

## **Is Menopause Associated with an Increased Risk of Medial Meniscus Posterior Root Tears and Arthroplasty?**

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**INTRODUCTION:** Medial meniscus posterior root tears (MMPRTs) accelerate osteoarthritis progression. Increased age and female sex are recognized risk factors for MMPRT, but menopause-specific risk factors remain unexplored. Therefore, the goals of this study were to: 1. identify risk factors for MMPRT and define arthroplasty-free survival in men and post-menopausal women with meniscal tears, 2. define menopause-specific factors associated with MMPRT, and 3. identify risk factors for and survivorship-free from arthroplasty in patients with MMPRT.

### **METHODS:**

All patients at our institution with a meniscal tear from November 1975 to December 2024 were identified. From this cohort, women with a menopausal diagnosis preceding their meniscal tear were matched one-to-one with men by age and body mass index (BMI). Imaging studies were reviewed to identify MMPRTs. Subsequent arthroplasty, Charlson Comorbidity Index (CCMI), menopausal type (surgical or physiologic), hormone replacement therapy (HRT), bisphosphonate usage, and bone mineral density (BMD) were recorded. Logistic and Cox regression were used to define risk factors for MMPRT and arthroplasty; survivorship was determined using Kaplan-Meier analyses.

**RESULTS:** The final cohort consisted of 1564 patients (n=782 females) with a median age of 63 years, of which 244 patients (15.6%) had MMPRT. Age (OR [95% C.I.]: 1.02 [1.004-1.035]) and female sex (OR: 1.34 [1.02-1.76]) were associated with the risk of MMPRT. The presence of a MMPRT (HR: 1.43 [1.10-1.87]), female sex (HR: 1.56 [1.26-1.93]), BMI (HR: 1.03 [1.02-1.05]), and CCMI (HR: 0.87 [0.79-0.96]) were associated with increased risk of subsequent arthroplasty among males and post-menopausal females with a meniscal tear. Among post-menopausal females, age at menopause (OR: 0.97 [0.95-0.99]), prior surgical menopause (OR: 2.08 [1.40-3.08]), HRT usage (OR: 1.61 [1.07-2.48]), and femoral neck BMD (OR: 4.01 [1.06-15.4]) were associated with MMPRT. Among subjects with a MMPRT (n=137 post-menopausal female patients and n=107 male patients), female sex (HR: 1.90 [1.08-3.35]) was associated with conversion to arthroplasty. Ten-year survivorship-free from arthroplasty in patients with MMPRT was 53.5% for women and 78.4% for men (P=0.02).

### **DISCUSSION AND CONCLUSION:**

Post-menopausal status and HRT usage are novel risk factors for MMPRT. Compared to men, post-menopausal women with MMPRT exhibit reduced arthroplasty-free survival, underscoring the need for targeted interventions in this population.