

**FRACTURES OF THE
ELBOW-JOINT,
AN ESSAY**

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Fractures of the elbow-joint, an essay by Walter Ela

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WALTER ELA

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AN ESSAY

TO WHICH WAS AWARDED THE SECOND PRIZE OF THE
BOYLSTON MEDICAL SOCIETY FOR 1873.

BY

WALTER ELA.

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1873.

By the kindness of Drs. J. T. Heard and C. B. Porter I obtained most of my statistics from the fracture books of the Out-Patients Department of the Massachusetts General Hospital.

The drawings from which the woodcuts and albertype were taken were made by Dr. H. P. Quincy.

FRACTURES OF THE ELBOW-JOINT.

FRACTURES of the elbow-joint, in most surgical works, receive scarcely more than a passing notice. In two essays on fractures of the upper extremity that I have seen lately, fractures at the elbow have been ignored. The joint is a valuable one, and the proper treatment in case of fracture is important. In unskilful hands, they readily pass for sprains, which upon casual inspection they closely resemble, and are treated accordingly.

The diagnosis as to the nature of the fracture is not always easily made out, even by skilful surgeons. The obscurity which attends fractures in this region is due to the facts: that the bones are beneath a great mass of muscle; that the important structures are confined in so small a compass; that oedema, often accompanied by ecchymosis, speedily ensues on account of the laxity and mobility of the parts; that an effusion often takes place rapidly within the artic-

ulation; and that, owing to the similarity of symptoms, it is sometimes difficult to determine whether we have to deal with a fracture or with a dislocation.

Surgeons confess that among the most difficult fractures to treat successfully are to be classed those of the elbow-joint. This difficulty is due chiefly to the implication of the joint. The treatment is not varied, inasmuch as all fractures in this region, with one exception, are treated in the same manner. Even if a correct diagnosis is made, and the appropriate treatment pursued, we are not always confident that there will be a happy result. The uncertainty in prognosis is, to a great extent, due to the extensive articular surfaces in this vicinity, which are often implicated in case of fracture of the joint, whereby inflammation is set up, and this is followed by a fibrinous exudation and proliferation of cells, resulting in firm adhesions, causing ankylosis, and seriously impairing the use of the joint.

The injury is not infrequently of a complicated nature: instead of a simple fracture, there may be a dislocation with one or more fractures, a compound fracture, a comminuted fracture, or both.

An accurate knowledge of the anatomy of the parts is essential to understand the fractures which occur at this articulation.

Anatomy of the Joint.

The lower extremity of the humerus, the upper extremities of the radius and ulna, form this joint. The humerus is expanded laterally into the external and internal condyles, the latter of which is the more prominent. Between these condyles are the articulating surfaces for the radius and ulna. The articular surface on which the head of the radius is received, the capitellum, is on the inferior extremity of the external condyle. That for the ulna, the trochlea, is much broader, and extends from the coronoid fossa anteriorly to the olecranon fossa posteriorly. The partition of bone between these fossæ is very thin,—so thin that in some cases they meet, and the *supratrochlear* foramen is formed, which frequently exists in the Mound Builders and in some of the lower mammalia. The *supracondylar* foramen is above the internal condyle, but does not exist in man normally. This it is which transmits the median nerve and brachial artery when these structures deviate from their usual course.

The upper extremity of the ulna has, anteriorly to the greater sigmoid articular surface, the coronoid process, into the base of which is inserted a portion of the brachialis anticus. Posteriorly to the greater sigmoid cavity is the olecranon, which forms the

point of the elbow, and into which is inserted the triceps extensor cubiti. In flexion, the coronoid process is received into the coronoid fossa; and in extension, the olecranon process into the olecranon fossa. On the radial side of the coronoid process, the radius finds an articular cavity, — the lesser sigmoid cavity.

The head or superior extremity of the radius is disk-shaped, and concave at its extremity. It is supported on a constricted portion, of a cylindrical form, called the neck. About an inch and three eighths below the head is the tubercle into which is inserted the tendon of the biceps.

Ligaments.

The ligaments which bind these bones together are the external and internal lateral, the orbicular, the anterior, the posterior, and the oblique.

In all ginglymoid joints like the elbow, the lateral ligaments are the strongest.

The external lateral ligament arises from the external condyle, and is inserted chiefly into the orbicular ligament.

The internal lateral ligament is composed of an anterior and posterior part, which have a common origin from an eminence on the internal condyle.

The anterior set radiate and are inserted along the inner margin of the greater sigmoid cavity. The posterior set, of a similar triangular shape, are chiefly inserted into the inner border of the olecranon.

A band of lateral fibres extends from the coronoid process to the olecranon, so that when the latter is fractured, it is this ligament, in some cases, which prevents its extensive separation.

The orbicular ligament passes from the ulna anteriorly to the lesser sigmoid cavity posteriorly, surrounding the head of the radius. This ligament does not adhere to the radius, as it is lined by the synovial membrane of the elbow-joint, which is reflected beneath, in a thin sheet, upon the inferior border of the head of the radius.

The anterior and posterior ligaments are thin, loose fibres, which arise just above the fossæ on the anterior and posterior aspects of the humerus. The anterior is inserted into the coronoid process and orbicular ligament; the posterior, into the olecranon.

These with the lateral ligaments form the capsule of the joint.

The oblique ligament passes downwards and outwards from the coronoid process of the ulna to just below the tubercle of the radius; and it is this ligament which limits the rotation of the radius.

The synovial membrane is very extensive; it lines