Outcomes Of Multiligament Knee Reconstruction With Concomitant Patellar Tendon Repair In A One-Stage Procedure: Is The Patellar Tendon Ruptures The Limiting Factor?

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Faculty Disclosure Information

- Nothing to disclosure

Introduction

- The association of multiligament knee injury and patellar tendon (PT) injury is rare
- Literature evidence is limited to guide treatment
- Outcomes presented are a matter of debate

Medvecky MJ, et al. J Bone Joint 2023

- Question:

  - the outcomes of multiligament knee reconstruction (MLKR) and patellar tendon repair in a one-stage procedure

- Purpose:

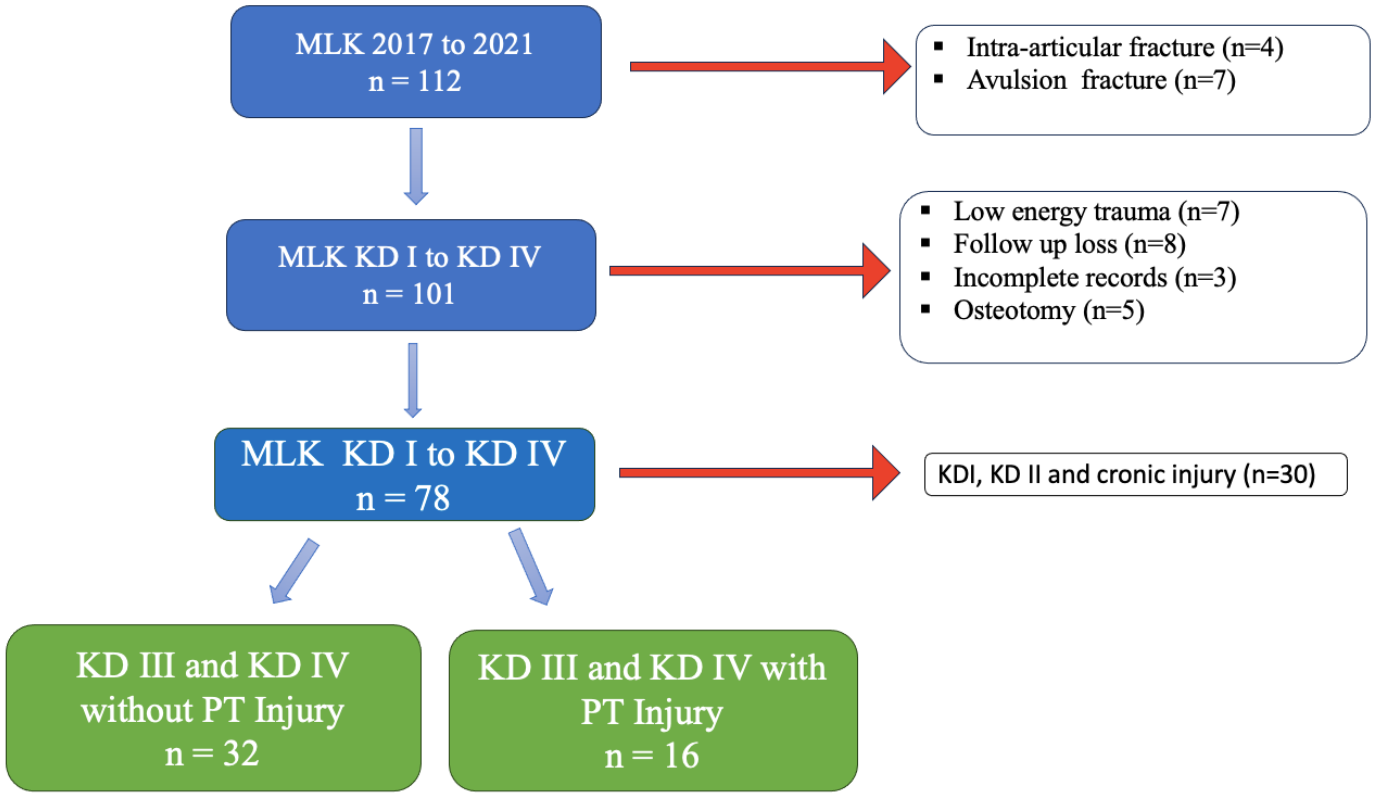
  - compare the outcomes of MLKR and patellar tendon repair in a one-stage procedure in relation to a group without injury to the PT submitted to MLKR

- Inclusion criteria

- Skeletally mature
- Minimum follow-up of 24 months
- Injury to at least 3 of the 4 ligaments
- Diagnosis confirmed by PE and/or MRI
- Injuries resulting from high-energy trauma
- Acute injury

- Exclusion criteria

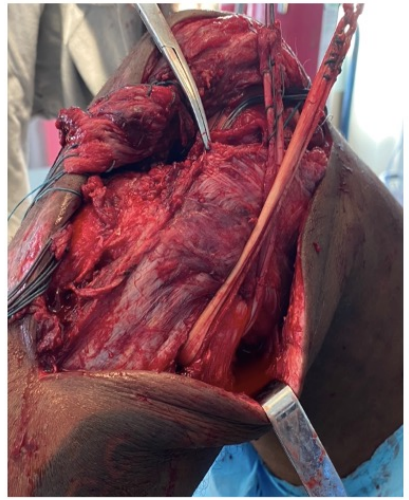
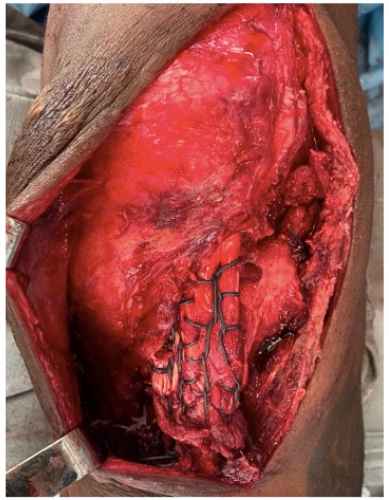
- Avulsion fracture
- Intra-articular fracture
- Previous knee surgery
- Knee arthritis
- Chronic injury



Surgical Management: Autograft were used in all cases

- MLKR without PT Injury:
  - PCL arthroscopically transtibial single bundle
  - ACL arthroscopically transportal in KD IV the ACL was not reconstructe
  - PLC Arciero
  - MCL Canuto et al.

- MLKR with PT Injury: through anterior open approach
  - PCL transtibial single bundle
  - ACL was not reconstructed
  - PLC Arciero
  - MCL Canuto et al.
  - PT: distal avulsion direct repair
    intra-substance ST reinforcement

Rehabilitation

- All patients had the same acute rehabilitation goals
- Long removable rigid brace for 8 weeks
- Rehabilitation was started on the 2 day
- First 4 weeks, the ROM 0 and 90, after that full ROM was allowed
- 6 weeks, progressive weight-bearing started, using crutches
- 8 weeks, the long static immobilizer was removed
- Return to sports activities after 12 months: the one-leg hop test, absence of pain, and effusion

Subjective and objective assessment

- Lysholm
- Tegner activity scale
- Patient satisfaction
- Objective and subjective IKDC
- Range of motion
- Stress radiographs
- Time to return to work
- Complications

Descriptive Demographics of the Cohort, High-energy Multiligament Injuries and Minimum 2-Year Follow-up Comparing Patients With and Without Patellar Tendon (PT) Injury

Acute injury KD III e KD IV	N (%)	Mean Age at Surgery, y (Range)	Male: Female, N	Mean BMI (Range)	Median Time to Surgery, d (Range)	External fixator (no/yes)	Mechanism of Injury (Motorcycle/Car: Pedestrian)	Mean Follow-up, m (Range)
Without PT injury	32 (66,7)	29,69 (20-49)	30:2	24,7 (18,2-30,6)	16,0 (13-26)	25:7	25:1:6	32,8 (24-46)
With PT injury	16 (33,3)	33,2 (19-48)	16:0	23,7 (19,2-30,4)	8,0 (4-11)	6:10	16:0:0	33,6 (26-45)
P value		0,268	0,546	0,336	0,001*	0,006*	0,106	0,677

*p<0,05
BMI, body mass index; m, month; y, year; N, Number of individuals; d, days

Description of Associated Injuries in the Total Sample of Patients

Acute injury KD III e KD IV	Vascular Injury	Peroneal Nerve Injury	Fracture (excluding knee)	Meniscal Injury	Cartilage Injury	Open Injury
Without PT injury	31:1	29:3	29:3	20:12	27:5	31:1
With PT injury	16:0	15:1	16:0	4:12	15:1	15:1
P value	0,475	1,00	0,541	0,014*	0,648	1,00

Values are presented as Number of individuals (No/Yes) for all variables;
*p<0,05

Postoperative Outcome Scores Comparing isolated acute KD III and IV (N=32) and associated with patellar ligament injury (N=16) Reconstruction Groups

Scores	Acute injury KD III e KD IV				p
	No patellar ligament injury (N=32)		With patellar ligament injury (N=16)		
	Mean (SD)	Range	Mean (SD)	Range	
Lysholm Pós	80,19 (7,8)	53-91	77,44 (6,8)	65-88	0,128
IKDC Pós	67,27 (11,6)	33-94	64,62 (6,7)	53-77	0,321
Tegner Pós	3,38 (0,8)	2-6	3,44 (0,6)	2-4	0,531
Satisfaction	8,34 (1,0)	6-10	8,31 (1,1)	7-10	0,828

Outcomes - Objective IKDC

Postoperative IKDC	KD III e KD IV				p
	Without PT injury		With PT injury		
	N	%	N	%	
A	8	25,0	0	0,0	
B	20	62,5	12	75,0	0,072
C	4	12,5	4	25,0	

N, Number of individuals

Range of motion and time to return to work (months)

	KD III e KD IV				p
	Without PT injury		With PT injury		
	Mean (SD)	Range	Mean (SD)	Range	
Extension	0,16 (1,0)	-2 a 3	0,0 (1,0)	-2 a 2	0,576
Flexion	117,97 (8,1)	100-130	116,88 (7,3)	105-130	0,317
Time to return to work (months)	4,03 (0,7)	3-6	8,44 (2,1)	5-12	<0,001*

N: número de indivíduos; DP: desvio-padrão; valores mínimo e máximo (range).

*p<0,05

Pre- and Postoperative Stress Radiographs for Patients With MCL, PCL, and FCL/PLC Injuries According to Valgus, Posterior and Varus Stress

Patellar tendon	Stress Radiograph	Preoperative		Postoperative		p
		Mean (SD)	Range	Mean (SD)	Range	
Without injury (N=32)	PCL	13,59 (2,12)	10-19	1,84 (1,0)	1-4	<0,001*
	MCL	5,10 (2,15)	10-20	1,20 (0,7)	1-3	<0,001*
	PLC	9,33 (2,8)	15-21	1,24 (0,6)	1-3	<0,001*
With injury (N=16)	PCL	18,25 (2,0)	14-21	1,81 (0,5)	1-3	<0,001*
	MCL	7,08 (1,8)	4-10	1,35 (0,8)	1-3	0,001*
	PLC	12,0 (2,3)	9-15	1,27 (0,8)	1-3	0,001*

All measurements are reported in millimeters. *p<0,05

Table 20 – Results Comparing the Numerical Variables of the Caton-Deschamps Index Between the Injured Knee and the Contralateral Knee in the Sample of Patients With Patellar Ligament Injury (N = 16)

Variable	Contralateral Knee		Injured Knee		p
	Mean (SD)	Range	Mean (SD)	Range	
Caton Deschamps Index	1,09 (0,1)	1-1,2	1,03 (0,1)	0,9-1,2	0,095

Note: Values are presented as mean, standard deviation (SD), minimum and maximum values (range);

All measurements are reported in centimeters

Patients With Reported Complications After Multiligament Knee Surgery

		KD III e KD IV				p
		Without PT injury (N=32)		With PT injury (N=16)		
		N	%	N	%	
Arthrofibroses	No	28	87,5	13	81,3	0,563
	Yes	4	12,5	3	18,8	
Infection	No	31	96,9	15	93,8	1,0
	Superficial	1	3,1	1	6,3	
	Deep	0	0	0	0	
DVT	Yes	0	0	0	0	-
	No	32	100	16	100	
Graft Failure	Yes	0	0	0	0	-
	No	32	100	16	100	

DVT, deep venous thrombosis

Conclusion

- There was no significant difference ($p>0.05$) in the postoperative outcome scores, satisfaction, range of motion and stress radiographs when comparing patients undergoing MKR and patellar tendon repair in a single procedure in relation to the group undergoing MKR and without patellar tendon injury

- There was significant difference in time to return to work ($p<0.001$), patients with PT injury the average time was 8,44 months (range, 5-12 months) and in patients without PT injury this time was 4,03 months (range, 3-6 months)

- All patients in the group with PT injury returned to work at the same level as before the injury, and in the group without PT injury, one patient required a change in work activity and the others returned to work at the same level

- Patellar tendon repair associated with a single-stage multiligament reconstruction of the knee and early rehabilitation was effective in restoring joint stability and knee function with outcome scores comparable to the group without patellar tendon injury

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