Understanding Knee Arthritis

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Arthritis is COMMON

More than 43 million people have some form of arthritis. It is estimated that the number of people affected by arthritis will increase to 60 million by 2020.

Source: CDC

This program will touch upon the following topics:

- Review of Knee Anatomy
- Discussion of Arthritis
- Latest Treatment Options for Knee Arthritis
- Expectations/Outcomes

About My Practice

Undergraduate at CU Boulder
University of Colorado School of Medicine for medical school and residency
Board certified in 2005, 2015
Fourteen years at the Boulder Medical Center
In addition to the management of arthritis, I enjoy trauma, sports-related injuries, and hand
ANATOMY

The Knee Joint
Musculature
- Multiple muscles acting upon knee joint

The Knee Joint
Ligaments
Stability
- Complex array of ligaments
- Critical for knee stability and function
The Knee Joint

Cartilage

Cartilage is critical in understanding arthritis.

The Knee Joint

Cartilage

• Transmits applied loads across mobile surfaces
• Lines the ends of bones
• Surfaces roll or slide during motion
  - Hyaline cartilage is fluid-filled wear-resistant surface
  - It reduces friction coefficient to 0.0025.

Normal Cartilage

"Like the tires on your car"

Healthy, normal cartilage rolls easily
Smooth motion

Damaged Cartilage

When the cartilage is thinned or absent, problems such as pain, instability, limited motion occur.

This mechanical wearing of the cartilage surface leads to deterioration in the joint or ARTHRITIS.
**What is ARTHRITIS?**

**Definition:** Inflammation of a joint, usually accompanied by pain, swelling, and stiffness.

Importantly, this mechanical change is accompanied by biochemical changes.
Most Common Causes of Arthritis

Degenerative – “wear and tear”
Osteoarthritic – traumatic
Rheumatoid – inflammatory
Bacterial - infectious

Evaluation of Knee Arthritis

Diagnosing Knee Pain

- Medical history
- Physical examination
- X-rays, radiographic studies
- Other tests

Symptoms

PAIN
- Weight-bearing activities
- While sleeping at night
- Located across entire knee or focally to an area
- Usually slow in onset
**Diagnosis**

**Medical History**
- How and when did the pain start?
- If the pain has occurred before, how was it treated?
- What activities aggravate the pain?
- What activities relieve the pain?

**Diagnosis**

**Physical Examination**
- Tenderness to the touch
- Weakness in the muscles
- Extent of passive and active range of motion
- Crepitation

**Diagnosis**

**X-ray Evaluation**

X-rays of an arthritic knee:
- Narrowing of the joint space
- Cystic changes in the bone
- Formation of bone spurs (osteophytes)

**Diagnosis**

**Additional Tests**
- Blood tests
- Computerized Tomography (CT) scans
- Magnetic Resonance Imaging (MRI) scans
  - Best non-surgical modality to identify focal cartilage defects
- Arthroscopy
  - Small areas of traumatic arthritis, loose bodies
Non-Surgical Treatment Options for Arthritis

Nonsurgical treatment options
Physical Therapy
- Almost always start with physical therapy
  - Improve range of motion
  - Improve strength
  - Decreases pain

Nonsurgical treatment options
Medications
- NSAIDS
  - Decreases inflammation
  - Decreases pain

Nonsurgical treatment options
Supplements
- Lots of claims
- NONE have passed FDA testing as proven
- Personal trials
**Nonsurgical treatment options**

**Cortisone injection**

**PROS**
- Relatively easy
- Excellent diagnostic tool
- Well-tolerated
- Very predictable reduction in pain

**CONS**
- Must be placed carefully
- Masks symptoms
- Can soften cartilage
- Used to “buy” time

**Viscosupplement**

**PROS**
- Protects remaining cartilage
- Improves biochemical environment of joint
- Reliable reduction in pain

**CONS**
- Purify hyaluronic acid from rooster combs or bacterial growth
- “Oil-additive” to joint fluid
**Nonsurgical treatment options**

**Viscosupplement**

CONS
- NONE
  - * With appropriate patient selection
- Small potential for reaction with repetitive administration

**Surgery Treatment Options**

**Nonsurgical treatment options**

**Stem Cell Therapy**
- Great claims of what can be treated
- Promising early anecdotal reports
- Expensive
- Likely the best future option for moderate arthritis

**Surgical Treatment Algorithm**

**Focal**  versus  **Global**
**Surgical Treatment Algorithm**

Individualized with each patient

**Decision Variables**

- Focal or Global arthritis
- Age, strength, range of motion

**Anatomy**

Physiology

Expectations

**Surgical treatment**

Focal cartilage damage

- Must catch damage early
- Best treated before secondary bony changes occur
**Surgical treatment**

Focal cartilage damage

**Microfracture**
- Largely treated arthroscopically

**Surgical treatment**

Focal cartilage damage

**Cartilage transplantation**

**Surgical treatment**

Focal cartilage damage

**Resurfacing**

**Surgical Treatment**

Global Arthritis
Surgical treatment

More advanced arthritis requires more advanced surgical options

Surgical treatment

Advanced Arthritis

- Patient determines the appropriate time for surgical intervention
- Influenced by X-ray
- Unlike hip arthritis, You CAN “miss the boat” for certain procedures

Surgical treatment

Partial versus Total

Patient Variables

- Age
- Weight
- Range of motion
- Alignment
- Additional arthritis?
- X-rays
- Expectations

Surgical treatment

At this point decision is between a partial knee replacement versus a total knee replacement
Surgical treatment

My Philosophy:

Do **ONE** surgery well

Surgical treatment

Partial Knee Replacement

- Three distinct compartments

Surgical treatment

Partial Knee Replacement

- Makoplasty technique

Surgical treatment

Partial Knee Replacement

- Computer assisted

- Preoperatively template from CT Scan

- Extreme precision
Surgical treatment

Partial Knee Replacement
  Resurfacing

Total Knee Replacement
  Tri-compartmental arthritis
  Mal-alignment
  Knee contractures
  Patient factors

Partial Knee Replacement

Total Knee Replacement
  Makoplasty technique
**Computer Assisted Knee Replacement**

**Makoplasty**

- Technique:
  - Preoperative CT scan data is synced to intraoperative data with a probe.
  - Implant positioning and surgical resection can be planned before any cuts are actually made.

**Surgical treatment**

**Total Knee Replacement**

- Computer assisted
- Preoperatively template from CT Scan
- Extreme precision

**Surgical treatment**

**Total Knee Replacement**

- Real time guidance
- Balance knee ligaments
- Less invasive

"Game changer"
**Surgical treatment**

Total Knee Replacement

“Game changer”

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**Recovery**

- Begins immediately
- Improvements in anesthesia/pain control also facilitate immediate mobility
- Start working with therapy to get out of bed
- WBAT

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**Summary**

- You choose the time to intervene for knee replacement
  - *Have to work hard at recovery*
- Very predictable outcome with a painless and fully functional knee joint
Thank You

Replaced Knee X-ray