Risk factors for Lateral Meniscus Posterior Root Tears in the Anterior Cruciate Ligament Injured Knee: An Epidemiological Analysis of 3956 Patients from the SANTI database.

Abstract

Background: Lateral meniscal posterior root tears (LMPRT) result in loss of hoop forces and significant increases in tibiofemoral contact pressures. Pre-operative imaging lacks reliability and therefore holding an appropriate index of suspicion, based on the epidemiology and risk factors for LMPRT, may reduce the rate of missed diagnoses.

Hypothesis/Purpose: The primary objectives of this study were to evaluate the incidence and risk factors for lateral meniscus root lesions in a large series of patients undergoing anterior cruciate ligament (ACL) reconstruction.

Study Design: Case series

Methods: All patients who underwent primary or revision ACL reconstruction, between January 2011 to April 2018 were considered for study eligibility. From this overall population, all patients who underwent repair of a lateral meniscus posterior root tear (LMPRT) were identified. The epidemiology of LMPRT was defined by the incidence within the study population, stratified by key demographic parameters. Potentially important risk factors for the presence of LMPRT were evaluated in multivariate logistic regression analysis.

Results: 3956 patients undergoing ACL reconstruction were included in the study. A LMPRT was identified and repaired in 262 patients (6.6%). Multivariate analyses demonstrated that significant risk factors for LMPRT included a contact sports injury mechanism (7.8% incidence with contact sports mechanism vs 4.5% with non-contact mechanism 4.5%; OR = 1.69, IC95% 1.266 - 2.285; P <.001) and the presence of a medial meniscal tear (7.9% incidence with medial meniscal tear vs 5.8% in those without; OR = 1.532, IC95% 1.185 - 1.979; P <.001). Although the incidence of LMPRT in male patients (7.3%) was higher than females (4.8%) this was not significant in multivariate analysis (P = 0.270). Patient age, revision ACL reconstruction and a pre-operative side to side laxity difference of ≥ 6mm were not found to be significant risk factors for LMPRT.

Conclusion: The incidence of LMPRT was 6.6% in a large series of patients undergoing ACL reconstruction. Participation in contact sports and the presence of a concomitant medial meniscal tear were demonstrated to be important independent risk factors. Their presence should raise the index of suspicion of this injury pattern.

Key Terms: Root lesions. ACL, ACLR, Meniscus, Meniscus repair

What is known about the subject: Previous reports on the epidemiology and risk factors for LMPRT have all been limited by small study populations. This is an important limitation because it reduces the confidence that can be held in the estimation of the true incidence of these injuries. Understanding the epidemiology and risk factors for LMPRT is of paramount importance because it is recognized that these injuries are likely to be frequently missed and that left untreated can result in significant increases in tibiofemoral compartment pressures and early arthritis. The recognized rate of missed diagnoses is due to a lack of reliability of pre-operative imaging and also failure to hold an appropriate index of suspicion. For that reason it is important to determine a more reliable estimate of the true incidence, and define important risk factors for LMPRT, based on a large population of patients undergoing ACL reconstruction.

What this study adds to existing knowledge: To the knowledge of the authors, this is the first large series (almost 4000 ACL reconstructions) that specifically evaluates the epidemiology and risk factors for LMPRT. The epidemiological data presented in the manuscript allows surgeons to hold an appropriate index of suspicion for these injuries and reduce the rate of missed diagnoses. Furthermore, the presence of identified significant risk factors in an individual patient (contact sports and concomitant medial meniscal tears) should highlight the need to carefully evaluate the lateral meniscal posterior root at the time of ACL reconstruction.

INTRODUCTION:

Anterior cruciate ligament (ACL) registry data demonstrates that meniscal tears are identified in 47-61% of ACL-injured patients.[1,17] A particularly important subset, estimated to occur in 7-12% of ACL injured knees,[4,5,7,11,39] is the lateral meniscus posterior root tear (LMPRT). These injuries are defined by either a radial or longitudinal tear within one centimeter of the posterior root insertion site, or an injury to the menisco-tibial ligaments. [3,39] The importance of this injury pattern lies in the resulting loss of effective hoop stress distribution with weight bearing and significantly increased tibiofemoral contact pressures [20].

LMPRT are usually post-traumatic and are most frequently associated with ACL injuries.[4,5,7,11,39] There are no specific clinical diagnostic methods which reliably identify the presence of these injuries. Diagnosis of LMPRT on magnetic resonance imaging is based on evidence of lateral meniscus extrusion and the "ghost sign" and not usually by direct visualization. It is therefore unsurprising that these injuries may be missed on pre-operative imaging.[18,22] Knowledge of important risk factors for LMPRT allows clinicians to hold an appropriate index of suspicion for these injuries which in turn enables appropriate pre-operative planning, and more importantly may reduce the rate of missed diagnoses and the subsequent risk of early degenerative change associated with failure to repair these lesions. The primary objectives of this study were therefore to evaluate the incidence of lateral root lesions in a large series of patients undergoing ACL reconstruction, and also to determine the risk factors associated with LMPRT.

METHODS:

Patient selection

Institutional review board approval (IRB COS-RGDS-2018-05-001) was granted for this study and all patients provided informed consent in order to participate. A retrospective analysis of prospectively collected data was performed. All patients who underwent arthroscopic primary or revision Anterior Cruciate Ligament (ACL) reconstruction, performed by a single surgeon, between January 2011 to April 2018 were considered for study eligibility. All of these patients had sustained an ACL tear, diagnosed on the basis of clinical examination and magnetic resonance imaging (MRI). The patients had been unable to resume their previous levels of activity because of instability symptoms and therefore underwent ACL reconstruction.

From this group, all patients who underwent repair of a lateral meniscus posterior root tear (LMPRT) were identified and included. As per the methodology of Ahn et al, all patients with incomplete radial or longitudinal tears in the region of the posterior horn were excluded.[3] Furthermore patients who underwent major concomitant surgery (e.g. multiligament reconstructions and/or high tibial or slope osteotomy) were also excluded.

Surgical Techniques of Repair

All surgical procedures were performed by a single surgeon (Y). Patients were positioned in the standard arthroscopy position, with a lateral support at the level of a padded tourniquet, and a foot post to allow the knee to be maintained at 90 degrees of flexion when required. Meniscal and chondral lesions were addressed prior to ACLR, which was performed with either a quadrupled semitendinosus tendon or a bone-patellar tendon-bone autograft.

The lateral meniscus posterior root was evaluated with the knee in a “figure of 4” position whilst viewing from the anterolateral portal. An arthroscopy hook placed in the anteromedial portal was used to carefully probe the meniscal root and its attachment. LMPRT were repaired with a trans-tibial pull-out suture technique[24] (Fig 1: A1, A2, A3), for tears involving the meniscotibial ligament, or an all-inside arthroscopic technique either by suture [3,28] or meniscus repair device, for longitudinal and radial tears within 1cm of the root. (Fig 1; B1, B2, B3).

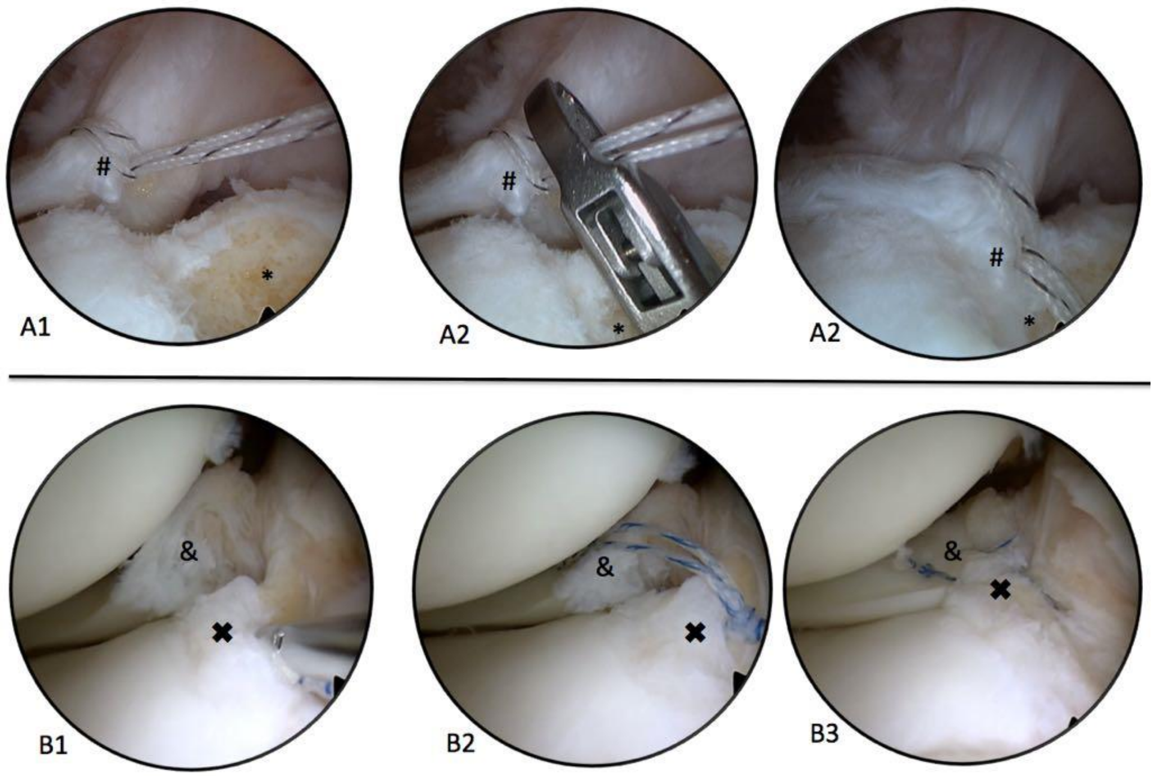

Fig 1. A1: Trans-tibial pull-out technique: A suture cinch (TigerWire, Arthrex, Naples, FLA) is placed in the posterior lateral root. A2: The two traction limbs of the cinch suture are passed through the ACL reconstruction tibial tunnel. A3: Traction is placed on the suture limb at the tibial tunnel aperture in order to obtain anatomical tear reduction

B1: All inside suture technique with FastFix (Smith & Nephew, Massachusetts, USA) device: Through a central midline portal, the first Fast Fix meniscal anchor is placed in the medial remnant of the lateral meniscal root. B2: The second Fast Fix anchor is then placed into the posterior horn of the lateral root in order to bridge the meniscal tear. B3: One or two Fast fix devices can be used to obtain anatomical tear reduction

*# Edge of the Lateral meniscal root tear. * ACL R tibial tunnel.*

& Posterior horn of the lateral root. X Medial remnant of the lateral root.

For the transtibial suture pull-out technique, the knee was also placed in a "figure 4" position. With anterolateral portal viewing, a grasper inserted through the anteromedial portal was used to reduce the meniscal tear and evaluate the optimum suture location for anatomical tear reduction. A suture-passing device (knee scorpion, Arthrex, Naples, Florida, USA) was used to pass a TigerWire suture into the avulsed meniscal root in a cinch configuration. This was then retrieved via the ACL tibial tunnel, tensioned to give anatomical tear reduction and fixed with a SwiveLock (Arthrex, Naples, Florida, USA) anchor before proceeding to ACL graft passage.

For radial and longitudinal tears within 1cm of the root, an all-inside technique was used. Again, with anterolateral viewing, tear reduction was evaluated with a grasper. A central midline portal was used for instrumentation and either an all-inside meniscal repair device (FastFix, Smith and Nephew, Massachusetts, USA), or the knee scorpion were used to repair the meniscus. This was performed with either one or two suture limbs/or FastFix devices, placed within the medial remnant of the posterior root and the displaced posterior horn portion of the meniscal root.

<u>Rehabilitation</u>

All patients underwent the same post-operative rehabilitation. This comprised immediate brace-free mobilization, weight bearing as tolerated, and a restricted range of motion from 0-90° for the first 4 weeks postoperatively. Full extension and quadriceps activation were key elements of the early physiotherapy. Return to sports was allowed gradually with non-pivoting sports at 4 months, pivoting non-contact sports at 6 months and pivoting contact sports at 8-9 months.

Follow-up

Postoperative evaluation was conducted by a sports physician, independent of the primary surgeons at 3 and 6 weeks, and 3, 6, 12 and 24 months.

Epidemiological and Risk Factor Analysis of LMPRT

The epidemiology of LMPRT was defined by the incidence within the study population, stratified by key demographic parameters. Potentially important risk factors for the presence of LMPRT were evaluated for significant association. This included gender, body mass index, primary or revision ACLR, age, time between injury and surgery, whether the ACL injury was sustained performing a contact or non-contact sport (although the specific mechanism of injury was not available), associated medial meniscus tears and pre-operative side-to-side laxity difference (≤6 mm vs >6mm).

Data analysis

All calculations were made with SAS for Windows (v 9.4; SAS Institute Inc), with the level of statistical significance set at $P < 0.05$. Descriptive data analysis was conducted depending on the nature of the considered criteria. For quantitative data this included number of observed (and missing, if any) values, mean, standard-deviation, median, first and third quartiles, and minimum and maximum. For qualitative data this included the number of observed (and missing, if any) values, and the number and percentage of patients per class. A multivariate logistic regression was performed in order to identify predictive factors of LMPRT. The factors considered in the multivariate analysis were selected by way of a univariate approach, using a 20% threshold to indicate a significant effect.

RESULTS :

3956 patients undergoing ACL reconstruction were included in the study. A LMPRT was identified and repaired in 262 patients (6.6%). The incidence of LMPRT, stratified according to patient characteristics and potential risks factors, is presented in Table 1.

Table 1 Individual characteristics of patients with or without an associated lateral meniscus posterior root tear

		Number of Patient analyzed	Lateral meniscus posterior root rears	No lesion
Total		3956	262 (6.6%)	3694 (93.4%)
Gender	Male	2880	210 (7.3%)	2670 (92.7%)
	Female	1076	52 (4.8%)	1024 (95.2%)
Age at injury (years)	≤30	2650	191 (7.2%)	2459 (92.8%)
	> 30	1280	70 (5.5%)	1210 (94.5%)
BMI (kg/m²)		3956		
	Mean (SD)		24.21 (2.91)	23.87 (3.28)
	Median (Q1; Q3)		23.8 (22.2 ; 25.9)	23.5 (21.6 ; 25.6)
	Min ; Max		18.1 ; 35.1	14.6 ; 41.3
Time from injury (months)				
	<= 3	1913	169 (8.8%)	1744 (91.2%)
	]3 – 6]	861	44 (5.1%)	817 (94.9%)
	]6 - 12]	488	18 (3.7%)	470 (96.3%)
	]12 - 24]	263	8 (3.0%)	255 (97.0%)
	> 24	405	22 (5.4%)	383 (94.6%)
ACLR revision				

		Number of Patient analyzed	Lateral meniscus posterior root rears	No lesion
	Yes	324	14 (4.3%)	310 (95.7%)
	No	3632	248 (6.8%)	3384 (93.2%)
Cause of rupture	n			
	Contact sport	2571	200 (7.8%)	2371 (92.2%)
	Non-contact sport	1385	62 (4.5%)	1323 (95.5%)
Laxity (mm)	n			
	<= 6	1969	128 (6.5%)	1841 (93.5%)
	> 6	1987	134 (6.7%)	1853 (93.3%)
Medial meniscus lesion	n			
	Yes	1523	121 (7.9%)	1402 (92.1%)
	No	2426	141 (5.8%)	2285 (94.2%)

Risk Factors for LMPRT

Multivariate analyses were performed in order to investigate the association of potential risk factors with the occurrence of LMPRT (Table 2). These analyses demonstrate that significant risk factors included participation in a contact sport at the time of injury (7.8% incidence of LMPRT in patients participating in a contact sport vs 4.5% in a non-contact injury; OR = 1.69, IC95% 1.266 - 2.285; P <.001) and the presence of a medial meniscal tear (7.9% incidence of LMPRT in patients with a medial meniscal tear vs 5.8% in patients without medial meniscus lesion; OR = 1.532, IC95% 1.185 - 1.979; P <.001). Although the incidence of LMPRT in male patients (7.3%) was higher than females (4.8%) this was not significant in multivariate analysis (P = .270).

A significantly higher incidence of lateral meniscus posterior root tears was observed in patients with an injury to surgery time less than or equal to 3 months, when compared to those with a duration greater than 3 months (8.8% vs 4.6%; P < .0001). There was also a trend to decreased incidence of LMPRT in the groups with greater chronicity for all time intervals studied, up to 60 months (Table 3). It was identified that there were significant differences in the demographic characteristics of patients undergoing surgery before and after three months from the date of injury. In the acute ACL injured group (before three months), this included a significantly younger age, a higher incidence of participation in a contact sport at the time of injury, a lower proportion of patients with side-to-side laxity difference >6mm, and a lower rate of patients with a medial meniscal injury (Table 4). These factors were therefore accounted for in multivariate analysis of the association between time to surgery and LMPRT. This demonstrated that even when accounting for these factors, patients undergoing early surgery (injury to surgery time < 3 months) had a significantly greater risk of LMPRT (8.8%; OR 1.718 to 3.196; P <.001) than those undergoing later surgery. Regression analysis demonstrates the correlation between time since injury and the decreasing incidence of LMPRT (Fig 2).

Table 2 Multivariate logistic regression analysis of the association of potentially important risk factors with lateral meniscus posterior root tears [α]

Risk factor	Comparison	OR (N= 3923)	OR IC95%	*P* value
Gender	Male vs Female			**n.s**.[β]
Age at injury (years)	<= 30 years vs > 30 years			**n.s.**
Time from injury (months) *	<= 3 months vs > 3 months	2.07	[1.591; 2.709]	**<0.001**
ACLR revision?	Yes vs No			**n.s.**
Laxity (mm)	> 6 mm vs <= 6 mm			**n.s.**
Medial meniscus lesion?	Yes vs No	1.532	[1.185; 1.979]	**<.001**
Cause of ACL rupture	Contact sport vs Non contact sport	1.69	[1.266; 2.285]	**<.001**

*[α]Bolded P values indicate statistical significance; [β] n.s. = non-significant ; *3 months after injury was defined as a time between acute anterior cruciate ligament rupture and chronic injury; ACL : anterior cruciate ligament ; ALCR : anterior cruciate ligament reconstruction*

Table 3 The incidence of lateral meniscus posterior root tears in the study population, stratified by class of time interval between injury and ACLR

Time From Injury	No. of Patients	LMPRT	*P* Value*
≤3 mo[α]	1913	169 (8.8%)	<.0001
>3 mo	2017	92 (4.6%)	
≤6 mo	2774	213 (7.7%)	<.0001
>6 mo	1156	48 (4.2%)	
≤12 mo	3262	231 (7.1%)	0.0143
>12 mo	668	30 (4.5%)	
≤24 mo	3525	239 (6.8%)	0.3021

>24 mo	405	22 (5.4%)	
≤36 mo	3639	250 (6.9%)	0.0416
>36 mo	291	11 (3.8%)	
≤48 mo	3693	251 (6.8%)	0.1224
>48 mo	237	10 (4.2%)	
≤60 mo	3737	254 (6.8%)	0.0846
>60 mo	193	7 (3.6%)	

$^{\alpha}$3 months after injury was defined as a time between acute anterior cruciate ligament rupture and chronic injury; * Chi-square test

Table 4. Demographic characteristics of study population, by class of time between injury and surgery. Please note that for 26 patients the date of injury was not available in the database and therefore only 3930 patients are included in this part of the analyses

Variable		> 3 months	<= 3 months	P value*
Gender	n	2017	1913	
	Male	1438 (71.3%)	1422 (74.3%)	**0.0324**
	Female	579 (28.7%)	491 (25.7%)	
Age at injury (years)	n	2017	1913	
	<= 20 years	574 (28.5%)	546 (28.5%)	**<.0001**
	(20, 30) years	718 (35.6%)	812 (42.4%)	
	(30, 40) years	427 (21.2%)	333 (17.4%)	
	> 40 years	298 (14.8%)	222 (11.6%)	
BMI (kg/m²)	n	2017	1913	
	Mean (standard deviation)	23.86 (3.24)	23.91 (3.26)	
	Median (Q1 ; Q3)	23.5 (21.6 ; 25.7)	23.5 (21.8 ; 25.5)	

Variable		> 3 months	<= 3 months	P value*
	Min ; Max	14.6 ; 41.3	15.8 ; 40.2	
BMI (kg/m^2)	n	2017	1913	
	< 18.5 kg/m^2	47 (2.3%)	32 (1.7%)	0.2260
	[18.5, 25.0[kg/m^2	1346 (66.7%)	1322 (69.1%)	
	[25.0, 30.0[kg/m^2	532 (26.4%)	462 (24.2%)	
	[30.0, 35.0[kg/m^2	82 (4.1%)	84 (4.4%)	
	>=35.0 kg/m^2	10 (0.5%)	13 (0.7%)	
ACLR revision	n	2017	1913	
	No	1831 (90.8%)	1783 (93.2%)	**0.0052**
	Yes	186 (9.2%)	130 (6.8%)	
Type of sport	n	2017	1913	
	Contact sport	1236 (61.3%)	1320 (69.0%)	**<.0001**
	Non contact sport	781 (38.7%)	593 (31.0%)	
Laxity (mm)	n	2017	1913	
	<= 6 mm	927 (46.0%)	1027 (53.7%)	**<.0001**
	> 6 mm	1090 (54.0%)	886 (46.3%)	
MM lesion?	n	2014	1909	
	No	1118 (55.5%)	1294 (67.8%)	**<.0001**
	Yes	896 (44.5%)	615 (32.2%)	
LMPRT	n	2017	1913	
	No	1925 (95.4%)	1744 (91.2%)	**<.0001**
	Yes	92 (4.6%)	169 (8.8%)	

** Chi-square test*

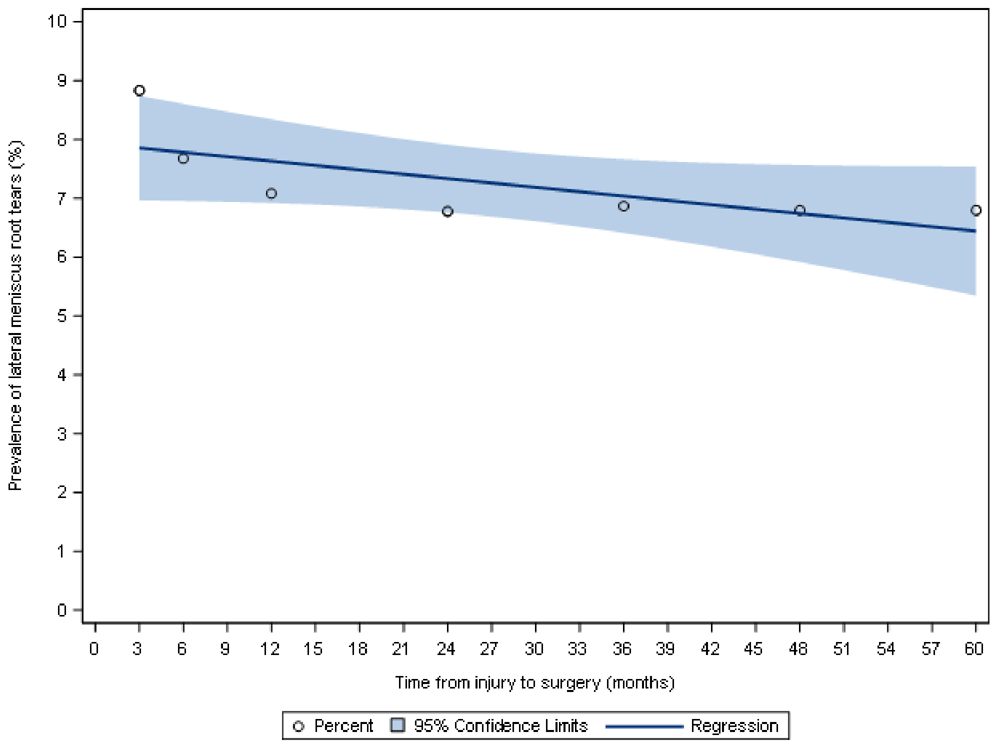

Fig 1 . Scatter plot of the incidence of LMPRT by time category from initial ACL injury to surgery (≤ 3 months, ≤ 6 months, ≤ 12 months, ≤ 24 months, ≤ 36 months, ≤ 48 months and ≤ 60 months); with associated linear regression line and corresponding 95% confidence limits.

DISCUSSION:

The main finding of this study was that LMPRT occurred with an incidence of 6.6% in this continuous series of almost 4000 ACL reconstructions. Previous authors have reported higher rates of LMPRT that have varied between 6.7% (432 ACLR / 29 LMPRT) and 14% (228 ACLR / 32 LMPRT) .[4,5,7,11,15,39] It is likely that the large sample size in the current study provides a more reliable estimate of the true incidence of LMPRT than previous smaller studies.

Other major findings include confirmation that participation in contact sports is a significant risk factor for LMPRT. Feucht et al previously reported a contact injury mechanism to be the strongest risk factor for an associated major lateral meniscus tear (including root, complete radial, unstable longitudinal, including bucket handle) in the ACL-injured knee[13] and the current study has demonstrated that participation in contact sports is also a risk factor for the specific subgroup of LMPRT when other meniscal tear sub-types are excluded. The current study also identified the presence of a concomitant medial meniscal tears as an important risk factor. These findings in combination support the suggestion that LMPRT are typically associated with higher energy injuries. It was also identified that there was a trend towards a higher incidence of LMPRT in male patients (7.3%) than female patients (4.8%) but this was not significant. Similar findings have been reported by previous authors.[5,10,13]

It is reported that LMPRT's occur most frequently in the acute ACL ruptured knee.[3,5,7,10,11,14,16,26] In the current study, it was identified that patients undergoing early surgery (within 3 months of injury) had an almost two-fold higher incidence of root tears than patients undergoing surgery after 3 months. In contrast, Feucht et al reported that the incidence of LMPRT was independent of the time interval from injury to ACL reconstruction,[13] and in addition several authors have reported that the incidence of LMPRT increases with greater delay between injury and surgery .[4,35] It is important to note the aforementioned studies have been limited by small study populations (Feucht et al n=22, Ahn et al n=25, Song et al n=74), and this limits the reliability of their estimates of the true incidence. In the current study it was identified that patients undergoing surgery within three months of the injury had significantly different demographics to those undergoing surgery later (Table 4). However, even when these demographic differences were accounted for in multivariate analysis, it was identified that there was still a significantly greater risk of LMPRT in those undergoing early surgery (OR 1.718 to 3.196; P <.001). However, when interpreting this finding it should be noted that this was not a longitudinal study, and the patients were not followed over time to detect a decreasing incidence. Instead this finding is a cross sectional parameter and a logical explanation for why the incidence of LMPRT was higher in patients undergoing early surgery in this study is the senior authors strategy to recommend prompt surgery in patients in whom a meniscal lesion (either medial or lateral) is suspected, either on the basis of recognized risk factors or due to imaging findings. However, alternative possible explanations for this finding could be that some LMPRT heal. In fact, good healing potential of LM tears left in-situ (without repair) concomitant to ACLR has been reported.[19,33] Due to the good blood supply of the meniscus roots, there might be some potential for spontaneous healing, but with the recognized tendency for meniscal extrusion, it seems illogical to attribute this as the primary explanation for this finding. It should be further emphasized that even if healing does occur, it would most likely be in a non-anatomic position which might adversely affect the biomechanical function of the meniscus.[29,37] As Starke concluded, there is a narrow window for a functionally sufficient repair of meniscal root tears.[37]

It is well recognized that extruded lesions can result in rotatory instability [10,34] and lateral compartment overload [9,12,27,30] thus supporting the indication for suture repair of these lesions. Following LMPRT repair, Ahn et al., described a high healing rate, even within the white-white zone as determined by second look arthroscopy, albeit with a limited sample.[3] Anderson et al. repaired posterior radial and posterior detachments of the lateral meniscus and included post-operative MRI and second look arthroscopy to determine that 22 of 24 root repairs had successfully healed at 59-months follow up.[5] Despite these results, the healing potential of repaired LMPRT is still not clearly documented and further studies are needed regarding this topic.

Arthroscopic evaluation is considered the gold-standard for the diagnosis of LMPRT. Several important series have evaluated the sensitivity and specificity of LMPRT in MRI studies,[6,7,11,22] and there is a broad variability reported. Although some authors endorse MRI as a good diagnostic tool [8,11,18] others have described a high percentage of false negatives.[6,22] Krych et al reported that a high proportion (67%) of LMPRT were missed on preoperative MRI.[22] This variability in reliability is likely a result of the difficulty of visualizing a frank tear due to the relatively small size of each meniscus root. As a result there is a reliance on indirect MRI features of root tears including the presence of meniscal extrusion,[6–8,25] and the *ghost sign* (the absence of an identifiable meniscus in the sagittal plane or high signal replacing the normal dark meniscal signal). [6,21] However, as a result of the limitations of MRI it is likely that imaging studies under-report the true incidence of LMPRT. The authors of the current study agree with Krych et al. that in the setting of an ACL injury, "poor visualization" of the lateral meniscus posterior root on MRI must alert the surgeon for this pathology and prompt a comprehensive arthroscopic evaluation for root tear.[22]

The greatest concern with LMPRT is the progression of degenerative knee osteoarthritis at mid- to long-term follow-up.[36] 70% of the load in the lateral compartment of knee is borne by the lateral meniscus.[2,32,38] This load is converted into circumferential hoop stresses and is transmitted to the tibia via the anterior and posterior roots.[32] Thus anatomic integrity of the roots is of paramount importance for its effective function of load transmission. The posterior root of the lateral meniscus has a bony insertion on the tibia and is attached to the intercondylar area of the femur via the menisco-femoral ligaments (MFL),[40] each acting as primary and secondary restraints to meniscal extrusion respectively. LaPrade[10] and Shybut[34] demonstrated a significant role of the lateral meniscus posterior root in controlling internal rotation of the knee in cadavers, and also showed that the MFL contribute to this stability. In addition, Ode et al· demonstrated a significant increase in lateral compartment contact pressures after complete radial tears in a cadaveric model.[27] These results point to the established detrimental effect of elevated pressure on articular cartilage.[12,30] Choi et al reported that radial displacement of the lateral meniscus may predispose to arthritic changes[9] and this has also been suggested by a great number of authors.[3,13,15,20,23,27,31] It therefore appears to be of great importance to repair LMPRT, but further clinical series are needed to better evaluate lateral compartment arthritis.

Limitations of this study include its retrospective nature. However, it should be recognized that despite inherent weaknesses of retrospective studies, this type of study design confers the advantage of allowing prospectively collected data from very large series of patients to be easily reported. However, specific limitations arising from the retrospective study design included a failure to record an injury mechanism in the database. Although the type of sport (contact vs non-contact) was recorded, it was not known if individuals had suffered a contact injury or not. It was also a limitation that this study did not include an assessment of functional outcomes or a comparison with a control group, for example a comparison of outcomes in patients undergoing non-operative treatment of LMPRT would have been of great interest. In addition, the study did not include routine second-look arthroscopy, MRI or clinical functional evaluation of all patients at final follow-up. This precluded an assessment of the healing rate of LMPRT repair.

CONCLUSION :

The incidence of LMPRT was 6.6% in a large series of patients undergoing ACL reconstruction. Participation in contact sports and the presence of a concomitant medial meniscal tear were demonstrated to be important independent risk factors. Their presence should raise the index of suspicion of this injury pattern.

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