**Tibial Design Considerations in Unicompartmental Knee Arthroplasty**

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TKA 68%

HTO 9%

UKA 12%

Men Tx (incl. CMI) 71%

**Tibial Design Considerations in UKA**

- Fixed-bearing vs mobile-bearing design
- Clinical results: Literature
- Conclusion

**Implant types: Fixed-bearing vs Mobile-bearing Design**

- Fixed-bearing Design
  - Metal-backed
  - All polyethylene
- Mobile-bearing Design

**Fixed-bearing Designs**

- Metal backing
  - 1980s (e.g., Robert-Brigham)
  - More even distribution of stress
  - Modular
  - Disadvantage: Thinner polyethylene liner or larger tibial cut is needed

**Mobile meniscal bearing Designs**

- Oxford (Biomet)
  - Fully congruent (i.e., constant radius)
  - Uncaptured straight track
- LCS (Depuy)
  - Dovetail radial track → reducing dislocation risk
- Purpose: optimize congruency → minimizing point tibial contact forces and stress at implant fixation interface
Minimise wear by increasing contact area without increasing constraint

- Mobile bearing design
- Spherical femoral articulating surface
- Flat polished CoCr tibial plate
- Bearings designed to reduce anterior impingement

Anatomy - Spherical condyles

Spherical condyles
- Alignment of femoral and tibial component less critical

Contact Area

- Improve function by allowing rollback and working with soft tissues
  - Meniscal bearing design
  - Movement of bearing dictated by ACL & PCL

The results
**Fixed-bearing Designs**

- Metal-backed vs All-poly:
  - No difference in clinical results or migration at short term
  - Long-term undetermined


**Clinical results: Fixed-bearing**

- Berger et al 2005:
  - Modular fixed-bearing, metal-backed
  - Thinnest polyethylene 5.7mm
  - 96% survival at minimum 10 year follow up (average 12 years)


**Clinical results: Mobile bearing**

Price et al 2005:
- Oxford meniscal-bearing
- Thinnest polyethylene 3.5mm
- No degradation in outcome with thinner PE
- 93% survival at 15 year in 439 knees
- Congruency and resulting decrease in contact stress may obviate need for thicker (>6mm) inserts → supports surgical principle of minimizing tibial bone cut thickness


**Results summary: Mobile bearing**

- Goodfellow 99.1% survival at 9 years
- O’Connor 96.0% survival at 15 years
- Svärd 94.0% survival at 10 years
- Swedish knee register 89.5% survival at 6 years (results adversely affected by two centres)

Exceptional results subject to good technique!

**Clinical results: Mobile vs Fixed-bearing**

- Emerson et al 2002:
  - Retrospective review, 2 time periods
  - Loosening and revision
  - Oxford mobile bearing 99% survival
  - Robert-Brigham fixed-bearing (J&J) 93% survival


**Clinical results: Mobile vs Fixed-bearing**

- Confalonieri et al 2004:
  - Prospective RCT
  - AMC mobile bearing (Alphanorm)
  - Allegretto fixed-bearing (Centerpulse)
  - No statistical difference at 5.7 years

Lewold et al. 1995:
- Swedish multicenter survival study
- Oxford mobile bearing vs Marmor fixed-bearing
- 6 year revision rate Oxford more than twice than Marmor
  - Most common: PE dislocation in Oxford (especially early in learning curve)

Smith et al. 2009: Meta-analysis
- Clinical, radiological and kinematic outcomes
- No significant difference
- Only 5 of 737 studies met inclusion criteria
  (4 medial UKA, 1 lateral UKA)

Primary reasons for revision:
- Fixed bearing: tibial component failure
- Mobile bearing: progressive arthritis lateral compartment

Survival rates between 90 and 98% at 10 years
- Fixed- vs mobile-bearing:
  - Overall comparative data remain mixed
  - Larger, long-term follow-up studies may be needed to determine any true difference

Patient Selection
- Surgical technique & experience!!

Thank you for your attention!!!