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OPEN PEER REVIEW

Radiological Comparison of Meniscofemoral Ligaments in Patients with Intact and Ruptured Anterior Cruciate Ligament

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1 Original submission

2 comments · 1 Mar 2021 – 2 Apr 2021

L Maqina Reviewer

MAJOR REVISION 1 Mar 2021

This is a well-designed study with a good sample size, but a better statistical description of the participants would only improve the study and the author's argument.

Soroush Baghdadi Reviewer

MAJOR REVISION 2 Apr 2021

I congratulate the authors of the manuscript titled “Evaluation of Meniscofemoral Ligaments in Patients with Ruptured Anterior Cruciate Ligaments” for their work.

In this study, they have evaluated 200 MRIs to evaluate the presence of MFLs in patients with and without ACL injury. They have found that ACL-deficient knees are significantly less likely to have MFLs.

This is a generally well-written manuscript, which I believe merits publication. However, there are major issues that need to be addressed before the manuscript is ready for publication:

1) I suggest revising the title to “radiologic evaluation of …”.

2) line 1 of abstract: The first sentence is hard to understand: “other pathologies associated with trauma in ACL rupture”. Please revise.

3) line 5: by “conduit” do you mean “condyle”?

4) line 26-27: remove the sentence. There are many papers in the literature on MFLs and their relationship to knee injuries. Of course, every study has something new to add to the literature; otherwise, it would just be a repetition of the same data.

5) line 35: what is the definition of “contact mechanism” and why were these cases removed? Is soccer considered a contact mechanism?

In the same vein, line 39: patients with a history of trauma to the knee joint were excluded! Doesn’t ACL injury occur with trauma? It seems that you will be removing every ACL injury with your exclusion criteria. Please explain.

6) line 43: “whose with suspected ACL tear” is not an English sentence. Please revise.

7) line 48: the first sentence has repeated words. Also, please cite the reference for your methodology here.

8) How did you use ICC analysis for a qualitative variable? I am sure you know that ICC is only used for continuous variables, and kappa statistics should instead be used for nominal data, as in this case.

9) line 78: remove the female data. When the data add up to 100%, there is no need to have the second half. The same applies to line 81.

10) Line 80: You mention that 94 patients had a left ACL injury and 106 a right injury. But 100 of your patients had an intact ACL!! Did you mean MRI exams instead of ACL injuries? Please address.

11) line 86: What is “MFL ratio”? This term should be defined in the methods. This term is also present in the abstract.

12) line 87-88: The sentence is hard to understand and should be revised.

13) lines 93- 97: A big chunk of this paragraph belongs to the methods section. Your results appear only in the last sentence. To reiterate, ICC is not applicable to your data.

14) line 99: you state that there were three principal findings in your study, but you only provide two.

15) line 103: “one of the main functions of MFLs affects the meniscus”. What does this sentence mean?

16) In general, the discussion does not have a good flow. It goes from explaining the biomechanics of MFLs to imaging data and back again. It is also a bit too long. I suggest summarizing and reorganizing the manuscript.

17) The conclusion is not derived from your findings. I suggest mentioning that you found a higher rate of absence of MFLs in patients with ACL tears.

18) In all tables, I suggest adding aMFL and pMFL to the ligament names. Also, the correct name is “Humphrey” and not “humpry”. Also, “Wisberg” and not “wrisberg”.

19) “,” is used instead of “.” in the tables. 7,51 should be revised to 7.51. The same applies to all numbers.

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Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Rewiever 1

Comment 1) I suggest revising the title to “radiologic evaluation of …”.

Answer 1: According to your suggestion. Title changed.

Radiological comparison of meniscofemoral ligaments in patients with intact and ruptured anterior cruciate ligament

Comment 2) line 1 of abstract: The first sentence is hard to understand: “other pathologies associated with trauma in ACL rupture”. Please revise.

Answer 2) According to your suggestion.Sentence has been changed.

Evaluating concomitant injury in ACL rupture is important for predicting long-term results.

Comment 3) line 5: by “conduit” do you mean “condyle”?

Answer 3) We made a mistake in writing . Thank you for fixing our mistake. Word has been changed.

The meniscofemoral ligaments (MFLs) consist of collagen fibres adhering to the medial femoral condyle from the posterior horn of the lateral meniscus

Comment 4) line 26-27: remove the sentence. There are many papers in the literature on MFL and their relationship to knee injuries. Of course, every study has something new to add to the literature, otherwise it would just be a repetition of the same data.

Answer 4) According to your suggestion. Sentece removed.

Comment 5) line 35: what is the definition of “contact mechanism” and why were these cases removed? Is soccer considered contact mechanism?

Answer 5)

ACL injuries that occur without physical contact between patients are referred to as non-contact ACL injuries(1,2,3) and most occur through a non-contact mechanism of injury in sports in which sudden deceleration, landing and pivoting manoeuvres are repeatedly performed(1). Mechanically, in contact ACL injury, there could be compressive, shearing and tensile forces depending on the type of trauma. However, a non-contact ACL injury occurs when a person themselves generates great forces or moments at the knee that apply just excessive tension force on the ACL(4). Since different mechanisms may impair the homogenization of the groups and affect the results, only patients with noncontact mechanisms were included. And also physical activity and occupations part added. Since it was thought that repetitive traumas could affect the results, those who worked with heavy work , professional athletes or those with recreational sporting activities related to the knee were not included in the study.

References

1:Boden BP, Dean GS, Feagin JA, et al. Mechanisms of anterior cruciate ligament injury. Orthopedics 2000;23:573–8.

2- Feagin JA Jr, Lambert KL. Mechanism of injury and pathology of anterior cruciate ligament injuries. Orthop Clin North Am 1985;16(1):41–5.

3- Ferretti A, Papandrea P, Conteduca F, et al. Knee ligament injuries in volleyball players. Am J Sports Med 1992;20:203–7.

4- Yu B, Garrett WE. Mechanisms of non-contact ACL injuries. Br J Sports Med. 2007 Aug;41 Suppl 1(Suppl 1):i47-51.

Patients with arthroscopically confirmed total ACL rupture with noncontact mechanism, adequate quality images available on our Picture Archiving and Communication system and underwent primary ACL reconstruction were included in the study. According to this evaluation, we found 202 patients with total ACL. Non- contact ACL ruptures are defined as ACL ruptures that occur without physical contact between patients and contact ACL ruptures are defined as ACL ruptures that occur with physical contact between patients.

The exclusion criteria were: (1) Patients with partial ACL rupture; (2) ACL ruptures with contact mechanism;(3) combined PCL injury;(4) posterolateral corner (PLC) injury or MCL injury; (5) previous knee surgery; (6) moderately advanced primary and secondary knee arthritis (Kellgren–Lawrence grades 3–4); (7) knee tumour; (8) osteochondral defects, associated medial/lateral meniscal lesions other than ramp lesions; (8) varus valgus knee deformity (>15°); (9) general joint laxity(Beighton Scoring>0)[13], skeletal immaturity, history of major trauma to the knee joint before ACL rupture, infection of the knee; (10) body mass index > 25 ; (11) lack of available MRI, (12) professional athletes or those with recreational sporting activities related to the knee, (13) heavy labor (occupations were subjectively classified as light, intermediate, and heavy). (14) Q-angle>20^0 .

Comment 6) In the same vein, line 39: patients with a history of trauma to the knee joint were excluded! Doesn't ACL injury occur with trauma? It seems that you will be removing every ACL injury with your exclusion criteria. Please explain.

Answer6) According to your suggestion , Necessary changes were made.

'history of major trauma to the knee joint before ACL rupture'

Comment 7) line 43: “whose with suspected ACL tear” is not an English sentence. Please revise.

Answer 7) According to your suggestion. Sentence changed

We recruited 100 patients with suspected ACL tear (from a similar mechanism of injury) and whose MRI revealed an intact ACL.

Comment 8) line 48: the first sentence has repeated words. Also, please cite the reference for your methodology here.

Answer 8) First sentence removed.The citation added where appropriate

The aMFL (humphrey) or pMFL (wrisberg) was characterised as a separate, ovoid, hypointense focus or discrete hypointense bulge or lump, >3 mm thick and posterior or anterior to the PCL, respectively, on sagittal images and as a ≥3-mm thick hypointense band coursing obliquely from the posterior lateral meniscus to the medial femoral condyle on coronal images [12,14,15]. Additionally, the presence of aMFL and pMFL was evaluated by examining all available planes. If any MFL was seen in at least one plane, it was recorded as present.

Comment 9) How did you use ICC analysis in a qualitative variable? I am sure you know that ICC is only used for continuous variables, and Kappa statistics should instead be used for nominal data, such as this case.

Answer 9) We made a mistake in the statistics part. Thank you for correcting our mistake. Statistics were performed again with kappa values.

The interobserver and intraobserver reproducibilities were determined by Cohen's Kappa. They were categorized: 0, none; ≤ 0.40 poor; 0.41 to 0.60 moderate agreement; 0.61 to 0.80 good agreement; >0.81 excellent agreement [16].

A radiologist and an orthopaedic surgeon who were blinded to the study separately evaluated the MFLs. The interobserver and intraobserver kappa values were 0.71 and 0.83 for the MFLs, respectively.

Comment 10) line 78: remove the female data. When the data adds up to 100%, there is no need to have the second half. The same applies to line 81.

Line 80: You mention that 94 patients had a left ACL injury and 106 a right injury. But 100 of your patients had an intact ACL!! Did you mean MRI exams instead of ACL injuries? Please address.

Answer10) After your criticism, the whole paragraph and table 1 were deleted as the comparison between groups was also mentioned again.

Comment 11) line 86: What is “MFL ratio”? this term should be defined in the methods. This term is also present in the abstract.

Answer 11) According to your suggestion, “MFL ratio” definition changed.

In the ACL ruptured group ,a significantly lower presence of wrisberg or humphrey ligament was observed than the control group (P = 0.001) (Table 1).

Comment 12) line 87-88: The sentence is hard to understand and should be revised.

Answer 12) According to your suggestion, the whole paragraph changed.

The time from injury to MRI showed a significant difference among ACL ruptured subgroups (P = 0.001; P < 0.01). Pair comparisons were made to determine the subgroup that showed difference; The time from injury to MRI was higher in group 1 than group 2, group 3 and group 4 (p = 0.017, p = 0.001, p = 0.001, p = 0.004; respectively). No statistical difference was observed between the other groups (p > 0.05, all) (Table 2).

Comment 13) lines 93- 97: A big chunk of this paragraph belongs to the methods section. Your results is only the last sentence. To reiterate, ICC is not applicable to your data.

Answer 13) According to your suggestion, first sentences removed

A radiologist and an orthopaedic surgeon who were blinded to the study separately evaluated the MFLs. The interobserver and intraobserver kappa values were 0.71 and 0.83 for the MFLs, respectively.

Comment 14) line 99: you state that there were three principle findings in your study, but you only provide two.

Answer 14) Necessary correction was made.

There were two principal findings of this study. First, the presence of MFLs on MRI was significantly lower in the ACL rupture group than in the control group. Second, the presence of MFLs decreased with increasing time from injury.

Comment 15) line 103: “one of the main functions of MFLs affects the meniscus”. What does this sentence mean?

Answer 15) In line with your suggestion, the discussion has been summarized , so this paragraph has been completely deleted.

Comment 16) In general, the discussion does not have a good flow. It goes from explaining the biomechanics of MFLs to imaging data and back again. It is also a bit too long. I suggest summarizing and reorganizing the manuscript.

Answer 16) Summarizing and reorganizing were made to discussion part

Comment 17) The conclusion is not derived from your findings. I suggest mentioning that you found a higher rate of absence MFLs in patients with ACL tears.

Answer 17) Since we change the result section the conclusion part is clarified

In conclusion, we observed absence of MFLs (aMFL and pMFL) in a significant majority of patients with ruptured ACLs. Furthermore, we found a significant relationship between the time from injury to MRI and absence of MFL in the ruptured ACL group. Future research is needed to evaluate correlations between arthroscopic or surgical findings and MRI features.

Comment 18) In all tables, I suggest adding aMFL and pMFL to the ligament names. Also, the correct name is “Humphrey” and not “humpry”. Also, “Wisberg” and not “wrisberg”.

Answer 18) Necessary corrections were made.

Comment 19) “,” is used instead of “.” in the tables. 7,51 should be revised to 7.51. The same for all numbers.

Answer 19) Necessary corrections were made.

Rewiever 2

Comment 1-Please reconsider title change as the context speaks abot a comparism between intact and non intact please account for this in your title

Answer 1- According to your suggestion, title was changed.

Radiological comparison of meniscofemoral ligaments in patients with intact and ruptured anterior cruciate ligament

Comment 2- How was this number standarised/ randomised to ensure all the randomly selected MRI had a chance or no biased selection and how did you end up with the specific number of 100 participants. Please state

Answer 2 :Randomization would not be possible in a retrospective study. We made a mistake at the writing stage in this paragraph. We changed the paragraph. Thanks for fixing our error.

We retrospectively evaluated MRI images of the knees of patients aged between 15 and 50 with adequate quality images and medical history available on the Picture Archiving Communication system from 2014 to September 2018. This retrospective MRI study was approved by [redacted] Ethics Committee Decision no: E-2018-2220.

Patient selection:

The patient's age, sex, occupation (past and current jobs), sport activity level (classified as sedentary, recreational, and professional), sides and time from injury to MRI (± days) were recorded.

The inclusion criteria were: Patients with arthroscopically confirmed total ACL rupture with noncontact mechanism, adequate quality images available on our Picture Archiving and Communication system and underwent primary ACL reconstruction were included in the study. According to this evaluation, we found 202 patients with total ACL. Non- contact ACL ruptures are defined as ACL ruptures that occur without physical contact between patients and contact ACL ruptures are defined as ACL ruptures that occur with physical contact between patients.

The exclusion criteria were: (1) Patients with partial ACL rupture; (2) ACL ruptures with contact mechanism;(3) combined PCL injury;(4) posterolateral corner (PLC) injury or MCL injury; (5) previous knee surgery; (6) moderately advanced primary and secondary knee arthritis (Kellgren–Lawrence grades 3–4); (7) knee tumour; (8) osteochondral defects, associated medial/lateral meniscal lesions other than ramp lesions; (8) varus valgus knee deformity (>15°); (9) general joint laxity(Beighton Scoring>0)[13], skeletal immaturity, history of major trauma to the knee joint before ACL rupture, infection of the knee; (10) body mass index > 25 ; (11) lack of available MRI, (12) professional athletes or those with recreational sporting activities related to the knee, (13) heavy labor (occupations were subjectively classified as light, intermediate, and heavy). (14) Q-angle>20^0 .

After exclusion criteria were applied 100 patients were selected for the study in the ACL ruptured group. We recruited 100 patients with suspected ACL tear (from a similar mechanism of injury) and whose MRI revealed an intact ACL. The patients for inclusion in

the matched control group were selected by applying the same exclusion criteria as described above. A demographic form was developed for all patients.

Comment 3- Knee complaints? How was the complaints standerised do you mean someone with a pallofemoral pain syndrome would have been considered? Please state what compalins and alt least what criteria of camplaint the would have to meet pain scalea?

Answer 3: According to your suggestion, the characteristics of the control group patients were explained

We recruited 100 patients with suspected ACL tear (from a similar mechanism of injury) and whose MRI revealed an intact ACL. The patients for inclusion in the matched control group were selected by applying the same exclusion criteria as described above. A demographic form was developed for all patients.

Comment 4- Why did you chose from 15 years? Please elborate. The is a huge anatomical difference in a 15 year old knee vs a 50 year old one. Please specify the reasoning of choosing this age range

Answer 4- Patients who were physis closed and operated were included in the study. Patients with open physis were not included because it could change the biomechanics during anterior cruciate ligament injury (1). Although there are age-related MFL changes in the normal population in the literature(2,3), we think that in our study, it will not have an impact on clinical results since it has a similar age distribution in the control group.

1-Thompson-Kolesar JA, Gatewood CT, Tran AA, Silder A, Shultz R, Delp SL, Dragoo JL. Age Influences Biomechanical Changes After Participation in an Anterior Cruciate Ligament Injury Prevention Program. Am J Sports Med. 2018 Mar;46(3):598-606.

2-Lee BY, Jee WH, Kim JM, Kim BS, Choi KH. Incidence and significance of demonstrating the meniscofemoral ligament on MRI. British Journal of Radiology. 2000;73(867):271–274.

3- Nagasaki S, Ohkoshi Y, Yamamoto K, Ebata W, Imabuchi R,Nishiike J. The incidence and cross-sectional area of the meniscofemoral ligament. Am J Sports Med 2006:34:1345–1350.

Comment 5- Please specify type of arthits (osteo vs Rheumatic)if RM was considered or disregarded)

Answer 5 Necessary correction was made.

moderately advanced primary and secondary knee arthritis (Kellgren–Lawrence grades 3–4);

Comment 6- What about female Q-angle was this not considered ?

Answer 6 -We added q angle changes in the exclusion criteria

Q-angle>20^0 .

Comment 7- What would be the range of this laxity

No end feel?

End feel but with laxity (please specify clearly)?

Answer 7-We used beighton scoring system to clarify laxity

general joint laxity(Beighton Scoring>0**)

Comment 8- İf you have considered BMI what were the other anatomical markers ? Body fat i? Waist- hip ratio?f not please sate why only BMI was considered

Answer 8-Since our study is a retrospective study, only BMI was available in the records. So anatomic markers such as body fat i, waist- hip ratio were not evaluated. This limitation was added in the limitation section? thanks for your contributions.

There were some study limitations that should be considered. The use of MRI to evaluate the MFLs was a potential major issue because there is no established arthroscopic or surgical correlation with MRI findings. MRI may give false-negative results if it misses the fine MFL bonds and may give false-positive results because of the oblique PCL fibres [15,32]. We were careful to distinguish the oblique PCL and pMFL bundles. In our study as anatomic markers, only BMI was evaluated. Such as body fat, waist-hip ratio were not evaluated. Although we did not find any relation between the presence of MFL and BMI, other anatomic markers could be impacted by the presence of MFL. Other limitations were the small numbers of patients with intact and ruptured ACLs and that most of the subjects were male. However, no sex-related difference in the prevalences of MFLs in the normal population has been reported [23,33]. Finally, we did not evaluate the cross-sectional areas, proximal/distal adhesion sides and running angles in the MFLs in this study, which could have affected our results.

Comment 9-This statement is very confusing with very minimal full stops. Please clearly separte your inclusion and exclusion criterias under two seperate topics E.g

Inclusion criteria

ACL ruptures with contact mechanism, combined PCL injury, posterolateral corner (PLC) injury or MCL injury, previous knee surgery, moderately advanced knee arthritis (Kellgren–Lawrence grades 3–4), knee tumour, osteochondral defects, associated medial/lateral meniscal lesions other than ramp lesions, varus valgus knee deformity (>15°)

Exclusion criteria

Answer 9- According to your suggestion, necassary headings were added.

The inclusion criteria were: Patients with arthroscopically confirmed total ACL rupture with noncontact mechanism, adequate quality images available on our Picture Archiving and Communication system and underwent primary ACL reconstruction were included in the study. According to this evaluation, we found 202 patients with total ACL. Non- contact ACL ruptures are defined as ACL ruptures that occur without physical contact between patients and contact ACL ruptures are defined as ACL ruptures that occur with physical contact between patients.

The exclusion criteria were: (1) Patients with partial ACL rupture; (2) ACL ruptures with contact mechanism;(3) combined PCL injury;(4) posterolateral corner (PLC) injury or MCL injury; (5) previous knee surgery; (6) moderately advanced primary and secondary knee arthritis (Kellgren–Lawrence grades 3–4); (7) knee tumour; (8) osteochondral defects, associated medial/lateral meniscal lesions other than ramp lesions; (8) varus valgus knee deformity (>15°); (9) general joint laxity(Beighton Scoring>0)[13], skeletal immaturity, history of major trauma to the knee joint before ACL rupture, infection of the knee; (10) body mass index > 25 ; (11) lack of available MRI, (12) professional athletes or those with recreational sporting activities related to the knee, (13) heavy labor (occupations were subjectively classified as light, intermediate, and heavy). (14) Q-angle>20^0 .

Comment 10- Please specify clearly how you came about a control group and experimental group and how was this randomised

Answer 10 Randomization would not be possible in a retrospective study. We made a mistake at the writing stage in this paragraph. We changed the paragraph. Thanks for fixing our error.

We retrospectively evaluated MRI images of the knees of patients aged between 15 and 50 with adequate quality images and medical history available on the Picture Archiving Communication system from 2014 to September 2018. This retrospective MRI study was approved by [redacted] Ethics Committee Decision no: E-2018-2220.

After exclusion criteria were applied 100 patients were selected for the study in the ACL ruptured group. We recruited 100 patients whose with suspected ACL tear (from a similar mechanism of injury) and whose MRI revealed an intact ACL. The patients for inclusion in the matched control group were selected by applying the same exclusion criteria as described above. A demographic form was developed for all patients. The patient's age, sex, sides and time from injury to MRI (± days) were recorded.

Comment 11 Why only 18 females to this group and how did you get to this numbers) please specify clearly

Answer 11- Since our study was a retrospective study and the study group was selected among the patients who were operated for anterior cruciate ligament rupture, 18 female patients with appropriate criteria were included in the study.

Comment 12- Font sizes are not the same

Answer 12- According to your suggestion, font sizes fixing

Comment 13- Why was level of physical activity not considerd sport or different sporting codesvs sedentary lifestyle please specify

Answer 13: According to your suggestion physical activity and occupations are added.

Patient selection:

The patient's age, sex, occupation (past and current jobs), sport activity level (classified as sedentary, recreational, and professional), sides and time from injury to MRI (± days) were recorded.

The exclusion criteria were: (1) Patients with partial ACL rupture; (2) ACL ruptures with contact mechanism;(3) combined PCL injury;(4) posterolateral corner (PLC) injury or MCL injury; (5) previous knee surgery; (6) moderately advanced knee arthritis (Kellgren–Lawrence grades 3–4); (7) knee tumour; (8) osteochondral defects, associated medial/lateral meniscal lesions other than ramp lesions; (8) varus valgus knee deformity (>15°); (9) general joint laxity, skeletal immaturity, history of major trauma to the knee joint before ACL rupture, infection of the knee; (10) body mass index > 25 ; (11) lack of available MRI, (12) professional athletes or those with recreational sporting activities related to the knee(sport activity level (classified as sedentary, recreational, and professional), (13) heavy labor (occupations were subjectively classified as light, intermediate, and heavy).

Comment 14 How is the reported comparison accounted for as the is fewer women in the study

Answer 14 –The low number of female patients included in the study is an important limitation of the study. This limitation is mentioned in the discussion, limitation section. However, it has been shown in the literature that there is no MFL variability depending on gender. Therefore, we think it will not affect the results.

Other limitations were the small numbers of patients with intact and ruptured ACLs and that most of the subjects were male. However, no sex-related difference in the prevalences of MFLs in the normal population has been reported [23,33]. Finally, we did not evaluate the cross-sectional areas, proximal/distal adhesion sides and running angles in the MFLs in this study, which could have affected our result

Comment 15 Since your age range starts from 15 years are 15 years old included in this grouop as men ? and if yes how many particiapants were 15-18 years? NOt sure please specify

Answer 15-In ACL ruptured group, 4 female and 10 male patients were between 15-18 years old. In the control group 9 female and 10 male patients were between 15-18 years old.

The low number of female patients included in the study is an important limitation of the study. This limitation is mentioned in the discussion, limitation section. However, it has been shown in the literature that there is no MFL variability depending on gender. Therefore, we think it will not affect the results.

Comment 16 İf the varied from age,sex, And race then why was this not repoterd fully on your stastics . please report this on each point or graphical or remove the statement or state from which studies you refereing to.

Answer 16: An error was made during writing. No difference was observed according to gender. Thanks for fixing our mistake.

Comment 17 How was the age differnce accounted for in the thickness would a 15 year old vs 50 year be the same? Please state tyhe criteria used to classify tihs thicknes same with male vs females

Answer 17: We did not evaluate the thickness of MFL. We could not say these definitions so these sentences were removed. Thanks for fixing our mistake.

Anatomical studies have shown several variations in the proximal and distal adhesion sites of the MFLs (17; 20)[17,20]. The aMFL may be thick or thin in two or three bands adjacent to the articular cartilage in the inferoanterior portion of the PCL, starting from the posterior part of the posterior meniscus and in the direction of the femur to the left. The pMFL is generally expressed from the posterior horn of the anterior horn and may be thick or thin in the posterosuperior part of the PCL or in the two bands within the posteromedial PCL band (21)[21]. Bozkurt et al. observed that the MFL thickness ranged from 2.6 to 6.1 mm (average: 2.6 mm) (22)[22]. In our study, the thickness and adhesion site variations in the MFL bonds were not evaluated. We accepted MFLs ≥ 3 mm as being present.

Comment 18-Please state short falls ae per reviw comments

Age

Race

Gender

Q angle

Bodyfat vs bmi

Answer 18- Your suggestions have been added

2 Revision 1

1 comment · 13 Jul 2021

Soroush Baghdadi Reviewer

ACCEPT 13 Jul 2021

I commend the authors for revising the manuscript. I think all of my comments were answered.