Unicondylar Knee Arthroplasty for Unicompartmental Osteoarthritis of the Knee

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www.nycsportsmed.com
Osteoarthritis of the Knee

- Knee osteoarthritis is a leading cause of disability in the United States.
- In 2005, approximately 9 million American adults were diagnosed with knee osteoarthritis.
- Total Knee Arthroplasty (TKA) is the most common surgical solution for advanced OA of the knee.
What is Osteoarthritis of the Knee?
Evaluating a Patient with Knee Pain

- **History**
  - Age
  - Activity level
  - Pain pattern
    - With activity
    - Nocturnal pain
    - Walk tolerance
- **Physical Exam**
  - Deformity
  - Range of motion
  - Locus of pain
- **Standing X-Rays**
  - AP, Tunnel, Lateral, and Merchant views
Treatment Options for OA of the Knee

- Activity modification
- Physical Therapy
- Weight control
- NSAID

- Cortisone or viscosupplementary injection
- Knee arthroscopy
- Joint replacement

Less Invasive

More Invasive
Primary Care Physician’s Initial Treatment

- Counsel patient
  - Weight control
  - Modify activities

- NSAIDS

- Enroll in PT

- Referral to specialist
  - If no response to initial treatment
Orthopedist Evaluation and Treatment

- Accurate Diagnosis
  - OA vs. RA

- Physical exam
  - Deformity
    - Fixed or correctable

- X-Rays
  - Angular deformity quantified
  - Assess how if single or multi-compartment

- Indicate for
  - Continued conservative care
  - Surgery
    - TKA
    - UKA
Indications for Surgery

- Failure of conservative care
- Refractory pain
  - Nocturnal pain
- Severe limitations in walk tolerance
- Limitations in lifestyle

- Weight gain
- Other health issues arise or worsen
  - HTN
  - DM
  - Heart Disease
Total Knee Arthroplasty

**Pros**
- Proven track record
- 21-year survival = 90%
- Reliable pain relief
- High acceptance by patients

**Cons**
- Invasive surgery
- Decreased knee ROM
- Inability to return to some activities
- 3 to 4 day hospital stay
- Complications
  - DVT, PE, Fat embolism
  - MI
Unicondylar Knee Arthroplasty

- Track record of longevity
- Improved knee range of motion
- Less invasive
- Outpatient to overnight hospital stay
- Return to most activities possible
- Slightly lower risk of major complications
- Bearing surfaces and wear characteristics
Historical Perspective of the Development of TKA
Total Knee Implant
Bicompartmental  1976

Over 300 implanted, saw cuts

Phase 1
Unicompartmental (Open Approach)

- 1982
- Phase 1

- 1987 – Phase 2
  - Mill for accurate ligament balance
  - Reduced dislocation

Phase 2
Phase 3 – Minimally Invasive Approach
1998

- Operation simpler & more reliable
  - Modified instruments
  - Increased range of sizes

- Minimal invasive approach

- Surgeon training instructional courses
Other UKA Designs

Fixed bearing
- High contact stresses
- Increased wear rates
- 10 year survival 90%
  - Increased failures thereafter
UKR - Designer’s series

- 10 year survival 98%
- Murray et al JBJS 1998
Phase 1 & 2 series >10yr, >100 UKR, with Oxford indications

<table>
<thead>
<tr>
<th>Surgeon</th>
<th>Number</th>
<th>Lost</th>
<th>Survival</th>
<th>Years post operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodfellow</td>
<td>144</td>
<td>1</td>
<td>98%</td>
<td>10yr</td>
</tr>
<tr>
<td>Keyes</td>
<td>200</td>
<td>0</td>
<td>99%</td>
<td>10yr</td>
</tr>
<tr>
<td>Scott</td>
<td>135</td>
<td>0</td>
<td>94%</td>
<td>10yr</td>
</tr>
<tr>
<td>Svard</td>
<td>420</td>
<td>0</td>
<td>94%</td>
<td>15yr</td>
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<tr>
<td>(Unpublished)</td>
<td>683</td>
<td>0</td>
<td>92%</td>
<td>20yr</td>
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</table>

Survival vs Years post operation graph

0% 20% 40% 60% 80% 100%
0 5 10 15
Years post operation
Polyethylene Wear

- Average penetration rate 0.03mm per year
- Average time for 1mm penetration 33 years

10 year retrieval
Survival

ACL intact

ACL absent

Years post operation
Phase 3 survival (Pandit 2005)

- 633 UKR - 2 Surgeons (CD, DM)
- 7 yr survival 98% (CI ± 5%)
Swedish Knee Arthroplasty Register Lewold et al 1995

![Graph showing failure rate vs number per centre.](image)
Korea (Prof Choy)

- 40 patients
- 3 months
- Full flexion in 95%
  - 2 others 135° & 120°
- Squat 86%
Indications

• Medial OA
  – Full thickness cartilage loss on stress Xray

• Functionally normal ACL (PCL also)

• Functionally normal MCL
  – Correctable varus on stress X ray

• Full thickness lateral
  – Full thickness cartilage on stress Xray
Contraindications
(very rare if ACL intact)

• Fixed flexion deformity > 15°
  - (Pre Op mean 8, 1 year mean 2)
• Varus deformity > 15°
• Flexion < 90° anaesthetised
• Lat femoral condyle central ulcer
Other “Accepted” Contraindications
Kozinn & Scott (J Arthroplasty 1989) and others

Patellofemoral OA and Anterior Pain
Age (< 60 and very old)
High Activity
Obesity
Chondrocalcinosis

Most NOT FOUNDED ON SCIENTIFIC EVIDENCE
The designer's never considered these to be contraindications and now have some evidence to support their view
Patello-femoral joint
For the Oxford knee

• Full thickness cartilage loss
  – Seen at operation
  – Or on Pre-operative Xrays
  – Is not a contraindication

• Pain anteriorly is
  – Not a contraindication
Age

- Old/unfit - ideal
  - minimal invasive
  - low morbidity
- Young (50s or less)
  - <60 & >60 NSD
  - JWG & Svard
  - mean 55, n=52
  - 92% 10yr survival
Actual Activity - Tegner Score
50 patients, < 60yr, min 2yr

5  Heavy labour, competitive cycle, jog uneven ground
6  Tennis, downhill skiing
7  Competitive tennis, running
8  Competitive soccer, squash

- 4 or less “Advised”
- 30% 5 to 8
- Don’t do as advised!
- ?Does not seem to matter
Obesity

- No increased wear
  - Argenson et al JBJS 1992

- No data on grossly obese

- In very obese
  - Exposure relatively straight forward as instrumentation works from front
  - Easier than TKR
Complications NOT Requiring Revision

- Pain at 1 year: 2%
- Stiffness requiring MUA: 0.7%
- Hemarthrosis - scope: 0.2%
- PE: 0.3%
- CVA: 0.5%
- Death: 0
<table>
<thead>
<tr>
<th>Condition</th>
<th>CD &amp; DM 600 5yr</th>
<th>Svard 600 20yr</th>
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</thead>
<tbody>
<tr>
<td>Lateral OA</td>
<td>0</td>
<td>2%</td>
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<tr>
<td>Infection</td>
<td>0.5%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Dislocation</td>
<td>0.2%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Loosening</td>
<td>0</td>
<td>0.8%</td>
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<tr>
<td>Unexplained pain</td>
<td>0.4%</td>
<td>0</td>
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<tr>
<td>Tib plateau #</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wear</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PFJ problems</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>
Tibial plateau #

• **Cause**
  - Bone weakened per-op

• **Presents**
  - Per-op or early post-op

• **Prevention**
  - Light hammer
  - **AVOID DEEP SAW CUTS**
  - Preserve posterior cortex
  - Adequate slot for keel
Post Operative Care

- Eat & drink - 2hrs
- Mobilization
  - Walk from 2hrs (helps pain relief)
- Drain – removed following morning
- Flexion
  - Day 1 achieve flexion
  - Thereafter flex as tolerated - will improve
  - Physio for gait training

- Analgesia
  - Naproxen 500 mg BID
  - Or Celebrex 400mg QD
  - Ranitidine 150 mg BID
- As necessary - breakthrough pain
  - Percocet 5/325 Q4h PRN
- Discharge Home POD #1 or 2
  - Moving towards same day surgery
Post Op Course

- **6 weeks**
  - Patients usually have
    - Some pain
    - Small effusion
    - Some restriction of movement

- **3 months**
  - Walk without limp
  - Flexion near normal

- **6 months to 1 year**
  - All remaining symptoms usually resolve
Oxford UKR - Summary

• Results
  – Rapid recovery
  – Normal kinematics
  – Excellent function
  – Good long term survival, even in young
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