good in 85% in the group treated with interlocking compression nails, 90%, with ordinary compression nails.

**Conclusion** : There was no difference in the treatment results between the groups treated with interlocking compression nails and ordinary interlocking nails.

**Key Words** : Tibia, Acute fracture, Interlocking compression nail

