Introduction
Neglected elbow dislocation is not an uncommon condition. It disturbs activities of daily living, such as reaching hand to face, toilet etc. It becomes a disability if both elbows are affected.

Elbow range of movement
I. Normal- 0 to 145°
II. Functional- 30° to 130°, according toMorrey [1-4].
III. Good functional- 70° to 120°
IV. Functional pronation and supination are 50° each.

The aim of treatment of a neglected elbow dislocation is to achieve the functional range [1,4,5]. Causes of stiff elbow are varied. Post-traumatic or post-surgical stiff elbow is the commonest

Table 1: Causes of Stiff elbow.

| Sex       | Qty | Percentage |
|-----------|-----|------------|
| Male      | 12  | 85%        |
| Female    | 2   | 15%        |

Surgical management
Arthrolysis can be done by lateral, medial or combined (lateral & medial). Most preferred incision is combined (lateral & medial) as it allows joint approach on all sides.

Figure 1: Lateral incision for elbow joint arthrolysis.
If plastered - elbow immobilized for at least 3 weeks [2,3,7].

In majority of cases we applied hinged Ilizarov external fixator to achieve better results and better mobility.

Ilizarov - gives better result and better mobility - comparatively less costly and is very helpful.

Other various types of hinged external fixators are
I. Volkov-Oganesyan apparatus
II. Mayo distraction device
III. Compass universal hinged
IV. Orthofix device

Diagrams of the elbow: a- angular and axial characteristics of the elbow, b- positioning of the hinge units of the fixator (1, 2- distraction rods of the hinge units, 3- the line, drawn through the tops of olecranon) (Figure 3).

Diagram of the elbow and the Ilizarov fixator: a-determination of the elbow axis of rotation, b- vector resolution of forces for extension in the elbow using the force element, c- vector resolution of forces for flexion in the elbow using the force flexion element (Figure 4).
Case Illustrations (Figure 5-8)

**Figure 5: Case I**
- a. 3 months old dislocated right elbow of a 27 yrs. old man
- b. After reduction with Ilizarov. Gradual passive range of movement using hinge rod in stiffness.

**Figure 6: Case II** 37 yrs. old male (neglected dislocated elbow) before and after treatment.

**Figure 7: Case III** Old fracture dislocation (40 yrs.) PO-20 months.
- a. X-ray of floating elbow G III B
- b. Floating elbow
- c. Fixation with Ilizarov apparatus
- d. Clinical appearance of the patient after treatment
- e. Patient could reach his hand for perineal hygiene.

**Complications**

Complications are a fact of life that every surgeon has to face. In our series we managed all the complications by local care and applying antibiotics.
I. Local skin complications
II. Deep infections
III. Pin tract infections
IV. Neurologic injuries
V. Recurrence of the contracture
VI. Heterotopic ossification
VII. Ligament instability

Results

Elbow contracture release, regardless of the surgical approach, has been highly successful, with an overall improvement in motion ranging from 29° to 65°. Most patients achieve a functional arc of motion and patient satisfaction is high.

Discussion

In old, neglected unreduced dislocations or fracture dislocations of the elbow, the procedure is almost the same, except it is more extensive [8-11]. The key to application of the elbow fixator is proper identification of the rotational axis of the elbow joint. Ilizarov frame is applied after completion of the arthrolysis and skin sutures are taken. The proximal unit for the humerus consists of an arch or omega ring proximally and full range distance. This distance is about 6-8 cm above the lateral epicondyle. The rings are connected to the shaft of the humerus by wires and olive wires. The distal ring is fixed to the ulna using wires. It is important to place the hinge exacting at the axis of rotation of the elbow. The Ilizarov external fixator replicates the movement of the elbow. The axis of rotation of elbow passes through the centre of the capitulum and a point just distal and anterior to the medial epicondyle. Post-operatively the movements can be started from day 2nd onwards. Total distraction of the elbow joint is 6-8 mm.

Conclusion

If elbow is unstable after fixation of the associated fracture and repair of the lateral collateral ligament, Ilizarov hinged external fixator provides satisfactory results.

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