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Arthroscopic Partial Meniscectomy for Degenerative Tear: 10 Year Outcomes

To the Editor:

Arthroscopic partial meniscectomy (APM) — keyhole resection of torn meniscus tissue — is commonly performed in middle-aged and older adults with knee pain attributed to a degenerative meniscal tear; it is among the most commonly performed orthopedic procedures worldwide.

Over the past decade, randomized trials comparing APM with nonoperative care or sham surgery have shown little or no benefit, while

observational evidence has raised concern that APM may accelerate structural degeneration and increase the likelihood of subsequent knee replacement (1).

The FIDELITY trial (NCT00549172 and NCT01052233) is a multicenter, randomized, participant- and assessor-blinded, sham-surgery–controlled study evaluating APM for degenerative medial meniscal tear in adults without established radiographic osteoarthritis. Trial methods and short- and intermediate-term outcomes (2-5) have been published previously, and the study protocol is available with the full text of this letter at NEJM.org. Here we report the 10-year outcomes.

Participants underwent diagnostic arthroscopy to confirm eligibility before intraoperative randomization to APM or sham surgery. Over the 10-year follow-up, we collected repeated patient-reported outcome

measures, serial radiographic assessments of osteoarthritis, and predefined clinical endpoints including reoperations and subsequent knee procedures (See supplementary appendix).

Of the 146 participants originally randomized, 64 of 70 (91%) in the APM group and 69 of 76 (91%) in the sham group completed 10-year follow-up (Tables S1 and S2). At 10 years, adjusted mean differences between the APM and sham surgery groups for the 3 primary patient-reported measures were: -9.4 points (98.33% CI, -17.0 to -1.7) for the WOMET score (assessing meniscal symptoms and related disability), -5.1 points (98.33% CI, -11.2 to 0.95) for the Lysholm score (assessing knee function), and 0.86 points (98.33 CI, -0.12 to 1.85) for knee pain after exercise (Table 1 ; legend provides score ranges and interpretation.)

Radiographic OA progression occurred in 81% of participants in the APM group and 70% in the sham group (adjusted risk difference, 12

percentage points; 95% CI, -1 to 26). Eight (11%) participants in the APM group and three (4%) in the sham group underwent knee replacement or high tibial osteotomy (Table 1). Findings were similar in sensitivity analyses censoring patient-reported data after knee replacement or osteotomy and accounting for missing radiographic outcome data (Tables S3 and S4).

Because the original study was designed to maximize the chance of detecting benefit from APM, we enrolled patients with minimal or no radiographic osteoarthritis. Yet, even in this low-risk group, we found no evidence of benefit and a suggestion of worse outcomes following APM. Taken together with other evidence, these findings raise concern regarding the use of APM for degenerative meniscal tear in middle-aged and older adults.

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§ A complete list of the FIDELITY (Finnish Degenerative Meniscus Lesion Study) Investigators (and their roles and responsibilities in the execution of the trial) is provided in the Supplementary Appendix.

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Table 1. Primary and secondary outcomes of the trial at 10 years after arthroscopy.

	Arthroscopic partial meniscectomy (n=64)	Placebo surgery (n=69)	The difference* (95% CI) between groups
Primary outcomes			
<i>Patient-reported outcomes[†]</i>			
WOMET score [‡] –mean (SD)	80.1 (21.8)	87.3 (14.7)	-9.4 (-17.0 to -1.7)
Lysholm knee score [§] –mean (SD)	80.2 (17.8)	84.6 (13.9)	-5.1 (-11.2 to 0.95)
Pain after exercise (NRS) –mean (SD)	2.5 (2.8)	1.8 (2.2)	0.86 (-0.12 to 1.85)
<i>Radiographic outcomes</i>			
Kellgren-Lawrence [¶] grade progression –no. (%)	52 (81)	44 (70)	12 (-1 to 26)
OARSI** Score –mean (SD)	5.9 (4.0)	4.7 (3.3)	1.02 (-0.02 to 2.07)
Secondary outcomes			
Treatment-group unblinding –no. (%)	8 (12)	9 (12)	0.01 (-0.09 to 0.12)
Mechanical symptoms	11 (17)	15 (22)	-4 (-18 to 8)
Satisfied patients –no. (%)	48 (75)	58 (84)	-8 (-22 to 5)
Improved patients –no. (%)	62 (89)	63 (83)	-6 (-19 to 6)
Returned to normal activities –no. (%) ^l	44 (71)	55 (85)	-13 (-27 to 1)
Clinical OA ACR ^{††} –no. (%)	13 (22)	12 (19)	4 (-11 to 18)

Re-arthroscopy –no. (%)	3 (4)	7 (9)	Not applicable
HTO/TKR ^{†‡} –no. (%)	8 (13)	3 (0)	Not applicable

* The mean difference for continuous variables and the risk difference for categorical variables (APM minus sham). The risk difference estimates were derived from an adjusted logistic regression model using the method of standardization. The confidence intervals for the three primary patient-reported outcomes are 98.33% confidence intervals (CIs) for between-group comparisons to account for performing three tests. These CIs do not take into account previous tests of these outcomes. All other estimates are reported with 95% CIs without any adjustment for multiplicity. The reported CIs should not be used in place of hypothesis testing.

†

‡ The Western Ontario Meniscal Evaluation Tool (WOMET) contains 16 items addressing 3 domains: 9 items addressing physical symptoms; 4 items addressing disabilities due to sports, recreation, work, and lifestyle; and 3 items addressing emotions. The percentage of normal score is used; accordingly, the range is 0 (%) to 100 (%) , with higher scores better.

§ The Lysholm knee score is an 8-item questionnaire designed to evaluate knee function and symptoms in activities of daily living. The score range is 0 to 100; higher scores indicate less severe symptoms.

- || Knee pain after exercise and at rest (during the preceding week) was assessed on a rating scale of 0 to 10, with 0 denoting no pain and 10 denoting extreme pain.
- ¶ Kellgren–Lawrence (KL) grade is a widely used 0–4 radiographic scale for tibiofemoral osteoarthritis; grade progression reflects worsening structural disease.
- ** OARSI sum score is a semi-quantitative 0–18 radiographic measure combining joint-space narrowing and osteophytes in medial and lateral compartments; higher scores indicate more severe structural change.
- †† Clinical OA ACR = knee osteoarthritis according to the American College of Rheumatology (ACR) Clinical Criteria (dichotomous outcome: Yes or No)
- ‡‡ HTO = High Tibial Osteotomy; TKR = Total Knee Replacement