

Meniscal Root Tears: A Classification System Based on Tear Morphology

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Disclosures

- RFL is a consultant for Arthrex, Ossur and Smith and Nephew and receives royalties from Arthrex and Smith and Nephew
- LE is a consultant for Arthrex and Smith and Nephew and receives royalties from Arthrex

Background

- Meniscal **root tears present in many forms** and can have profound consequences on the health of knee articular cartilage^{1,2,3,4}
- However, the spectrum of meniscal root tear patterns observed during arthroscopic examination **has yet to be adequately defined and categorized**

Purpose/Hypothesis

- The purpose of this study was to **establish a classification system for meniscal root tears** by reporting the morphology of meniscal root tears observed during knee arthroscopy
- It was hypothesized that meniscal root tears could be grouped into types by distinct tear patterns

Methods

- All patients who underwent arthroscopic surgery from April 2010 to May 2014 by a single orthopaedic surgeon were included
- After arthroscopic examination, **data regarding the integrity of the meniscal roots were prospectively recorded** in a data registry
- Data regarding tear morphology and treatment received were subsequently extracted by two independent reviewers from operative notes and arthroscopic surgical photos

Results

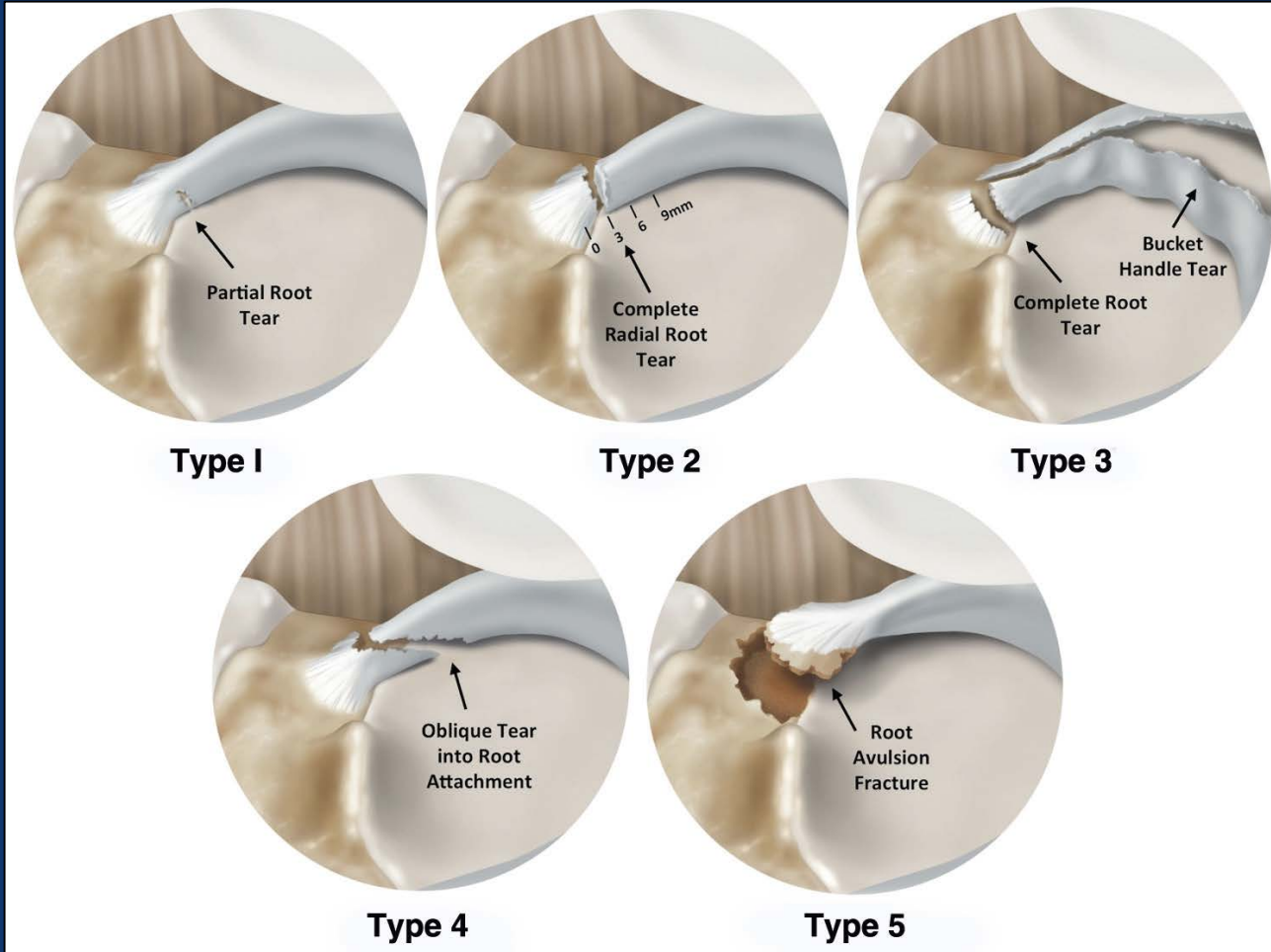
- From April 2010 to May 2014, a total of 81 meniscal root tears were identified in 77 patients (48 male, 29 female) with a mean age of 33 years
- After iatrogenic and revision etiologies were excluded, **a total of 71 meniscal root tears in 67 patients**, representing **4.3% of all arthroscopies performed** during the study time period, were grouped into tear types with similar tear morphologies

Results-Classification Scheme

- Meniscal root tear patterns were categorized into 5 types:

TYPE	SUBTYPE	DESCRIPTION
Type I		Partial stable meniscal tear 0-9 mm from root attachment
Type II		Complete radial meniscal tear
	A	Complete radial tear 0 mm to < 3 mm from attachment
	B	Complete radial tear 3 mm to < 6 mm from attachment
	C	Complete radial tear 6 mm to ≤ 9 mm from attachment
Type III		Bucket handle tear with meniscal root detachment
Type IV		Complex oblique meniscal tear extending into the root attachment
Type V		Avulsion fracture of the meniscal root attachment

Results-Illustrations



Results-Patient Demographics

	AGE		GENDER	
	<i>Average</i>	<i>Range</i>	<i>Male</i>	<i>Female</i>
Type I	36	19 - 65	1	4
Type II	38	14 - 70	30	18
Type III	28	18 - 49	4	0
Type IV	30	17 - 68	6	1
Type V	33	21 - 55	3	4
Exclusions	32	21 - 55	7	3
TOTAL	33	14 - 70	48*	29*

*Patients with multiple tears were only included in the total once

Results-Location, Chronology, and Treatments Received

	LOCATION				CHRONOLOGY			TREATMENT				TOTAL
	AM	AL	PM	PL	Acute	Chronic	Debrided	Trans-tibial	Suture Anchor	Suture Repair	ORIF	
Type I	0	0	1	4	2	3	5	0	0	0	0	5
Type II	0	0	29	19	24	24	1	45	0	2	0	48
Type III	0	0	2	2	4	0	0	3	0	1	0	4
Type IV	0	0	4	3	4	3	2	2	0	3	0	7
Type V	0	5	1	1	7	0	0	5	1	0	1	7
TOTAL	0	5	37	29	41	30	8	55	1	6	1	71

ORIF, open reduction and internal fixation; AM, anterior medial meniscal root; AL, anterior lateral meniscal root; PM, posterior medial meniscal root; PL, posterior lateral meniscal root

Conclusions

- This study demonstrated that it was possible to establish **a concise classification system** to group patients with meniscal root tears by tear morphology

Clinical Relevance

This classification system is recommended to:

- **Establish standardized definitions** for various types of meniscal root tears
- **Improve communication** regarding meniscal root tears between practitioners and across centers
- **Facilitate improved reporting of patient outcomes** after treatment of meniscus root tears with various morphologies

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