Increased Posterior Tibial Slope Correlates with Greater Odds of Reoperation and Failure Following Meniscus Allograft Transplantation

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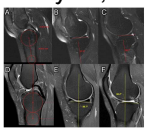
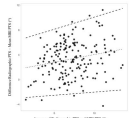
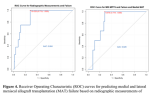
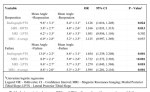
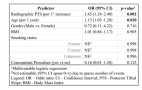
INTRODUCTION: Higher posterior tibial slope (PTS) is associated with a higher rate of failure in meniscal root tears and anterior cruciate ligament reconstruction. The purpose of this study is to analyze the correlation of PTS with patient reported outcomes (PROs), reoperation, and failure rates in meniscal allograft transplantation (MAT).

METHODS: A retrospective review of a prospectively maintained database was performed to assess outcomes after MAT in patients between 2003 and 2021 with minimum 2-year follow-up. PTS was measured on lateral knee radiographs, with medial posterior tibial slope (MPTS) and lateral posterior tibial slope (LPTS) measured on magnetic resonance imaging (MRI). PROs were collected preoperatively and at a minimum of 2-years follow-up. MAT failure was defined as revision MAT or conversion to arthroplasty. Multivariable regression was used to correlate PTS with PROs, reoperation, and failure rates. Failure and reoperation were further analyzed separately in medial and lateral MATs for MPTS and LPTS, respectively.

RESULTS: One-hundred-seventy-five knees (174 patients) met inclusion criteria with an average age of 27.4 ± 9.1 years and mean follow-up of 8.3±3.8 years. Average PTS was 8.8° ± 3.2° by radiograph, 5.1° ± 2.7° (MPTS) and 5.8° ± 3.3° (LPTS) by MRI. MRI measurements significantly underestimated radiographic measurements by 3.3°±2.9°. Correlation coefficients demonstrated weak to moderate correlations between radiograph and MRI measurements, while intraclass correlation coefficients ranged from 0.920-0.931 for intra-rater reliability and 0.855-0.952 for inter-rater reliability within MRI or radiographic measurements. There was no association between PTS and postoperative PROs. Sixty cases (34.3%) resulted in reoperation at an average of 2.5 ± 2.8 years and 8 cases (4.6%) experienced failure at an average of 8.9 ± 2.9 years. Higher radiographic PTS and MPTS was associated with higher odds of reoperation (OR=1.126, p=0.024 and OR=1.166, p=0.013), and failure (OR=1.654, p=0.001 and OR=1.712, p<0.001). Higher LPTS was associated with greater odds of failure (OR=1.279, p=0.018). In medial MAT, MPTS was associated with higher odds of reoperation and failure.

DISCUSSION AND CONCLUSION: Increased PTS correlates with greater odds of reoperation and failure following MAT. With subgroup analysis, increased MPTS is associated with an increased risk of medial MAT reoperation and failure.