✚ Evidence in focus

Publication summary: Smith LA, et al. *J Arthroplasty* (2020)*

Smith+Nephew

Femoral geometry and the cruciate ligaments may play a significant role in achieving more normal-like kinematic patterns post-total knee arthroplasty (TKA)

✚ Plus points

JOURNEY® II XR® knees experienced more **normal-like kinematic patterns** compared to JOURNEY II CR, demonstrating the importance of the ACL

The authors stated JOURNEY II CR knees demonstrated an **improvement in lateral femoral rollback and axial rotation** compared to previous studies on CR knees

Overview

- First study to assess the impact of the ACL, PCL and femoral condylar geometry on kinematic patterns following TKA and comparing this to the normal knee
  - 40 JOURNEY II CR knees (average follow up, 24.8 months; mean age, 68.8 years)
  - 10 JOURNEY II XR knees (average follow up, 16 months; mean age, 62.3 years)
  - 10 normal knees (mean age, 57.4 years)
- All TKA subjects were selected as a result of having a well-functioning TKA, with a Knee Society Score (KSS) ≥80
- Each patient was asked to perform a weight-bearing deep knee bend (full extension to full flexion; Figure)
- Kinematics were measured at full extension and at 30° increments to full flexion

Results

Compared to the normal knee:

Early flexion (0-30°; ACL function)
- JOURNEY II XR demonstrated a similar magnitude of posterior femoral rollback (PFR)
- JOURNEY II CR demonstrated PFR, but significantly less than the normal knee (lateral, p=0.004; medial, p=0.002)
- Both JOURNEY II XR and CR exhibited external femoral rotation, but to a lower magnitude

Mid flexion (30-60°; ACL/PCL translation)
- JOURNEY II XR demonstrated no statistical difference in anterior–posterior translation or axial rotation
- JOURNEY II CR demonstrated significantly less anterior-posterior translation (lateral, p<0.004; medial, p<0.03) and axial rotation p=0.01)
  - The authors stated that JOURNEY II CR did not experience the significant amount of paradoxical sliding seen in other PCR TKAs

Deeper flexion (60-90°; PCL dominant)
- No significant difference with JOURNEY II XR or CR in anterior-posterior translation
- JOURNEY II XR and CR experienced similar axial rotation patterns where the femur externally rotated relative to the tibia

Late flexion (90°+)
- JOURNEY II XR and CR demonstrated no significant differences in anterior-posterior translation or axial rotation

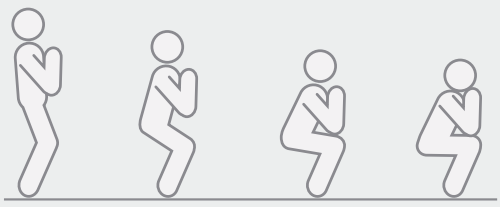

Figure. Stages of weight-bearing knee bend which were analysed using fluoroscopy

Conclusions

The retention of the ACL did benefit the JOURNEY II XR subjects compared to the CR subjects. However, the authors stated that JOURNEY II CR subjects did achieve increased amounts of lateral condyle PFR and axial rotation compared to previously studied CR TKAs. Anterior-cruciate ligament retention and subtle changes in femoral geometry may play an important role in kinematic outcomes.

Citation

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