Advancements in Hip & Knee Arthroplasty

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MERCER-BUCKS ORTHOPAEDICS
Treatments

- Medication
- Exercise
- Heat or cold
- Carefully pacing activities
- Joint protection
- Self-help skills
- Surgery
Determining Severity of Condition

- Physical examination
- X-rays, MRI or CAT scan
- Medical history
- All other treatment methods have failed
Total Joint Replacement

- Total joint replacement began over 40 years ago
- Implant technologies and materials have significantly improved over the years
- It has evolved into the predictable surgery we have today
Total Joint Replacement

• Goals should be realistic and obtainable
  – Reduction of pain
  – Increase ADL’s (activities of daily living)
  – Increase mobility and function
  – Improve the quality of life
Total Joint Replacement

- Very common
  - Approximately 600,000 TJRs per year in the U.S.
- Very predictable
  - less than 10% of TJRs will require revision
- Over 90% patient satisfaction *
- One of the most successful surgical advances of the last 30 years
- Suitable for specific patient conditions

* Based on cumulative findings from individual surgeon’s clinical outcome studies.
Anatomy of a Normal Hip

- Femoral Head covered with cartilage
- Acetabulum (socket)
- Femur (thighbone)
- Pelvic Bone
Arthritis of the Hip

A general term used to describe a condition where a joint is damaged and painful.

Healthy hip

Diseased “arthritic” hip
Osteoarthritis

In this condition, the cartilage that surrounds the ends of bones in the hip joints breaks down.
Total Hip Replacement What is THR?

The replacement of the *articulating surfaces* of the hip

- Hip socket (acetabulum)
- “Ball” (femoral head)
Total Hip Replacement
TOTAL HIP COMPONENTS
RANGE OF MOTION
What is an MIS Total Hip Replacement?

- Recent advances in instrumentation and surgical technique allow surgeons to perform some total hip replacements through a much smaller skin incision.
- This less-invasive procedure is called MIS and is intended to cause less damage to the muscles and tissues that surround the hip joint.
Indications for MIS Total Hip Replacement

• Same indications as standard THR:
  – Severe hip/groin pain
  – Degenerative changes apparent on x-ray
  – Osteoarthritis
  – Rheumatoid arthritis
  – Avascular necrosis
MIS vs. Standard Total Hip Replacement

MIS: 3-4” skin incision

Standard: 10-15” skin incision
Standard Total Hip Replacement

- 10 -12” incision
- 4 - 5 day hospital stay
- Ambulating with a walker for 3 - 6 weeks
- Back to work in 3 months
- Full recovery in 6 -12 months
MIS Total Hip Replacement

• Potential for:
  – 3 - 4” incision
  – Shorter hospital stay
  – Shorter recovery period
  – Relatively less pain
  – Better gait pattern / ambulation after surgery
SPECIAL INSTRUMENTATION

ADVANCED TRAINING REQUIRED
WHY MIS MINI-INCISION HIP?

• Less Painful/Shorter LOS
  – Traditional  3.5 days
  – Mini  1.9 days

• Less Rehab Stays
  – Traditional  28%
  – Mini  12%

• Quicker Recovery

• Better Cosmesis
  – AAOS  87%

More satisfied patients
THR Components: Femoral Heads

- Usually made of CoCr
- Also available in Ceramic Alloy
  - Much harder surface, reduces wear of polyethylene liner
Anatomy of a Normal Knee

- Medial Meniscus
- Femur
- Tibia
- Lateral Meniscus
- Cartilage
- Anterior Cruciate Ligament
- Fibula

Mercer-Bucks Orthopaedics
Arthritic Knee

Cartilage worn and torn away
Stages of Arthritis of the Knee
Total Knee Replacement

- Realignment is a major issue
Indications for Total Knee Replacement

- Severe pain in the knee associated with activity
- Severe interference with normal daily activities
- Pain while going up stairs
- Severe pain and deformity
- Knock knees or bowlegs
- All components of knee affected by osteoarthritis
- Rheumatoid arthritis
Total Knee Replacement

What is TKR?

- The “resurfacing” or replacement of the articulating surfaces of the knee
  - Thigh bone (femur)
  - Shin bone (tibia)
  - Knee cap (patella)
Total Knee Replacement

• 10 - 12” incision
• 4 - 5 days in hospital
• Ambulating with a walker for 3 - 6 weeks
• Back to work in 3 months
• 6 - 12 months full recovery
Knee Replacement Materials

- There are many different shapes, sizes and designs of artificial knees. These are generally made of titanium, cobalt chrome and medical grade polyethylene.
Prolong™ Highly Crosslinked Polyethylene
Why was *Prolong* Highly Crosslinked Polyethylene Created?

- To address the loading conditions and wear patterns found in knees
- To maximize wear reduction while retaining mechanical integrity
- Specifically for knees
Damage

Delamination, Pitting & Flaking
Driven from cyclic load on the articular surface
MIS vs. Standard Total Knee Replacement

MIS: 3-4” skin incision

Standard: 10-15” skin incision
What is Minimally Invasive Surgery (MIS)?

- Minimally Invasive Surgery is intended to reduce disruption and damage to muscles and soft tissues during surgery as much as possible to improve and accelerate the recovery experience.
- MIS may facilitate optimal healing and can lead to faster and easier rehab, thus allowing patients to get back to activities of daily living sooner.
Conventional Open TKA  MIS Quad-Sparing TKA

Minimally Invasive Exposure
Final Components Implanted
Postoperative

- Compression dressing 24 h
- Full weight-bearing 4 - 6 h postop
- Free flexion / extension
- Oral pain killers
- DVT prophylaxis for 10 days
Why a woman’s knee

- Anatomical Differences
- Intraoperative adjustments
- Account for nearly 2/3 of TKA’s in the U.S.
- 3 times more likely to forego TKA than men
But the Most Important Why—

WOMEN AND MEN ARE DIFFERENT.
OUT OF SIMPLE TRUTHS COME EXTRAORDINARY INNOVATIONS.
Because Women and Men Are Different!

WOMEN AND MEN ARE DIFFERENT.
OUT OF SIMPLE TRUTHS COME EXTRAORDINARY INNOVATIONS.
It’s all about shape.
Anterior Flange Thickness

- Less-pronounced anterior condyles.
- Traditional implants can “overstuff” female knees

Gender Solutions Implants:
- Reduced anterior flange thickness
- Recessed patellar sulcus
- Retained clinically successful NexGen patellar articulation
Anterior Flange Width

The femoral anterior resection of the female bone is narrower than the male femoral anterior resection.

*Gender Solutions* Implants address this issue with a more narrow anterior flange.
Increased Trochlear Groove Angle

*Gender Solutions* High-Flex Femoral Implants replicate the distinct Q-angle difference by increasing the trochlear groove angle of the implant three degrees.
Shaping For the Female Patient

Femoral Mapping – Applying the science.

1) The three-dimensional inner box shape of the traditional implant is determined.
2) This shape is then extracted...
3) ...and unfolded into a two-dimensional profile.
4) The resection planes of the female bone are rendered in a two-dimensional profile and overlayed on the implant profile.
5) Arrows indicate the areas where traditional implants overhang the female bone.
6) Additional female data sets are then added to increase the statistical accuracy.
7) A two-dimensional female profile is created...
8) ...that replicates the shape of the female bone.
The NEW NexGen LPS-Flex Mobile Knee System. Setting life in motion.

Zimmer introduces NexGen™ Complete Knee Solution components expressly designed to help your patients safely resume their high-fusion lifestyles. To ensure stability and facilitate smooth motion up to 135° of flexion, we extended the posterior femoral condylar section, modified the cam-pin mechanism, and deepened the anterior patellar cut-out on the tibial articulating surface. A mobile bearing provides the axial rotation necessary to allow rotation of the tibia during flexion.

Now you can confidently recommend total knee replacement for patients willing and able to resume deep flexion. Give your patients the chance to experience life at 135° by calling your Zimmer representative today.
Traditional TKA vs. High Flex TKA

- Designed to safely accommodate flexion up to 125°
- Designed to safely accommodate flexion up to 155°
- Global cultural and religious activities < 125°
- Global, cultural and religious activities to 155°
Keys to high flexion

- Patient selection
- Surgical technique
- Implant design
- Rehabilitation
3 Months Post-Op
30 Months Post-Op
Indications for Unicompartmental Knee Replacement

- For patients 55 and older with advanced non-inflammatory degenerative joint disease of one compartment
- Pain mainly on the inside or outside of the knee
- Difficulty walking or climbing stairs
- Complete loss of joint space and only mild deformity
Unicompartmental Knee Replacement
vs.
Total Knee Replacement

- Shorter operating time
- Increased ROM - closer to normal kinematics
- Less bone loss and greater preservation of soft tissue
- Usually does not require blood transfusion
- Generally quicker recovery, less physical therapy
- Relatively low postoperative morbidity
Advantages UKA

- Less invasive surgery
- Shorter hospital stay
- Better ROM than TKA
- More “normal knee”
- Easier revision
The Goal:
Improved Quality of Life
The RIO® Robotic Arm Interactive Orthopedic System
MAKOplasty® - Partial Knee Surgery

Less invasive
Uses a surgeon-controlled robotic arm system
Enables more accurate resurfacing for optimal positioning of implants

Can be performed on the medial (inner), patellofemoral (top), and lateral (outer) portion of the knee.
RIO® Enables Consistently Reproducible Precision

- Patient specific pre-operative planning
- Intra-operative guidance and knee balancing
- Surgeon-controlled robotic arm
THANK YOU

I CAN'T SAY I'M ENTIRELY PLEASED WITH MY HIP REPLACEMENT.