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- Email customerservice@PhysicalTherapy.com
Surgical Updates for Less Invasive and Outpatient Total Hip Replacement

Alexander P. Sah, M.D.
Sah Orthopaedic Associates
Medical Co-Director, Institute for Joint Restoration
Director, Outpatient Joint Replacement Program
Chair, IJRR Research and Education Committee

August 29th, 2018

Learning Outcomes

- Identify at least 3 indications a patient may be appropriate to refer for a hip replacement.
- Describe at least two pros/cons of less invasive hip surgery compared to traditional hip replacement.
- List at least one new advancement in pain management allowing faster recovery.
- Outline at least three faster rehab techniques in modern hip replacement.
Procedures

- Total knee replacement, revision knee surgery
  - Partial knee replacement
- Total hip replacement, revision hip surgery

✓ Multimodal pain management
✓ Rapid Recovery/Minimally Invasive Techniques
✓ Outpatient Joint Replacement
✓ Anterior Hip Replacement

Overview

- Hip Arthritis basics – anatomy and definition
- Non-operative treatments – medications and other
- Hip Replacement – definition
- Hip approaches – pros and cons
- Bearing surfaces – controversies
- IJRR – keys to success
- Rapid Recovery hip surgery – what’s involved
- Outpatient Surgery – here and now
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The Hip Joint
Hip motion

Pelvis

Socket

Ball

Smooth cartilage

Femur
Arthritis 101

1. Arthritis is simply wear of cartilage
   - Common problem
   - Affects old and young people
   - CDC: affects 50 million Americans
     - 5.5 million in CA

Referred Pain

- Up to 1/3 of hip symptoms can refer pain to knee
- Small percentage present with symptoms ONLY in the knee
A Joint is Like a Tire on a Car

Why do some tires wear faster?
- Bad quality rubber (cartilage)
- Damage to the rubber
- Driving habits of driver
- Wheel (leg) is out of alignment
- Size of the car (body) too large for wheel

Physical Examination

Typical Pain Symptoms:
- Anterior groin, medial thigh
- With weightbearing
- Prolonged sitting with hip flexed
- Pain or catching on rising from sitting position
- Difficult with shoes/socks or with stairs

“C” sign
SLR 1.8x BW
Loss of internal rotation
**Hip Xrays**

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**Arthritis 101**

There is no cure for arthritis

- No way to grow normal cartilage
- Arthroscopic treatment has limited role in setting of arthritis
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Non-Surgical Treatment Options for Knee Pain: Over-the-Counter Medications

- **Non-Steroidal Anti-Inflammatory Drugs (NSAIDS)**
  - Usually first drug used to treat joint pain
  - Most popular type for osteoarthritis treatment
  - Includes ibuprofen (Motrin®, Advil®), naproxen sodium (Aleve®)
  - Can reduce pain, swelling and warmth
  - Best if taken regularly for temporary basis for anti-inflammatory effect
  - Take with food to avoid GI upset
  - Reversible affect on platelets
  - Caution if taking blood thinners or renal impairment
Over-the-counter Medications

• **Aspirin**
  - Reduce joint pain and inflammation
  - Form of NSAIDs
  - Irreversible affect on platelets

• **Acetaminophen**
  - Reduces pain, lowers fever
  - Does not reduce inflammation of arthritis
  - 4000mg per 24 hours maximum
  - caution if liver impairment
  - Examples:
    • Tylenol®
    • Datril® Extra Strength
    • Tempra®

Narcotics

– **Analgesics**
  - Provide pain relief, but do not reduce inflammation
  - Includes Acetaminophen with codeine (Tylenol® with Codeine), Oxycodone (OxyContin®, Roxicodone®), Hydrocodone with acetaminophen (Vicodin®, Dolacet®), etc.
Supplements

• **Glucosamine/Chondroitin Sulfate**
  – A natural compound found in healthy cartilage
  – Not approved by FDA, classified as dietary supplement, evidence of safety and efficacy is not required
  – Caution if allergy to shellfish or iodine
Physical Therapy

- Range of motion / flexibility exercises - possibly helpful
- Leg Strengthening - shown to be beneficial
- Exercise
- Best with organized program combined with home program
- Benefits lost within 6 months of terminating

Non-Surgical Treatment Options for Knee Pain:

Hip Injection Therapy

- Cortisone Injections
  - Helps reduce swelling and discomfort
  - Temporary pain relief, one week is proven relief, but beyond is less reliable.
  - Allergic reaction, joint swelling and pain several hours after injection
  - Very small risk of infection.
  - Useful for acute cartilage injuries or temporary relief of arthritis pain
Biologics

- Platelet-rich plasma (PRP) takes a small amount of a patient's blood, isolates the platelets and injects the growth factors they release directly into the injured area, where they promote the body's natural healing response.

- The PRP has the benefit of stimulating the release of stem cells from vessel walls further augmenting repair.

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What is a Hip Replacement?

Replacing the ball & socket
- Lining of hip socket is replaced
- New ball attached to top of thigh bone
- Sir John Charnley 1960s
- William Harris, et al. 1970s

Hip Replacement
Total Hip Replacement
Less Invasive Approaches

There are many!

- ZIMMER MIS TOTAL HIP REPLACEMENT PROCEDURE
  - Traditional Incision 25-30cm
  - Zimmer MIS Mini-Incision 6-8cm
  - Zimmer MIS 2-Incision 4-5cm each

Traditional vs. Mini Posterior
Proposed Benefits of Less Invasion

Shorter recovery time

- Reduced patient pain
- Reduced blood loss
- Shortened hospital stay
- No increase in major complication rate
- Earlier return to walking normally
Specific Rehab Details

Rapid Progress Protocol

- Weight bearing as tolerated
- Walker on day of surgery
- Progress to cane ASAP
- 95% directly home
Functional Outcome

Results
• On a cane within first week (or day)
• Rid of the cane by 2 weeks
• Driving after 2-3 weeks
• Golf at 6 weeks
• Complete (nearly) recovery by 3 months

“It feels like a normal hip”

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Advances in Primary THA

• Regardless of approach
  – Reduced patient pain
  – Reduced blood loss
  – Shortened hospital stay
  – Earlier return to normal function
  – No increase in major complication rate

  Mini-posterior approach:
  • patients can do well
  • outpatient hips
  • still concerns with instability

Modified Hardinge

Pros and Cons

• The good – surgeon can perform the surgery without an assistant
• The bad – the dissection compromises the anterior portion of abductors
• The ugly – higher incidence of limp

Damage to the superior gluteal nerve after the Hardinge approach
Remeen M, O’Byrne JM, McCarthy N, Janda A, Mahelingham K, Cahalan WF, Cork University Hospital, Ireland.
Direct Anterior Approach

- Smith Peterson Interval / Judet
  - Adapted for hip replacement by Joel Matta
  - Access to femur allowed by special OR table
  - Theoretical advantage is reduced dislocation risk, faster recovery, no muscle cutting

Why consider it?
Anterior hip advantages

- Hip stability
- Muscle-sparing
- C-arm confirmation
- Faster recovery
- Young patients, athletic patients

Early results

Hours after surgery

First postop visit
MIS Comparative Studies

Mixed Results

Lateral femoral cutaneous nerve impairment after direct anterior approach for total hip arthroplasty.
Sengalavella J, Gupta RN, Jonas LD, Hargarten MW.
Department of Orthopedic Surgery, The Johns Hopkins University at Good Samaritan Hospital, Baltimore, Maryland, USA.

No benefit of the two-incision THA over mini-posterior THA: a pilot study of strength and gait.
Koch AJ, Pagnano MW, Wood KC, Meneghini RM; Kaehrmann K.
Department of Orthopedic Surgery, Mayo Clinic, 200 First Street SW, Rochester, MN 55905, USA.

Slower recovery after two-incision than mini-posterior-incision total hip arthroplasty. A randomized clinical trial.
Pagnano MW, Trousdale RT, Meneghini RM; Hansen AD.
Department of Orthopedic Surgery, Mayo Clinic, 200 First Street SW, Rochester, MN 55905, USA.

Why not every surgeon?
Technically difficult

General Recommendations

- Do some research
- Pick surgeon and program carefully
  - Higher volume generally means fewer complications
- Talk to a surgeon who performs the surgery to discuss the pros/cons
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Metal on Metal Articulations

Pros/Cons

- Very low wear
- Allows use of larger femoral heads
- Hypersensitivity reaction to cobalt debris
- High levels of metal ions in blood and end organs
  - Chromium Level increased 28 fold
  - Cobalt (a carcinogen) increased 12 fold
Metal on Metal Concerns

The New York Times

Concerns Over 'Metal on Metal' Hip Implants

DePuy said that it had made
decline to withdraw the product
because many patients req
second hip replacement and
company's compliance had to
The new compound used
Johnson & Johnson, which
some of the bone-forming and
liquid children's 'lympho' in
Johnson recoupt last

Metal on Metal Recall

The New York Times

Business

Johnson & Johnson Recalls Hip Implants

DePuy Orthopaedics, already in hot water with government regulators, issued a global recall Thursday of two hip implant systems after finding that more patients than expected suffered pain which required additional surgery.

J&J unit recalls 93,000 hip implant systems

DePuy, which has sold about 90,000 units of its ASR Hip Resurfacing System and the ASR Hip Replacement System, said recent data received by the company showed an increase in the number of patients who have had a second hip replacement surgery, also called a "revision surgery."
CERAMIC-ON-CERAMIC

Alumina-Alumina

Quality has changed with time

Improved manufacturing over last 20+ years

- ↓ grain size
- ↑ strength (~50%)

Ceramic Articulations

Pros/Cons

- Very smooth with low wear rates
- Limited number of neck lengths available
- Problems in manufacturing consistency
- Risk of fracture with impingement
- Squeaking in some cases
Ceramic Squeaking

The New York Times
That Must Be Bob. I Hear His New Hip Squeaking.

Bearing Surfaces

Conclusions
• Traditional polyethylene has been improved upon
• Metal on metal has ion and failure concerns
• Ceramic has demonstrated fracture and squeaking problems
• Highly cross-linked polyethylene bearings are the gold standard
Corrosion
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IJR Preoperative Education

Preop Class
• One hour session run by PT, OT and nursing
• Attended by over 95% of patients before surgery
• Documented benefit to patients who attend
IJR Preoperative Education

Hip and Knee Binders
- Comprehensive written information source
- Binder design allows easy addition and subtraction
- Should be the primary place for patients to look for information

IJR Personnel
- Fellowship-trained surgeons
- Anesthesiologists dedicated to the OR Joint Team
- OR Techs and Nurses dedicated to OR Joint Team
- Nurses dedicated to CJR
- Therapists dedicated to CJR

“This is all we do…”
Clinical Research
Accolades

BECKER'S Hospital Review

Washington Hospital | 125 hospital and health systems with great orthopedic programs 2014
Written by Staff | September 09, 2014

Washington Hospital (Fremont, Calif.)
Washington Hospital is ranked among the 75% best hospitals in the nation. Washington Hospital is also a designated Blue Distinction Center for knee and hip replacement. Washington Hospital is the number one joint replacement center in California.

Accolades

• 5 Stars for Hip Replacement
• 5 Stars for Knee Replacement
• Since 2002…
• Top 5% in the Nation
• #1 Joint Replacement Center in California

Washington Hospital Healthcare System
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Perioperative Advancements

- **Pain Control**
  - Narcotics
  - Multimodal pain control
  - Regional anesthesia
  - Local anesthetics

- **Blood Management**
  - Tranexamic acid
  - Coagulation devices
  - Topical agents
  - Drains

Narcotics

---

**DICODINE**

Mode of action

- Effective in the central nervous system
- Specific receptors in the brain for different narcotics lead to different side effects

**OxyContin**

Relaying specific neurons
A Multimodal Approach Addresses the Complex Nature of Pain Transmission

- Opioids have Historically been the Foundation for Acute Pain Management
  
  In a 2012 research database of 1,665,418 patients, 72% of inpatients treated with IV analgesia received IV opioid monotherapy

- Data from the hospital research database maintained by the Premier healthcare alliance, July 17, 2015

- A Multimodal Approach Addresses the Complex Nature of Pain Transmission

- Opioids, Alpha-2 agonists\(^1\)
  Acetaminophen, some NSAIDs
  NE-reuptake inhibitors\(^2\)

- Local anesthetics
  (epidural), Opioids, Alpha-2 agonists\(^1\)

- Local anesthetics
  (nerve block), NSAIDs, Coxibs\(^1\)

- Local anesthetics
  (field block), NSAIDs, Coxibs\(^1\)

- Pain

- NE = norepinephrine
- NSAIDs = nonsteroidal anti-inflammatory drugs
Multimodal pain management

Study of Acetaminophen Cerebrospinal Fluid PK (IV, PO, PR) (Singla et al., 2012), cont.

Randomized, 3-way, cross-over design in 6 healthy volunteers; efficacy was not assessed

- The mean CSF IV acetaminophen AUC over 6 h is 75% higher than the PO group (P<0.0099) and 142% higher than the PR group (P<0.0004)
- Comparing mean CSF C_max values, the IV group was 59.7% higher than PO (P<0.0001) and 86.6% higher than PR (P<0.0001)
- The median CSF T_max values were 2.0, 4.0 and 6.0 h for IV, PO and PR, respectively

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<td>Mean (µg/mL)</td>
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<td>2</td>
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*Note: PR acetaminophen data reflects standardization of the 1300 mg dose to 1000 mg (linear kinetics)

Local Anesthetics

Exparel: Liposomal Bupivacaine

Mean Bupivacaine Plasma Concentration (ng/mL)

<table>
<thead>
<tr>
<th>Time Post dose (h)</th>
<th>Bupivacaine 100 mg</th>
<th>Liposomal Bupivacaine 266 mg</th>
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<tbody>
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</table>

Bupivacaine 100 mg
Liposomal Bupivacaine 266 mg
Perioperative Advancements

- Clot stabilizer
- Many studies in joint replacement
- Inexpensive
- Effective

Perioperative Advancements

- Ease of use
- Visible and audible feedback
- Coagulation and collagen shrinkage
- Broad area of treatment
- Expensive
**Quill™ Device Features**

- Eliminates the need for tying knots
- Barbs are “bi-directional” (2 needles)
- Barbs escarped in helical fashion
- Multiple points of fixation
- Distributes tension evenly across wound

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**AQUACEL® Ag SURGICAL Dressing**

- Waterproof viral and bacterial barrier (when intact and with no leakage)
- Patented Hydrofiber® Technology absorbs and locks in fluid, including harmful bacteria.*
- Unique construction enhances extensibility and flexibility
- Skin-friendly hydrocolloid technology flexes with the skin during body movement

*When treated with no leakage
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Outpatient Surgery

• Patient Selection
• Preop Education
• Perioperative protocols
  ▶ Pain
  ▶ Nausea
  ▶ Bleeding
  ▶ Dvt
  ▶ Wound management
• Surgical technique
• Rehab protocols
• Support system
• Follow-up

Success

Good
OK
Good
OK
Good
OK
Good
OK
Good
OK
Good
OK
Success
What’s New

- Outpatient Joint Replacement
  - Faster recovery
  - Safety at home

Increasing interest

From 2012-2015:

47% increase in outpatient hip and knee replacements per Sg2
• Director, Outpatient Joint Replacement
  Program WOSC

...and in no time he's back in the saddle.

Introducing your active lifestyle for knee replacement surgery...no need to spend time in the hospital...now you can have a partial knee replacement, be sailing on your own and back at home in 24 hours! Along with the comfort of recuperating in your own home, you’ll experience less pain and achieve a faster recovery. Washington Hospital Institute for Joint Replacement and Research, in collaboration with the Washington Outpatient Surgery Center, has pioneered this breakthrough surgery. For more information, contact Dr. Lawrence Berk, one of the most sought after and well-respected surgeons on the West Coast. Join his hundreds of happy and appreciative patients who love sharing stories.

What’s This Mean for PT?

• Patients ambulating sooner
  • Have to slow them down
• Knee motion achieved faster
  • Don’t over-do too quickly
• Seeing a different type of patient in office
  • Different pace of recovery
Outpatient Joint Replacement

Thank you

SAH ORTHOPAEDIC
ASSOCIATES
INSTITUTE FOR JOINT RESTORATION

continued®