Injuries Of The Extensor Mechanism Of The Knee.

Essay
Submitted for partial fulfilment
of the Master degree in
Orthopaedic Surgery.

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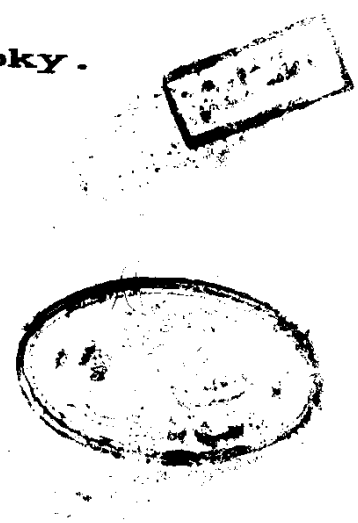

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1990

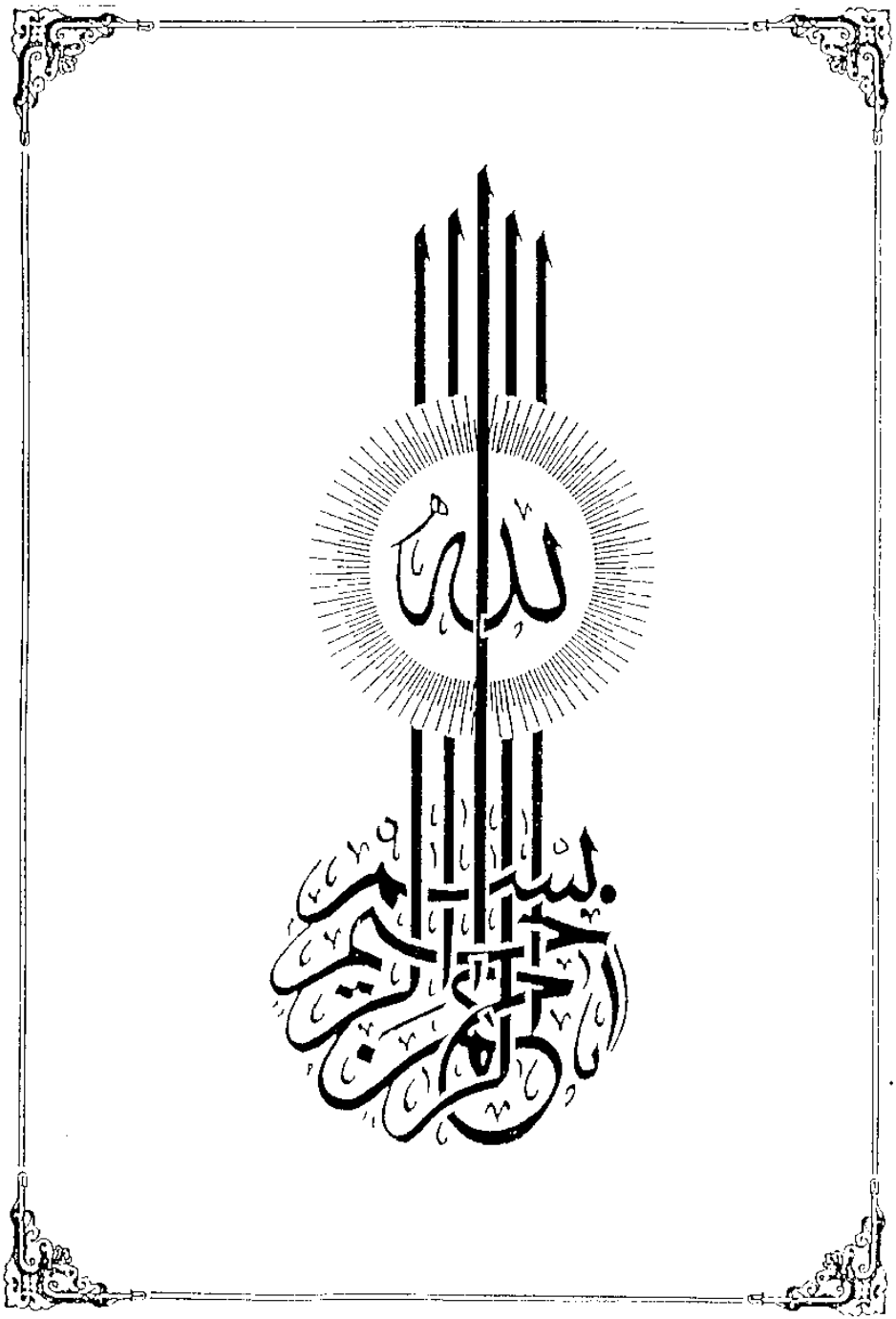
Acknowledgment.

I would like to express my deepest gratitude to **Prof. Dr. Ahmed Z. El Sobky**, Professor of Orthopaedic Surgery, Faculty of Medicine, Ain Shams University; for suggesting the topic, and enriching my work through his wide knoweldge and constructive criticism.

I would like also to express my sincere thanks to **Dr. Sameh A. Shalaby**, Lecturer of Orthopaedic Surgery, Faculty of Medicine, Ain Shams University; for his appreciated advice and continous encouragement.

My deepest thanks are due to **Prof. Dr. El Sayed Wahab**, Chairman of the Orthopaedic Surgery Department, Faculty of Medicine, Ain Shams University; for his guidance and generous support with useful and important literature.

Finally, my deepest thanks are due to all the Staff members of the Orthopaedic Surgery Department; for their generous encouragement and co-operative spirit and help.



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Introduction.

Introduction.

The quadriceps femoris muscle, is the most powerful muscle in the body. The action of the quadriceps in producing extension of the knee joint is the basic factor in maintaining the erect position in man (**Smillie, 1978**).

This essay aimed at spotting light on various injuries which cause disruption of the extensor mechanism of the knee aided by the anatomy of the extensor apparatus of the knee discussed in chapter one.

Since patellectomy is one of the methods of treatment of fracture patella so it is necessary to tackle the biomechanics of the extensor mechanism of the knee discussed in chapter two.

Moreover, it is essential to discuss the mechanism of injury of the extensor apparatus in chapter three.

To simplify matters, the various injuries of the extensor mechanism of the knee are divided into two big categories; soft tissue injuries and bony injuries.

Soft tissue injuries are discussed in chapter four, besides the complications which occur due to either the injury itself or the various methods of treatment.

The bony injuries are discussed in chapter five, clarifying in short the various methods of treatment and complications.

Historical Review.

Historical Review.

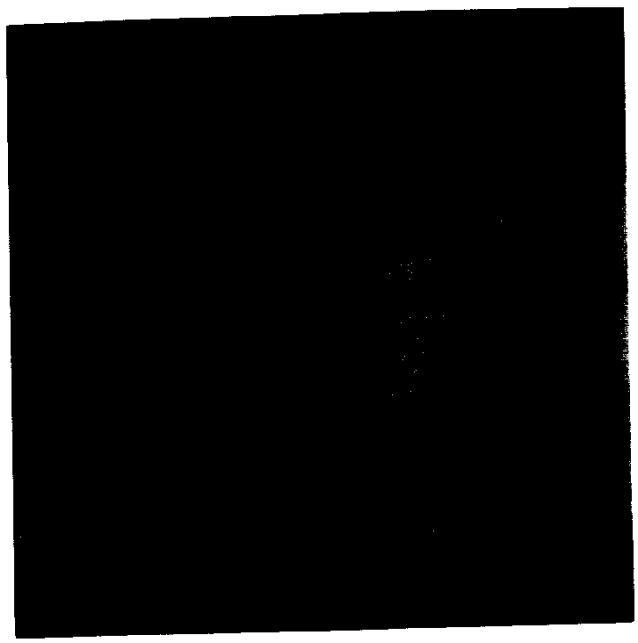
The first known description of a patient with an injured extensor mechanism of the knee was found in the writings of **Galen**, in which he described a young man who sustained such an injury in a wrestling match.

McBurney, in 1887, was the first to publish a single case report in the American literature. He described a fifty years old man who was struck by the edge of a heavy box just above the patella. The ruptured quadriceps tendon was sutured successfully with catgut and silver wire.

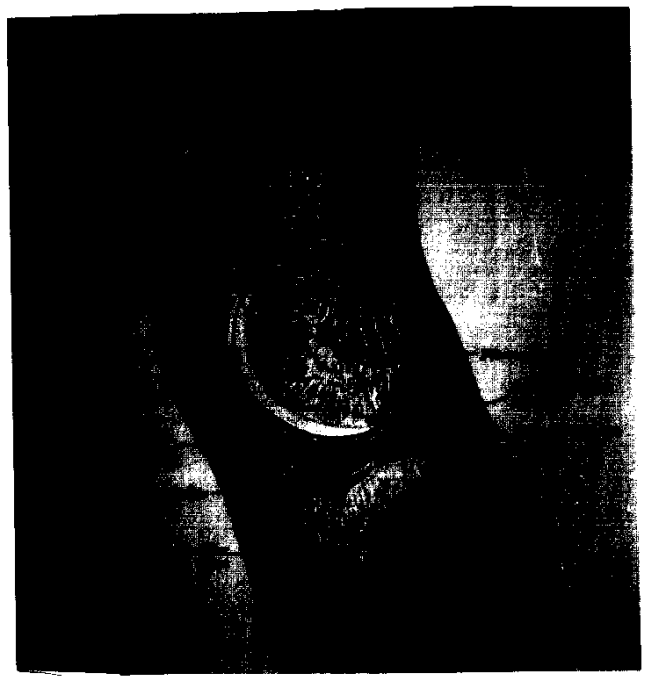
Despite sporadic reports of successful repair, conservative methods of treatment prevailed until the end of the nineteenth century. **Quenu and Duval**, in a review of twenty-one patints treated operatively, pointed out the **neccessity and methods** of surgical treatment.

McMaster, after experimenting with ruptures of tendons **and muscles** in rabbits, concluded that ruptures of the quadriceps tendon and patellar ligament rarely occur through their substances; but rather are sustained at the musculo-tendinous junction or insertion of the tendon into the bone.

Anatomy.



Fig, I, 1: Right knee joint, anterior view external aspect. (Snell, 1978).



Fig, I, 2: A sagittal section through the left knee joint. Lateral aspect.(William & Warwick, 1973).

Anatomy.

The extensor mechanism of the knee consists of the quadriceps tendon, the patella, patellar retinaculae, ligamentum patellae and tibial tuberosity (Fig, I. 1).

The Quadriceps Femoris.

The quadriceps femoris comprises 4 heads; the rectus femoris and the 3 vasti, named medialis, lateralis and intermedius.

The four components of the quadriceps muscle forming a common trilammelar tendon, where the rectus femoris tendon flattens immediately above the patella and becomes the anterior lamina which inserts at the anterior edge of the proximal pole. The tendon of the vastus intermedius continues downwards as the deepest lamina, inserting into the posterior edge of the proximal pole of the patella. The middle lamina is formed by the confluent edges of the vastus lateralis and medialis (Fig, I, 2) (Ehrenborg, 1961, Calliet, 1978).

Watson Jones (1976) stated that the quadriceps muscle is not, in fact, inserted into the upper pole of the patella so much as into the tibia by means of the tendon

which passes over and round the patella. Quite apart from the slender fibres which pass over the front of the bone, there are sufficient strong fibres on each side of it to extend the knee, and the integrity of the quadriceps tendon needs not be destroyed by excision of the patella.

So the quadriceps femoris muscle is inserted as follows:

1 - The central portion of the common tendon is inserted into the upper pole of patella and is continued by the ligamentum patellae to the tibial tuberosity (**Ehrenborg, 1961; Watson Jones, 1976; Davies and Davies, 1964**).

2 - Some superficial fibres run over the front of the patella with the other fibres of the ligamentum patellae before continuing to reach the tibial tuberosity (**Ehrenborg, 1961; Davies and Davies, 1964**).

3 - The medial and lateral portions of the tendon of the quadriceps pass down on each side of the patella. They are called the medial and lateral patellar retinaculae.

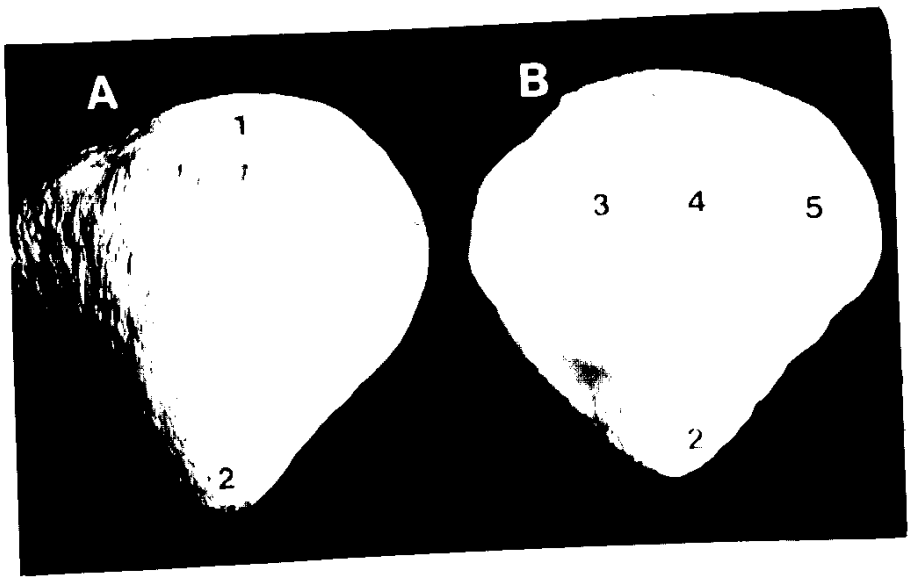
Patellar Retinaculae.

They were described by Terry after Uhry (1944) as follows:

The lateral and medial pateller retinculae have central portions attached to the patella and arising from the rectus femoris tendon. These pass over into the pateller ligament. The two thinner, less axial portions attach to the tibia along the oblique ridges of the tibia as far from the midline as the site of attachement of the medial and lateral collateral ligaments. These oblique ridges extend from the tubercle of the tibia curving upwards and backwards, on either side to the tibial condyles.

The Patella.

Is a triangular sesamoid bone which is wider at the proximal pole than at the distal pole. It's anterior surface is perforated by aperatures for the passage of nutrient vessels, and marked by numerous rough longitudinal striae. These striae are due to the fact that ossification has involved some of the deeper fibres of the



Fig, I, 3: Left patella.
A; anterior surface
B; articular posterior surface.
(Mc Minn & Hutchings, 1977).