Knee Replacement Handbook

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

Rick Kaselj, MS

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

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

Why Are Knee Replacements Performed?

- Pain
- Loss of function

Goal of a Knee Replacement

- Pain-free joint
- Fully functional
- Durable knee joint

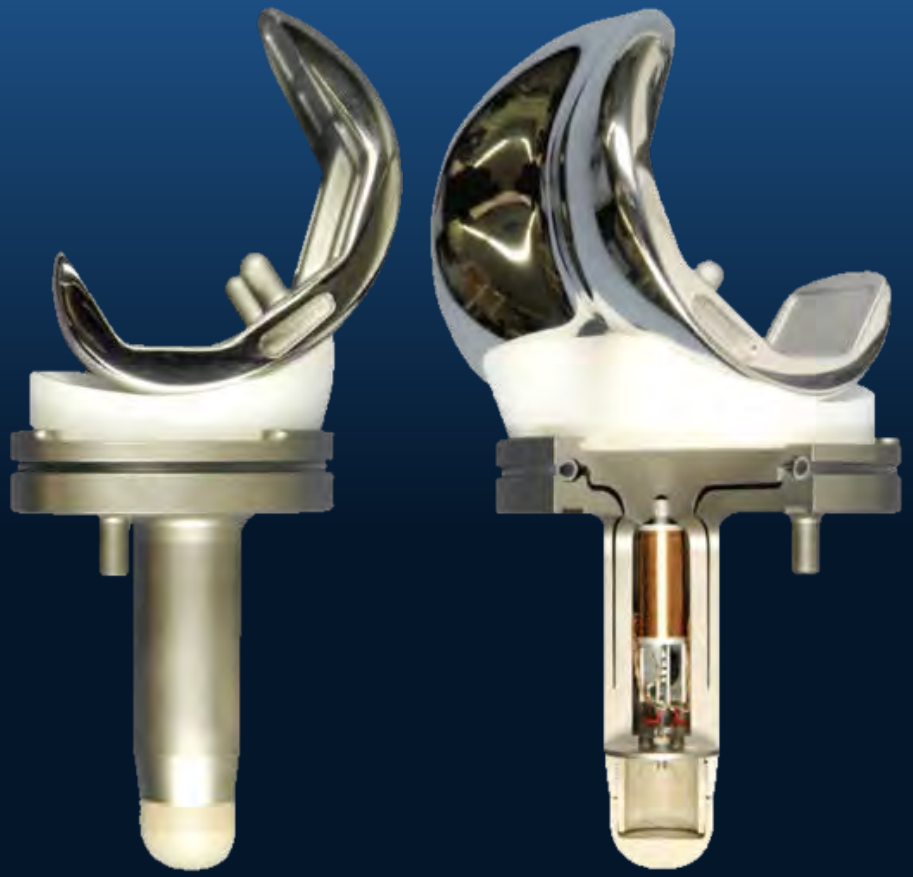
Focusing on what you can do to get back to being pain-free.

Different Types of Knee Replacement

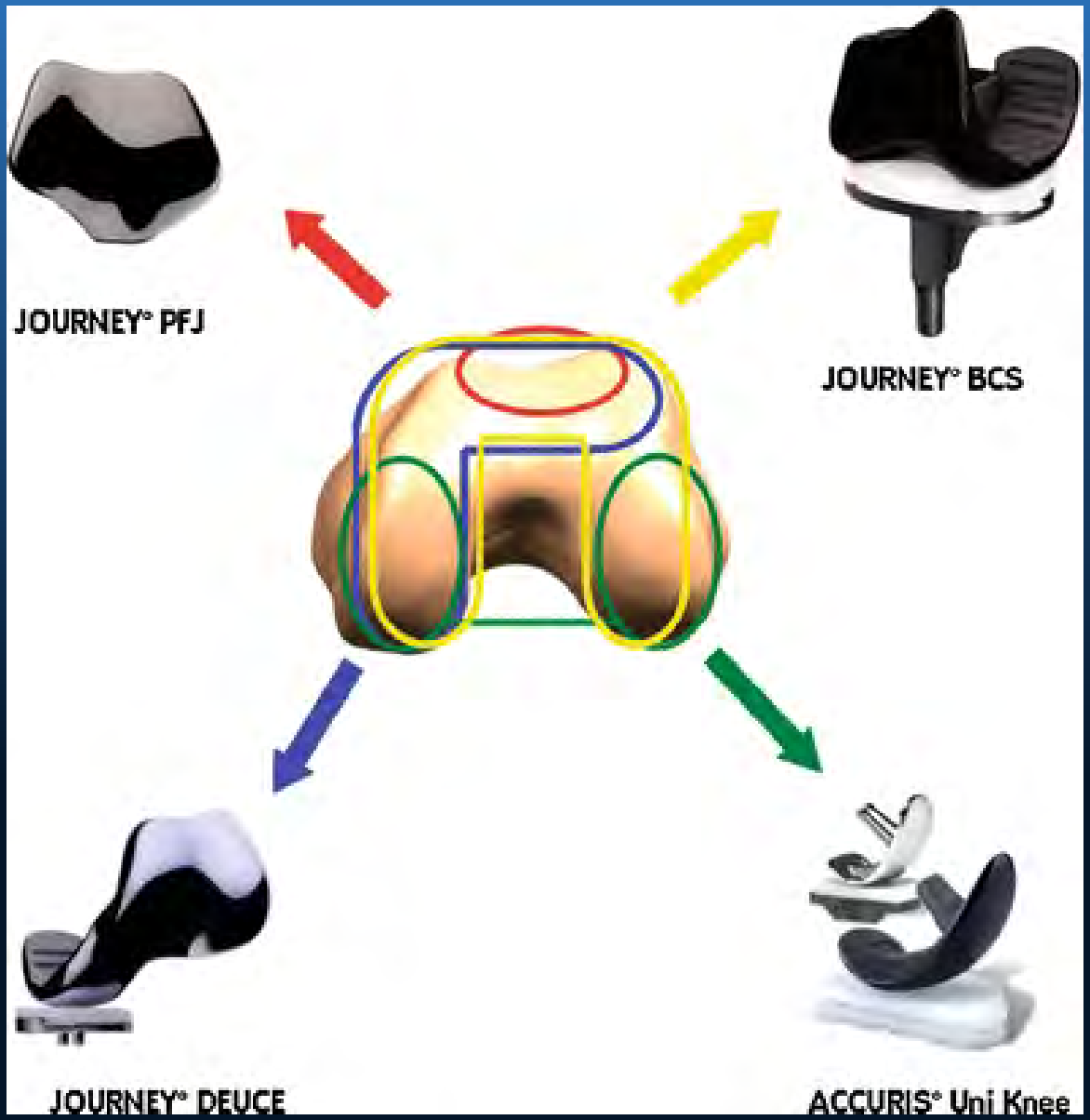
- **Total Knee Replacement**
- **Partial Knee Replacement**
  - Bicompartmental knee replacement
  - Unicompartmental knee replacement
- **Other Progress in KR:**
  - Minimally invasive surgery (MIS)
  - Techniques gender-specific prosthetics
  - Computer-assisted navigation systems

Different Types of Knee Replacement

- Total knee replacement hardware, including femoral head, tibial plate, patellar plate, and menisus replacement plate.



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



Different Types of Knee Replacement

– **<u>Orthopaedic surgeons are now able to offer patients knee replacement procedures that are associated with:</u>**

(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

~ Zanasi 2011

Different Types of Knee Replacement

- **<u>The anatomy of the knee is divided into three compartments:</u>**
  - The Inner Medial Femorotibial compartment
  - The Outer Lateral Femorotibial compartment
  - The Compartment that consists of the patella (kneecap) and the femur, the patellofemoral (PF) compartment.

~ Zanasi 2011

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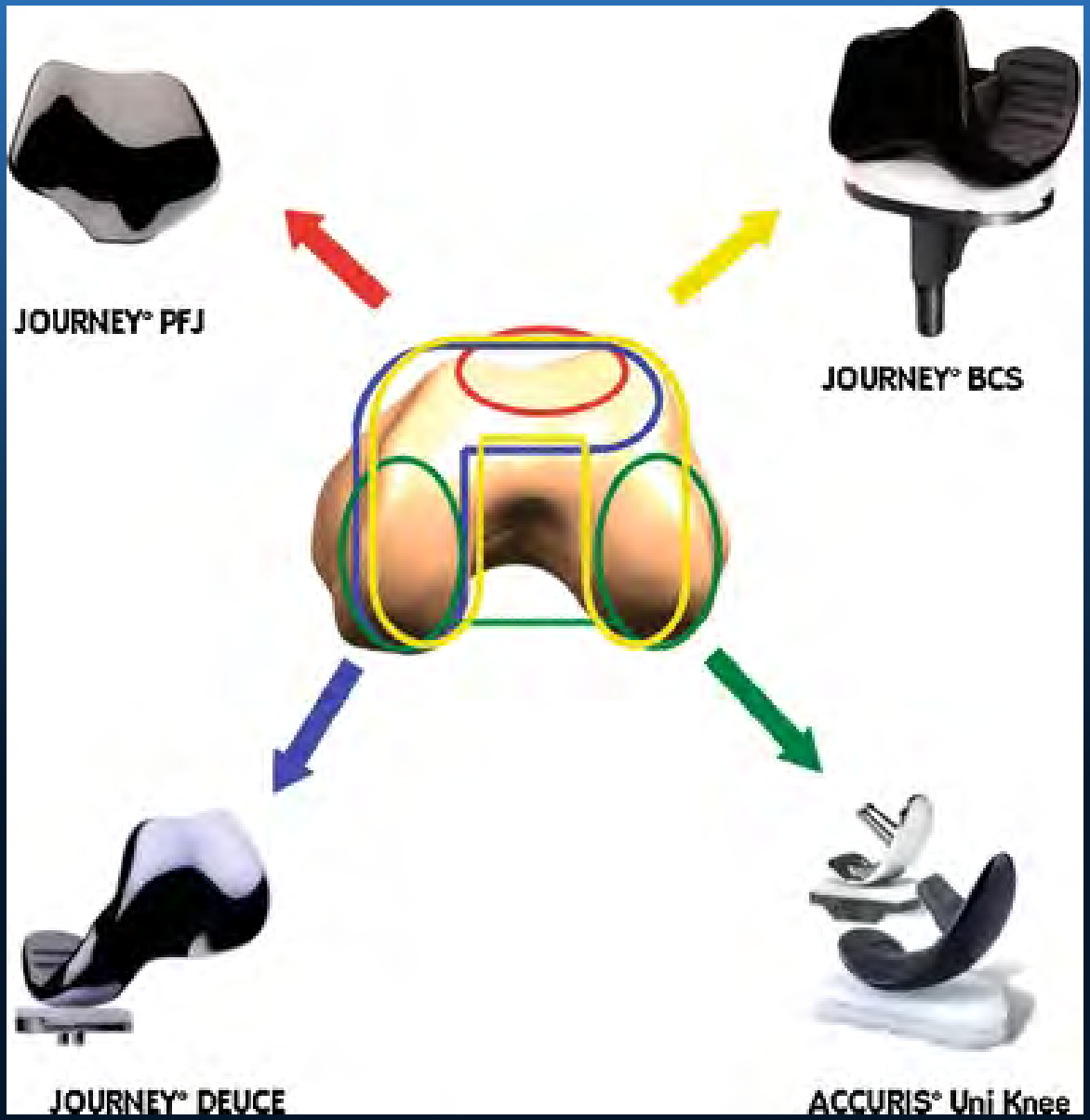
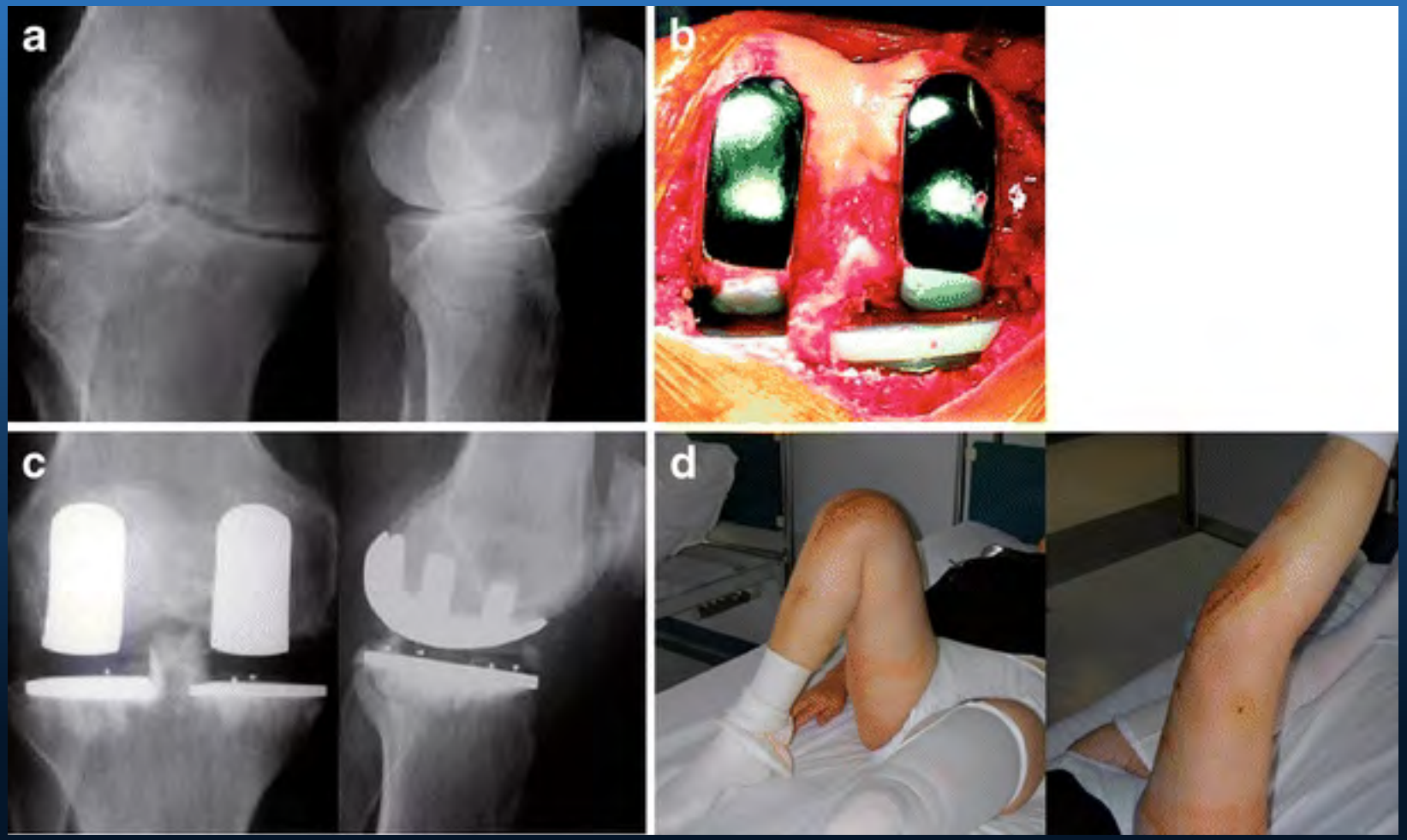




Bi-unicompartmental knee replacement - Zanasi 2011

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

Different Types of Knee Replacement

- **With appropriate patient selection and careful surgical technique, UKR can provide the following advantages over TKR:**
  - (1) Smaller incision if a minimally invasive surgery (MIS) technique is used
  - (2) Easier post-operative rehabilitation
  - (3) Shorter hospital stay
  - (4) Less blood loss
  - (5) Lower risk of infection
  - (6) Less joint stiffness
  - (7) Lower risk of venous thromboembolism (VTE) due to non-invasion of the medullary space
  - (8) Easier revision surgery, if required, at a later date

~ Zanasi 2011

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

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

How Big of a Problem are Knee Replacements?

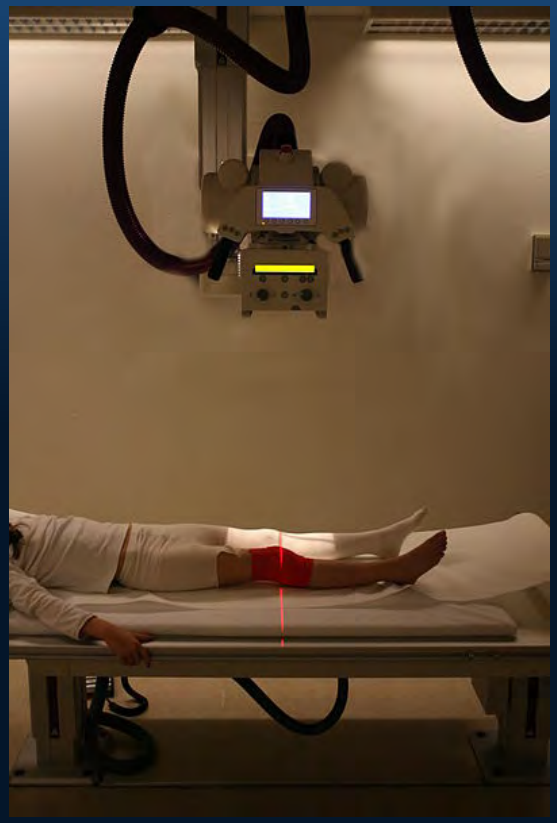
- The primary diagnosis leading to TKR is degenerative osteoarthritis (93%). Other diagnoses are inflammatory arthritis (5%), post-traumatic osteoarthritis (2%), and osteonecrosis (when bone dies due to blocked blood supply; 1%) - Health Quality Ontario 2005

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

How Big of a Problem are Knee Replacements?

- "Total hip and knee replacement are two of the most common and successful elective surgeries preformed 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

What are the Symptoms of Knee Replacement?



- Progressive increase in pain
- Loss of function

Common Causes for a Knee Replacement

- Arthritis
- Damage of one to three areas:
  - medial femorotibial
  - lateral femorotibial
  - patellofemoral compartments
- Rheumatoid Arthritis
- Injury

Common Causes for a Knee Replacement

- All other pain relieving things have failed or are not effective 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

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

What Else Could it Be?

– Nothing

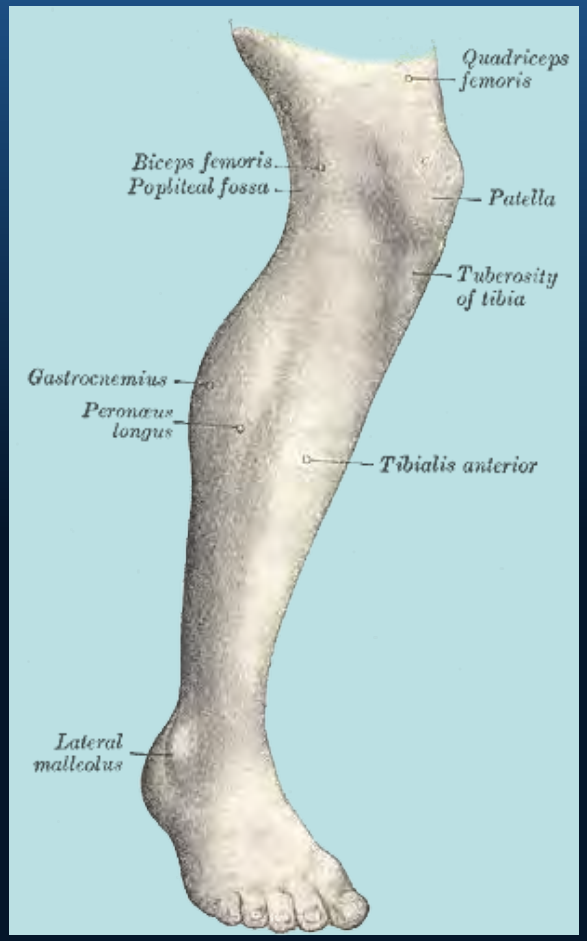
Other Names for Knee Replacement?

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

Key Structures Involved in Knee Replacement

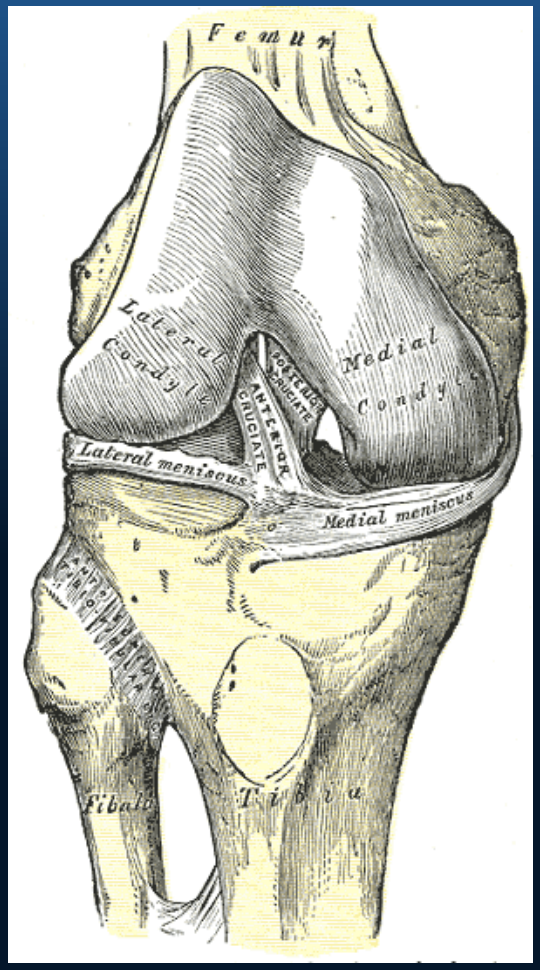
- <u>Overall Structure</u>
  - Knee

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

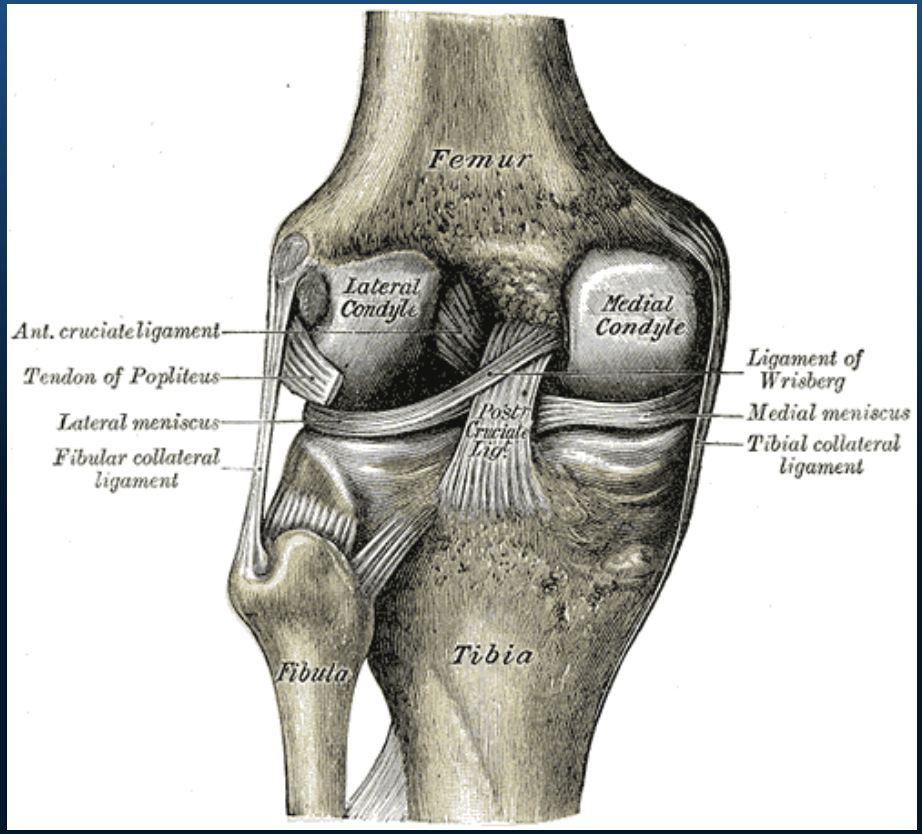
Key Structures Involved in Knee Replacement



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

Key Structures Involved in Knee Replacement

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

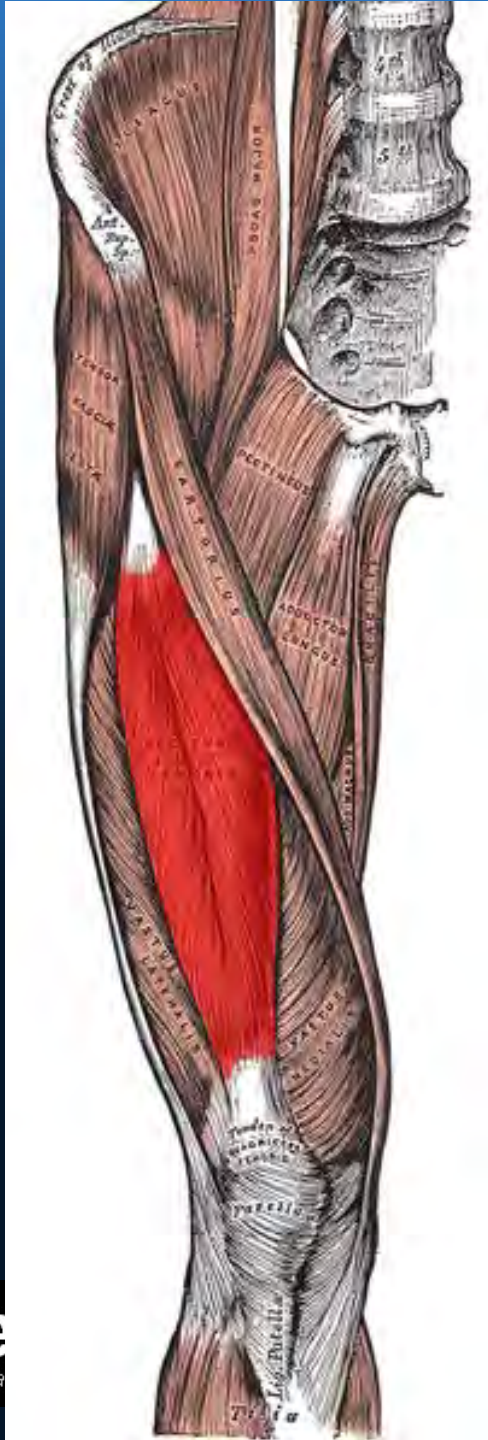


Key Structures Involved in Knee Replacement

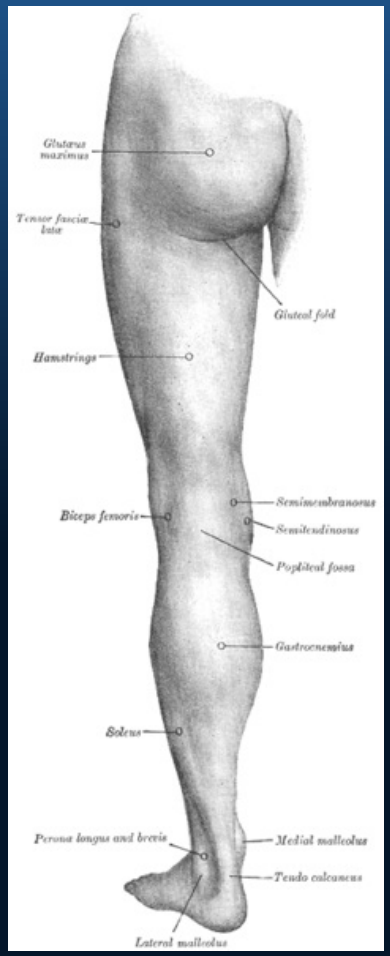
- Covering Each of the Bones:
  - Cartilage

Key Structures Involved in Knee Replacement

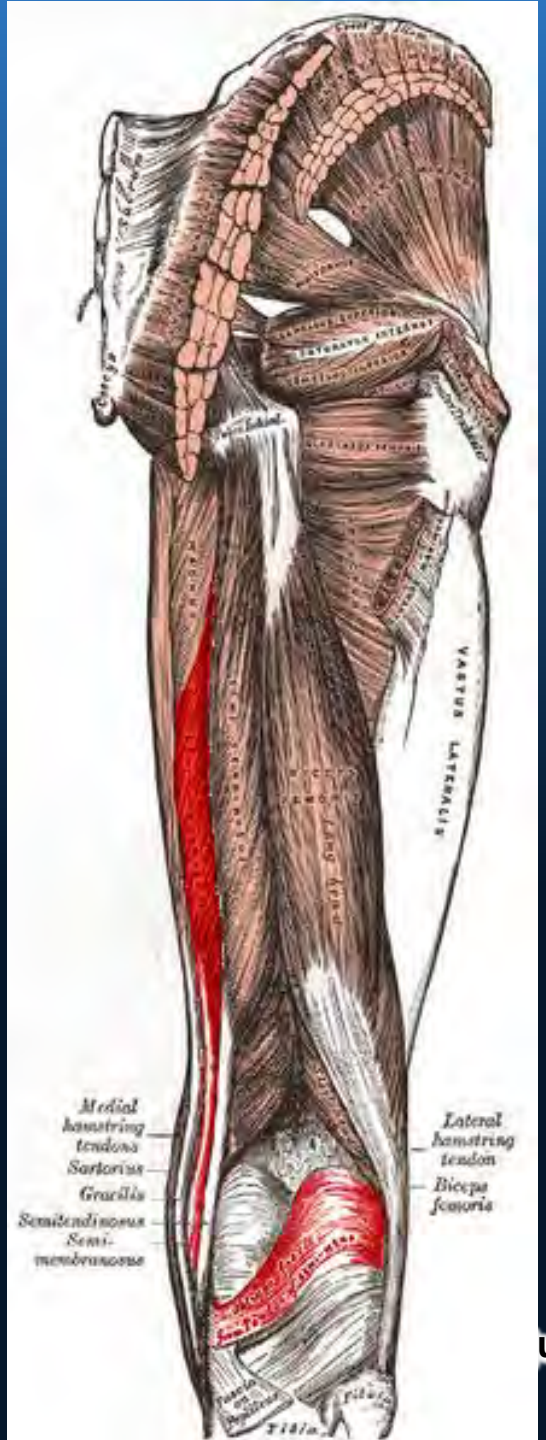
- Key Muscles:
  - Quadriceps:
    - Rectus Femoris
    - Vasuts Intermedius
    - Vastus Medialis
    - Vastus Lateralis



Key Structures Involved in Knee Replacement



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



Key Structures Involved in Knee Replacement

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

What Can You Do About It?

- Weight Loss
- Physiotherapy
- Medication
- Continuous passive motion
- Play Wii Fit
- Exercise

Remember! (IMPORTANT)

1. **Get things check out**
2. **Get an accurate diagnosis**
   - Any medical investigations
3. **Get clearance to start an exercise program**
4. **Bring this exercise program to your doctor to see if it is right for you**

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

#2 - Pre-Operative Rehabilitation

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

~ Ritterman 2013

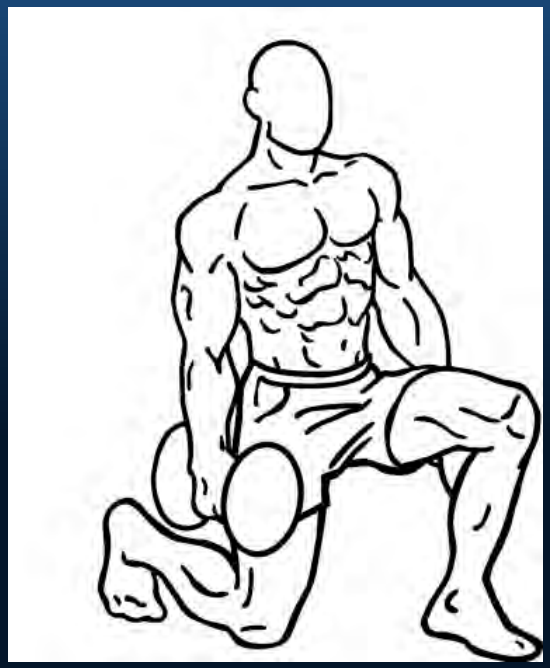
#3 – Focus on the Quads Before Surgery

"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

#4 - Core Stability

- Trunk Control



#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*

#6 - Hip Strengthening

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

#7 - Ankle Strengthening

- Standing Toe Lifts
- Calf Raises

#8 - Functional Movement

- Walking
- Squatting
- Lunging
- Stepping

#9 - Stretching

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

#10 - Walking and Gait

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

#11 - Sleeping

- Put knee in a minimal stress position
- One to two pillows between knees

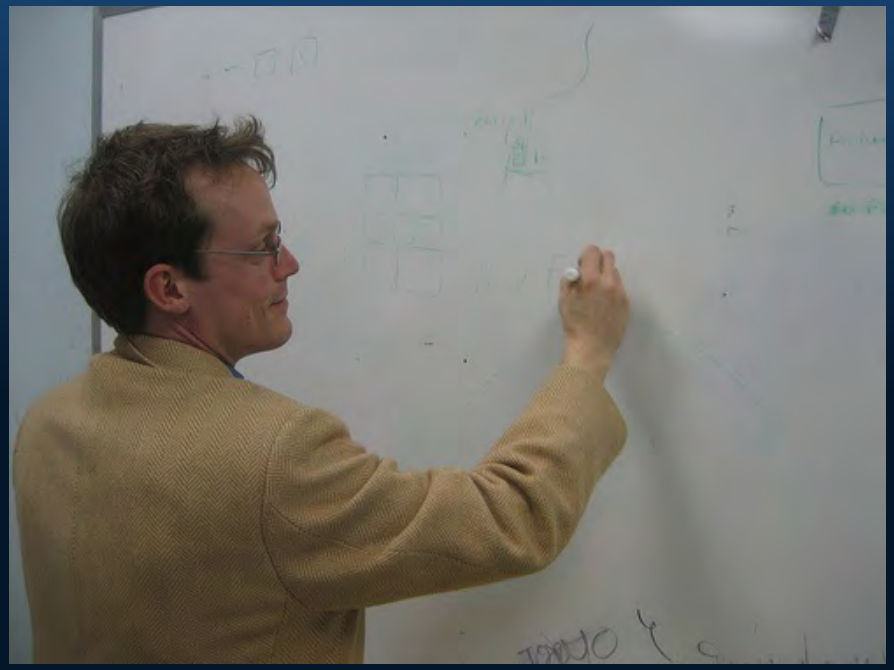
#12 - Focus on Activities of Low Stress

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

#13 - Other

- Be very careful how you get in an out of the 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

Essential Components of an Exercise Program For Knee Replacement



- **<u>Education cont.</u>**
  - 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?

Knee Replacement Assessment

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

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

Knee Replacement Exercise Program

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

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.

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

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

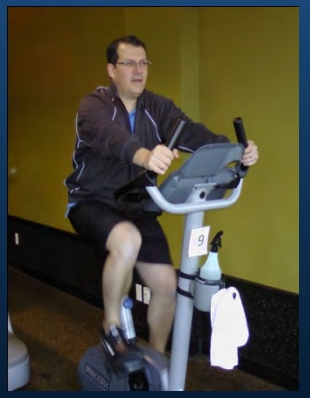
3-Stage Pain Relieving Exercise Program for Knee Replacement

	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

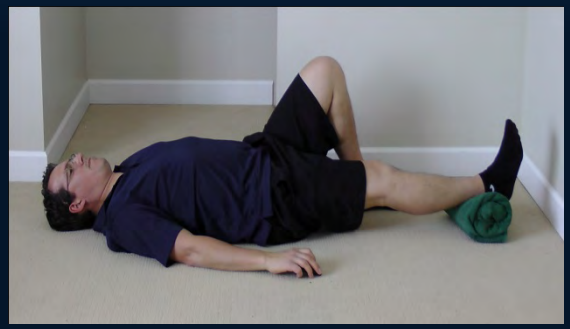
  - *Perform this exercise for 5 minutes.*



Exercise Rehabilitation Program

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

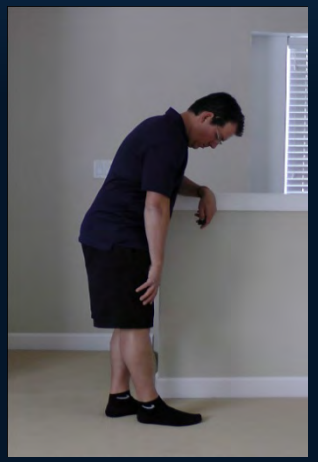
  - *1 set of 5 repetitions with each held for 2 seconds*



Exercise Rehabilitation Program

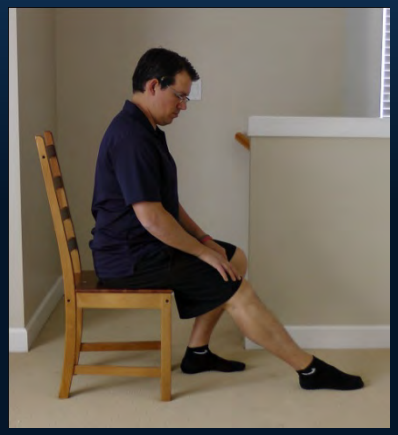
- **#2 – Knee Extension (cont.)**
  - Phase 2 - Tighten Quads in Sitting (1248)
  - Phase 3 - Tighten Quads in Standing (1249)

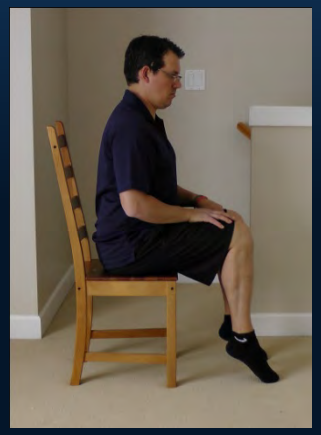
  - *1 set of 5 repetitions with each held for 2 seconds*



Exercise Rehabilitation Program

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



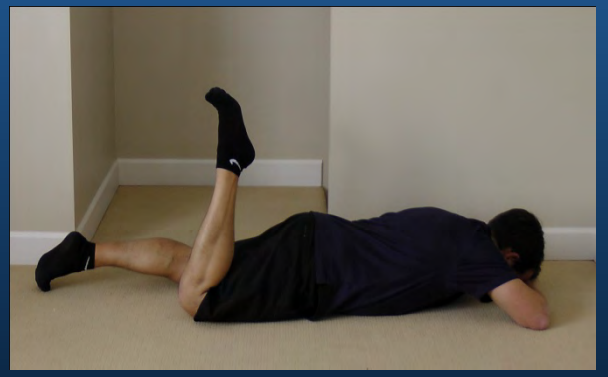


- *1 set of 5 repetitions with each held for 2 seconds*

Exercise Rehabilitation Program

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

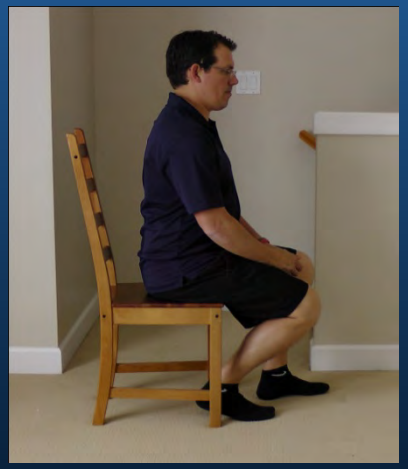
  - *1 set of 5 repetitions*



Exercise Rehabilitation Program

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

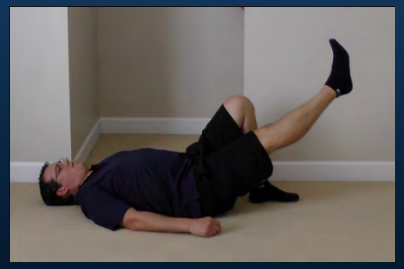
  - *1 set of 5 repetitions*

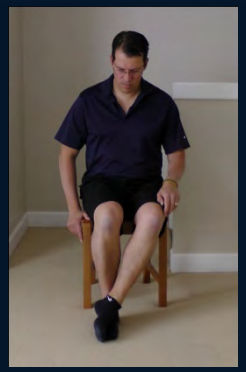


Exercise Rehabilitation Program

- **#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*

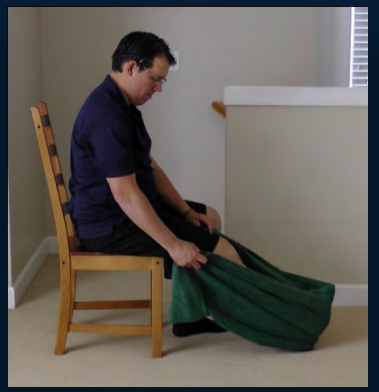




Exercise Rehabilitation Program

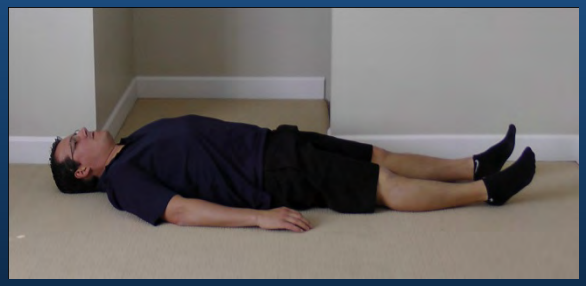
- **#5 – Quad Strengthening (cont.)**
  - Phase 3 - Sitting Leg Kicks (1260)
  - Phase 3 - Sitting Towel Leg Press (1270)

  - *1 set of 5 repetitions with each held for 2 seconds*



Exercise Rehabilitation Program

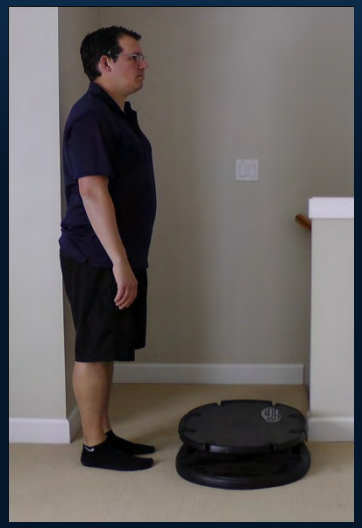
- **#6 – Gluteus Maximus Strengthening**
  - Phase 1 - Seat Squeezes (1271)
    - *1 set of 5 repetitions with each held for 2 seconds*
  - Phase 2 - Chair Lifts (1272)
    - *1 set of 5 repetitions*



Exercise Rehabilitation Program

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

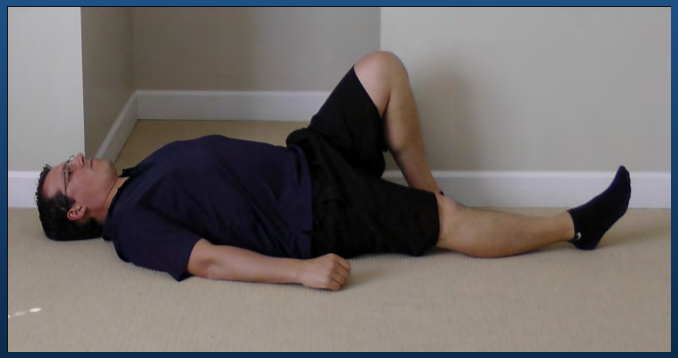
  - *1 set of 5 repetitions*

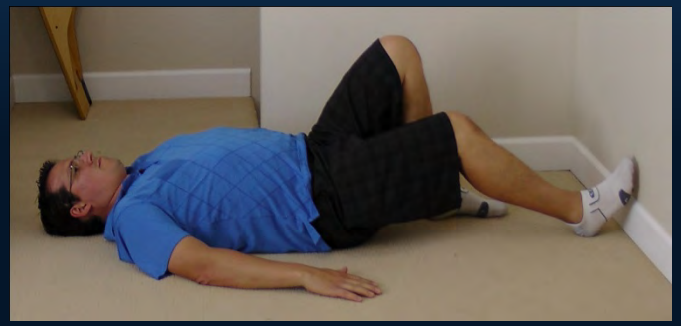


Exercise Rehabilitation Program

- **#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*

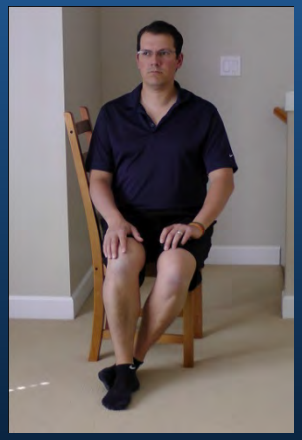


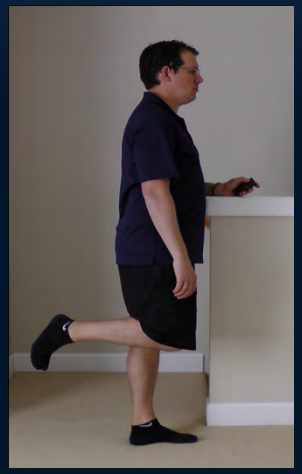


Exercise Rehabilitation Program

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

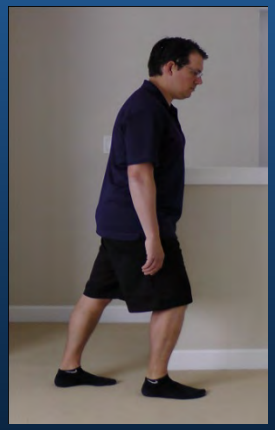
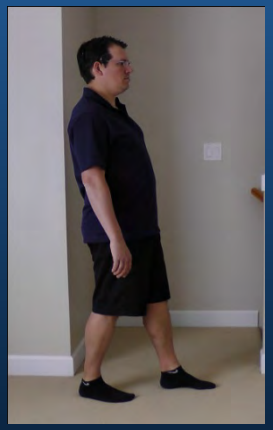
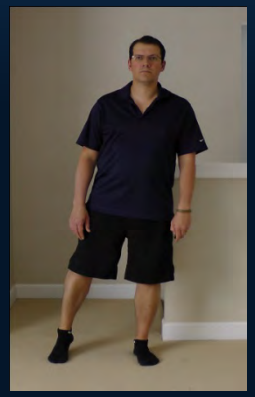
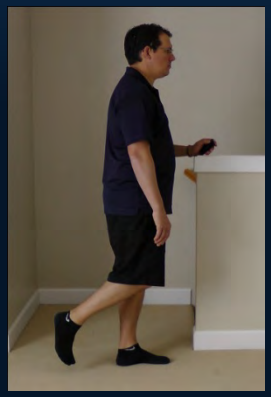
  - *1 set of 5 repetitions with each held for 2 seconds*





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)

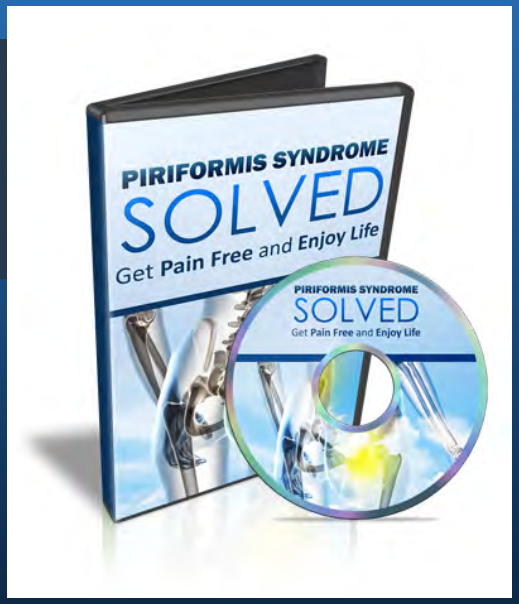
- *1 set of 5 repetitions with each held for 2 seconds*

Exercise Rehabilitation Program

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

Other Injuries

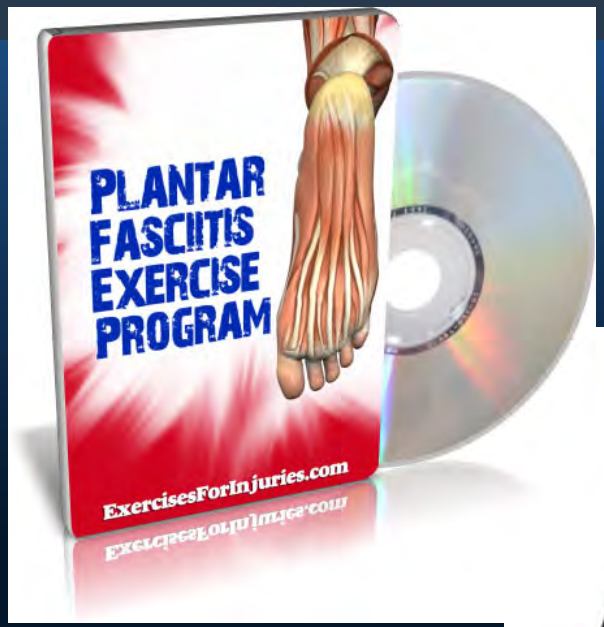
- Iliotibial Band Syndrome (IT Band)
- Shin Splints
- Piriformis Syndrome
- Patellofemoral Pain Syndrome
- Meniscus Tear
- Sacroiliac Pain
- What to do When a Low Back Flare Up Hits



Exercises For Injuries
The Fitness Professionals Source for Exercises and Injuries.

Other Injuries

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



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

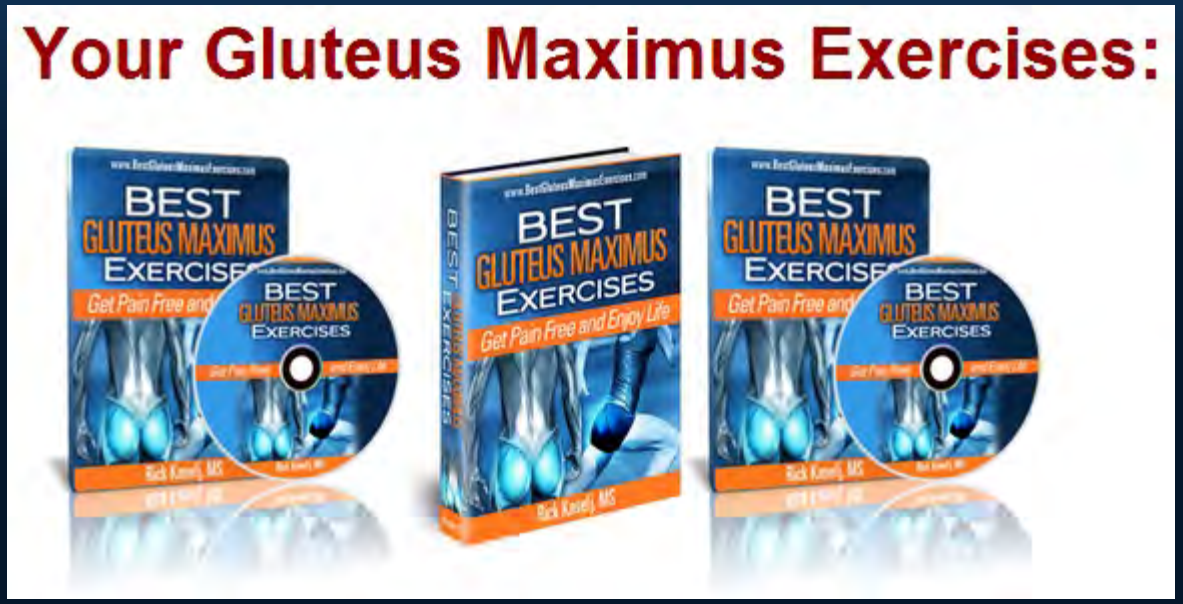
Recommended Resource

- Hip Replacement Handbook

Recommended Resource

- Best Gluteus Maximus Exercises

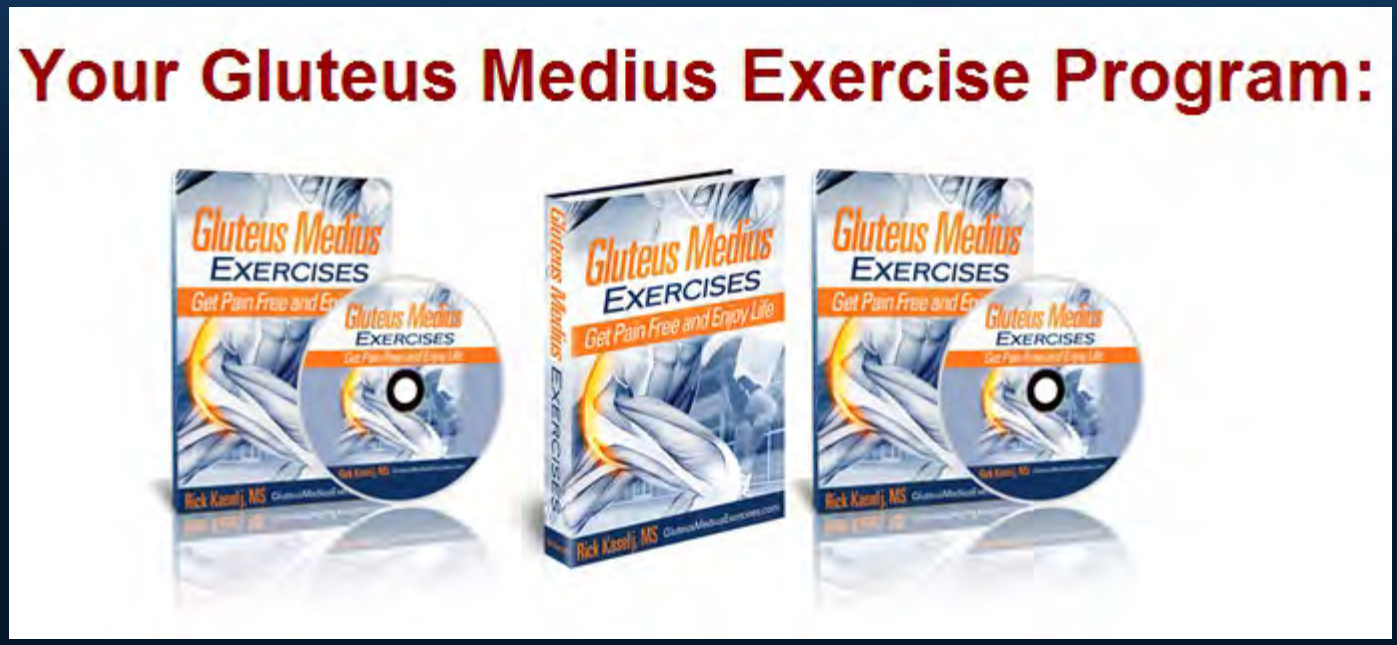
http://BestGluteusMaximusExercises.com



Recommended Resource

- Gluteus Medius Exercises

http://GluteusMediusExercises.com/



More FREE Information on Exercise & Injuries

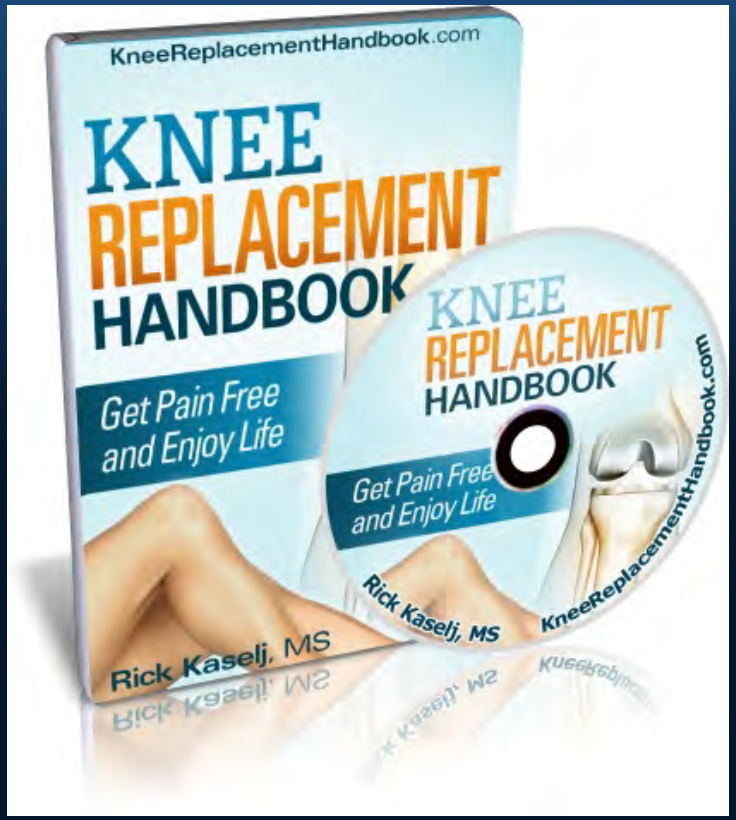
- **$299 Fitness Education Gift**
  - Returning the Shoulder Back to Optimal Function Seminar
  - Exercise Modification for the Sensitive Shoulder Seminar
  - Visit www.ExercisesForInjuries.com

Thank You

- **Send me your questions!**

- **Rick Kaselj**
  - support@ExercisesForInjuries.com
  - www.ExercisesForInjuries.com

End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Other Recommended Resources:

- **Scapular Stabilization Exercises** – ***ScapularStabilizationExercises.com***

Other Recommended Resources:

- **Effective Rotator Cuff Exercises** - *EffectiveRotatorCuffExercises.com*

Other Recommended Resources:

- **Fix My Shoulder Pain** – ***FixMyShoulderPain.net***

Other Recommended Resources:

- **Neck Pain Solved** – *NeckPainSolved.com*