

3 4







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가

<	>
:	3, 4
:	Neer 3, 4
12	21
	UCLA shoulder rating scale
	가
:	Neer 3, 4
(subtype)	2
UCLA	가 9 8 (89%), 10 4 (40%)
:	
가	가
	가가
:	
:	

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Table 2. Reclassification on simple radiographs

Angulation pattern	Valgus type	Varus type
Facing of humeral head		
	Post-sup facing	Ant-inf facing
Dominant tuberosity		
	Post-sup facing	Ant-inf facing
Dominant tuberosity		
	Great tuberosity dominant	Lesser tuberosity dominant

가 8,11,18),
 가 2,6),
 가
 Neer
 CT
 (interobserver reliability)
 (intraobserver reproducibility)
 22)
 (facing)
 ,
 , 4
 (1cm)
 1995 3 2000 6 3 가 , 4
 4 12
 가 가 21 (1cm)
 ,
 (valgus posterosuperior facing type)
 (varus anteroinferior facing type)
 3 4 (Table 1, 2).

Table 1. Reclassification of 3 & 4 part fracture of proximal humerus

Valgus post-sup facing fracture	case
Valgus post-sup facing GT * dominant 3 part fracture	(Valgus 3P) 8
Valgus post-sup facing GT dominant LT † displaced 4 part fracture	(Valgus 4P D) 2
Valgus post-sup facing GT dominant LT undisplaced 4 part fracture	(Valgus 4P UD) 0
Varus ant-inf facing fracture	
Varus ant-inf facing LT dominant 3 part fracture	(Varus 3P) 6
Varus ant-inf facing LT dominant GT displaced 4 part fracture	(Varus 4P D) 3
Varus ant-inf facing LT dominant GT undisplaced 4 part fracture	(Varus 4P UD) 2

* Greater tuberosity † Lesser tuberosity

가 가 UCLA
shoulder rating scale1)(Table 3)
가 2 .

Table 3. UCLA shoulder rating scale

	score
Pain	10
Function	10
Active forward flexion	5
Strength of forward flexion	5
Satisfaction of the patient	5

excellent : 34-35points, good : 28-33points
fair : 21-27 points, poor : 0-20points

1.
21 가 13 , 가 8 ,
61.5 (32-94) , 2 8
9 , 8 ,
4 . 4 ,
5 , 4 .

2.

5,18,19)

,
가 ,

3

(valgus posterosuperior
facing type ; great tuberosity dominant), (Fig 1)
(varus anteroinferior facing type ; lesser tuberosity
dominant), (Fig 2, 3)
Neer

. 21
10 (47%), 11 (53%) ,

(posterosuperior facing) 10 ,

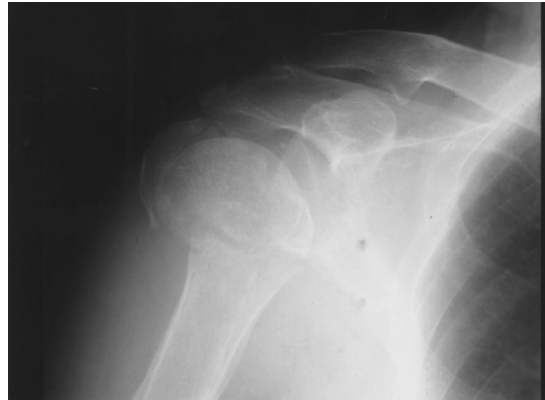


Fig 1 : Valgus posterosuperior facing GT dominant 3 part fracture(Valgus 3P) : Initially classified as Neer's 3 part fracture

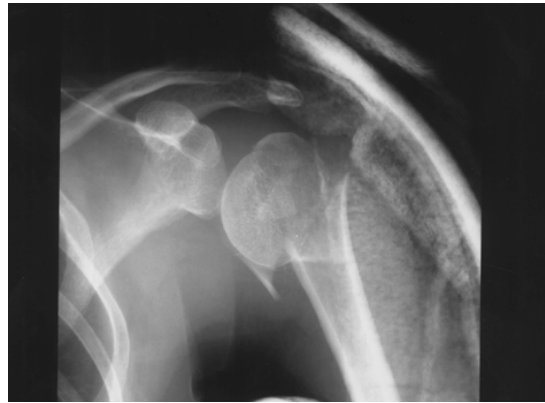


Fig 2 : Varus anteroinferior facing LT dominant 3 part fracture(Varus 3P) : Initially classified as Neer's 3 part fracture

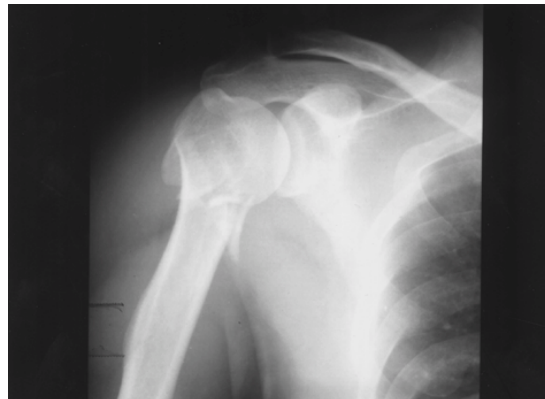


Fig 3 : Varus anteroinferior facing LT dominant GT undisplaced 4 part fracture(Varus 4P UD) : Initially calssified as Neer's 3 part fracture.

(anteroinferior facing) 11

10 , 1

3 ,

가

가

4 ,

18,19) ,

가

(dominant tuberosity) . 가

4

가

가

1 가

가

4 (Varus

Anteroinferior facing LTdominant GTundisplaced 4 part fracture)

3.

10

5 , 4

4 1

11

5 , 5

4 1

2 , 2

1

4. 가 .

가 2

. UCLA 가

9 8 (89%) , 10 4

(40%)

(Table 4), ($p < 0.05$).

Table 4. Comparison of valgus to varus pattern (UCLA scale)

	excel	good	fair	poor	total
valgus 3p [*]	3	4	1	0	8
valgus 4p [†]	0	1	0	0	1
Valgus	3	5	1	0	9
varus 3p	1	2	3	0	6
varus 4p	0	1	1	2	4
Varus	1	3	4	2	10

* 3part † 4part (P < 0.05)

8 (89%)
4 (40%)

Table 5. Comparison of functional results by operative methods

Operation	UCLA	Valgus 3p [†]	Valgus 4p [†]	Varus 3p	Varus 4p	total
TBW * & Screw	Excellent good	5	0	2	1	8
	Fair Poor	0	0	1	1	1
Plating	Excellent good	2	1	0	0	4
	Fair Poor	1	0	3	2	6

* Tension band wiring † 3part ‡ 4part (P<0.05)

5.

$\frac{1}{x^2} = x^{-2}$, $\frac{1}{x^3} = x^{-3}$,

1 가 1 가

$x^{-2} \cdot x^{-3} = x^{-2+(-3)} = x^{-5} = \frac{1}{x^5}$

2 가 2 (- ,
 . 2 -)
 가 ,
 1 .

가
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가
 4,6,12) 가 3 4
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Neer
 16) AO 15)가
 . Neer (firm fixation)
 Codman⁵⁾ ,
 4 , (minimal
 가 stable fixation) 가 2,4,6,13) Darder⁷⁾
 가 K-
 64% ,
 Neer 3 Wanner²³⁾ ,
 2 가 3 2 1/3
 (dual plate stabilization) 69%
 3,20,21) Siebenrock²¹⁾ (dual 1/3 plate)
 Neer 26%, AO 3 1
 38% , Brien³⁾ Neer 65% , T 3 1
 . Sjoden²²⁾ 3D CT 가 .
 가
 88% , 40%
 , 가 Gerber⁹⁾ 가
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 ,
 100%, - 91% . Jakob¹⁰⁾ 4
 , 74%

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 , 571
 UCLA shoulder rating score
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 Neer 3 4
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Abstract

Comparison study between valgus and varus type in Neer 's 3 and 4 part proximal humerus fracture

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Purpose : We reclassified three- and four-part proximal humerus fractures by Neer 's classification into valgus & varus type, and compared the results of these groups.

Materials & methods : 21 cases classified as three- and four-part fracture in Neer 's classification were treated surgically and followed for 12 months. We reclassified the 21cases valgus and varus type fractures, according to angulation of fractures, facing of humeral head, and dominant displaced tuberosity. Functional evaluation was done by UCLA shoulder rating scale.

Results : Neer 's three- and four-part proximal humerus fractures could be reclassified based on angulation, facing of humeral head, and dominant tuberosity displacement. The functional results according to UCLA shoulder rating scale were good or excellent in 8 of 9 cases of valgus type(89%), and at 4 in 10 cases of varus type(40%). The clinical result of the valgus type was better than that of the varus type.

Conclusion : Based on reclassification system of proximal humerus fractures, clinical results and radiographic findings including angulation, facing of head, and dominant tuberosity displacement showed close relationship. Neurovascular complication were more frequent in the varus type. Therefore, careful evaluation including surgical approach and soft tissue status should be considered in the varus type of complex proximal humerus fracture.

Key Words : Proximal humerus, Fracture, Valgus, Varus

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