Session 25: The Outstanding Scientific Knee Papers from the Specialty Societies

Learning Objectives
Upon completion of this activity, participants should be able to:

1. Understand kinematic factors which may impact knee flexion in TKA.

2. Understand predictions relative to demand for total joint replacement and supply of arthroplasty trained surgeons in the United States.

3. Identify the risk of infection in total hip and knee arthroplasty and factors which may influence this risk.

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Incidence and Risk Factors for Prosthetic Joint Infection Following TKA

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Joint Replacement Access in 2016: A Supply-Side Crisis

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Introduction: Demand for arthroplasty is expected to double in 10 years. Coincident with this increased demand is a decreased interest in arthroplasty by residents. Retirement of
arthroplasty surgeons further threatens access. This study determines the number of retiring arthroplasty surgeons and if those entering the supply chain will meet demand.

**Materials and Methods:** To calculate the workforce in 2016, American Academy of Orthopaedic Surgeons (AAOS) survey data and the AAOS database were queried. These data were used to create an economic supply-and-demand model for arthroplasty in 2016.

**Results:** Between 2008 and 2016, 400 hip and knee specialists and 1584 generalists will enter the work force, while 963 specialists and 3568 generalists will retire, leaving a work force of 5038 in 2016 (↓ 34%). In 2016, the work force working at current rates will perform only 231,071 hips and 287,759 knees—a shortfall of 46% and 72%, respectively.

**Discussion/Conclusion:** This economic model predicts a supply-side crisis that threatens patient access. Immediate steps to stimulate the supply side of this model must be taken.

**References:**
Factors Affecting TKA Flexion

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In vivo fluoroscopic studies have documented that subjects achieve variable kinematic results, especially when related to posterior femoral rollback (PFR), axial rotation (AR), and weight-bearing flexion (WBF). Therefore, the objective of this study is to assess in vivo kinematics for 2 groups of subjects, those that achieve excellent WBF and those that do not, to determine if kinematic parameters are influencing factors.

Two-hundred subjects undergoing a total knee arthroplasty (TKA) were evaluated using fluoroscopy during a deep knee bend to determine their in vivo kinematics. Eighty-two of these subjects experienced less than 95° of WBF (Group 1), while 118 subjects achieved greater than 110° (Group 2). Statistical analysis at 95% confidence level was conducted in order to determine which variables are different for subjects undergoing a TKA who experienced greater WBF compared to others who did not.

Both the lateral and the medial condylar contact positions for subjects in Group 2 were significantly more posterior ($P < .05$) than the subjects in Group 1 at all flexion angles. Interestingly, both groups experienced a similar amount of PFR from full extension to 90° flexion ($P > .05$). However, this trend changed when assessing overall motion from...
full extension to maximum knee flexion as subjects in Group 2 achieved statistically greater posterior femoral rollback of both condyles \((P < .05)\). The overall amount of axial rotation and the incidence of lift-off for the 2 groups were statistically similar. Interestingly, subjects in this study who achieved less axial rotation also experienced higher condylar-bearing surface forces.

Subjects in Group 2 achieved greater WBF, mostly influenced by the condylar contact positions throughout flexion, especially at maximum knee flexion. These subjects also achieved greater PFR from full extension to maximum knee flexion. It was also interesting that axial rotation did not play a role in the subjects in Group 2 achieving greater weight-bearing knee flexion, but axial rotation for both groups of subjects seemed to be limited by the applied bearing surface forces at each condyle/tibia interface.

Femoral condylar position was a statistically significant factor that affected TKA flexion. Therefore, surgical techniques and implant designs that lead to greater PFR may be desirable.

Please note that not all article abstracts for this session were available at time of printing.