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## Pilon

= Abstract =

### Limited Internal Fixation for the Treatment of the Pilon Fracture

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The intraarticular fractures of the distal tibia-so called pilon fracture or plafond fracture- were caused by high energy and axial compression forces arising from motor vehicle accidents or falls from a height, and it is frequently associated with severe comminution and soft tissue injury. Especially soft tissue injury has been considered as a difficult problems to treat these fractures and there has been many controversies in the methods of treatment.

We analyzed 30 cases of pilon fracture who were treated by limited internal fixation from March 1992 to March 1997. The average follow up period was 26 months(from 15 to 50 months).

The results as follow:

1. According to Ruedi and Allgower classification, Type I were 4(13%), Type II were 14(46%) and Type III were 12(40%) cases.
2. By using Ovadia and Beals ' radiologic assessment, limited internal fixation showed good and fair results in about 80 % of cases.
3. By using Mast and Teipner 's clinical functional assessment, limited internal fixation showed good and fair results in about 80% of cases.
4. Complications after operation were traumatic arthritis(17%) and nonunion(3.3%). But there were no complications such as wound infection and skin necrosis.

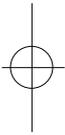
Limited internal fixation with casting provides good result to treat pilon fractures and it

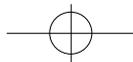
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reduces the complications of soft tissues problem.

Key Words : Tibia, Pilon fracture, Limited internal fixation.

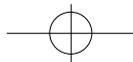
(plafond) . pilon 1992 3 1997 3 pilon 1 . 30 . 가가 30 30 . 가 18 , 가 12 , 36 (16 - 62 ) . 14 (45%), 11 (35%), 5 . Ruedi-Allgower , 30 . Ruedi I 4 , II 14 , III 12 (Table 1). Allgower<sup>22)</sup> , 8 .

Table 1. Classification (by Ruedi & Allgower)

Fracture type	Case
Type I	4
Type II	14
Type III	12
Total	30

Table 2. Classification of reduction of the fracture (by Ovdia and Beals, 1986)

	Good	Fair	Poor
Malleous			
Lateral	Anatomical or 1.0mm displacement	2.0-5.0mm displacement	>5.0mm displacement
Medial	2.0mm displacement	2.0-5.0mm displacement	>5.0mm displacement
Posterior	Proximal displacement	Proximal displacement	Proximal displacement
Mortise widening	0.5mm	0.5-2.0mm	>2.0mm
Talus			
Tilt	0.5mm	0.5-1.0mm	>1.0mm
Displacement	0.5mm	0.5-2.0mm	>2.0mm



**Table 3.** Functional Criteria (by Mast and Teipner, 1980)

Good	No pain No swelling No loss of motion compared to opposite
Fair	Occasional mild pain, not requiring medication Occasional swelling Combined loss of motion <15 ° in extension and flexion
Poor	Pain requiring medication Swelling Loss of motion >15 °

1. 가  
I (4 )  
II 14 8 , III 12 3  
, II 4 , III 5  
II 2 , III 4  
(Table 4).  
2. 가

**Table 4.** Radiologic assessment (Ovadia & Beals, 1986)

Type	Reduction of Fracture		
	Good	Fair	Poor
I(4)	4		
II(14)	8	4	2
III(12)	3	5	4
Total(30)	15	9	6

III 12 7  
(ligamentotaxis)

I (4 )  
II 14 7 , III 12 3  
, II 5 , III 5  
II 2 , III 4  
(Table 5).

I II 2 ,  
III 4

3.

**Table 5.** Clinical functional assessment (Mast & Teiner, 1980)

Type	Good	Fair	Poor
I(4)	4		
II(14)	7	5	2
III(12)	3	5	4
Total(30)	14	10	6

(poor) (Table 2). 가  
Mast Teipner<sup>17)</sup> 가

30 6

(good), (fair), (poor)  
(Table 3).

II 2 , III 3 , III  
1 가 가  
(Table 6).

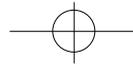


Table 6. Complications

Type	wound infection	skin necrosis	traumatic arthritis	Non union
I(4)	-	-	-	-
II(14)	-	-	2	-
III(12)	-	-	3	1
Total(30)	0	0	5	1

1  
21  
Type II pilon  
가  
(Fig 1-A,B,C).

2  
30  
Type III pilon  
8

15  
가  
(Fig. 2-A,B,C).

1911 Destot<sup>11)</sup> pilon  
Bonin plafond  
Mears<sup>12)</sup> “ 4  
”  
Allgower<sup>22)</sup> Ruedi 5%  
, Ovadia<sup>20)</sup> 7.2%  
, Bone<sup>8)</sup> 1%  
pilon  
1950 Ferguson  
Ruedi  
Mast<sup>16)</sup> 가

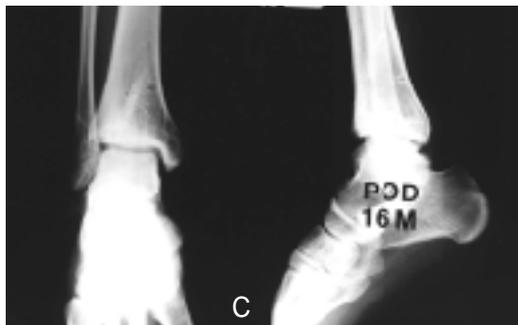


Fig 1. Twenty one year old male who sustained a slip down injury  
A. Preoperative radiography shows Ruedi-Allgower type II pilon fracture  
B. Limited internal fixation with casting was done  
C. Post op 16 months radiography



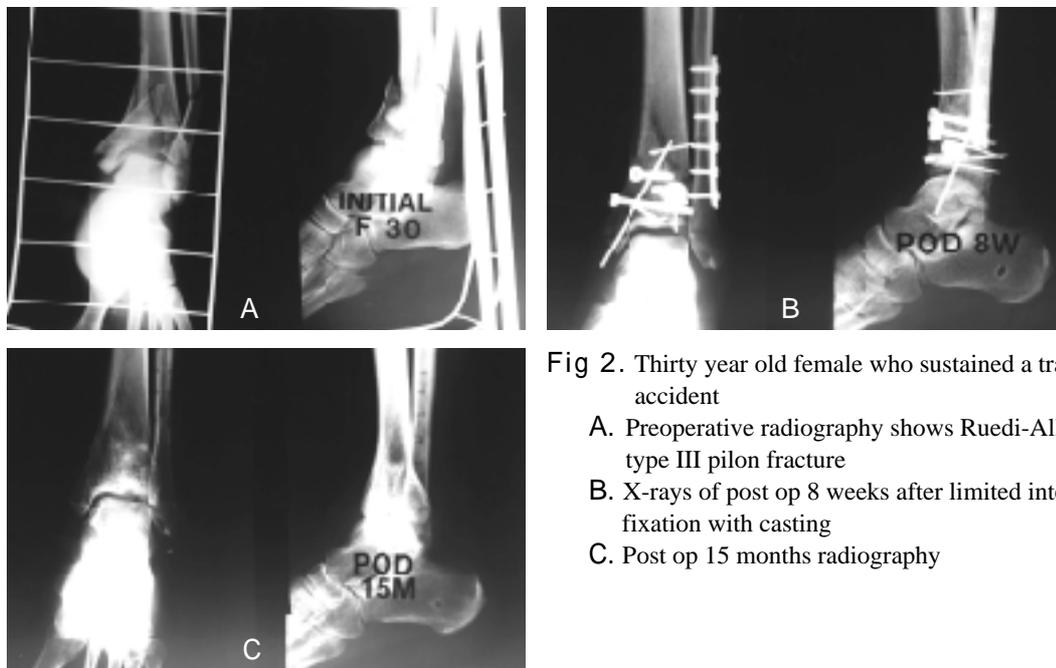
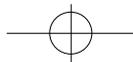
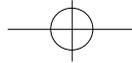


Fig 2. Thirty year old female who sustained a traffic accident  
 A. Preoperative radiography shows Ruedi-Allgower type III pilon fracture  
 B. X-rays of post op 8 weeks after limited internal fixation with casting  
 C. Post op 15 months radiography

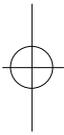


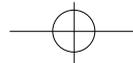
가  
 II 가 III  
 (minimal) 가  
 Ruedi-Allgower  
 AO/ASIF CCF  
 (Comprehensive classification of fracture)  
 1,2,3,4,5) 가  
 pilon ,  
 가 CT  
 (commi-  
 nution), (impaction), ,  
 21).  
 Ruedi -Allgower II III  
 CT 19).  
 pilon  
 pilon Burwell-Charnley<sup>10)</sup>,  
 Ovadia-Beals<sup>20)</sup>, Lauge-Hansen<sup>15)</sup> 가  
 3가 Ruedi -Allgower<sup>22)</sup>  
 , I





가  
가 4,5,6,7,8,24)  
AO/ASIF 5 2  
가 “ 1) , 2) , III 12 3 (25%), 5  
, 3) (42%), 4 (33%) III  
, 4) , 5) 3 , 1 ,  
”  
. Ruedi-Allgower<sup>22)</sup> 75 pilon  
pilon - : 3 , I :  
25%, II : 28%, III : 47% - 가 ,  
74%  
Heim<sup>13)</sup> 128 . Helfet<sup>14)</sup> pilon 34  
90%  
Ruedi-Allgower III (AO Type C3) 가 (viability)  
가  
가  
. Teeny Wiss<sup>24)</sup> 60  
pilon 2 5 50%  
III 37%,  
I , II 10%, III pilon  
26% . Bourne  
9) 42 pilon 4 4  
I (11 ) II (12 )  
80% III  
(19 ) 6 (32%)  
6 (32%) 1992 3 1997 3 5 ,  
1 가  
pilon 30  
가  
1. Ruedi-Allgower  
, Type I 4 (13%), Type II 14 (46%), Type III  
12 (40%)  
2. 가  
Rush III 12 7  
, Rush  
가 , ,

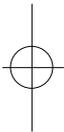


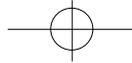


3. Ovadia Beals  
 Type I 4, Type II  
 14 12, Type III 3 (25%),  
 5 (42%), 4 (33%).  
 4. Mast Teipner 7  
 Type I 4, Type II 7, 5  
 , 2, Type III 3 (25%), 5  
 (42%), 4 (33%).  
 5.  
 , Type II 2, Type III  
 3 Type III 1.

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