ARTHRITIS & JOINT REPLACEMENTS

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OBJECTIVES

- Review the background of Arthritis and Joint Replacement
- Review treatment options
- Introduce surgical concepts
- Answer questions
According to the CDC:
- 52.5 million people affected by arthritis
- 25% of people develop hip arthritis
- 50% of people develop knee arthritis by age 85
WHAT IS ARTHRITIS?

- Wearing out of cartilage inside joint
- Cartilage is the smooth coating of the bone surface inside joints
- Cartilage acts as a cushion for the bones and prevents bone rubbing against bone
TYPES OF ARTHRITIS

- Osteoarthritis
- Inflammatory Arthritis
- Post-Traumatic Arthritis
- Avascular Necrosis
OSTEOARTHRITIS

- Most common type of arthritis
- Slowly progressive, cartilage wears out
- “Wear & tear”
- Middle-aged & older people
Osteoarthritis has a Strong Correlation with Obesity and Diabetes

- The overall age and weight of the US population are both increasing
- For adults with arthritis, obesity prevalence 54% higher than adults without arthritis
- 52% of adults with diabetes have arthritis
INFLAMMATORY ARTHRITIS

- Rheumatoid arthritis (RA) is most common form
- Chronic inflammation of joints destroys cartilage
- Can affect any age, multiple joint involvement
- New medications have significantly helped limit joint damage
POST-TRAUMATIC ARTHRITIS

- Arthritis following a fracture or bad injury near a joint
- Often develops many years after injury
AVASCULAR NECROSIS (AVN)

- Common in hip
- Steroids (Prednisone)
- Trauma/Dislocation
- Alcohol abuse
HOW YOUR HIP WORKS

Anatomy of the Hip

• Ball-and-socket joint

• Ball (femoral head) at the top of the thigh bone (femur)

• Hip socket (acetabulum) holds the ball
Hip Anatomy

Acetabulum  
Greater Trochanter  
Femoral Neck  
Lesser Trochanter  
Femoral Head  
Pelvis  
Erosion of Cartilage  
Erosion of Bone
HOW YOUR KNEE WORKS

Anatomy of the knee

• Largest joint in body

• Referred to as a hinge joint because it allows the knee to flex & extend; but the knee also has the ability to rotate (turn) & translate (glide)

• 3 bones
  • Shin bone (tibia)
  • Thigh bone (femur)
  • Kneecap (patella)
HIP ARTHRITIS

How Can I Tell?

• Limp
  • May feel one leg is shorter than other due to wearing out of cartilage

• Pain
  • Groin most common site
  • Also side of hip, or buttock pain
  • May radiate to knee

• Stiffness
  • Difficulty putting on socks & shoes
DIAGNOSIS

- History
- Physical Examination
- X-Rays
- MRI (AVN)
HIP OSTEOARTHRITIS

![Comparison of normal joint space and joint space narrowing in the hip.](image-url)
HIP OSTEOARTHRITIS

Joint Space Narrowing

“Bone on Bone”
Normal Knee  Osteoarthritis

“Bone on bone”
TREATMENT OF ARTHRITIS

- Medications (Nsaid/Anti-inflammatories)
- Injections (steroids or viscosupplementation/gel)
- Physical therapy or home exercise program
- Activity modification
- Weight loss
- Cane – use in hand opposite affected hip
- Joint replacement surgery
ANTI-INFLAMMATORIES (NSAIDS)

- Many varieties with little difference in results
- Discuss options with your physician
- Side effects: GI Upset, kidney damage, heart attack/stroke
JOINT REPLACEMENT SURGERY
Professor Themistocles Gluck (1853-1942)

- Earliest recorded attempts at hip replacement – Germany 1891
- Used Ivory to replace femoral heads destroyed by tuberculosis
- Achieved short term success but all ultimately failed because of chronic infection
HISTORICAL PERSPECTIVE

Mold Arthroplasty

- Dr. Smith-Peterson (Boston, 1920s-1930s)
- Tried multiple types of materials to fit over the ball of the hip joint
- “Interposition or Mold Arthroplasty”
- Also credited with 1st to describe anterior surgical approach to hip joint
SIR JOHN CHARNLEY (1911-1982)

- Served Royal Army Medical Corps during WWII and participated in British evacuation of Dunkirk
- Developed low friction arthroplasty concept
  - Low friction depends mostly on the coefficient of friction of two materials in contact
SIR JOHN CHARNLEY (1911-1982)

- Initially tested hip replacement with implant cemented into femur and Teflon socket
  - Teflon showed high wear rates and soft tissue reaction ~1 year after surgery

- A salesman introduced him to high molecular weight polyethylene which was first implanted in 1962
  - Mechanical failure rate of 1.3% at 4-7 years
SHOULD I HAVE THE OPERATION?

- No, if:
  - “My family/friends say I should have it”
  - “You’re the doctor, whatever you think”
  - “I want to get it done before the arthritis gets too bad or I get too old”
SHOULD I HAVE THE OPERATION?

- Yes, if:
  - You understand the procedure, the recovery process, and the risks for your case
  - You have advanced arthritis on x-rays and have not had relief with nonoperative treatments
  - Your quality of life has decreased so that the benefits >> the risks
GETTING READY FOR SURGERY

- Evaluation/labwork by PCP
- Complete any significant upcoming dental work
- Weight loss
- Preoperative education class at hospital
WHAT IS A HIP REPLACEMENT?

Surgical procedure that removes diseased joint surfaces and replaces with implants.
**BEARING OPTIONS**

**What is the bearing?**
The bearing is the interaction of the ball and liner

Metal-on-Metal not commonly used anymore because of adverse reactions

- Metal-on-metal
- Metal-on-plastic
- Ceramic-on-ceramic
- Ceramic-on-plastic
HIP REPLACEMENT

- Remove the head
- Make the socket a sphere
- Shape the thigh bone (femur)
- Check for stability and leg lengths with trial components
- Insert the final cup and stem (No Cement)
TRADITIONAL SURGERY

- Patients typically lie on side or front
- Incision on side or buttock
- Surgeon detaches muscles, disrupts tissue
- Surgeon relies on post-operative x-ray to check component placement and leg length
ANTERIOR APPROACH HIP REPLACEMENT

- Incision is made on the front of the leg rather than the side (lateral) or back (posterior)

- Surgeon can work between muscles/tendons without detaching them from the hip or bones

- Can be done with a specialized operating table and intraoperative x-ray to check for positioning of parts
ANTERIOR APPROACH

Small incision in the upper thigh

Access to hip joint between muscle intervals-no cut required
ANTERIOR APPROACH

Why is it exciting?

- Potential for faster recovery
- Potential for less postoperative pain
- Likely lower dislocation rate
  - Less restrictions in movement/activity after surgery
ANTERIOR APPROACH

Patients lie on back
Incision on front of leg
No detachment of muscles, minimal disruption of tissue
Surgeon can check component placement & leg length with x-ray during procedure
TOM WATSON

2^{nd} Place finish at British Open in 2009 at age 59
Left hip replacement via anterior approach 9 months earlier
DOWNSIDES TO ANTERIOR HIP

- Relatively new procedure
- Possibility of numbness in the lateral thigh
KNEE REPLACEMENT

- Shape bone ends
- Adjust ligaments
- This combination straightens leg
- Cement parts into place
UNICOMPARTMENTAL KNEE REPLACEMENT

- “Uni”, “Partial”
- Replace only damaged portion of joint
- Leave ligaments and other parts of knee without arthritis alone
PARTIAL KNEE REPLACEMENT

[Diagram showing a normal knee joint space and a knee with a partial knee replacement implant]
PARTIAL KNEE REPLACEMENT

Pros
- Quicker recovery
- Potential for knee to feel more “normal”
- May allow for higher activity levels (running)

Cons
- Higher rate of implant loosening compared to total knee replacement
- Can develop arthritis in remaining parts of knee
- May require additional surgery to change to full replacement
MAKOPLASTY - ROBOTIC ASSISTED PARTIAL KNEE
SURGERY EXPECTATIONS

- Out of bed on the day of surgery with physical therapy
- Progression of therapy as tolerated
- Length of stay in hospital 1-3 days
  - Some go home on day of surgery
- Home with walker/crutches/cane
- Transition to cane as tolerated
COMPREHENSIVE RAPID RECOVERY PROGRAM

- Pre-operative education
- Spinal/Epidural anesthesia with twilight sedation
- Medications to help limit blood loss
- Injection around joint during surgery and anti-nausea meds
- Post-op multi-modal pain management using multiple different types of pain medicine
- Early (day of surgery) mobilization
COMPREHENSIVE RAPID RECOVERY PROGRAM

- Walk with walker: 24hrs – 1 week
- Walk with cane: 1-4 weeks
- Walk unassisted: 2-6 weeks
- Drive: 4 weeks right leg, 2-3 weeks left leg
- Return to work: 2-6 weeks
- Ski/Hike/Run/etc: 4-6 months
WHAT HAPPENS AFTER 15-20 YEARS?

- Joint replacements do not fall apart after 15 years.
- Can wear out, loosen, become infected, or cause persistent pain.
- Historical data: ~1% failure rate per year.
  - At 20 years, ~80% still have original implants in place & 20% required a revision surgery.
- Current implants likely improve on those results.
- Total hip & Total knee lower revision rate compared to Partial knee replacement.
POLYETHYLENE WEAR
POSSIBLE COMPLICATIONS

- Infection: superficial (skin) or deep (joint)
  - Deep infection requires at least 1 or possibly multiple surgeries and long-term antibiotics
  - Risk factors: Diabetes, Obesity (BMI > 35), Smoking, +MRSA screen

- Blood clots: leg (DVT) or lungs (PE)
  - SCDs in hospital, Aspirin or other medication for ~1 month post-op

- Hip dislocation

- Leg-length discrepancy after hip replacement

- Fracture

- Persistent pain

- Medical complications
HIP DISLOCATION
SOURCES OF INFORMATION

- www.northernvirginiahipandkneereplacement.com
- Office: www.pwortho.com
- AAOS: www.orthoinfo.aaos.org