

# Exercises to Strengthen and Prevent Knee Injuries

with Rick Kaselj, MS

# My Story

## Rick Kaselj

- BSc – 1997
- MS – 2008 / RC
- Work – physio, studio, gym, rehab
- Courses – live, webinars
- Writing – books, manuals
- Blog – [ExercisesForInjuries.com](http://ExercisesForInjuries.com)
- Knee Pain Story



**Rick Hiking 4300 km / 5 months  
from Mexico to Canada**

**Rick Kaselj – [ExercisesForInjuries.com](http://ExercisesForInjuries.com)**

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# Objectives



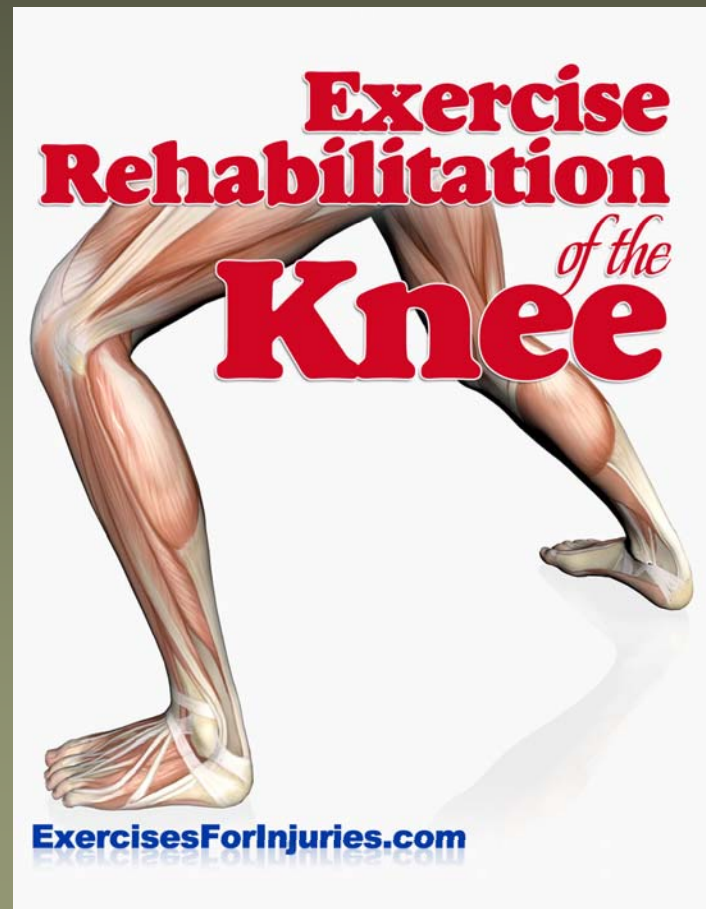
- Part 1 – Quick Knee Anatomy Review
- Part 2 – Assessing the Knee
- Part 3 – Exercises to Strengthen and Prevent Knee Injuries

# Part 1 – Quick Knee Anatomy Review

with Rick Kaselj, MS

# Anatomy of the Knee

- Bones
- Ligaments
- Joints
- Cartilage
- Muscles



# Anatomy of the Knee



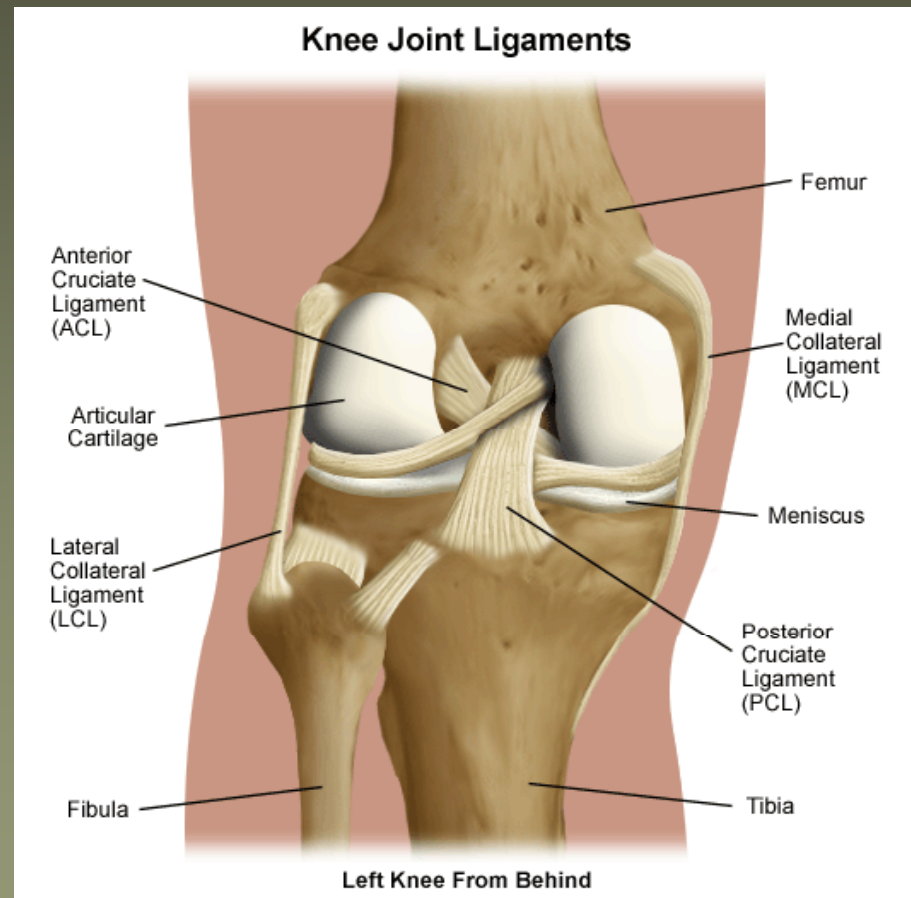
## Four Bones

- Femur (thigh bone)
- Patella
- Tibia (shin bone)
- Fibula

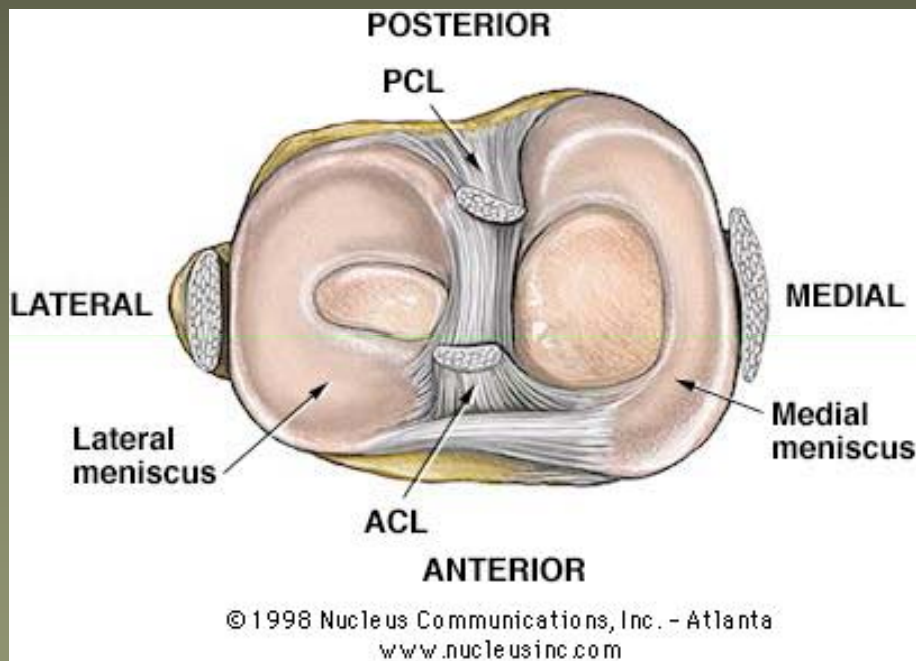
# Anatomy of the Knee

## Ligaments

- Anterior Cruciate Ligament (ACL)
- Posterior Cruciate Ligament (PCL)
- Medial Collateral Ligament (MCL)
- Lateral Collateral Ligament (LCL)



# Anatomy of the Knee



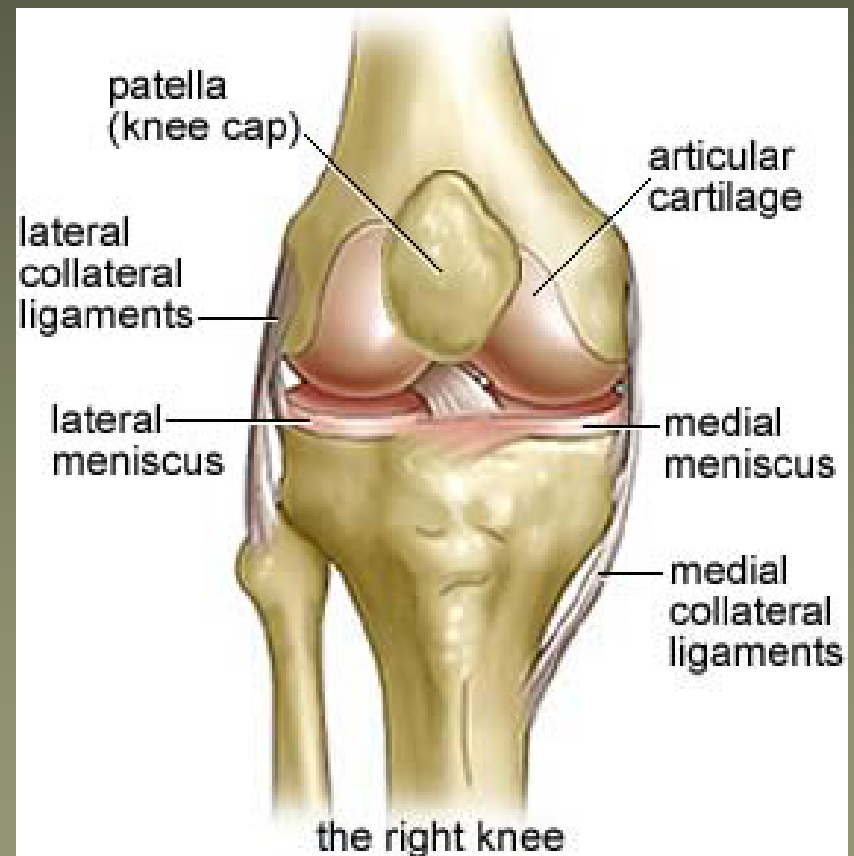
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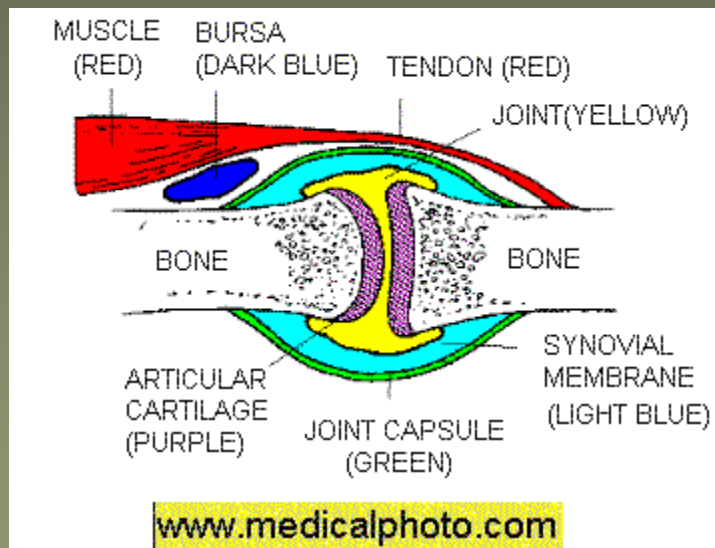
# Anatomy of the Knee

- Joints
  - Knee (Overall)
  - Patello-femoral Joint
  - Tibio-femoral Joint
    - *Medial*
    - *lateral*

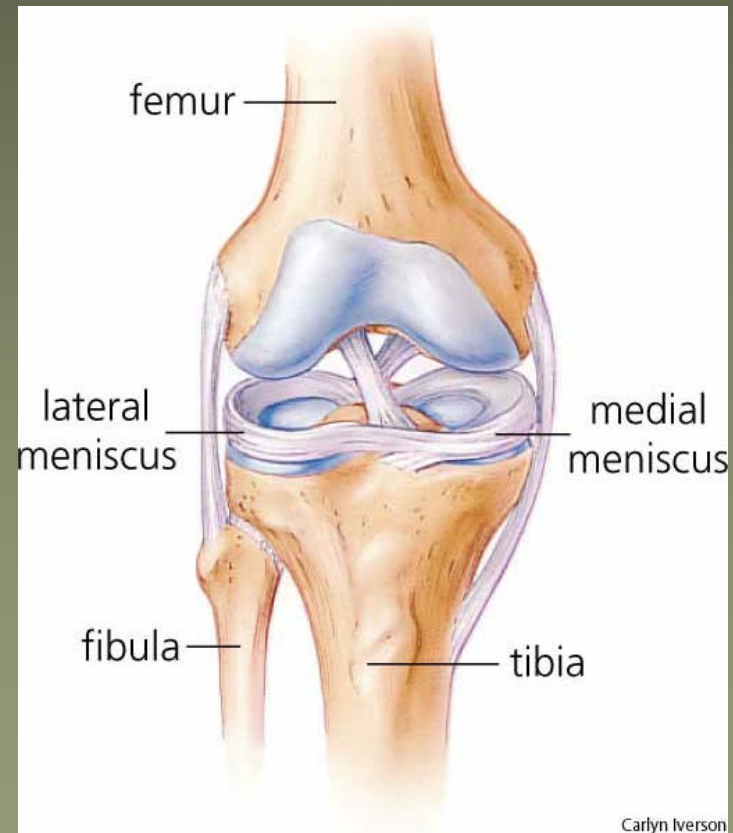


# Anatomy of the Knee

- Articular Cartilage

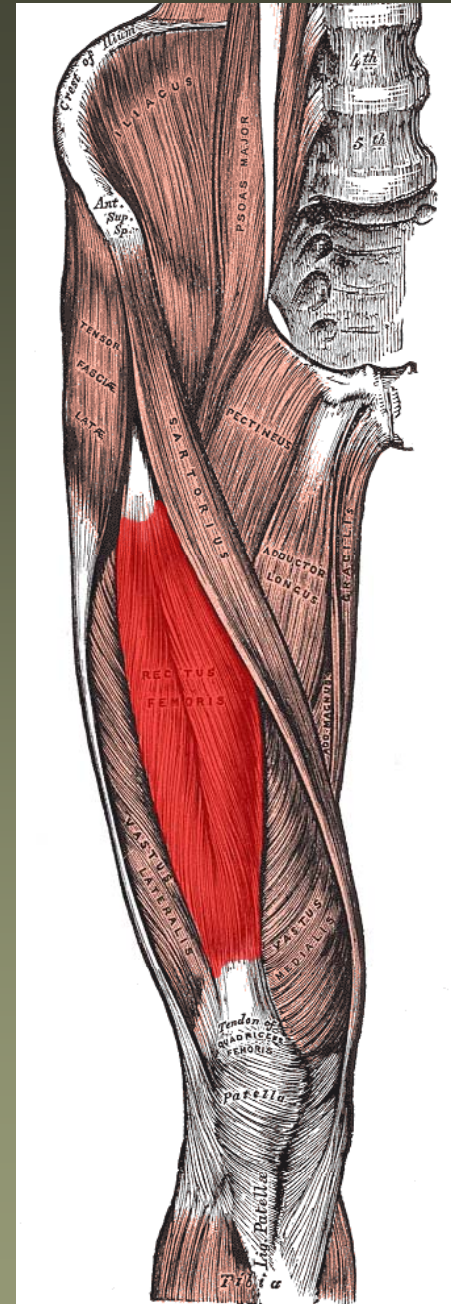


- Meniscus



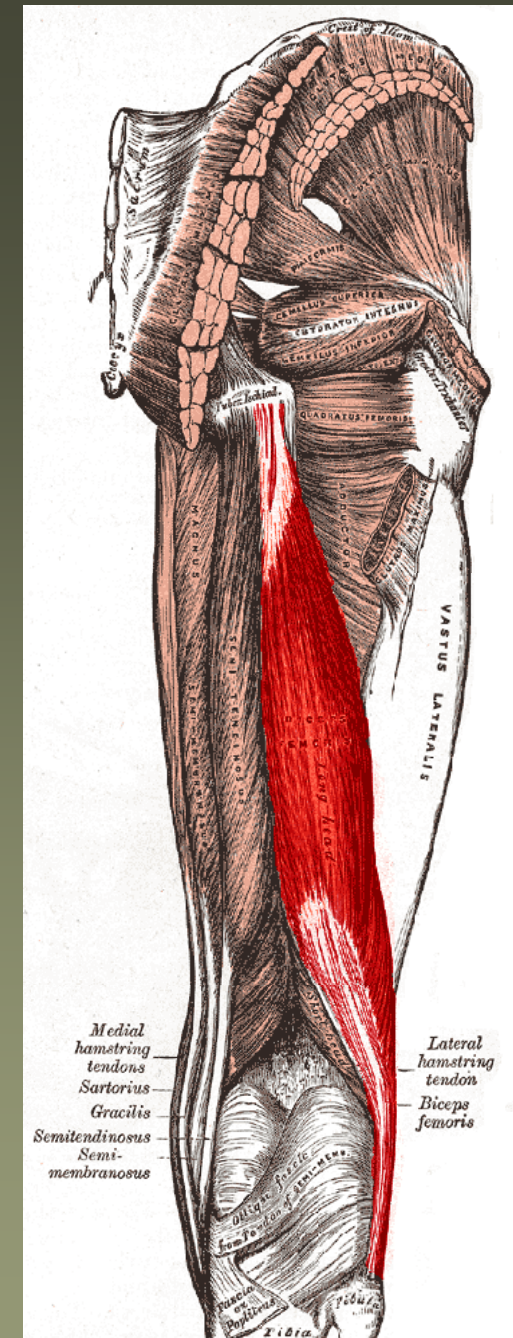
# Anatomy of the Knee

- Muscles
  - **Quadriceps**
    - *Rectus Femoris*
    - *Vastus Lateralis (Externus)*
    - *Vastus Intermedius*
      - (Under Rectus Femoris)
    - *Vastus Medialis (Internus)*
  - *Sartorius*

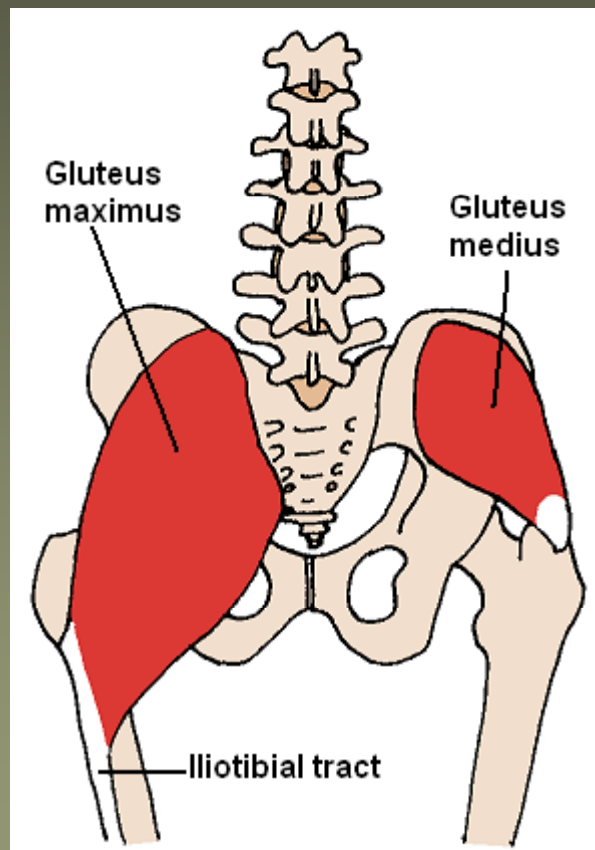


# Anatomy of the Knee

- Muscles
  - Hamstrings
    - *Biceps Femoris, Long Head*
    - *Biceps Femoris, Short Head*
    - *Semitendinosus*
    - *Semimembranosus*



# Structures in the Hip that Affect the Knee

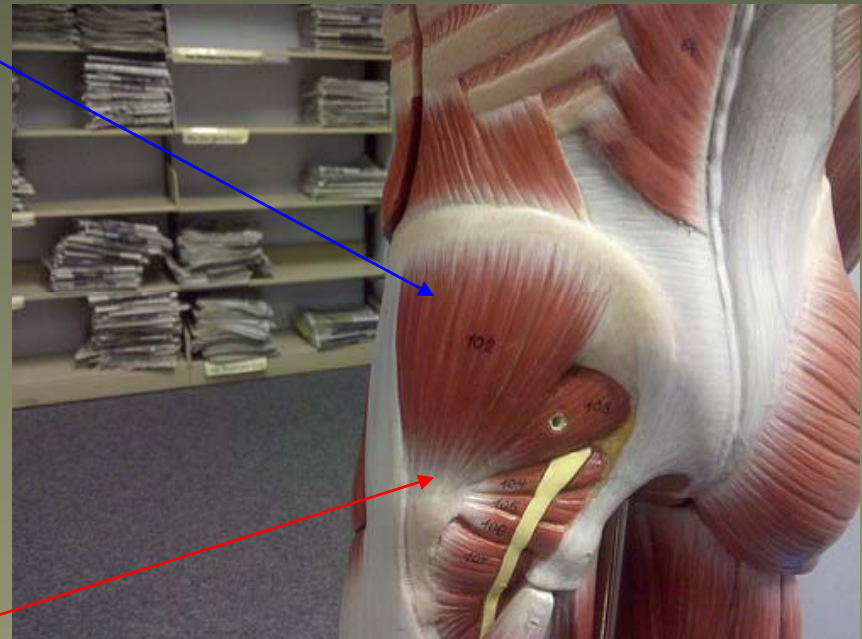


- Key Structures
  - Gluteus Medius
  - Gluteus Minimus
  - Secondary Structures
    - *Gluteus Maximus, Quadratus Lumborum, Hip Adductors, Tensor Fascia Latae, Psoas*



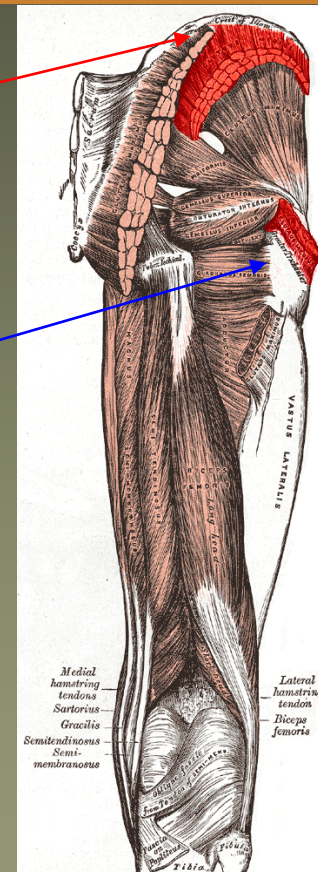
# Structures in the Hip that Affect the Knee

- Gluteus Medius
  - Primary hip abductor
  - Provides frontal plane stability for the pelvis during walking and other activities
  - Has three sets of fibers – anterior, middle, posterior
  - Tapers to a strong tendon

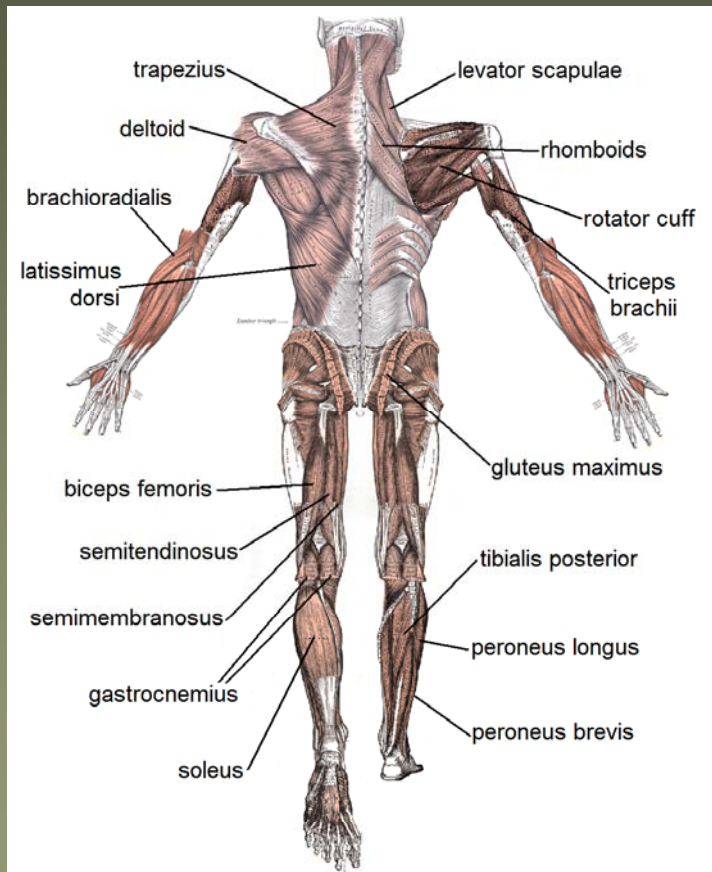


# Structures in the Hip that Affect the Knee

- Gluteus Medius
  - Origin – outer surface of the ilium between the middle and posterior gluteal lines
  - Inserts – lateral surface of the greater trochanter of the femur



# Structures in the Hip that Affect the Knee



- Gluteus Medius

- Primary function – hip abduction
- Anterior fibres – assist in hip flexion and hip internal rotation
- Posterior fibres – assist in hip extension and hip external rotation



# Structures in the Hip that Affect the Knee

- Gluteus Medius
  - *It is responsible for preventing the opposite side of the pelvis from dropping during standing or when the body is in a one leg stance position (walking, running, cutting, etc.)*
  - *If pelvis drops it is called a Trendelenburg Gait*



# Part 2 – Assessing the Knee

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# Assessing the Knee



- Supine Hip Abduction (Stage 1)
  - *No movement of the pelvis*

# Assessing the Knee

- Side Lying Hip Abduction (Stage 1)
  - *No backward movement of pelvis, flexion of hip, or internal rotation of the hip*



# Assessing the Knee



- Single Leg Standing (Stage 2)
  - *Trendelenburg Test*
    - Lifting one leg up
    - Positive = pelvis shifts
- Single Leg Balance with Anterior or Side Reach (Stage 2)

# Assessing the Knee

- Single Leg Squatting  
(Stage 3)

# Assessing the Knee



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- Functional Tests (Stage 3)
  - *Landing tests*
  - *Running*
  - *Sprinting*
  - *Jumping*
  - *Cutting*

# **Part 3 - Exercises to Strengthen and Prevent Knee Injuries**

**with Rick Kaselj, MS**



# Exercises to Strengthen and Prevent Knee Injuries

	Stage 1	Stage 2	Stage 3
<b>Activation</b>	Clam Exercise with 60 Degrees Clam Exercise with 30 Degrees Superman's with Hip Abduction		
<b>Frontal Stability</b>	Side Wall Bridge	Floor Bridge – 2 foot	Floor Bridge – 1 foot
<b>Hip Abduction</b>	Side-lying Leg Lift	Standing Hip Abduction	Pelvic Hip Drop
<b>Pelvic Stability</b>	Knee on Wall – Non-involved Leg	Knee on Wall – Involved Leg	Knee on Wall with Stability Ball
<b>Squatting</b>	Ball Squat	Squatting	Leg Press
<b>Lateral Movement</b>	Lateral Walking	Lateral Tubing Walk	Monster Walking
<b>Balance</b>	Single Leg Balance – Non-involved Leg	Single Leg Balance – Involved Leg	Single Leg Deadlift
<b>Stepping</b>	Step Up	Step Over	Side Step
<b>Lunge</b>	Lunge Upright	Lunge Forward	Bowling Lunge

# Exercises to Strengthen and Prevent Knee Injuries

- Activation

- Clam Exercise with 60 Degrees
- Clam Exercise with 30 Degrees
- Superman's with Hip Abduction



# Exercises to Strengthen and Prevent Knee Injuries

- **Frontal Stability**

- Side Wall Bridge
- Side Floor Bridge
  - 2 Feet
  - Side Floor Bridge
  - 1 Foot



# Exercises to Strengthen and Prevent Knee Injuries

- Hip Abduction
  - Side-lying Leg Lift
  - Standing Hip Abduction
  - Pelvic Hip Drop



# Exercises to Strengthen and Prevent Knee Injuries

- Pelvic Stability
  - Knee on Wall – non-involved Leg
  - Knee on Wall – Involved Leg
  - Knee on Wall with Stability Ball



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# Exercises to Strengthen and Prevent Knee Injuries

- Squatting
  - Ball Squat
  - Squatting
  - Leg Press





# Exercises to Strengthen and Prevent Knee Injuries

- Lateral Movement
  - Lateral Walking
  - Lateral Tubing Walk
  - Monster Walking



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# Exercises to Strengthen and Prevent Knee Injuries

- **Balance**

- Single Leg Balance – Non-involved Leg
- Single Leg Balance – Involved Leg
- Single Leg Deadlift





# Exercises to Strengthen and Prevent Knee Injuries

- Stepping
  - Step Up
  - Step Over
  - Side Step



# Exercises to Strengthen and Prevent Knee Injuries

- Lunge

- Lunge Upright
- Lunge Forward
  - *gluteus maximus and biceps femoris* (Farrokhi 2008)
- Bowling Lunge

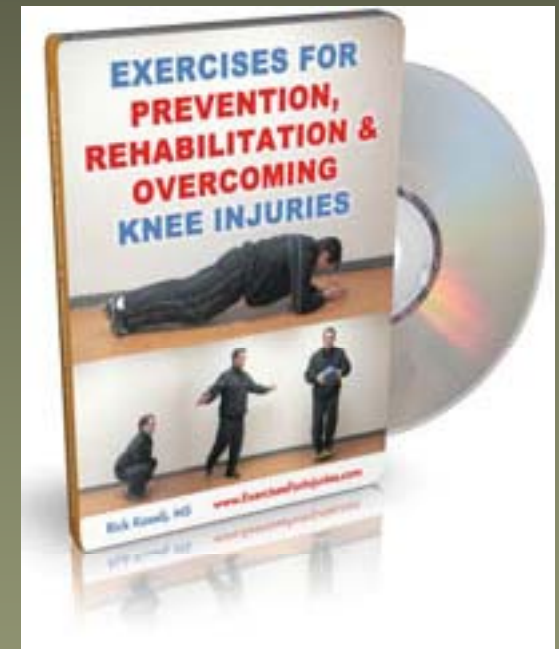
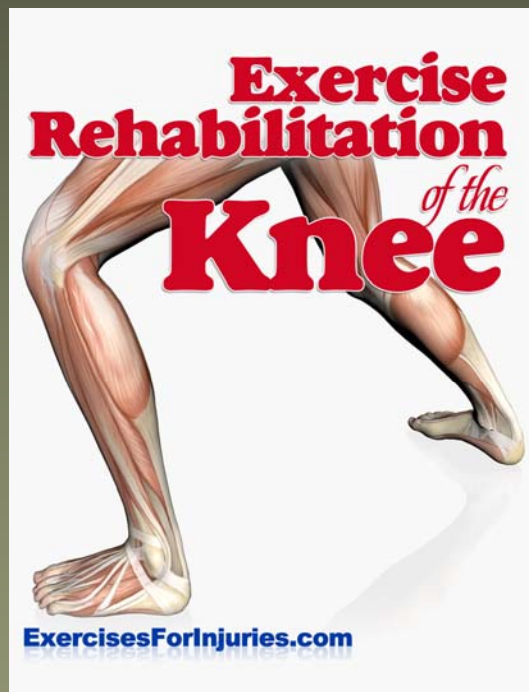


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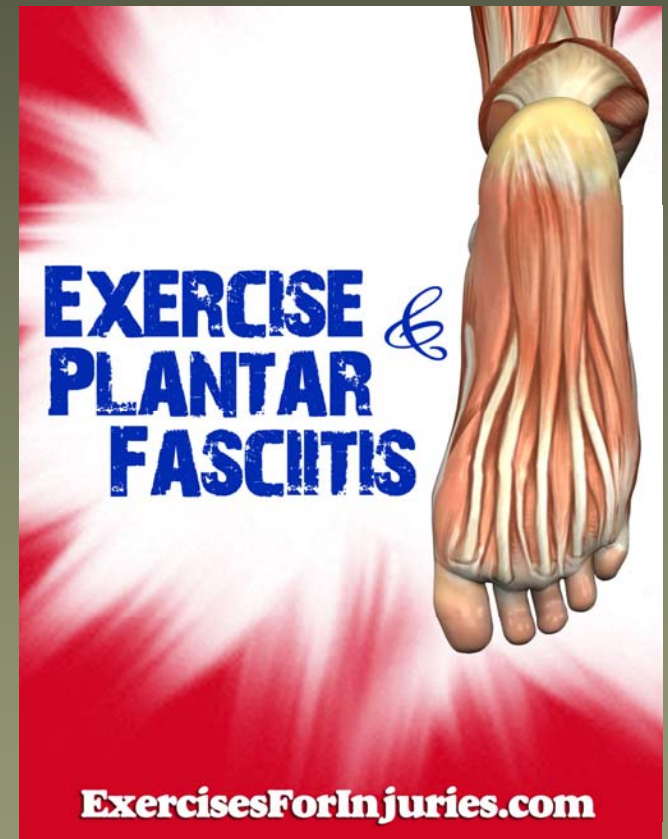
# Where to Get More Information



Rick Kaselj – ExercisesForInjuries.com

# Other Presentations

- Scapular Stabilization Exercises
- Plantar Fasciitis and Exercise
- The Most Effective Rotator Cuff Exercise Program
- Exercises for Prevention, Rehabilitation and Overcoming Knee Injuries
- Corrective Exercises for Running Injury-free
- Lumbar Spinal Fusion and Exercise



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# More FREE Information on Exercise & Injuries

- \$299 Fitness Education
  - Returning the Shoulder Back to Optimal Function Seminar
  - Exercise Modification for the Sensitive Shoulder Seminar
  - Visit [www.ExercisesForInjuries.com](http://www.ExercisesForInjuries.com)

# Thank You

- Send me your questions!
- Visit [ExercisesForInjuries.com](http://ExercisesForInjuries.com) to get \$299 in Fitness Education Gifts
- Rick Kaselj
  - [rick@ExercisesForInjuries.com](mailto:rick@ExercisesForInjuries.com)
  - [www.ExercisesForInjuries.com](http://www.ExercisesForInjuries.com)

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# End



# Bibliography

- Farrokhi S, Pollard CD, Souza RB, Chen YJ, Reischl S, Powers CM. (2008). Trunk position influences the kinematics, kinetics, and muscle activity of the lead lower extremity during the forward lunge exercise. J Orthop Sports Phys Ther. 2008 Jul;38(7):403-9. Epub 2008 Apr 15.

# MCL Injury

- Frontal plane
- Excessive pronation

# Leg Exercises

- Seated Bilateral Leg Extension

# LCL Injury

- Frontal plane

# Meniscus

- Obesity

# Cartilage

- Obesity