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The Journal of the Korean Society of Fractures  
Vol.11, No.3, July, 1998

## Compass Elbow Hinge

= Abstract =

### Fracture and Dislocation of the Elbow Treated with Compass Elbow Hinge

Hyung-Bin Park, M.D. and Hae-Ryong Song, M.D.,

*Department of Orthopaedic Surgery, College of Medicine,  
Gyeong-Sang National University, Chinju, Korea.*

Post-traumatic elbow stiffness is a common and disastrous complication after acute elbow injury. Prolonged immobilization universally leads to stiffness. Stable fixation and controlled, gradual increase in range of motion is preferred for the treatment of comminuted intraarticular fracture and acute unstable dislocation of elbow. In comminuted intraarticular fracture of elbow, the Compass Elbow Hinge provides additional stability for fixation devices used to fix intraarticular fractures and simultaneously permits measured and controlled joint mobilization. In instability after reduction of elbow dislocation, the Compass Elbow Hinge helps to protect the soft tissue from undesirable stresses during healing. The purpose of this study is to evaluate the results of the Compass Elbow Hinge in maintaining and restoring mobility in the acutely injured elbow. The authors reviewed 11 consecutive patients who had the Compass Elbow Hinge applied for acute elbow instability. The average duration of application was 7 weeks. Follow-up averaged 18 months, and motion averaged 96 degrees in flexion/extension plane. Concentric stability was restored in all but one case, one case of resubluxation required reconstruction of medial collateral ligament, following which, the elbow was stable. According to the Mayo

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Tel : 0591)750 - 8105 Fax : 0591)761 - 6063



elbow performance index there were 8 excellent, 2 good and 1 fair result. The Compass Elbow Hinge helps to facilitate management of complex osseo-ligamentous injuries of the elbow. It decreases the incidence of sequelae such as stiffness and instability by permitting early mobilization through a kinematically normal range of motion without jeopardizing soft tissue healing.

**Key Words :** Elbow fracture and dislocation, Compass Elbow Hinge

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 Richards Inc, Memphis, U. S. A)  
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 Compass Elbow Hinge

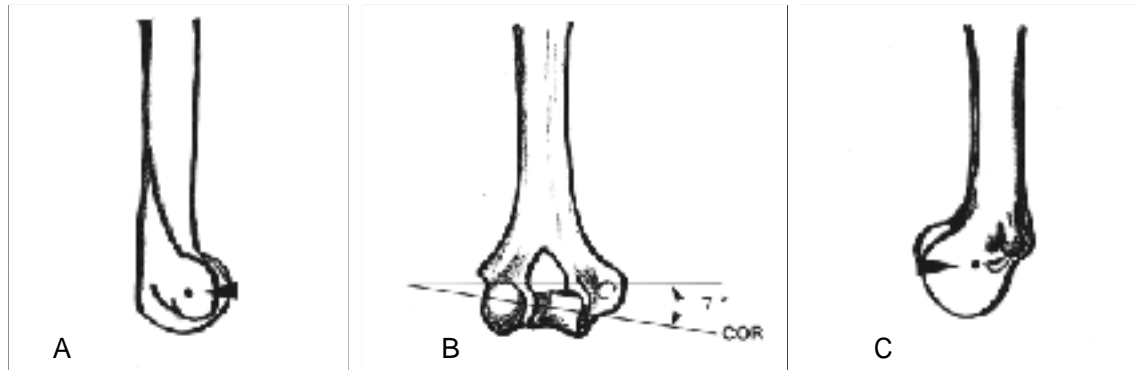
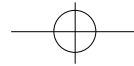


Fig 1. Anatomic location of the axis of elbow motion in the flexion - extension arc.

- A. The lateral landmark is the tubercle at the site of origin of the lateral ligament which represents the geometric center of the capitellum.
- B. The tilt of the axis is approximately 7-degrees of valgus with respect to the long axis of the humerus(COR : center of rotation).
- C. The medial location of the axis emerges at the antero-inferior aspect of the medial epicondyle which represents the center of the trochlea.

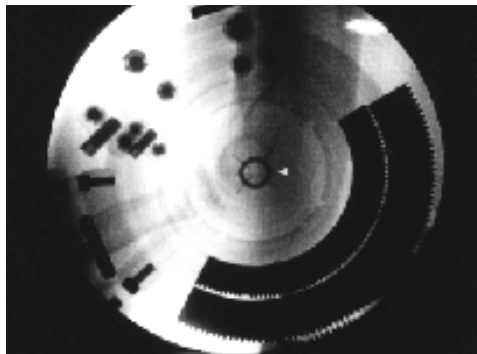


Fig 2. The center of rotation being confirmed under C-arm image intensifier control.

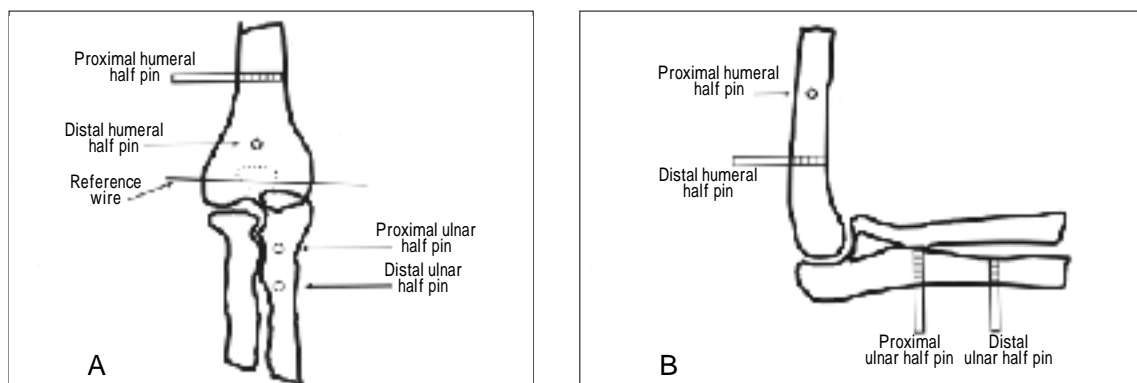


Fig 3. Anteroposterior and lateral diagrams showing the placement of humeral and ulnar half pins.

- A. The proximal humeral half pin must be inserted perpendicular to the axis of humerus.
- B. The distal humeral half pin is placed posteriorly, perpendicular to the axis of the humeral shaft. The two ulnar half pins are also placed posteriorly perpendicular to the long axis of the ulna.

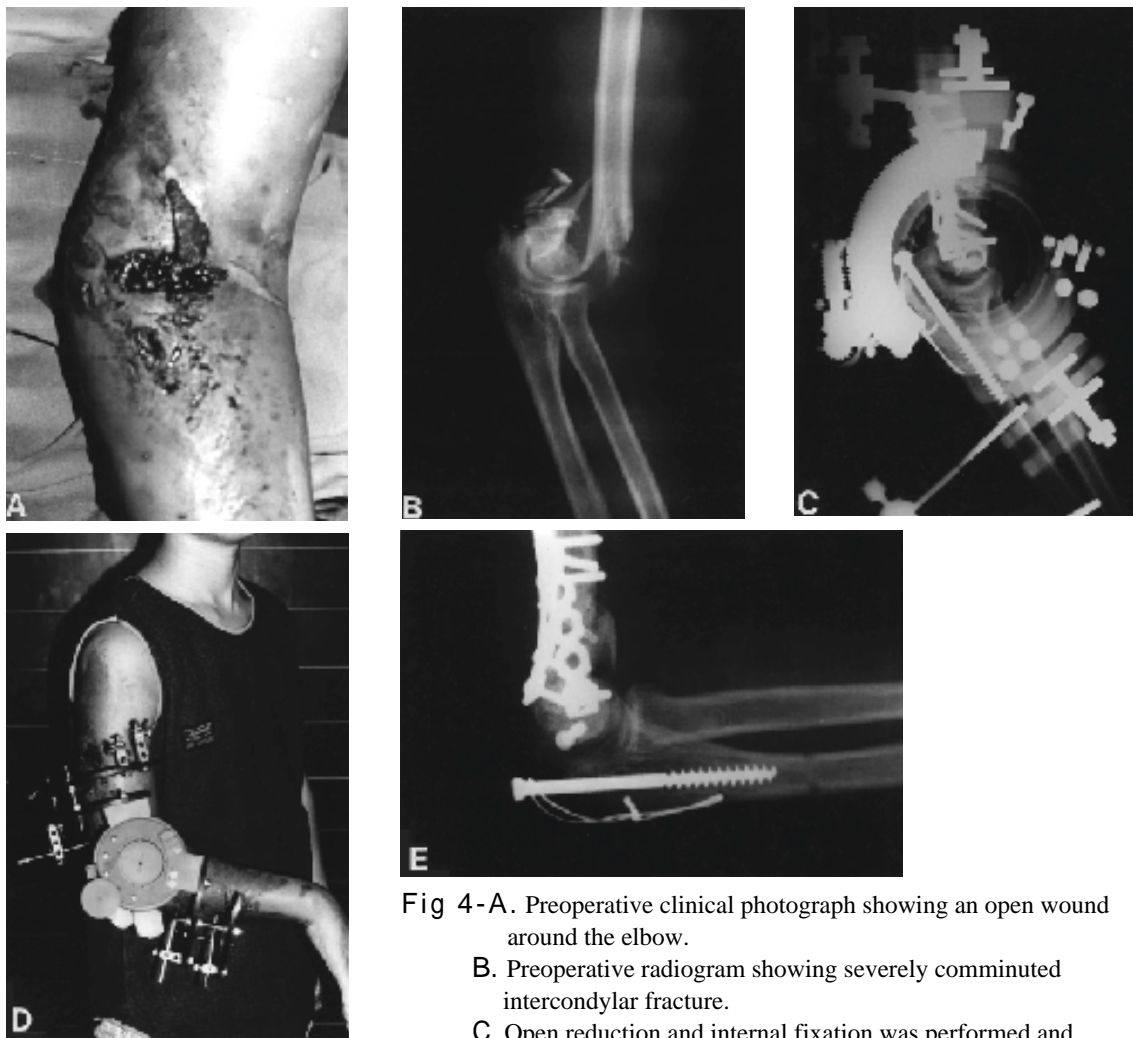
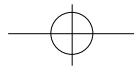


Fig 4-A. Preoperative clinical photograph showing an open wound around the elbow.  
 B. Preoperative radiogram showing severely comminuted intercondylar fracture.  
 C. Open reduction and internal fixation was performed and Compass Elbow Hinge was applied.  
 D. Clinical photograph showing the application of Compass Elbow Hinge.  
 E. Lateral radiogram showing anatomic restoration of the anterior tilt of the distal humerus.

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(Fig 3A-B). Compass Elbow Hinge



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Mayo Elbow Performance Index<sup>19)</sup> 가 . 1 가 가

(Table 1).

Table 1. Mayo Elbow Performance Index

Function	points	Definition	(Points)
Pain	45	None	(45)
		Mild	(30)
		Moderate	(15)
		Severe	(0)
Motion	20	Arc 100 degrees	(20)
		Arc 50-100degrees	(15)
		Arc 50 degrees	(5)
Stability	10	Stable	(10)
		Moderate instability	(5)
		Gross instability	(0)
Function	25	Comb hair	(5)
		Feed	(5)
		Hygiene	(5)
		Shirt	(5)
		Shoe	(5)
TOTAL	100		

Classification : Excellent 90 ; Good 75-89  
; Fair 60-74 ; Poor 60

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Mayo Elbow Performance Index

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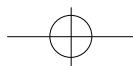
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(Table 2).

Table 2. Clinical findings and results in patients who had been treated by Compass Elbow Hinge

Case No.	Sex/Age	Type of injury	Associated injury	Treatment	Pain	Motion F/E, S/P	Stability	Complication	Mayo elbow performance
1	F/54	Open D/L	Brachial A. rupture	OR	No	5/135, 30/70	Stable	None	Excellent
2	M/23	Open D/L	Other polytrauma	OR	No	30/100, 70/60	Stable	Pin tract infection	Excellent
3	F/65	Open D/L	Degloving injury elbow	OR	No	10/130, 30/60	Moderate	None	Excellent
4	M/35	Closed D/L with radial head Fx	Radial N. palsy	ORIF	No	10/130, 70/70	Stable	None	Excellent
5	F/32	Open D/L	Brachial A. stretching injury Median, ulnar & radial N. palsy All anterior flexor M. rupture with impending compartment syndrome, forearm	OR	No	20/115, 70/70	Moderate	Subluxation	Excellent
6	M/44	Open comminuted intercondylar Fx	Triceps muscle rupture	ORIF	Mild	30/120, 70/60	Stable	Pin tract infection	Good
7	M/28	Open comminuted intercondylar Fx	Other polytrauma	ORIF	No	20/100, 70/70	Stable	None	Excellent
8	M/30	Closed comminuted olecranon Fx & radial head Fx	Radial nerve palsy	ORIF Radial head excision	No	30/120, 75/0	Moderate	None	Excellent
9	F/65	Closed comminuted intercondylar Fx	Other polytrauma	ORIF	moderate	30/120, 60/30	Stable	None	Fair
10	M/62	Open comminuted	Closed midshaft Fx & surgical neck Fx of humerus	ORIF	Mild	20/100, 40/70	Stable	None	Good
11	M/45	intercondylar Fx Open comminuted intercondylar Fx	Brachial A. rupture Median N. division Biceps brachii & brachialis M. rupture	ORIF	No	20/115, 70/70	Stable	None	Excellent

ORIF : Open Reduction & Internal Fixation, CEH : Compass Elbow Hinge, Fx : Fracture, D/L : Dislocation, F/E : Flexion/Extension, S/P : Supination/Pronation, Moderate : Moderate Instability, A. : artery, N. : nerve, M. : muscle, OR : Open Reduction of elbow.



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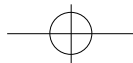
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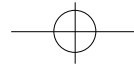
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