When Good Knees Go Bad
2016

REMINDER:
Obtain medical clearance and physician’s release prior to beginning an exercise program for clients with medical or orthopedic concerns.

Steps to Effectively Managing Knee Injuries or Conditions
1. Understand the Condition
2. Avoid Exercises or Movements that Cause Pain or Discomfort
3. Implement Strategies to Address the Common Causes of the Condition
4. Refer to PT if New Pain or Progression Occurs

KNEE ANATOMY REVIEW
Right Knee View
- Quadriceps Tendon
- Femoral Condyles
- Patella
- Meniscus
- Patellar Tendon
- Tibial Condyles

Range of Motion
- Functional
  - 0° to 120° flexion
- Active/Passive
  - 0° to 135° flexion
  - 10° hyperextension is common

Common Knee Conditions/Injuries
- Anterior Knee Pain
- Meniscus Injury
- Degenerative Arthritis
- Knee Arthroscopy
Anterior Knee Pain (AKP)

- Patellofemoral Pain (PFPS)
  - *i.e. Runner’s Knee*
- Patellar Tendinopathy
  - *i.e. Jumper’s Knee*
- Chronic Degenerative Condition
- IT Band Syndrome (ITBS)

Proposed Causes of AKP

- Weak Muscles
  - Quadriceps, Hip Abductors, Hip Flexors
- Tight Areas
  - Psoas, IT Band, Quadriceps
- Altered Lower Extremity Kinematics
  - Increased Internal Hip Rotation

PREVENTIVE STRATEGIES

- Avoid or “Modify” Activities that Worsen Condition
- Foam Rolling & Stretching:
  - Quadriceps, IT Band, Psoas
- Strengthening:
  - Quadriceps, Glutes, Hip Flexors
- Braces, Taping and Supports

Patella Loading with Activity

- Walking
  - 0.3 x body weight
- Climbing stairs
  - 2.5 x body weight
- Descending stairs
  - 3.5 x body weight
- Squatting
  - 7.0 x body weight

Avoid Aggravating Condition

- Runners
  - Evaluate technique, shoes, mileage, surfaces
- Cyclists
  - Check bike fit; avoid prolonged high gears and hill climbing
- Fitness
  - Avoid exercises with high impact stress, require excessive knee flexion, or excessively load the quads

Foam Roll & Stretch

- Quadriceps
- IT Band
- Psoas
Isometric Holds Decrease Pain

- Isometric Exercise Can Reduce Tendon Pain for up to 45 Min.
- Use a 10” Isometric Prior to Quad-Dominant Lower Body Exercises

Role of Glutes

- Ability to control Frontal and Transverse Plane Hip Motion impaired in those with PFPS

Strengthening Hip External Rotation and Abduction

Clamshell

Side Bridge w/ Isometric Hip Abduction
Band Assisted Cook Hip Lift

Band Resisted Hip Flexion
- Hip Extension w/ Opposing Hip Flexion increase focus on Psoas

Eccentric Hip Flexion

Role of Foot
- Increased Pronation of Subtalar Joint along with Arch collapse directly influence knee valgus

Subtalar Joint SMFR

Improving Arch Strength

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Band Resisted Arch Strengthening
- Go from Neutral to High Arch Position, and hold for 10°

Train Barefoot - Sometimes
- Barefoot exercises can increase foot strength & proprioception
- Single Leg Stance
- Deadlifts

Eccentric Quad Strengthening
Exercise Most Frequently Researched to Treat Patellofemoral Pain & Tendinopathy

Hamstring Muscle Injury
- Overuse
- Muscle imbalances
- Weak Glutes

Negative Assisted Leg Curl

Posterior Knee Pain
- Muscle | Tendon Injury
  - Popliteus
  - Hamstring
  - Gastrocnemius
- Posterior Cruciate Ligament Injury
- Baker’s (popliteal) Cyst

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Popliteal Muscle Injury

- The "key" of the knee
- Overuse Injury
  - Associated with Frequent Uphill Running
  - Excessive Overpronation

Band Resisted Popliteus Strengthening

Single Leg Disc Rotations

- Closed Chain Rotation

What is a Baker’s Cyst?

- Fluid-filled sac
- Expressed as "tightness" behind the knee
- Pain is worsened by full flexion or extension, and by activity
- Scale back exercise as necessary to avoid increasing inflammation

Meniscus Tears

- Occurs with flexion and rotation of the knee as in cutting or changing direction
- Older adults are prone to tears due to degenerative weakness

Consequences of Meniscus Tears

- Low-level swelling following activity that causes friction
- "Locked" knee
- Earlier onset of osteoarthritis
- Baker’s Cyst
Managing Meniscus Injury

- Discuss inflammation management with physician
- Avoid deep knee bending (– Deep squats and lunges)
- Maintain a Vertical Shin
- Avoid locking out the knee
- Avoid or modify impact activities

Training Around Knee Arthritis

- Decrease BW
- Up to 80% reduction in pain w/ well-rounded PT program
- Yoga | Tai Chi
- Hydro-Aquatic Ex
- Strength | Cardio

Stability Ball Wall Squats or Wall Sits

The Long-Term Solution

- Total Knee Replacement
- Partial Knee Replacements

General Recommendations for Knee Post-Rehabilitation

- Progressive Resistance
- Stable to Unstable
- Strengthen Hips and Hamstrings
- Look to Improve Weak Areas or Movement Patterns
- Train with Support

Increase Stability in Training

- Use Bi-Lateral Exercises
  – Squat
  – Leg Press
  – Knee Extension
  – Leg Curls
- Do Hamstring and Glute Activation Drills 1st
Glute + Hamstring Activation

• Mini-Band Lateral Shuffle
• Hamstring Bridges

Improve Proprioception

• Weight Shifting
• Single Leg Balance
• Eyes Closed
• Unstable Surfaces
  – Barefoot on Floor
• Perturbation Training

Suitcase or Racked KB Carry w/ Balance Challenge

• Hold Balance for 3-5 Seconds
• Walk:
  – Forward
  – Lateral
  – Backward

Neuroreactive Training Methods

• Use bands to pull into valgus position
• Body reflexively neutralizes tension
• Progress to Med Ball Toss

NRT Squat/Split Squat

Cable Rotation to 1-Leg Stance
Directional Band Resisted Lunges

LATERAL SKATING

Cone Reach | SL Squat

SL Standing Clock Reach

MULTI-DIRECTIONAL LUNGES

Adapting Cardio for Knee Pain
- Repetitive stress & chronic knee pain
- Recommendations
  - Cross-Training
  - Interval Training
  - Aquatics
- Recovery
  - Ice & Massage

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Incorporating Aquatic Exercise

• Aquatics classes for arthritis
• Pool Running may be tolerable for people with Runner’s/Jumper’s Knee
• Kickboard w/ or w/out Fins works quads with limited range of motion

Use of Supports and Braces

• Wearing knee sleeves improves function in those with knee arthritis
• Improves Stability & Proprioception