Summary

Proximal humeral fractures represent the most common humeral fractures (45%) In adults older than 40 years of age, the percentage of proximal humeral fractures increases to 76%. Also, a higher incidence of proximal humeral fractures was noted in women than in men, by a rate of approximately 2 to I. Proximal humeral fractures range in severity from relatively benign avulsion to massive fracture dislocations.

The management of displaced fractures of the proximal humerus is still under debate and the need to evaluate alternative methods has been emphasized [*Rose, 1982*].

There are many treatment options for management of displaced fractures of proximal humerus..

Closed reduction by manipulation is difficult to maintain because of the muscle action especially in displaced three or four part fractures.

Temporary insertion of pins may be used to aid closed reduction, or they may be left in situ for 4-6 weeks to hold the reduction. Open reduction and internal fixation has been used for proximal humeral fractures . Extensive soft tissue stripping may result from the use of buttress plates with potential devascularization of the fracture fragments.

Prosthetic replacement is considered in four-part fracture dislocations or impression fractures involving more than 40% of the head and in head

splitting fractures.

In our study, the percutaneous reduction and external fixation of displaced humeral fractures by Hoffmann external fixator have been used as an alternative to open reduction and internal fixation in two, three, and four-part fractures and in management fracture as an alternative to hemiarthroplasty.of one case with head splitting

This study comprises 24 patients with 25 displaced fractures of proximal humerus, which include all fractures of the humeral neck and head. The patients were classified into groups according to Neer, two-part fractures, three part-fractures, four-part fractures and humeral head splitting fractures.

We assessed our patients post-operatively on clinical and radiological basis, Clinically; The patients were examined two, four, six weeks and at the time of removal of the external fixator, eight weeks post-operatively, six months after the operation and finally after one year to assess the function and the occurrence of displacement of the fracture fragments secondary to looseness of the external fixator, and radiologically the patients were examined two, four, six, and eight weeks at the time of removal of external fixator to assess the displacement of the fracture fragments and to assess the occurrence of union . During the period of study all patients were available for complete follow up both clinically and radiologically. There were 15 fractures (60% of fractures) in males and 10 fractures (40% of fractures) in

females .

Six fractures (24% of cases) were two-part fractures with gross displacement more than 1 cm or angulation more than 45° .Thirteen fractures (52% of cases) were Three-part fractures with more than 1 cm displacement between the fragments. Five fractures (20% of cases) were Four-part fractures without dislocation of shoulder neither anteriorly nor posteriorly. One fracture (4% of cases) was Head splitting injury including the articular surface.

All patients were subjected to the standard trauma series with the three standard views. One case needed CT study.

With the patient under general anesthesia and in a supine position , percutaneous reduction and external fixation of displaced humeral fractures by Hoffmann external fixator was performed .

We adopt the three phase system rehabilitation protocol that has been advised by ***Hughes and Neer 1975,*** all the patients started the rehabilitation program within the first 24-48 hours postoperatively by the surgeon and seven to ten days postoperatively under supervision of a physical therapist.

The long-term follow up was performed six months after the operation and the final postoperative assessment was done twelve months after the operation.

We assessed our patients post-operatively on clinical and radiological

basis , we adopt the rating system of Neer to evaluate the results of trans-cutaneous reduction and Hoffmann external fixation of displaced fractures of the proximal humerus.

Results according to rating system of Neer

	Score	Number of fractures	Percentage
Excellent	89-100	15	60%
Good	80-88	5	20%
Fair	70-79	3	12%
Poor	0-70	2	8%

Complications

Complications	No. of cases	Percentage
Infection		
• Pin track infection	4	16%
• Frank osteomyelites	0	0%
Loosening		
• Of fixator with re-reduction	5	20%
• Of pins with re-advancement	4	16%
Avascular necrosis	1	4%
Refracturing	0	0
Neurovascular injury	0	0

Thus the previously mentioned results support the success of this technique to take place among other methods of management of such difficult injury to be a useful alternative in the treatment of displaced

fractures of proximal humerus and to be further evaluated in controlled clinical trials as it eliminates many of the problems associated with closed methods and internal fixation as:

- Its permits immediate movement of shoulder, elbow and hand and thereby reduces oedema and capsular fibrosis.
- It prevents soft tissue stripping and decrease the incidence of avascular necrosis of head of humerus, regarding that the insertion of pins within the anatomical safe corroids described by green guard against neurovascular injury or transfixing of tendons.
- Fixation can be loosened and a re-reduction can be performed if re-displacement of fracture parts occurs.
- Pins can be removed without anaesthesia in the out patient clinic.

Thus, satisfactory fracture reduction and stability with fairly low rate of complications and good early functional results. Can be obtained by this technique.