Unicompartmental Knee Replacement

Results and Techniques

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Overview

- Why partial knee replacement? - versus TKA
- Medial UKA - bearing type and results
- Lateral UKA - unique features
- Patellofemoral replacement - pros and cons
Why Partial Knee Replacement?

• **Potential benefits**
  - less invasive procedure
  - bone conserving
  - less blood loss
  - ligament preserving
  - better range of motion
  - faster recovery
  - more “normal” feeling knee
UKA versus TKA

- **UKA can have *superior* results compared to TKA**
  - 200 knees, 46% candidates for UKA (Willis-Owen 2009)
    - UKA **function superior** to TKA, medial and lateral UKA indistinguishable compared to age matched healthy knees using Total Knee Questionnaire
  - 23 patients- UKA and TKA in *same patient* (Laurencin 1991)
    - range of motion improvement and patient preference for UKA
  - 23 patients- UKA and TKA in *same patient* (Dalury 2009)
    - improved range of motion and patient preference
  - 54 matched patients (Amin 2006)
    - improved motion UKA
  - 102 randomized to UKA or TKA, 15 years follow-up (Newman 2009)
    - early improved results of UKA are **maintained with no increase in failures**
Keys for Success

Keys for successful UKA
✓ Patient Selection
✓ Well designed implant
✓ Surgical Technique
Patient Selection

- Traditional criteria:
  - elderly
  - slender (<82kg)
  - sedentary
  - functional ACL
  - ROM >90 degrees
  - minimal deformity

- Cautious expansion of indications
  - younger
  - increased weight
  - amount of disease in other compartments
  - ACL more critical for lateral UKA

Evaluation and imaging studies
- Physical examination
- Stress radiographs
- MRI
Potential benefits of mobile bearing
- restoration of knee kinematics
- decreased wear with increased implant conformity
- lower polyethylene stresses

Fixed-bearing versus mobile bearing
- risk of dislocation 1-2%, less tolerance of ACL deficiency, limited role in lateral compartment

Similar survivorship and outcomes
- Finnish registry 2007-1928 UKAs survivorship of 81% for Oxford and 79% for MG designs
- Whittaker 2010 no difference in outcomes or durability in KSS and WOMAC

Mobile-bearing series report poorer outcomes of lateral vs. medial UKA due to bearing instability
- Gunther reported on 53 lateral Oxford UKAs with 75% functioning well, but 21% failed at average 5-year follow-up
**Medial UKA Survivorship**

UKA survivorship is durable at long-term follow-up

- 140 UKAs with 84% 22 year survivorship (Squire and Callaghan 1999)
- 160 UKA with 94% at 10 years (Argenson 2002)
- 62 UKA 11-13 years 98% survivorship (Berger 2005)
- 136 UKA 21 year survivorship 84% at 20 years and 75% at 25 years (O’Rouke 2005)
- 20 year survivorship 86% and 80% at 25 years (Steele 2006)
Lateral UKA

Represent only about 10% of all UKAs
Tibia internally rotates with increasing flexion and lateral side rolls back more than medial side
Bigger AP/ML ratio than medial side
More laxity
Wear more posterior in pattern

Technical issues for lateral UKA:
- excess laxity of compartment makes it easier to “overstuff”
- smaller compartment needs smaller devices
- screw-home mechanism so tibial component slightly internally rotated
- anatomical differences with medial-lateral dimension and potential for patellar impingement
Lateral UKA with Medial approach

The anterior horn of the medial meniscus should not be compromised with a medial approach.
Lateral UKA

Under-resection of the distal lateral condyle will prevent proper recession of the leading edge of the femoral component

Over-sizing a lateral femoral component will also risk patellar impingement
Lateral UKA

In the medial-lateral dimension, the femoral component must be shifted laterally to maximize tibio-femoral component congruency in extension.
Lateral UKA - Results

Technically more challenging

Results comparable to medial UKAs

- Pennington (2006) 29 lateral UKA follow-up 12 years with no revisions
- Argenson (2008) 40 lateral UKA 12 years with survivorship 92% at 10 years and 84% at 16 years
- Sah and Scott (2007) 49 lateral UKA average 5.2 year follow-up with no revisions
Patellofemoral Replacement

Incidence

- isolated PF arthritis in as many as 11% of men and 24% of women older than 55 years with symptomatic OA of knee
- isolated PF arthritis in 9.2% of patients older than 40
- 7-19% of patients experience residual anterior knee pain with TKA if done for isolated PF arthritis

Imaging

- weightbearing AP xrays to best evaluate tibiofemoral involvement
- midflexion PA views needed
- lateral radiographs to evaluated alta or baja
- axial radiographs for trochlear dysplasia, tilt, subluxation, extent of PF arthritis
- MRI and arthroscopic photos if available
Patellofemoral Replacement

**Indications**
- OA limited to PF joint
- symptoms referred to PF joint unresponsive to nonoperative treatment
- post-traumatic arthritis
- failed extensor unloading surgical procedure
- malalignment/dysplasia induced degeneration

**Contraindications**
- inadequate nonoperative treatment or failure to rule out other sources of pain
- arthritis involving tibiofemoral articulation
- systemic inflammatory arthropathy
- grade 3 or less of PF joint
- patella baja
- uncorrected PF instability or malalignment
- active infection
- chronic regional pain syndrome or evidence of psychogenic pain
- fixed loss of knee ROM, minimum of 10-110 degrees
Patellofemoral Replacement

Results

• majority of failures related to patellar instability from uncorrected malalignment, soft-tissue imbalance, component malposition
• with improved designs, tibiofemoral arthritis has become primary source of failure
• subsidence of loosening <1%
• PF replacement restores excellent function
• Several studies show progression of arthritis about 20% at 15 years
• Leadbetter 2006 JBJS, 30 PFA with 83% success at average 2 years, 84% survival at 10 years (van Jonbergen 2010)
Conversion of UKA to TKA

Conversions can achieve results similar to primary TKA

- Springer 2006, 22 conversions of UKA to TKA were successful
- Saldanha 2007, revision of UKA to TKA is favorable to revision TKA
- Johnson 2007, survivorship and results of converted UKAs to TKAs are comparable to primary TKAs
- Levine 1996, conversion superior to failed TKAs and comparable to primary TKA

- Lonner 2006 JBJS 12 failed PFAs revised, at mean 3.1 years the TKAs were functioning well
Summary

- Partial knee replacement has many benefits with excellent results
- Patient selection is critical
- 10 year results rival TKA outcomes
- Confidence that UKA role is perhaps expanding for isolated disease of knee