# LESIONS OF THE LIGAMENTUM PATELLAE

## THESIS

Submitted for Partial Fulfilment of
the Master Degree in
Orthopaedic Surgery


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1981



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## ACKNOWLEDGEMENT

I would like to express my deepest gratitude to Dr. Mamdouh Zaki, Assistant Professor of Orthopaedic Surgery, Ain Shams University, who suggested this subject and whose wide knowledge and constructive criticism enriched my work. He has actually done a great effort in revising this review.

I would like also to express my sincere thanks to Dr. Ibrahiem Nassar, Lecturer of Orthopaedic Surgery, Ain Shams University for his appreciated advise and constant encouragement and for sharing in revision of the review.

My deepests thanks are due to Prof Dr. Mohammed Mehrez who kindly supported me with very useful and important Literature.

I would like also to thank my father, Inspector of English Language, who revised the English Language of this subject.

Finally my deepest thanks are due to the chief and all the staff members of Orthopaedic Department for their helpful intrest and kind support.

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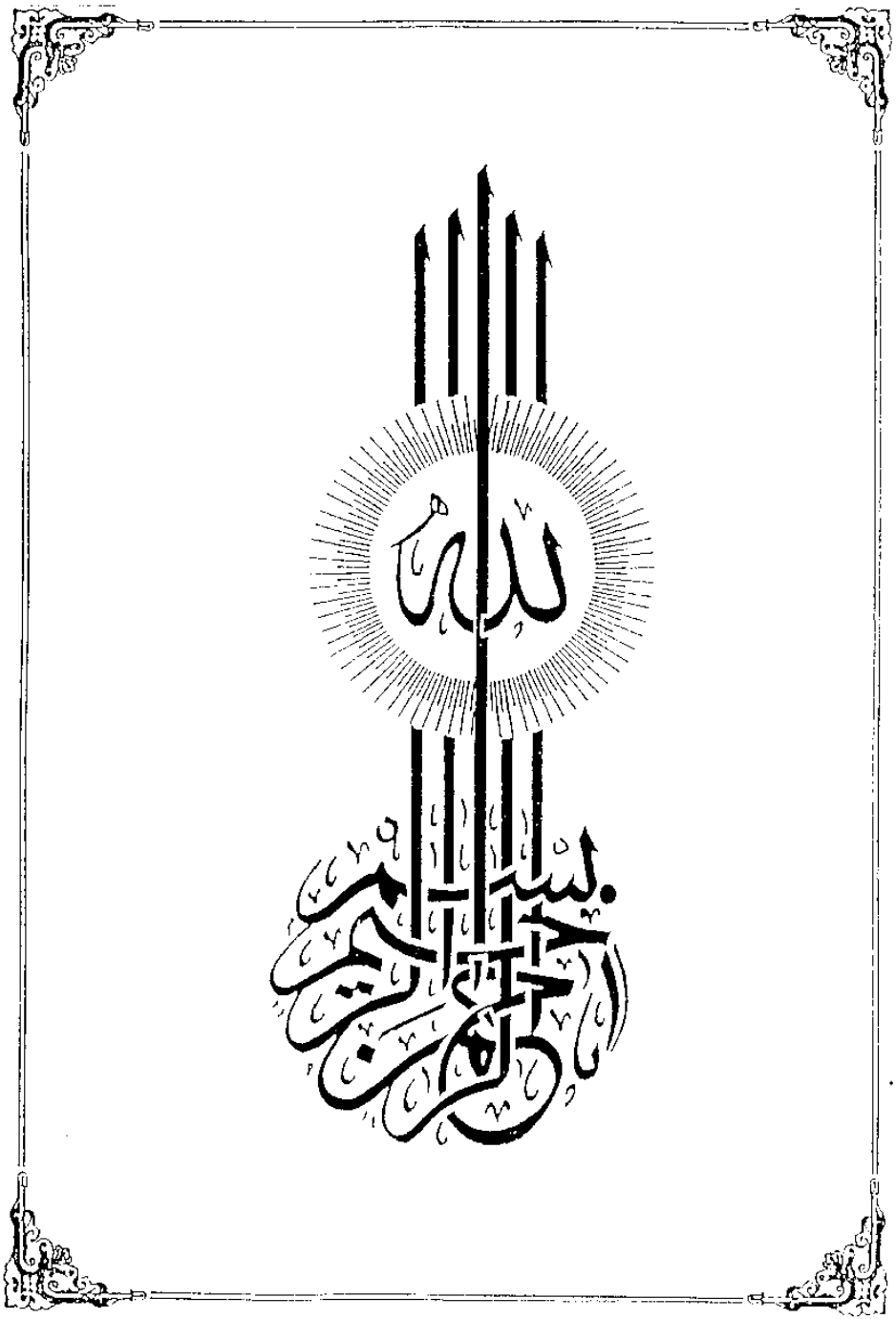


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# C O N T E N T S



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# ANATOMICAL CONSIDERATION

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## DEVELOPMENT OF LIGAMENTUM PATELLAE

The development of the ligamentum patellae has been discussed by Gray and Gardner (1950). Condensations for the tendon of quadriceps femoris muscle appear at the age of 7 weeks intrauterine. By 8 weeks the ligamentum patellae becomes definite. At 9 weeks the tendon of the quadriceps femoris muscle continues in the midsagittal plane of the limb as the ligamentum patellae as far as the tibial tuberosity which is only slightly developed. Lateral to the midsagittal plane the tendon ends at the level of the apex of the patella. By 10 weeks the ligamentum patellae is composed of numerous closely-packed cells containing long fusiform darkly staining nuclei and scanty acidophilic cytoplasm. A few collagenous strands are scattered among the cells. By 11 weeks the medial and lateral patellar retinacula extend distally on each side of the patella as cellular and fibrous bands which merge with the connective tissue adjacent to the femoral condyles, and to a lesser extent with the femoral condyles themselves. The patellar retinacula are still thin and cellular at 12 weeks. By $14\frac{1}{2}$ weeks

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two fibrous bands arise from the inferolateral margin of the patella. One, the lateral patellar retinaculum, fuses with the iliotibial band; the other, more deeply placed, is similar in structure but passes to the tibial perichondrium. The medial patellar retinaculum blends with the overlying fascia and then fuses distally with the tendons forming the pes anserinus.

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## A N A T O M Y

The major muscle of the extensor group is the quadriceps fermoris, comprising four heads: the rectus femoris, and the three vasti named medialis, lateralis and intermedius. All four muscles converge into a common tendon that crosses the knee joint and attaches to the tibial tuberosity via the patella (Fig. 1). The patella was considered for a long time as a sesamoid bone. It provides the femur with a gliding surface that minimizes frictional attrition and provides mechanical leverage (Calliet, 1978).

Calliet (1978) and Ehrenborg (1961a) suggested that the quadriceps tendon is composed of three leaves, the anterior leaf is formed by the tendon from rectus femoris, the middle leaf derives from vastus medialis and lateralis and the posterior leaf is a continuation of vastus intermedius. The three leaves are firmly united to each other by connective tissue a few centimeters above the patella. The tendon thus acts as a collecting site for muscle power which it then distributes downwards via fibres which are mostly inserted into the patella.

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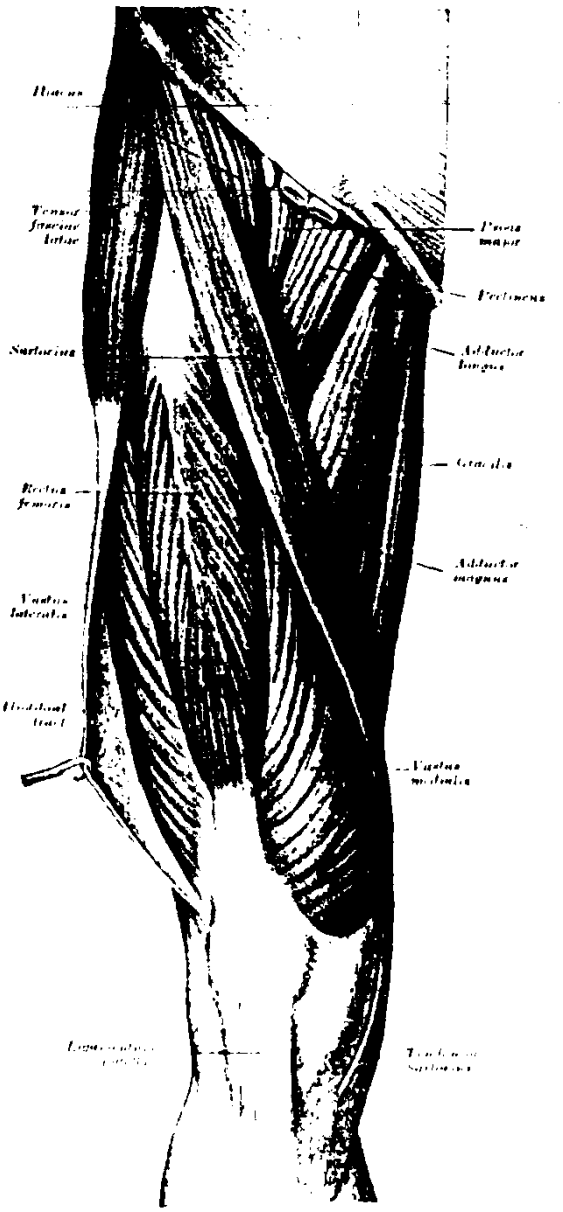

Fig. (1)

Dissection of the front of the thigh showing the quadriceps femoris muscle. (Quoted from Davies, D.V. and Davies, F., 1964).

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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 (Fig. 2):

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

2- Some superficial fibres run over the front of the patella and join up at the apex of the patella with the other fibres of the ligamentum patellae before continuing to reach the tibial tuberosity (Ehrenborg, 1961a and Davies D.V. and Davies F., 1964).

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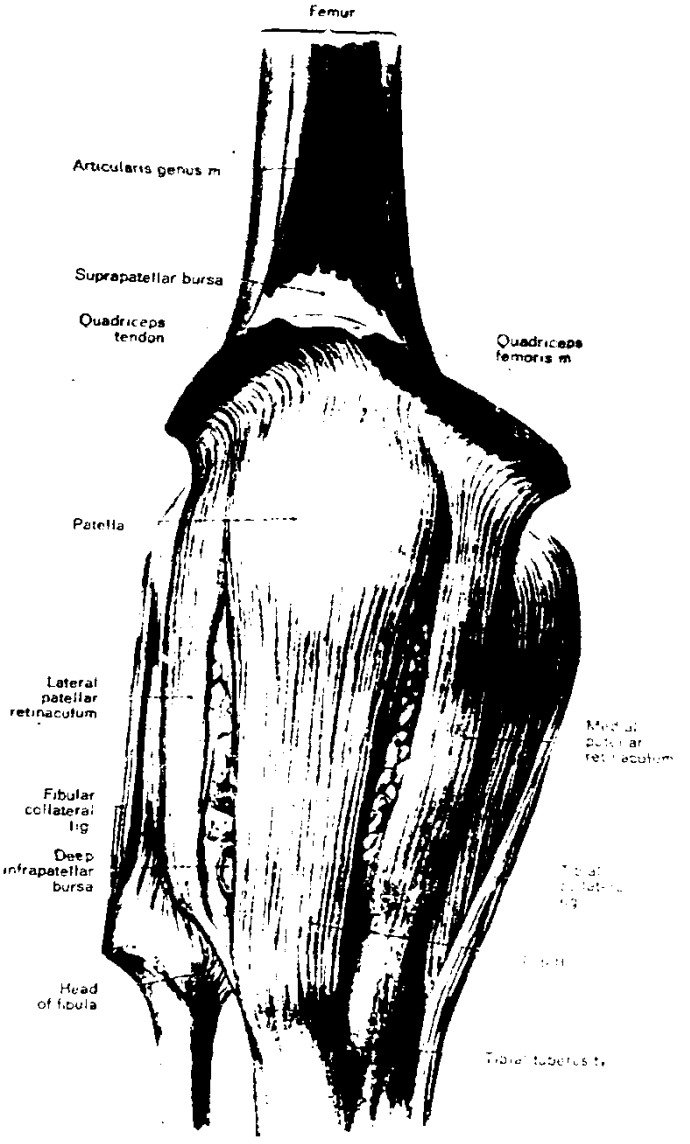


Fig. (2)

Dissection of the ligamentum patellae and patellar retinacula.
(Quoted from Sobotta/Figge, 1974).

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3- The medial and lateral portions of the tendon of the quadriceps pass down one on each side of the patella. They are called the medial and lateral patellar retinacula. They were described by Terry after Ubry 1944 as follows:

The lateral and medial patellar retinacula have central portions attached to the patella and arising from the rectus femoris tendon. These pass over into the patellar 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 attachment 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 fascia cruris, according to Ehrenborg (1961a), binds these attachments in such a fashion that muscle power is distributed over a large surface on the upper anterior part of the tibia. The main power, however, continues through the ligamentum patellae and is projected onto a relatively small area, viz, the tibial tuberosity.

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The anterior capsule of the knee joint is formed by the collateral patellar ligaments, which are the expansions of the vasti tendons and fascia lata on the lateral sides of the joint. The ligamentum collaterale fibulare is hidden within a covering driven from the iliolibial tract of the fascia lata. The medial expansion from the tendons of the sartorius and the semimembranosus muscles augment the capsule, which then becomes continuous with ligamentum collaterale tibiale (Wagner, 1927).

Ehrenborg (1961a), (1962) and Davies D.V. and Davies F. (1964) describe the ligamentum patellae as a strong flat ligamentous band built up from parallel fibrous strands, attached, above, to the apex and adjoining margins and to the rough depression on the lowest part of the posterior surface of the patella; and attached, below to the tuberosity of the tibia. It measures about 8 centimeters in length and up to 0.5 centimeter in thickness. At the apex patellae it is about 20 - 30 mm in breadth and 5 to 8 mm thick. Towards its attachment on the tibial tuberosity, the tendon thins off and at its most distal point it is about 20 to 25 mm in breadth.

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The insertion of the ligamentum patellae on the tibial tuberosity has raised much controversy. Hughes and Sunderland (1946) stated that the tibial tuberosity commences about 2 cm below the anterior edge of the tibial plateu where a groove separates it from the bone above (Fig. 3). The groove outlines the superior and lateral margins of the tuberosity and commences at the proximo-medial angle of it, then curves downwards and outwards, following the oblique proximal margin of the tuberosity, to reach the lateral margin down which it descends for a variable distance sometimes extending just distal to the line which separates the proximal smooth and distal roughened parts of the tuberosity. The tuberosity is subdivided into two approximately equal areas - the proximal of which is smooth and the distal, rough. The line of demarcation, like the groove described above, is obliquely arranged and is lower on the lateral side. The distal part of the tuberosity shelves abruptly into the sharp prominent anterior border of the shaft. The distal angles of the tuberosity may form elevations the lateral of which is more prominent.

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Fig. (3)

The Tibial tubercle.
(quoted from Hughes, 1946).

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