

Study on Thickness of Menisco-Femoral Ligament in North Indian Population

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Abstract: Menisco-femoral ligament is one of the most important accessory ligament of the knee. It connects the fibro-cartilagenous menisci of the knee to the intercondylar area of femur. This ligament have both functional and clinical importance. This ligament act in synergy with posterior cruciate ligament. In case of rupture of posterior cruciate ligament, function is performed by posterior menisco-femoral ligament. It is important to have knowledge of this ligament in arthroscopic surgery. Present study was conducted in department of Anatomy in PGIMS Rohtak on 50 human cadaveric knee joint, in which mid-point thickness was measured in both the sex in two age group 20-40years and 41-60years using vernier caliper. Mean thickness was measured which showed no statistically significant difference in the thickness of this ligament in 20-40 years age group, but statically significant difference in the thickness of this ligament was seen in age group 41-60years. Present study showed that thickness of this ligament decreased in males in older age group whereas thickness in females almost remained the same. This showed sexual dimorphism of this ligament in older age group.

Keywords: menisco-femoral ligament, knee joint, meniscus

1. Introduction

Menisco-femoral ligament is one of the most important accessory ligament of the knee. Menisco-femoral ligament was first discovered by Poirier and Charpy but defined it as 3rd cruciate ligament (cited by Heller and Langman)¹. Kaplan wrote of lateral menisco-femoral ligament having an anterior and posterior part². Radioevitch proposed menisco-femoral as "third cruciate ligament"³. In French, Germany and Russian literature, this ligament is known as Robert's ligament⁴. It connects the fibro-cartilagenous menisci of the knee to intercondylar area of femur. Menisco-femoral ligament are the two ligament that connect posterior horn of lateral meniscus to the lateral aspect of medial femoral condyle. One of these passes anterior to posterior cruciate ligament and is known as ligament of humphry or anterior menisco-femoral ligament. Other passes posterior to posterior cruciate ligament and is known as ligament of wrisberg or posterior menisco-femoral ligament^{5,6}. Friedrich and Brien reported that anterior menisco-femoral ligament was tense in flexion while the posterior menisco-femoral ligament was tense in extension⁷.

2. Material and Method

The present study was conducted in department of Anatomy Pt. B. D. Sharma Post Graduate Institute of Medical Sciences Rohtak. The proposed study was carried out on 50 knee joint of both genders, in two age groups ranging from 20-40 years and 41-60 years in department of Anatomy on the human cadaveric knee joint .

Exclusion criteria

Following cases were excluded from study:

- 1) Cadavers in which any obvious traumatic injury to the knee joint.
- 2) Cadavers in which knee joint were distorted.
- 3) Cadavers with any surgical scar marks on the knee joint.

The anterior menisco-femoral ligament is posterior to anterior cruciate ligament and anterior to the posterior cruciate ligament so it could be visualized only when the knee joint is exposed from anterior aspect. The posterior menisco-femoral ligament is posterior to the posterior cruciate ligament and hence could be visualized best when knee joint is exposed from posterior aspect. So both anterior and posterior approach was used for dissection.



Figure 1: Showing the PMFL in male (PMFL = posterior menisco-femoral ligament) After dissection following parameters were measured



Figure 2: Showing PMFL in female

Midpoint thickness of the ligament was measured using Vernier caliper from the midpoint of two points of its attachment.



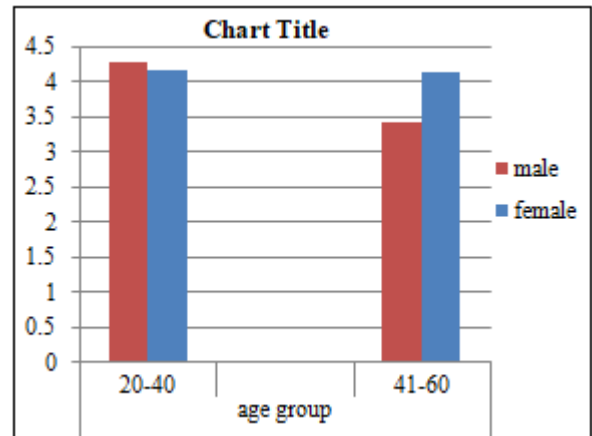
Figure 3: Showing the measurement of the mid-point thickness of menisco-femoral ligament

3. Observation and Results

Mean thickness of menisco-femoral ligament was measured in both the sex in two age group. Then the results were compared of the thickness of this ligament which came out to be insignificant in age group 20-40 years and significant in age group 41-60 years.

Table 1: Showing the mean thickness of the menisco-femoral ligament in male and female in two age group.

Age group	20-40 years	41-60 years
male	4.26±0.83	3.41±0.79
Female	4.17±1.16	4.12±0.01
p value	0.74	0.00



Graph 1: Showing sexual dimorphism in menisco-femoral ligament in north Indian Population

4. Discussion

Vast amount of literature is available regarding this ligament. Review of literature reveals no unanimity of opinion. This ligament is significant biomechanical structure in the knee joint because of its size and strength and it has protective influence on the posterior horn of lateral meniscus.⁸

It is one of the most accessory ligament of the knee. The ligament has an important relation with posterior cruciate, popliteus muscle and lateral meniscus. So it is important for orthopedic surgeon to know about menisco-femoral ligament and its relation, its thickness and size. So clarification of anatomy of menisco-femoral ligament has importance for orthopedic surgeon and for radiologists for MRI of knee joint.

Width of the posterior menisco-femoral ligament Width of the posterior menisco-femoral ligament (PMFL)

Table 2: Showing mean width of posterior menisco-femoral ligament(PMFL) in both sex

Names of authors	Population studied	Method used	Mean width of PMFL (in mm)	
			Male	Female
Poynton et al	Ireland	Dissection	5.5±2.1	4.7±2.4
Erbagci et al	Turkey	Dissection	2.5±0.8	2.3±1.1

Poynton et al reported mean width of posterior menisco-femoral ligament in male to be 5.5±2.1mm and in female 4.7±2.4mm whereas Erbagci et al reported mean width of posterior menisco-femoral ligament in male to be 2.5±0.8 and in female 2.3±1.1mm^{9,10}.

In present study mean width of posterior menisco-femoral ligament was measured in both the sex in two age groups. In age group 20-40 years mean thickness of the posterior menisco-femoral ligament in male was 4.26±0.83mm, and in female it was found to be 4.17±1.1 which was almost the same and the difference was not statistically significant. In age group 41-60 years mean thickness decreased in male and it was 3.41±0.79mm and that in female it was found to be 4.12±0.01 which was statistically significant.

Present study showed that thickness of this ligament decreased in males with increasing age which was in accordance to Lee- Minor¹¹ who proposed that posterior menisco-femoral ligament is regressive structure ,whereas thickness in females almost remained the same.

5. Conclusion

Thickness of this ligament decreased with increasing age in male whereas no such decrease in the thickness of this ligament in female was observed. This showed sexual dimorphism of this ligament in older age group.

Conflicts of interest: none.

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