

# Case Report

## Functional Outcome Following Fixation of Intra-Articular Elbow Fracture

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### Abstract

Capitellum bone is an integral part of distal humerus and it is located within the elbow joint. Fractures of the capitellum are rare. The incidence is 0.5 to 1 percentage of all elbow fractures, 6 percentage of all distal humerus fractures, and accounts for less than 1 percentage of all fractures. Being an intra articular fracture, anatomical reduction and a stable internal fixation during surgery are mandatory for achieving fracture union and to regain normal elbow function. We present one such displaced fracture of capitellum bone in a 26 year old lady who reported to us following a fall from a two wheeler. She underwent surgery – open reduction and internal fixation of the fracture capitellum with headless compression screws in our hospital. At the last follow up 3 years post surgery, patient had a pain free, stable elbow joint with full range of movement. She is able to perform her activities of daily living comfortably. This case is published for its rarity and the good functional outcome following surgery, in terms of elbow range of movements.

**Key Words:** Capitellum fracture, Intra-articular elbow fracture, Open Reduction & Internal Fixation, Headless compression screws

### Introduction

Fractures of the capitellum come under intra articular fractures of the elbow. The mode of injury is usually a fall on an outstretched hand with elbow in varying degrees of flexion. The force is transmitted through the radial head to the capitellum. Most of these fractures are displaced and often require surgery - open reduction and internal fixation (ORIF). Early mobilization of the elbow following surgery is essential for complete restoration of elbow function which in turn is crucial for day to day activities. Non-anatomical reduction of fracture and an unstable fixation often result in poor functional outcome.



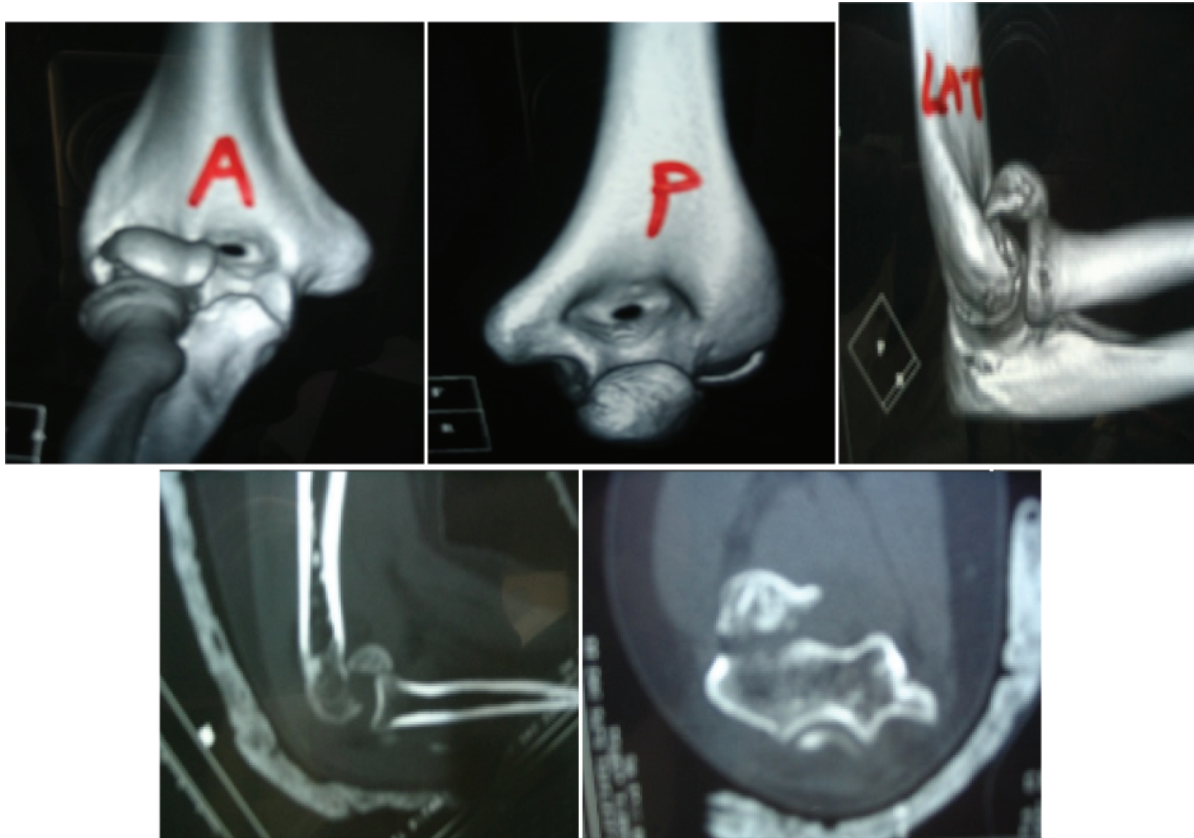
**Fig 1 :** Preoperative Xray Anteroposterior view

### Case History

A 26 year old lady reported to our out-patient department with pain, swelling and difficulty in moving her right elbow, following a fall on an outstretched hand in a road traffic accident two days before. Clinical examination revealed a swollen right elbow with tenderness on the lateral aspect of elbow. Active elbow flexion was restricted with pain. A radiograph of the right elbow revealed a displaced intra-articular fracture of the right capitellum (Fig 1,2).



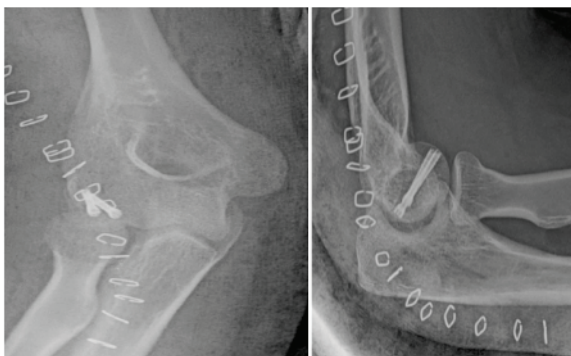
**Fig 2 :** Preoperative Xray Lateral view



**Fig 3 :** Preoperative CT scan imaging – 1st Row Left to Right -> 3 Dimensional image Anterior, Posterior and Lateral ; 2nd Row Left to Right -> Sagittal and Coronal Plane image

A computerized tomography (CT) scan of the right elbow revealed that the capitellum fragment was not only displaced, but also rotated 90 degree anteriorly (Fig 3).

The fracture as per Bryan & Morrey classification (McKee modification) belonged to type-1. Being a displaced intra-articular fracture, it warranted an open reduction and internal fixation of the fracture. The same was executed using Kocher's lateral approach to the elbow. Intra operatively the fracture fragment was displaced and rotated by 90 degree anteriorly, as pointed out in the CT report. Fracture was reduced anatomically and was fixed with headless compression screws – 2.4mm diameter – two numbers - length 20mmx1 & 16mmx1. The screws were inserted from the posterior surface of lateral condyle of distal humerus and was directed anteriorly (Fig 4).



**Fig 4 :** Immediate Postoperative Xray Anteroposterior and Lateral views

An above elbow POP slab was applied for two weeks till suture removal. After suture removal, elbow mobili



**Fig 5 :** 3 Months Postoperative Follow up Xray - Anteroposterior and Lateral views





**Fig 6 :** Clinical picture showing Elbow range of movement along with healed surgical scar at the end of 3 years postoperatively.

zation was started - active and active assisted exercises were started. Patient was on Capsule Indomethacin 25mg twice daily for three weeks post-surgery to prevent Myositis ossificans, a complication which can result in a stiff elbow. Patient was followed up once in 15 days during the first month post surgery, then once a month thereafter, for the next two months. During the follow-up 6 weeks post-surgery, patient was on wax therapy to the elbow for ten days and active exercises were encouraged. 3 months post-op X-ray of the right elbow revealed healed fracture of the capitellum with headless screws in-situ (Fig 5).

At 3yrs followup, patient was totally asymptomatic. She had a fixed flexion deformity of 10 degree, further pain free flexion was possible from 10 degree to 130 degree. Her right forearm rotations, both pronation and supination were full and pain free (Fig 6).

X-ray of the right elbow at this time showed a healed fracture of right capitellum with remodeling (Fig 7).

## Discussion

It is more common in women than in men<sup>1</sup>. In 20 percent of patients with capitellar fractures, radial head fractures are also found. Capitellar fractures may be associated with a posterior dislocation of the elbow too<sup>2</sup>. Fractures of the capitellum occur in the coronal plane due to the shear forces from a fall on an outstretched hand or of a fall directly onto the elbow. Failure of adequate intervention may result in an incongruous joint with resultant stiffness, instability and chronic pain of the elbow joint<sup>3</sup>.



**Fig 7 :** 3 years Postoperative Follow up Xray - Anteroposterior and Lateral views

AO classification system and the classification system of Bryan and Morrey are available for fracture classification<sup>2,3</sup>. The fracture presented here belonged to type 1 of Bryan and Morrey classification. The management options vary from conservative treatment to surgical fixation/excision of fragments. We performed ORIF with head less compression screws. We used the Mayo Elbow performance score for assessing the functional outcome following surgery. Our patient had a score of 95 points corresponding to an excellent result. Mahirogullari M et al. in an article published in the *Journal of Hand Surgery, British*, in June 2006, studied the clinical outcome of 11 type 1 capitellum fractures treated by ORIF using two herbert screws between 1998 and 2003<sup>4</sup>. The average age of patients was 27 years. The final assessment was made at the 12th month. The results were evaluated according to mayo elbow performance index. He obtained excellent results in 8 patients and good results in 3 patients. He recommended ORIF with herbert screws, inserted from posterior surface of lateral condyle of distal humerus, followed by early mobilization in all type 1 capitellar fractures. The same was performed in our case.

The complications associated with fracture capitellum are Osteonecrosis, Post traumatic arthritis and loss of elbow flexion. Cubitus valgus deformity may result after excision of articular fragment of capitellum or with an associated distal humerus lateral condyle fracture or radial head fracture<sup>3,5</sup>.

We conclude that most of the fractures of the capitellum belonged to type 1 of Bryan and Morrey classification. ORIF with head less compression screws (Herbert screws) in type 1 fractures maintains a stable anatomic articular reduction and gives good functional results post-operatively in terms of painless elbow movement<sup>6</sup>.

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