

Knee Replacement Handbook

Knee Replacement Handbook

- How to Get Back to a Pain Free Life After a Knee Replacement -

Rick Kaselj, MS

Rick Kaselj – ExercisesForInjuries.com



My Story

Rick Kaselj

- BSc – 1997
- MS – 2008 / RC
- *Work* – physical therapy clinic, studio, gym, rehab centre
- *Courses* – live, webinars, video presentations
- *Writing* – books, manuals
- Injury specialist
- Blog – ExercisesForInjuries.com



Rick Hiking 4300 km / 5 months from Mexico to Canada



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Presentation Objectives



- **Part 1** – What You Need to Know About a Knee Replacement
- **Part 2** – What Will Make Your Knee Replacement Pain Better or Worse
- **Part 3** – 3-Stage Pain Relieving Exercise Program for Knee Replacement



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Part 1 – What You Need to Know About a Knee Replacement

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Knee Replacement

– What is a Knee Replacement?

- A surgical procedure to replace the weight-bearing surfaces of the knee joint to relieve pain and disability



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Why Are Knee Replacements Performed?



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Goal of a Knee Replacement



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Focusing on what you can do to get back to being pain-free.

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Different Types of Knee Replacement

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- Partial Knee Replacement
 -
 -
- Other Progress in KR:
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 -
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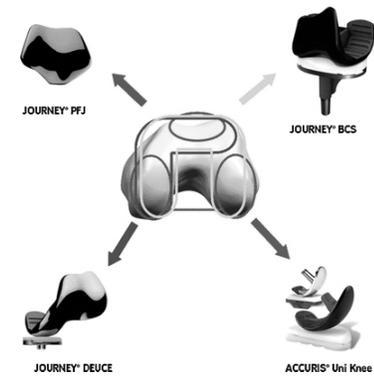
Different Types of Knee Replacement

– Total knee replacement hardware, including femoral head, tibial plate, patellar plate, and meniscus replacement plate.



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Uni-/bi-/three-compartmental osteoarthritis involvement, a new approach is resurfacing combination arthroplasty - Zanasi 2011



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Different Types of Knee Replacement

– Orthopaedic surgeons are now able to offer patients knee replacement procedures that are associated with:

- (1) Minimal risks during and after surgery by avoiding fat embolism, reducing blood loss and minimizing soft tissue disruption;
- (2) Smaller incisions
- (3) Faster and less painful rehabilitation
- (4) Reduced hospital stay and faster return to normal activities of daily living
- (5) An improved range of motion
- (6) Less requirement for analgesics
- (7) A durable, well-aligned, highly functional knee

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Different Types of Knee Replacement

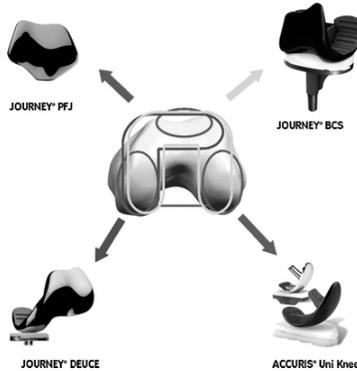
- The anatomy of the knee is divided into three compartments:
 -
 -
 -(kneecap) and the femur, the patellofemoral (PF) compartment.

~ Zanasi 2011

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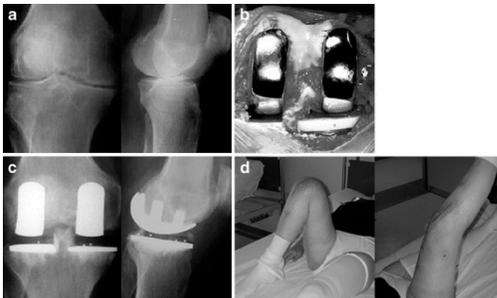


Uni-/bi-/three-compartmental osteoarthritis involvement, a new approach is resurfacing combination arthroplasty - Zanasi 2011



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Bi-unicompartmental knee replacement - Zanasi 2011

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Different Types of Knee Replacement

– Unicompartmental Knee Replacement/Resurfacing (UKR)

- More difficult procedure than TKR
- UKR is thought to allow preservation of the uninvolved soft tissue and bone
- Reduced operating time
- Better post-operative range of motion
- Less pain
- Better stair-climbing ability
- Improved gait due to proprioceptivity maintenance
- Increased patient satisfaction than TKR

~ Zanasi 2011

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Different Types of Knee Replacement

– With appropriate patient selection and careful surgical technique, UKR can provide the following advantages over TKR:

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7) the medullary space
- (8) Easier revision surgery, if required, at a later date

~ Zanasi 2011

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How Can A Pain Relieving Exercise Program for Knee Replacement Help You?

- Improves knee movement
- Makes your muscles strong
- Controls pain
- Reduce your body weight
- Improves sleep
- Reduces swelling
- Prevents blood clots
- Prevents constipation



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How Big of a Problem are Knee Replacements?

- First knee replacement was performed in 1968

- Each year, almost 44,000 surgical procedures are done in Ontario for arthritis and related disorders - Health Quality Ontario 2005
- TKR surgeries rose by 61.6% between 1994 and 1995 and 2001 and 2002 in Ontario - Health Quality Ontario 2005

- In terms of age, 40% of TKR surgeries were performed in patients aged 65 to 74 years, 8% were performed in patients younger than 55 years, and 3% were for patients older than 85 years. - Health Quality Ontario 2005

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How Big of a Problem are Knee Replacements?

- osteoarthritis (93%). Other diagnoses are inflammatory arthritis (5%), post-traumatic osteoarthritis (2%), and osteonecrosis (when bone dies due to blocked blood supply; 1%) - Health Quality Ontario 2005

- More women than men undergo knee replacement and most patients are between 55 and 84 years old - Health Quality Ontario 2005

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How Big of a Problem are Knee Replacements?

- "Total hip and knee replacement are two of the most common and successful elective surgeries performed in the United States each year." - Ritterman 2013

- 450,000 TKA a year are performed in the USA - Meier 2008

- Expected to double by 2020 - Meier 2008

- "Osteoarthritis (OA) is the largest source of physical disability in the United States" - Mizner 2005

- "The joint most commonly affected by OA is the knee." - Mizner 2005

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What are the Symptoms of Knee Replacement?



- Progressive increase in pain
- Loss of function

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Common Causes for a Knee Replacement

-
-
- areas:
 - medial femorotibial
 - lateral femorotibial
 - patellofemoral compartments
- Rheumatoid Arthritis
- Injury



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Common Causes for a Knee Replacement

- any more
- Knee replacement works on reconstructing the surface to a pain free joint
- In 2003/04 in Ontario, about 75% of THipR surgeries and 90% of TKR surgeries were to relieve pain and functional impairment due to OA - Health Quality Ontario 2005

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Common Causes for a Knee Replacement

- OA affects about 10% of Canadian adults - Health Quality Ontario 2005
- In 2003, Statistics Canada reported that 16.8% of the Canadian population over the age of 12 has arthritis - Health Quality Ontario 2005
- About 6% of Canadians aged 35 years and older have osteoarthritis of the knee - Health Quality Ontario 2005

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What Else Could it Be?



- Nothing

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Other Names for Knee Replacement?



- Knee Replacement
- Total Knee Replacement (TKR)
- Knee Arthroplasty
- Total Knee Arthroplasty (TKA)

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Key Structures Involved in Knee Replacement

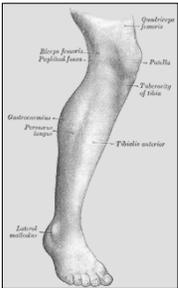


- Overall Structure
 - Knee

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Key Structures Involved in Knee Replacement

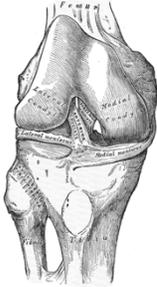


- Key Area:
 - Knee joint
 - Largest joint in the body
 - Majority of the body weight is supported by the knee joint

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Key Structures Involved in Knee Replacement



- Key Area:
 - Medial femorotibial
 - Lateral femorotibial
 - Patellofemoral

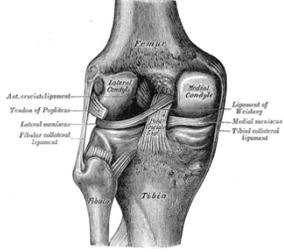
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Key Structures Involved in Knee Replacement

- Key Bones in the Knee Joint
 - Femur
 - Tibia
 - Fibula
 - Patella



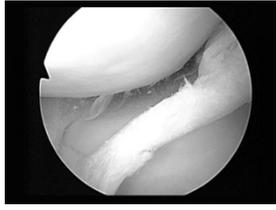
Anterior Cruciate Ligament
Tendon of Popliteus
Lateral meniscus
Fibular collateral ligament
Patella
Tibia
Femur
Knee Condyle
Ligament of Medial Collateral Ligament
Tibial collateral ligament

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Key Structures Involved in Knee Replacement

- Covering Each of the Bones:
 - Cartilage



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Key Structures Involved in Knee Replacement

- Key Muscles:
 - Quadriceps:
 - Rectus Femoris
 - Vastus Intermedius
 - Vastus Medialis
 - Vastus Lateralis



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Key Structures Involved in Knee Replacement



- Key Muscles:
 - Hamstrings:
 - Semimembranosus
 - Semitendinosus
 - Biceps femoris

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Key Structures Involved in Knee Replacement



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What Can You Do About It?

-
-
-
-
- motion
- Play Wii Fit
- Exercise



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Remember! (IMPORTANT)

- 1.
2. – Any medical investigations
3. **exercise program**
4. **Bring this exercise program to your doctor to see if it is right for you**



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Part 2 – What Will Make Your Knee Replacement Pain Better or Worse

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#1 - What Will Make Your Results Worse?

"Physical deconditioning, tobacco use, obesity and medical co-morbidities can adversely affect outcomes and should be addressed before any elective procedure."

~ Coudeyre 2007



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#2 - Pre-Operative Rehabilitation

"Rehabilitation before total hip and knee arthroplasty contributes to reduced hospital length of and modifying discharge conditions."

~ Ritterman 2013



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#3 - Focus on the Quads Before Surgery

"Pre-operative quadriceps exercise at least three weeks prior total knee replacement result in short-term benefit such as decreased pain, improved quadriceps strength and improved quality of life after elective TKA."

~ Tungtrongjit 2012

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#4 - Core Stability

- Trunk Control



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#5 - Balance Training

“Additional balance training exerted a significant beneficial effect on the function recovery and mobility outcome in patients with knee osteoarthritis after total knee replacement.”

~ Liao 2013

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#6 - Hip Strengthening

- Total Hip Machine
- Tubing in All 6 Directions of the Hip
- Sitting and Squeeze Ball between Knees



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#7 - Ankle Strengthening

- Standing Toe Lifts
- Calf Raises

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#8 - Functional Movement

- Walking
- Squatting
- Lunging
- Stepping

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#9 - Stretching

- Flexibility because muscles tighten up with pain and lack of use

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#10 - Walking and Gait

- It is affected before and after by pain
- Walking forwards, backwards, side-to-side

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#11 - Sleeping

- stress position
- One to two pillows between knees

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#12 - Focus on Activities of Low Stress

- swimming,
- water walking
- water running
- water aerobics
- cycling
 - bicycle
 - upright
 - recumbent



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#13 - Other

- exercises
- Do not keep your knee in one position for too long
- Do not kneel until your knee is fully healed
- Be cautious of any pivoting of the knee
- Exercises on the floor you can do them on your bed

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Essential Components of an Exercise Program For Knee Replacement



- **Education cont.**
 - What is a Knee Replacement?
 - Why did I get it?
 - What makes it worse?
 - What to do about it?
 - How to do the exercise program and exercises properly?

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Knee Replacement Assessment

- **Knee to Wall (1284)**
 - Sitting with toe against wall, and move your knee towards the wall. Measure how far your knee is from the wall.



- **Knee to Floor (1283)**
 - Sitting and straighten you knee and measure how far your knee is off the ground.



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Knee Replacement Exercise Program

- **Goals of this Exercise Program:**
 - Improve range of motion
 - Muscle strength especially quadriceps
 - Mobility of the joints
 - Decrease pain

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Keys to Remember

- Follow your therapist, doctor and surgeon advice.
- The program does not replace seeing a physical therapist.
- It is recommended that you see a physical therapist before and after your surgery.
- It is recommended that you see a physical therapist for the first 6 to 8 weeks after your surgery.

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Keys to Remember

- Use walking aids as per medical guidance
- Rest your knee when needed
- Pace yourself
- Use pain medication as prescribed
- If you use a bag of peas, do not eat them after you have used them

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Part 3 – 3-Stage Pain Relieving Exercise Program for Knee Replacement

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3-Stage Pain Relieving Exercise Program for Knee Replacement

	Stage 1	Stage 2	Stage 3
Step #1 - Cardiovascular	Stationary Bike	Rowing Machine	
Step #2 - Knee Extension	Tighten Quads on Back	Tighten Quads on Back with Heel on Towel Tighten Quads in Sitting	Tighten Quads in Standing
Step #3 - Ankle Mobility	Ankle Pumps on Back	Ankle Pumps in Sitting	Toe Raises in Sitting
Step #4 - Knee Flexion	Heel to Seat on Stomach	Heel to Seat on Back with Towel Heel to Seat in Sitting	Heel to Seat with Ball
Step #5 - Quad Strengthening	Leg Kicks on a Towel	Straight Leg Raises on Back Isometric Leg Extension in Sitting	Sitting Leg Kicks Sitting Towel Leg Press
Step #6 - Gluteus Maximus Strengthening	Seat Squeezes	Chair Lifts Bridging	Stair Step Up
Step #7 - Hamstring Strengthening	Heel Into Floor	Knee Bent Heel Into Floor Isometric Leg Curl in Sitting	Standing Heel to Seat



3-Stage Pain Relieving Exercise Program for Knee Replacement

	Stage 1	Stage 2	Stage 3
Step #8 - Transfer	Forward Transfer	Backward Transfer	Single Leg Balance
Step #9 - Ice	- 10 to 20 minutes - 2 to 6 times a day	- 10 to 20 minutes - 2 to 6 times a day	- 10 to 20 minutes - 2 to 6 times a day



Exercise Rehabilitation Program

- **#1 – Cardiovascular**
 - Phase 1 - Stationary Bike
 - Phase 2 - Rowing Machine





– minutes.

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Exercise Rehabilitation Program

- **#2 – Knee Extension**
 - Phase 1 - Tighten Quads on Back (1246)
 - Phase 2 - Tighten Quads on Back with Heel on Towel (1247)

• 2 seconds



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Exercise Rehabilitation Program

- **#2 – Knee Extension (cont.)**
 - Phase 2 - Tighten Quads in Sitting (1248)
 - Phase 3 - Tighten Quads in Standing (1249)

• 1 set of 5 repetitions with each held for 2 seconds



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- **#3 – Ankle Mobility**
 - Phase 1 - Ankle Pumps on Back (1250)
 - Phase 2 - Ankle Pumps in Sitting (1251)
 - Phase 3 - Toe Raises in Sitting (1252)

• 1 set of 5 repetitions with each held for 2 seconds



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Exercise Rehabilitation Program

- **#4 – Knee Flexion**
 - Phase 1 - Heel to Seat on Stomach (1253)
 - Phase 2 - Heel to Seat on Back with Towel (1254)
- 1 set of 5 repetitions



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- **#4 – Knee Flexion (cont.)**
 - Phase 2 - Heel to Seat in Sitting (1255)
 - Phase 3 - Heel to Seat with Ball (1256)
- 1 set of 5 repetitions



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- **#5 – Quad Strengthening**
 - Phase 1 - Leg Kicks on a Towel (1257)
 - Phase 2 - Straight Leg Raises on Back (1258)
 - Phase 2 - Isometric Leg Extension in Sitting (1259)
- 1 set of 5 repetitions with each held for 2 seconds



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- **#5 – Quad Strengthening (cont.)**
 - Phase 3 - Sitting Leg Kicks (1260)
 - Phase 3 - Sitting Towel Leg Press (1270)
- 1 set of 5 repetitions with each held for 2 seconds



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Exercise Rehabilitation Program

- **#6 – Gluteus Maximus Strengthening**
 - Phase 1 - Seat Squeezes (1271)
 - 1 set of 5 repetitions with each held for 2 seconds
 - Phase 2 - Chair Lifts (1272)
 - 1 set of 5 repetitions



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- **#6 – Gluteus Maximus Strengthening (cont.)**
 - Phase 2 - Bridging (1274)
 - Phase 3 - Stair Step Up (1273)
- 1 set of 5 repetitions



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Exercise Rehabilitation Program

- **#7 – Hamstring Strengthening**
 - Phase 1 - Heel Into Floor (1275)
 - Phase 2 - Knee Bent Heel Into Floor (1276)




• 1 set of 5 repetitions with each held for 2 seconds

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Exercise Rehabilitation Program

- **#7 – Hamstring Strengthening (cont.)**
 - Phase 2 - Isometric Leg Curl in Sitting (1277)
 - Phase 3 - Standing Heel to Seat (1278)




• 1 set of 5 repetitions with each held for 2 seconds

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Exercise Rehabilitation Program

- **#8 – Transfer**
 - Phase 1 - Forward Transfer (1279)
 - Phase 2 - Backward Transfer (1280)
 - Phase 2 - Side Transfer (1281)
 - Phase 3 - Single Leg Balance (1282)







• 1 set of 5 repetitions with each held for 2 seconds

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Exercise Rehabilitation Program

- **#9 – Ice**
 - 10 to 20 minutes
 - 2 to 6 times a day



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Other Injuries

- Iliotibial Band Syndrome (IT Band)
- Shin Splints
- Piriformis Syndrome
- Patellofemoral Pain Syndrome
- Meniscus Tear
- Sacroiliac Pain
- What to do When a Low Back Flare Up Hits



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Other Injuries

- Plantar Fasciitis
- Lumbar Fusion
- Achilles Tendinitis
- Jumper's Knee
- Tennis Elbow
- Recovery Workouts
- Ankle Sprain



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- **Part 1** – What You Need to Know About a Knee Replacement
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Recommended Resource

- Hip Replacement Handbook

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Recommended Resource

- Best Gluteus Maximus Exercises
<http://BestGluteusMaximusExercises.com>

Your Gluteus Maximus Exercises:



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Recommended Resource

- **Gluteus Medius Exercises**
<http://GluteusMediusExercises.com/>
Your Gluteus Medius Exercise Program:



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 - Returning the Shoulder Back to Optimal Function Seminar
 - Exercise Modification for the Sensitive Shoulder Seminar
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Thank You

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