

Introduction: There is extensive literature on implant positioning and comparisons between robotic and conventional techniques. However, there is scarce evidence regarding patellar tracking during robotically-assisted Total Knee Arthroplasty (TKA). The objective of this study is to describe patellar tracking during robotically-assisted TKA.

Methods: Prospective series of 23 patients (24 knees) undergoing TKA with patellar replacement using a robotic arm. Tracking was obtained in a standardized manner. The anterior surface of the patella was delimited with an electrocautery, using the thickest point of the patella as a mediolateral reference and the middle of the proximal-distal distance as a cephalocaudal reference. Freehand points are recorded from 0° to 90° of flexion, thus establishing the "native" patellar tracking. Then, after the bone cuts with the trial implants in place, a new recording is made, and the "final" tracking is obtained. Postoperative analysis with 3D software using references obtained from images with an intra and interobserver correlation greater than 0.9.

Results: Mean age was 64 years. Patellar tilt $>20^\circ$ was present in 25% of cases, and IWANO ≥ 3 was present in 50%. The center of rotation (CR) was located at an average of 55% of the transepicondylar (TE) distance, and at the final tracking at 60%. The radius of curvature increased by 4.8% (45 to 46.3 mm). In cases with tilt $>20^\circ$, IWANO ≥ 3 , and TT-TG ≥ 15 mm, the CR was medialized by 11.6 mm vs -8.1 mm ($p=0.028$) and was more lateral initially (66% vs 52% of the TE distance, $p=0.034$). In patients without malalignment, 55% had translation <2 mm. There was no overstuffing of patellofemoral joint superior to 5 mm.

Conclusions: In malalignment, the CR tends to be located laterally at initial evaluation, shifting medially after implantation. Both mediolateral translation and overstuffing can be optimized through component position adjustments and selective releases. These findings reinforce the usefulness of robotic navigation to customize prosthetic positioning according to individual patellofemoral kinematics. However, further clinical follow-up is required to determine the functional relevance of these findings.