ACUTE SIMPLE INJURIES AROUND THE WRIST JOINT IN ADULTS

Essay Submitted for the Partial Fulfillment of the Master Degree in Orthopaedic Surgery

By

Mohammed Abdel Hamid El-Rakaybi

M.B., B.Ch.

Supervised by

Prof. Dr. Ahmed Zaki El-Sobki

Professor and Head of Orthopaedic Dept. Surgery

Faculty of Medicine

Ain Shams University

Dr. Sherif Fathy Abdel Hamid

Assistant Professor of Orthopaedic Surgery

Faculty of Medicine

Ain Shams University

Dr. Tarek Mohammed Sami

Lecturer of Orthopaedic Surgery

Faculty of Medicine

Ain Shams University

Faculty of Medicine

Ain Shams University

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بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما علمتنا،
إنك أنت العليم الحكيم

صدق الله العظيم

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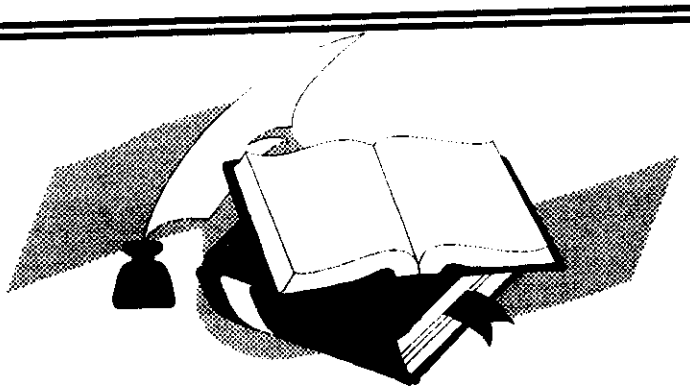
List of Contents

List of Figures



Introduction and Aim of the Work

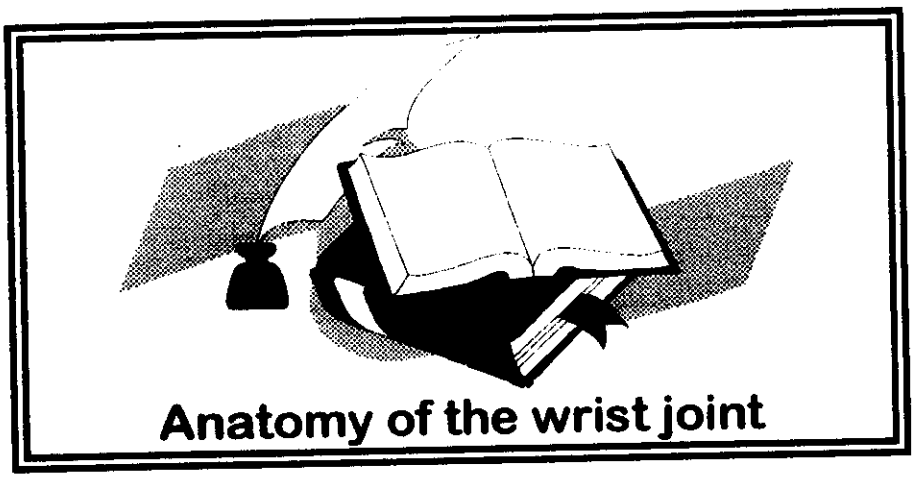
INTRODUCTION

The first book on wrist injuries was written by Sir Astley Cooper in 1822. Following the discovery of X-rays, Destot produced a remarkable discussion of a variety of wrist injuries in 1926. Since then, many injuries around the wrist were describe and many classifications were introduced ***(Cooney et al., 1996).***

The term "sprain" of the wrist took on a new meaning, and the real importance of ligament injuries in producing wrist instability equal to that of wrist fractures became appreciated ***(Jones, 1980; Cooney et al., 1996).***

AIM OF THE WORK:

The aim of this essay is to illustrate the anatomy and kinematics of the wrist joint. As well as to elaborate on the mechanisms of acute simple injuries around the wrist in adults, including bony and ligamentous injuries and their recent classification and treatment modalities.


Anatomy of the wrist joint

ANATOMY OF THE WRIST JOINT

The wrist is a specialized region of the upper extremity that extends from the carpometacarpal joints to the proximal border of the pronator quadratus. The wrist is the interconnecting group of joints between the hand and the forearm and include the radiocarpal, mid-carpal and the distal radio-ulnar joint.

The orientation of the wrist is based on skeletal landmarks of the distal radius ***(Kauer, 1980).***

The wrist is composed of the distal radius, ulna, the proximal and distal carpal rows and the base of the metacarpals.

From the carpometacarpal joints to the distal border of the pronator quadratus, most of the soft tissues that pass the wrist are bound within rigid compartments ***(Lewis et al., 1970).***

The carpus is a complex unit of bony articulation that transfers the force and motion of the hand to the supportive forearm and upper extremity. There is a detectable interaction between the eight carpal bones that are divided into 2 carpal rows ***(Kauer, 1986).***

The distal carpal row forms a rigid supportive transverse arch upon which the five metacarpals of the

hand are supported. The distal carpal row consist of (trapezium, trapezoid, capitate, hamate).

The proximal carpal row consist of lunate, triquetrum, pisiform and the entire scaphoid. The scaphoid is uniquely positioned to function mechanically as part of both the distal and proximal carpal rows ***(Cooney et al., 1996).***

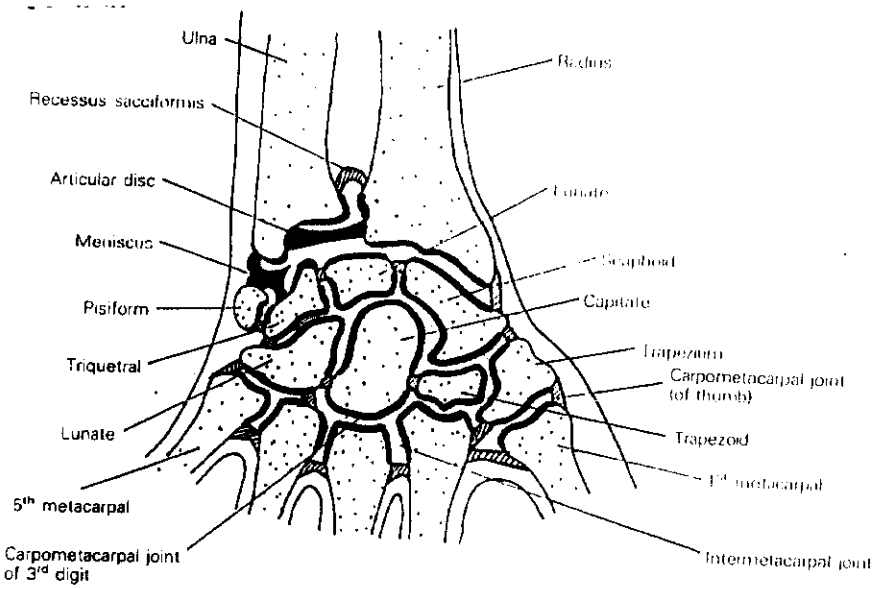


Fig. (1): Anatomical compartments of the wrist joint ***(Spot injuries, American Acad., 1992)***

Articular surfaces:

The articular surfaces of each of the joints that make up the wrist have important roles, in subsequent integrated movements of the wrist ***(Burgess, 1987).***

The distal articular surface of the radius is concave and titled in two planes. In the sagittal plane there is an average of 14° volar tilt, in the frontal plane there is an average ulnar inclination of 22°.

The triangular fbrocartilage complex TFC is the ulnar continuation of the distal radius and presents a concave surface for articulation with the lunate and triquetrum distally and the head of the ulna proximally.

The distal radius presents 3 articular surfaces (scaphoid, lunate fossa and sigmoid notch) for the scaphoid, lunate and distal ulna. These joint surfaces are important in judging congruent alignment of the wrist after fractures ***(Bradway et al., 1989).***

The midcarpal joint is a combination of 3 different types of articulation, laterally there is a convex distal scaphoid surface articulating with the trapezium and trapezoid.

Centrally, there is a concavity of the scaphoid and lunate receiving a convex proximal head of the capitate.

Medially there is a helicoid joint between hamate and triquetrum allowing a sliding move of the hamate on the triquetrum ***(Weber, 1984 and Cooney et al., 1989).***

The triangular fibrocartilage complex: is the main stabilizer of the distal radio-ulnar joint ***(King et al., 1986).***

It originates from firm attachments on the medial border of the distal radius and inserts into the base and around the tip of the ulnar styloid separating the ulnar styloid from the radio-carpal joint ***(Cooney et al., 1996).***

It gives origin to the volar ulnocarpal ligaments and blends imperceptibly into the volar and dorsal radio-ulnar ligaments, giving the appearance of one discrete structure ***(Taleisnik, 1976).***

The triangular fibrocartilage blends distally into the ulnar collateral ligament complex ***(Palmer, 1984).***

Ligaments of the wrist:

There are 2 major groups of ligaments of the wrist:

* Extrinsic
* Intrinsic

The extrinsic ligaments are those that connect the carpal bones to the radius, ulna and metacarpals. The intrinsic ligaments interconnect individual carpal bones ***(Cooney et al., 1989).***

The transverse carpal ligament is an extrinsic ligament of the wrist that connects the scaphoid tuberosity and trapezoid ridge with the hamulus and pisiform to provide structural integrity to the proximal carpal arch as well as to constrain the flexor tendons ***(Taleisnik, 1984).***

Extrinsic ligaments:

The deeper extrinsic ligaments are intracapsular ligaments best observed from within the radiocarpal and mid-carpal joints. The volar wrist ligaments originate laterally from a radial volar facet of the radial styloid and are directed in a distal ulnar direction where they meet ligaments originating medially from the triangular fibrocartilage complex and distal ulna. The volar extrinsic ligaments consist of two V-shaped ligamentous bands. One is proximal and connects the forearm to the proximal carpal row. One is distal and connects the forearm to the distal carpal row.