Knee Arthritis: Prevention and Treatment in the 21st Century

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Overview

- What is Arthritis of the knee
- Presenting symptoms
- Prevention
- Conservative treatment
- Operative treatment
- Latest advances
Osteoarthritis

- Pain
- Stiffness
- Loss of Function
- Instability & giving way
- Can be Primary or Secondary
Joints Affected

1. Knee
2. Hip
3. Shoulder
4. Ankle
5. Elbow

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Epidemiology - Who has it

- 26 Million People in the US
- 40% over 65
- 25% between 40 and 65
- Peaks at 70
- Women 2:1 vs Men
Pathophysiology

- Family
- Genetics
- Trauma
- Immune Moderated
- Condition
- Alignment
- Weight
## Risk Factors

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Hip OA</th>
<th>Knee OA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity</td>
<td>(+)</td>
<td>+</td>
</tr>
<tr>
<td>Age</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Female sex</td>
<td>(+)</td>
<td>+</td>
</tr>
<tr>
<td>Ethnicity (vs. Caucasian)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Genotype</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Bone mineral density</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grip strength</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadriceps strength</td>
<td></td>
<td>(−)</td>
</tr>
</tbody>
</table>
Prevention-Obesity

- **BMI > 30** leads to **2.9 times risk**

- **Metabolic Syndrome leads to 5.3 times risk**
Metabolic Syndrome

Metabolic syndrome is present if you have three or more of the following signs:

- Blood pressure equal to or higher than 130/85 mmHg
- Fasting blood sugar (glucose) equal to or higher than 100 mg/dL
- Large waist circumference (length around the waist):
  - Men - 40 inches or more
  - Women - 35 inches or more
- Low HDL cholesterol:
  - Men - under 40 mg/dL
  - Women - under 50 mg/dL
- Triglycerides equal to or higher than 150 mg/dL
TREATMENT OF ARTHRITIS

- Reducing joint pain and stiffness.
- Maintaining and improving joint mobility.
- Reducing physical disability and handicap.
- Improving health-related quality of life.
- Limiting the progression of joint damage.
- Educating patients about the nature of the disorder
Self Help

- Exercise/Physical Therapy
- Avoid Impact
- Weight Loss
- Have an Arthritis “buddy”
- Treat Metabolic Syndrome
Exercise

- **Low Impact**
- **Quad Strengthening**
- **Hamstring Stretch**
- **Quad Stretch**
- **Aerobic**
Treatment of Metabolic Syndrome

Your doctor will recommend lifestyle changes or medicines to help reduce your blood pressure, LDL cholesterol, and blood sugar.

- Lose weight. The goal is to lose between 7% and 10% of your current weight. You will probably need to eat 500 - 1,000 fewer calories per day.
- Get 30 minutes of moderate intensity exercise, such as walking, 5 - 7 days per week.
- Lower your cholesterol using weight loss, exercise, and cholesterol lowering medicines, if needed.
- Lower your blood pressure using weight loss, exercise, and medicine, if needed.

Some people may benefit from daily low-dose aspirin.

People who smoke should quit.
Bracing

- Reduces the wear on the injured side
- Medial vs Lateral
- Improves Stability
- Lowers risk of falling
- Reduces Pain
Orthotics

- Lateral Wedge for Medial Arthritis
- Medial Wedge for Lateral Arthritis
- Appropriate Support
ASSISTIVE DEVICES

- Cane
- contralateral Hand
- Walker
Modalities

- Cold
- Heat
- Electrical Stimulation
- Acupuncture
Drugs—"give me the good stuff"

- Tylenol
- NSAIDS
  - Low dose, Avoid Long term -> CV Risk
- Topical
- ? Glucosamine
- Narcotics
Experimental

- PRP

- Stem Cells
Injections

- Steroids
- Local
- Hyaluronate
Surgery

- Partial
- Navigation
- Robot
- Total
Case

- 57 Female
- Pain with activity
- BMI: 22.5
- L > R Knee Pain
## Patient VS Surgeon

<table>
<thead>
<tr>
<th>Variable</th>
<th>Surgeon Frequency Count</th>
<th>Patient Frequency Count</th>
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</thead>
<tbody>
<tr>
<td>Benefits of UKA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quicker recovery</td>
<td>12/14</td>
<td>10/20</td>
</tr>
<tr>
<td>Better preserved range of motion/function</td>
<td>11/14</td>
<td>2/20</td>
</tr>
<tr>
<td>Smaller, less invasive procedure</td>
<td>8/14</td>
<td>11/20</td>
</tr>
<tr>
<td>Easier revision</td>
<td>7/14</td>
<td>8/20</td>
</tr>
<tr>
<td>Lower infection rate</td>
<td>1/14</td>
<td>2/20</td>
</tr>
<tr>
<td>Preservation of anterior cruciate ligament</td>
<td>1/14</td>
<td>1/20</td>
</tr>
<tr>
<td>Less blood loss</td>
<td>1/14</td>
<td>0/20</td>
</tr>
<tr>
<td>Benefits of TKA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No progression of OA in other compartments</td>
<td>10/14</td>
<td>4/20</td>
</tr>
<tr>
<td>More predictable outcomes</td>
<td>10/14</td>
<td>2/20</td>
</tr>
<tr>
<td>Lower early revision rate</td>
<td>7/14</td>
<td>4/20</td>
</tr>
<tr>
<td>Better long-term survival</td>
<td>5/14</td>
<td>4/20</td>
</tr>
<tr>
<td>Preference if patient was eligible for UKA and TKA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UKA</td>
<td>6/14</td>
<td>11/20</td>
</tr>
<tr>
<td>TKA</td>
<td>2/14</td>
<td>4/20</td>
</tr>
<tr>
<td>Variable depending on age/activity level</td>
<td>6/14</td>
<td>0/20</td>
</tr>
<tr>
<td>Undecided</td>
<td>0/14</td>
<td>5/20</td>
</tr>
</tbody>
</table>
15 year FU of 2 year randomized uni vs total

71% excellent Uni 50% excellent TKR

89% survival Uni vs 79% TKR
**Uni Vs HTO**

- **Randomized Study Knee 2001**
- 32 HTO 28 Uni
- **10 Survival 77% for UKA 60% HTO**
OPTIONS

- **Uni**
- **Age > 60**
- **Wt < 180**
- **ROM > 90**
- **< 5 deg Flexion Contracture**
- **< 15 deg Deformity: Correctable**
Uni Contra

- Inflammatory
- Age < 60
- High Activity
- Rest Pain
- Patellofemoral Pain
- Lateral Pain
Unicompartmental Knee Replacement

Surfaces of femoral condyle removed

Surface of one side of tibia removed

Femoral implant

Knee joint with partial knee implants

Plastic Insert
Metal Baseplate

Tibial implant
UKA

Femoral component
Polyethylene tibial component
Tibial baseplate
Robot Assisted Uni

- Same Surgery
- Same morbidity
- As yet untested implant
- ? long term Results
Total
Knee

Femoral component
Plastic space
Tibial component

Femur
Femoral component
Tibial component
Tibia

Femur
Femoral component
Tibial component
Tibia
Minimally Invasive

Standard
20-30 cm
Quad Incision

Mini
12-14 cm
Quad Snip

Q-S
7-10 cm
No Quad
Postop Rehab

- Walk day after Surgery
- 3 days in hospital
- Home or Rehab Facility
- Drive at 2-4 weeks
- 6 Weeks for return to walk
**Summary**

- Treatment apropos Stage
- Exercise, Wt Loss, Meds effective
- Injections: NL and Experimental
- Bracing and Orthotics
- Surgery

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