بسم الله الرحمن الرحيم

THE PATELLOFEMORAL JOINT

Essay

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Of Master Degree in Orthopaedic Surgery

Presented By

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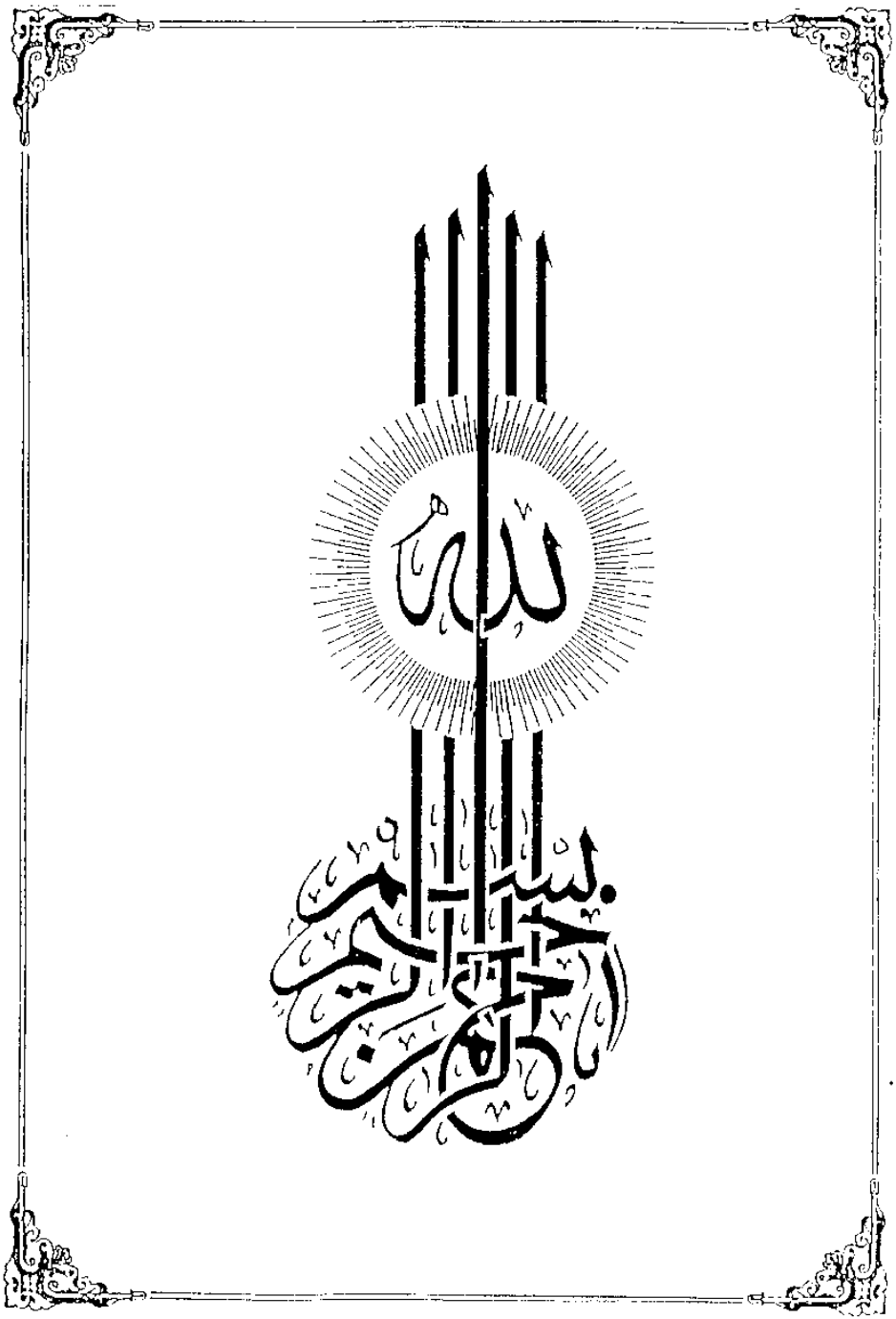

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SALAMA Ali ELTABEY

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Introduction

The patella is a large sesamoid bone within the quadriceps tendon . It functions biomechanically to increase the efficacy of the quadriceps muscle and also physically protect the articular surface of the femoral condyles **(Wilson and Fowler , 1990) .**

In a review of the relative frequency of each type of patellofemoral pain , about 65 percent of cases were caused by tracking and instability problems , 20 percent by chondromalacia , 10 precent by extra - articular or synovial problems and 5 percent by patellofemoral osteoarthritis **(Larson and Grana, 1990) .**

Patellofemoral disorders are causes of anterior knee pain, anterior knee pain occurs at all ages . It is a common complaint in adolescents particularly among athletically motivated young adults . It is generally recognized as a benign self limiting condition **(Sandow and Goodfellow ,1985) .**

Young patients with patellofemoral disorders present a most difficult and often enigmatic clinical group , in large part because of the highly subjective nature of the condition **(Dye and Boll , 1986) .**

Instability is the main disorder of the patellofemoral joint. The patient have frequent occurrences of giving way and fear of having giving way , which indicate the presence of a history of dislocation or subluxation of the patella **(Iwano et al ., 1990) .**

Patients may complain of anterior knee pain without evidence of instability , the so called patellofemoral syndrome .

Classically this is most symptomatic during activities that involve the dynamic compression of the patella such as climbing stairs or squatting or with unrelieved static compression such as prolonged sitting **(Sandow and Goodfellow, 1985)** .

Abnormal tracking may contribute to this syndrome with finding of malalignment **(Ficat and Hungerford , 1977)** .

In old people patellofemoral pain is again common as a more or less predominant feature of degenerative arthritis of the knee joint .

There is little evidence to suggest that patellofemoral disorders in youth pertends the development of osteoarthritis in later years **(Goodfellow et al ., 1976)** .

Aim of work :

In this study , attempt will be made to throw some light on the anatomy , biomechanics , patellofemoral disorders , diagnosis and treatment of patellofemoral disorders .

Surgical anatomy of the patellofemoral joint

The knee joint consists of two major articulations , the femorotibial and the patellofemoral joint .

Articular surfaces

Femoral condyles

The distal articular end of the femur is composed of the two femoral condyles . They are separated by the intercondylar notch .

The lateral femoral condyle is wider in the anteroposterior and transverse planes and has an increased curvature, the medial projects further distally to allow for the normal genu valgum .

The condyles are convex in their articulation with the tibia , and the area of articulation changes as the knee goes from full extension to full flexion .

The distal end of the femur articulates with the patella by means of a lateral and medial facet , these make up the trochlea . The leteral facet is taller - it averages 5 mm thus enhancing the patella's functional stability (Fig.1) **(Casscells , 1979) .**

In the trochlear groove the patella tracks during its excursion from full extension to flexion . If hypoplastic this shallow groove may contribute to a subluxating patella **(Ficat and Hungerford, 1977) .**

Patella (Fig.2)

Roughly triangular in shape , with its base proximal and apex distal . It is composed of two major facets - the medial and lateral which are separated by a longitudinal ridge and a second ridge subdivides the medial into medial and odd facets that comes into contact with the femur only with full fexion **(Goodfellow et al ., 1976)**, normally they articulate

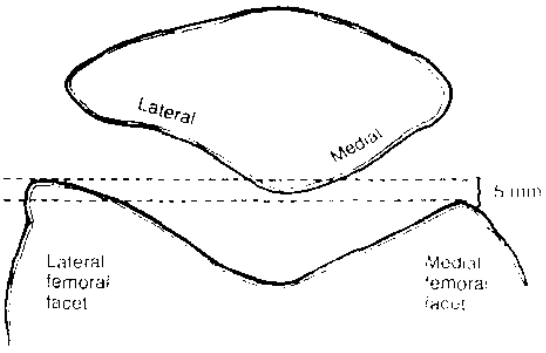

Fig. 1 : A tangential view of the patellofemoral joint shawing the broad lateral femoral facet and the 5 - mm differece in femoral facet height.

(Lombardo, and Bradley,1990)

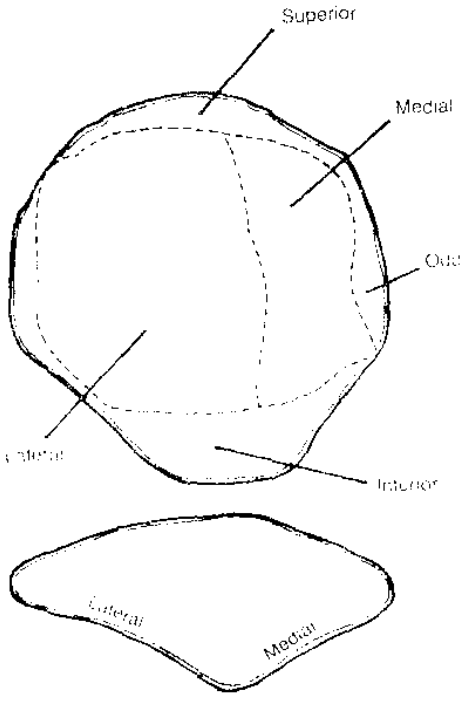

Fig. 2 : Patellar facets.

(Lombardo, and Bradley, 1990)

fastidiously with the femoral trochlear groove . This congruence permits transmission of a deceleration force at any knee flexion posture .

Shape of the patella (Fig. 3)

According to **Larson and Grana (1990)** patellar configuration as seen on tangential views of the patella are described by Wiberg and Baumgartle (1944) :

Type 1 has equal facets that are slightly concave.

Type II has a smaller medial facet both facet are concave .

Type III has a smaller medial facet but a convex surface .

Type II / III has a flat medial facet .

Type IV has a very small medial facet or non .

Type V has no medial facet , no longitudinal ridge and shows lateral subluxation .

It was found that type 1 constitute 24 % of cases, type II (most Common) 57% of cases and type III 19% of cases . Stresses are well distributed on types I and II . The other types are prone to unequal stresses to the patellar articular surfaces and Wiberg believed that chondromalacia occurred predomimantly in type II patella .

The smaller the medial facet the more likely the association with instability and articular damage .

Position of the patella (Fig.4)

The patella normally rests in the centre of the femoral sulcus and the inferior pole just proximal to a line drown across the distal margin of the

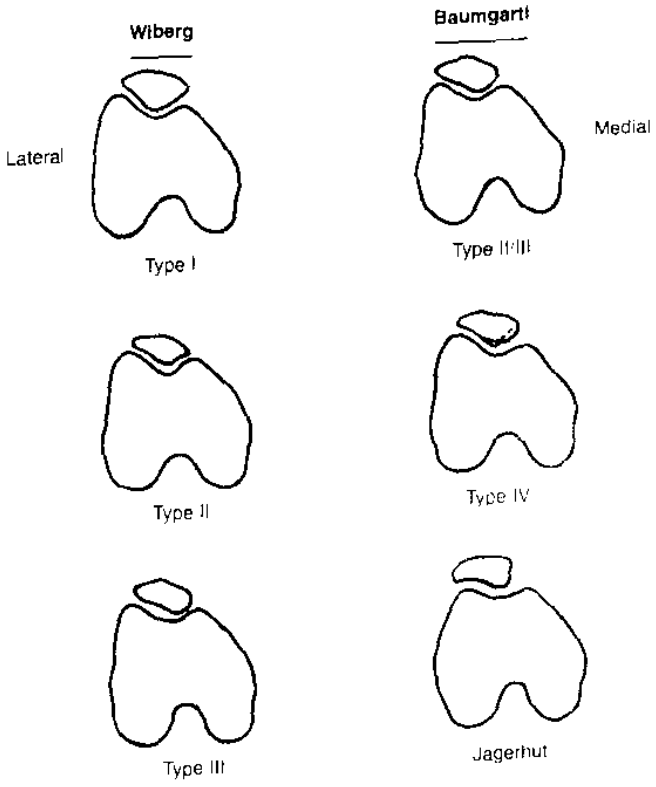

Fig. 3 : Wiberg and Baumgartl's patellar types

(Larson,and Grana , 1990)

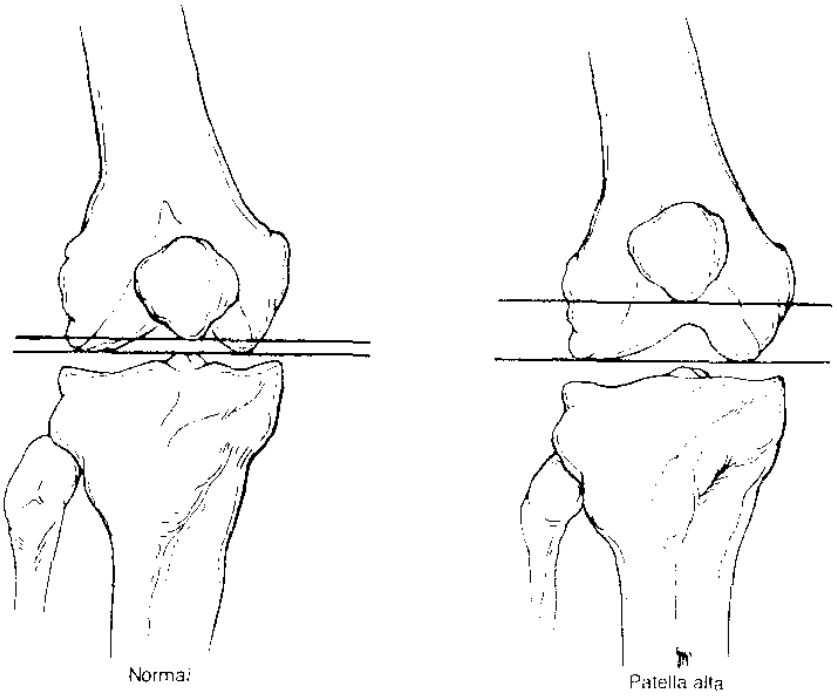

Fig. 4 : The patella normally rests in the centre of the femoral sulcus and the inferior pole just proximal to a line drown across the distal margin of the femoral condyle. Patella alta is suspected if the tip of the inferior pole is more than 20 mm above this line.

(Lombardo,and Bradley,1990)

femoral condyles . Patella alta is suspected if the tip of the inferior pole is more than 20 mm above this line as seen on anteroposterior X. Ray. **Insall et al., (1972)** shows that the length of the patella is approximately equal to the length of the patellar tendon as measured on lateral radiograph .

Patella alta - high riding patella is associated with patellar instability and dislocation .

Articular cartilage

There is a relative bony incongruity of the patellofemoral joint . In order to achieve the substantial contact area known to occur with flexion of the knee , the articular cartilage of the patella is subjected to considerable deformation . It is the thickest in the body 7 mm . **(Abernethy et al ., (1978) .**

Synovium

A synovial fold or plica is occasionally present in close proximity to the patella , it represents a normal embryologic synovial septum that persists into adulthood, three major types of plica exist :

(1) The infra patellar plica (ligamentous mucosum) .

(2) The suprapatellar plica partially separating the knee joint proper from the suprapatellar pouch and persists in 10% of human knee joint .

(3) The medial patellar plica occurs in about 70% of human as cresent outlines that originate along the anteromedial side of the joint extending from the synovium above the medial patella to the synovium investing the fat pad . The medial patellar plica can produce symptoms that may mimic patellar pathology when it becomes