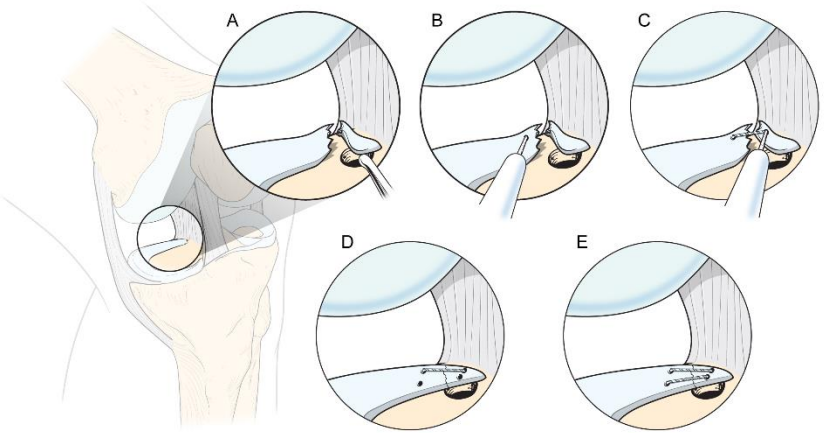
Outcomes of arthroscopic all-inside repair with a bony trough compared to transtibial pull-out repair of medial meniscus posterior root tears



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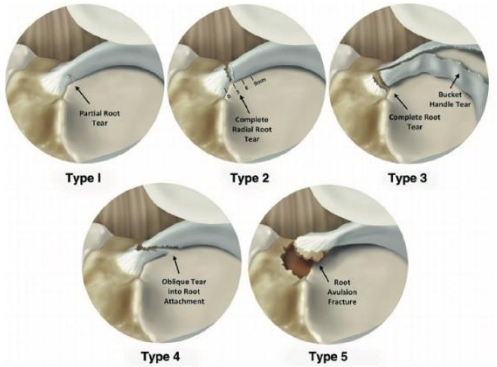
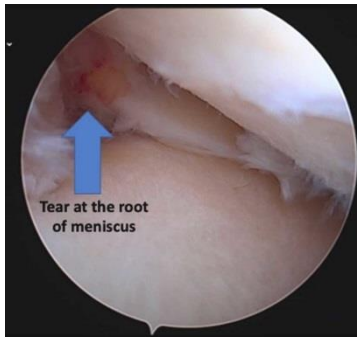
Disclosure

No conflicts of interest

Management of meniscus root tears

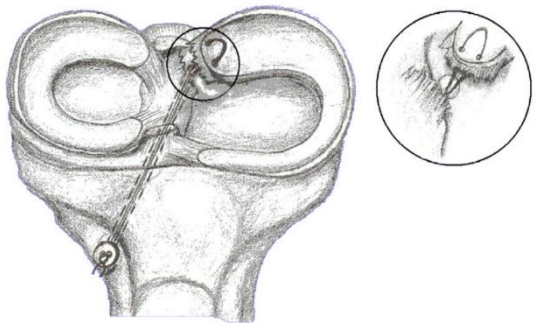




- Acute-on-chronic root tears typically occur in older patients with moderate osteoarthritis.
- Historically, patients with a chronic root tears were treated with nonoperative modalities.
- Studies have indicated that nonoperative treatment fails in up to 87% of patients, and up to 31% of patients undergo subsequent TKA.
- Biomechanical studies found that meniscus root repair restores the femorotibial contact area and pressure to levels near-identical to those of the normal knee

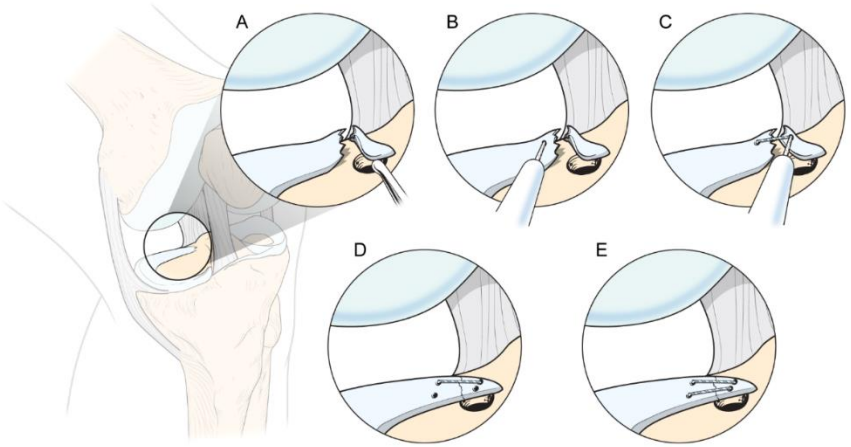
Transtibial pullout repair

- Superior repair technique has yet to be determined
- Most popular of which is transtibial pull-out repair
  - Improves function, pain, and various objective parameters
- Transtibial pullout repair has the disadvantage
  - Requiring a tibial tunnel to be drilled, which is technically challenging on its own, especially when combined with anterior cruciate ligament (ACL) reconstruction or HTO.
  - Risk of suture abrasion within the bony tunnel and creep of the sutures, which would then decrease the strength of the repair and increase the risk of suture rupture.



All-inside repair

- Novel technique
  - Uses all-inside sutures to return the root to its anatomical position
  - Creates a bony trough that enhances meniscus-to-bone healing at the point of anatomical attachment to the tibial surface
- Promising Biomechanical properties in previous studies
- Lacks clinical outcomes evidence



Purpose & Hypothesis

- Purpose

  To compare the clinical and radiologic outcomes between all-inside repair vs transtibial pull-out repair

- Hypothesis

  All-inside repair has similar clinical and radiologic outcomes compared to transtibial pull-out repair.

Study Design

- Retrospective study in a single institution (Kyung Hee University Hospital)
- Patients that underwent medial meniscus posterior root repair from 2013~2019
- From 2013~2016 -> Transtibial repair was surgery of choice
- From 2016~ -> All-inside repair was surgery of choice

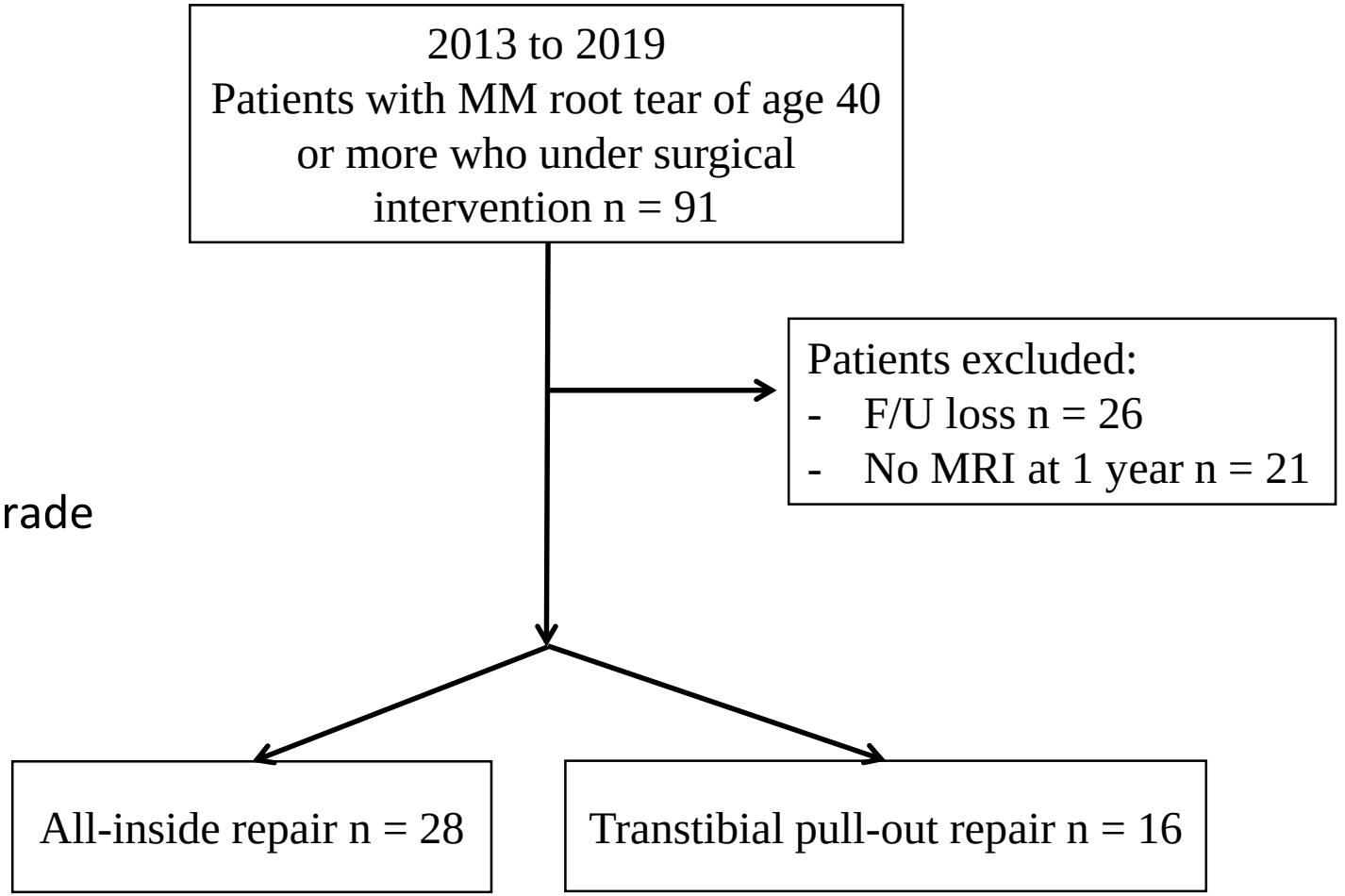
Inclusion and exclusion criteria

- Inclusion
  - Patients who were at least 40 years of age
  - Evidenced a clearly demarcated medial meniscus root tear in MRI
  - Who consented to surgery
- Exclusion
  - Kellgren/Lawrence (KL) grade 3 or 4 osteoarthritis
  - Varus malalignment greater than 5°, or a chondral injury of grade higher than ICRS 3 or 4

Methods

- Clinical evaluation at 2 years
  : IKDC, Lysholm, Tegner activity score

- Radiologic evaluation
  : MRI {preop and 1 year}
    1. Difference in extrusion ratio
    2. Post op 1 year MRI : healing status grade
       complete, partial, non-healing
    3. Post op 1 year MRI : Meniscus signal
       normal, intermediate, high



Demographics

Table 1. Baseline Patient Characteristics

	All-Inside Group (n= 28)	Pull-Out Group (n= 16)	P Value
Male/female	7/21	2/14	.450
Age (years)	54.1 ± 10.9	54.3 ± 9.6	.983
BMI (kg/m^2)	24.5 ± 3.4	24.7 ± 2.0	.760
Right/left knee	15/13	12/4	.350
Follow-up time (years)	2.4 ± 0.2	2.2 ± 0.3	.387

The values are means ± SD. BMI, body mass index.

Results

Table 2. Clinical Scores of the Two Groups Preoperatively and at the 2-Year Follow-Up

	All-Inside Group (n = 28)	Pull-Out Group (n = 16)	P Value
IKDC Subjective score			
Preoperative	40.3 ± 10.2	43.3 ± 7.0	.262
At 2 years	49.0 ± 12.0	47.9 ± 13.2	.807
P value	**.006**	**.278**	
Lysholm score			
Preoperative	43.7 ± 19.4	54.9 ± 22.9	.107
At 2 years	64.5 ± 21.0	65.9 ± 24.5	.852
P value	**.001**	**.248**	
Tegner activity score			
Preoperative	3.1 ± 1.8	4.0 ± 1.5	.092
At 2 years	4.2 ± 1.6	4.5 ± 1.3	.534
P value	**.02**	**.338**	

The values are expressed as means ± SD.

Results

Table 3. Relative Extrusion Percentages of the Two Groups Preoperatively and at the 2-Year Follow-Up

	All-Inside Group (*n* = 28)	**Pull-Out Group (*n* = 16)**	***P* Value**
Preoperative	23.1 ± 7.3	25.3 ± 6.8	.326
At 2 years	26.1 ± 8.6	33.3 ± 7.4	.006
Change in the relative extrusion percentage	3.0 ± 4.7	8.0 ± 6.1	.009

The values are expressed as means ± SD.

Results

Table4. Healing and Signal Status of the Medial Meniscus Posterior Root on 1-Year Postoperative Magnetic Resonance Imaging

	All-Inside Group (*n* = 28)	Pull-Out Group (*n* = 16)	*P* Value
Healing status			
None	1 (3%)	3 (19%)	
Partial	8 (29%)	8 (50%)	
Complete	19 (68%)	5 (31%)	
			.041
Signal intensity			
Normal	13 (46%)	1 (6%)	
Intermediate	11 (39%)	8 (50%)	
High	4 (14%)	7 (44%)	
			.011

(n). The values are percentages.

Conclusion

- All-inside MMPRT repair showed no difference in functional outcome score compared to that of a traditional method.
- Radiologically, all-inside repair was better than transtibial pull-out repair
- All-inside repair may be a viable option for MMPRT treatment.

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