

Jack A. Grace
L2
LSU Health Sciences Center, New Orleans, LA

Vinod Dasa
LSUHSC, Department of Orthopaedics

“A Prospective Study on the Relationship Between Mechanical Tension and Scar Cosmesis After Total Knee Arthroplasty”

INTRODUCTION: Total knee arthroplasty (TKA) is a widely performed and highly effective surgical intervention for patients with advanced symptomatic knee joint disease, most commonly due to osteoarthritis. While the procedure reliably improves pain, mobility, and quality of life, less attention has been paid to the aesthetic outcome of the surgical scar — a factor that can significantly influence patient satisfaction, particularly in younger or more active individuals. Prior research suggests that increased mechanical tension during wound healing is a key driver of hypertrophic or widened scar formation. However, there is a gap in the literature regarding how patient-specific mechanical forces, such as those generated by body habitus or soft tissue tension, affect scar cosmesis following TKA.

OBJECTIVES: This study aims to investigate whether increased mechanical tension, quantified through objective measurements such as anterior knee soft tissue thickness, thigh circumference, and body habitus, correlates with increased scar width and less favorable scar appearance following total knee arthroplasty. Identifying such a relationship may highlight modifiable risk factors to improve postoperative aesthetic outcomes and overall patient satisfaction.

METHODS: We will conduct a prospective, single-center observational cohort study of 30–40 patients undergoing primary TKA, with follow-up beyond 6 months postoperatively. Standardized clinical photographs with a ruler for scale will be obtained and used to measure scar width at multiple points along the incision. Additional variables will include body mass index (BMI), mid-thigh circumference, and anterior knee soft tissue thickness measured on lateral knee radiographs (quantified as the fat pad thickness beneath the patella). We will also collect data on potential confounders, including age, sex, race, Charlson comorbidity index, surgical closure technique, history of keloid or hypertrophic scarring, tobacco use, and diabetes status. Multivariable regression analysis will be used to identify independent predictors of less favorable scar outcomes.

HYPOTHESIZED RESULTS: We hypothesize that patients with greater anterior knee soft tissue thickness, larger thigh circumference, and higher body habitus measurements will demonstrate increased postoperative scar width and less favorable scar appearance following TKA.