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**EPIPHYSEAL INJURIES
OF THE LOWER END OF HUMERUS**

AN ESSAY

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of Mastar Degree in

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By

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Introduction

INTRODUCTION

Injuries to the epiphysis and physis, or epiphyseal plate, are common and account for roughly 15% of all injuries to the long bones during the period of growth. They occur more frequently in boys than in girls and in the periods of rapid skeletal growth, which are the first year and the preadolescent period (DePalma's, 1981).

Wilkins, 1984 , said that the peak incidence of physal injuries in most parts of the body is towards the termination of the skeletal immaturity.

Peterson, 1972 , found that the maximum incidence for injuries to the distal humeral physis was 4 to 5 years of age in girls and 5 to 8 years in boys. The increased incidence with advanced age is said to be due to weakening of the perichondral ring as it matures. Thus, some different biomechanical forces and conditions must exist about the elbow to make the physis more vulnerable to injuries at an earlier age.

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The aim of this essay is to review the nature of the injuries implicating the distal humeral epiphysis which will permit to institute adequate treatment, preventing angular deformities at the elbow and predict the prognosis of specific injuries.

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Anatomy
Of The Elbow Joint

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ANATOMY OF THE ELBOW JOINT

The elbow joint is a synovial joint of the hinge variety. It is formed by the articulation of the lower end of the humerus (Trochlea & Capitulum) with the upper end of the ulna (Trochlear notch) and the (Head of radius) respectively (Last, 1979).

THE LOWER END OF THE HUMERUS :

It is expanded transversely and is divided into 2 portions :

- 1- An articular portion.
- 2- Non-articular portion.

1- The articular portion :

This enters in the formation of the elbow joint and is formed of two parts :

- a) Capitulum (lateral convex part).
- b) Trochlea (medial pulley shaped part).

To each of these parts the lateral & medial epicondyles are attached respectively to the lateral & medial parts. Above

(4)

the trochlea, the olecranon fossa lies posteriorly and the coronoid fossa lies anteriorly, while the radial fossa lies above the capitulum anteriorly.

a) Capitulum :

It forms a section of sphere and projects forwards and inferiorly from the lateral part, and is bounded by a prominent ridge from the non-articular bone. It articulates with the upper surface of the discoid head of radius. In extension it is in contact with the head radius through its inferior surface, while in flexion, its anterior surface articulates with the head of radius which lies in the radial fossa in flexion.

b) Trochlea :

It is a pulley shaped part which lies medial to the capitulum and separated from it by a faint groove. Its articular surface covers it anteriorly, inferiorly & posteriorly. The grooved surface of the trochlea is limited medially by a sharp and prominent ridge and laterally by a lower & blunter ridge that blends with the articular surface of the capitulum. Thus is produced a tilt on the lower end of the

humerus. The transverse axis of these articular surfaces deviates about 10° from being perpendicular with the long axis of the humerus, this declination from the perpendicular matched by a similar angle of the trochlear notch of the ulna produces the "carrying angle" which causes the supinated hand to be about 15 cm. lateral to the body when the arm is fully extended. Since the angle of the articular surfaces of both humerus and ulna is similar, the bones are parallel in full flexion. The trochlea articulates with the trochlear notch of the ulna with which it comes in contact through its posterior & inferior surfaces in full extension, and through its anterior & inferior surfaces in full flexion .

2- The non-articular portion :

- They are : a) The medial epicondyle.
 b) The lateral epicondyle.

a) The medial epicondyle :

It is a blunt projection of bone on the medial side of the distal end of the humerus. It is a subcutaneous structure. The posterior surface of it is smooth and over its base the ulnar nerve passes in its way from the arm to the forearm.

Its anterior surface gives an attachment to the common flexor origin from its lower part. Deeply on its distal border the ulnar collateral ligament of the elbow joint originates.

b) The lateral epicondyle :

It projects laterally from the distal end of the humerus but not as prominent as the medial epicondyle. From its lateral and anterior surfaces the common extensor tendon originates. At the distal border of the epicondyle the radial collateral (lateral) ligament of the elbow is attached.

THE HEAD OF RADIUS :

The upper extremity of the radius expands to form disc shaped head which is covered with hyaline cartilage. The upper surface of the head is concave for the articulation with the capitulum. The circumference of the head articulates with the radial notch of the ulna & with the annular ligament which trapes it.

THE UPPER END OF ULNA :

The upper extremity of the ulna has two projections with saddle shaped articular surface between them. They are the

olecranon process and the coronoid process and they grip the trochlear surface of the humerus.

▪ The olecranon process : It is the proximal extension of the shaft of the ulna and in extension of the elbow it is lodged in the olecranon fossa of the humerus. Its upper surface receives the tendon of triceps. Its posterior surface is triangular in shape and is subcutaneous and the olecranon bursa lies on it.

▪ The coronoid process : It projects forwards from the upper end of the shaft. Medially its anterior lip shows a prominent smooth elevation (sublime tubercle) to which the ulnar nerve lies in contact. The radial notch on the lateral surface covered with hyaline cartilage which continuous with that of the trochlear notch. The anterior & posterior margins of the notch give attachment to the ulnar ligament while the quadr-ate ligament is attached to the shaft just below the notch.

▪ The trochlear notch : It is a saddle-shaped surface between the olecranon & the coronoid processes. It is convex from side to side and concave from top to bottom and fits the trochlea of the humerus. The notch is covered with hyaline car-

tilage which sometimes constructed in hour glass shape or even separated into two surfaces one on the olecranon and the other on the coronoid process.

SOFT TISSUE IN RELATION TO THE ELBOW JOINT :

(1) The capsule of the joint :

The capsule is attached to the humerus at the margins of the lower rounded ends of the articular surfaces of the capitulum and the trochlea, but in front and behind it is carried up over the bone above the coronoid and olecranon fossae (Fig.1-a & b). Distally, the capsule is attached to the edge of the articular cartilage of the trochlear notch of the ulna and to the annular ligament of the superior radio-ulnar joint (not attached to the humerus),(Cunningham's-1971).

N.B. The medial & lateral epicondyles are extracapsular.

(2) The synovial membrane of the joint :

It lines the deep surface of the capsule. Superiorly, it is reflected on the humerus to cover the non-articular part of the bone enclosed within the capsule. As it passes over

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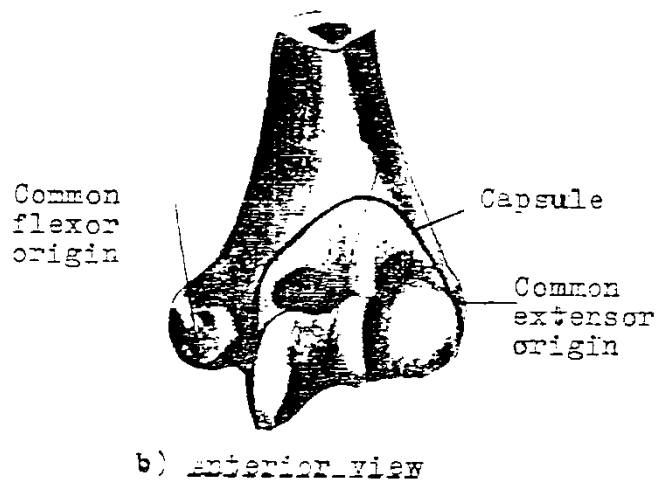
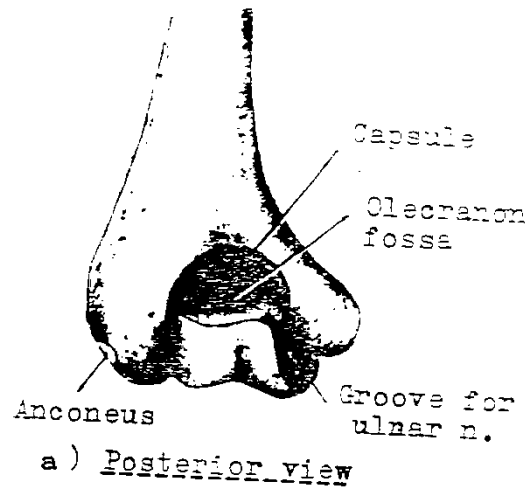


Fig.1 : Attachement of the capsule to the lower end of the humerus.