ORTHOPEDIC PRIMARY CARE: Diagnosing & Treating Non-Traumatic Knee Pain
Acknowledgement

This lecture was originally developed as part of *Orthopedic Primary Care*, a six-month continuing education program presented yearly by the *Jackson Orthopaedic Foundation*, a non-profit organization in Oakland, California.

More information at:

**OrthoPrimaryCare.Info**

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Learning Objectives

• At the conclusion of this presentation, participants will be able to

1. Identify likely causes of non-traumatic, non-arthritic knee pain based on presentation and history.

2. Appropriately apply specialty exam techniques and order diagnostic imaging as needed to definitively diagnose non-traumatic, non-arthritic knee pain.

3. Implement appropriate treatment plans to include integrative and pharmaceutical modalities. The use and effects of the following pharmaceutical types will be discussed: acetaminophen, NSAIDs, injectable corticosteroids and topical analgesics.
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Anterior Knee Pain

- Patellofemoral Pain Syndrome
- Chronic Patellar Dislocation
- Patellar Tendinopathy (Jumper’s Knee)
Patellofemoral Pain Syndrome

**History**
- Anterior pain
- + Theatre sign
- “Giving out” w sharp knee pain, popping, crepitus
- Descending stairs exacerbates pain

**Physical Exam**
- No effusion
- + Retinacular pain
- + Patellar Tilt Test (lateral edge of patella lifts < 20 degrees)
- + Pain with squatting
- (-) ligament instability (ACL, MCL, LCL)
Patellar Tracking Disorder (Right Knee)

- Vastus Lateralis Muscle
- Vastus Medialis Muscle
- Patellar
- Quadriceps femoris tendon
- Lateral Tracking
- Medial Tracking
- Patellar tendon
- Fibula
- Tibia

BodyHeal.com.au
Your Sports Therapy Shop

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Patellar Tilt Test
TREATMENT: PFPS

• Quad and hip strengthening
• Stretching: Hip flexors, hamstrings, iliotibial band, quads
• Taping/bracing *may* help
• Adjunctive only: biofeedback, chiro, orthotics

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Patellofemoral Pain Syndrome (Runner's Knee) Rehabilitation Exercises

- Standing hamstring stretch
- Quadriceps stretch
- Side-lying leg lift
- Quad sets
- Straight leg raise
- Step-up
Chronic Dislocation
aka Patellar Subluxation/ Patellofemoral Instability/ PFI

- History
- Anterior pain
- Snapping with feeling of dislocation
- History of dislocation
- Older
- Women

- Physical Exam:
- Decreased quad/VMO and hamstring strength & flexibility
- Hypermobile patella
- + J sign
- + Patellar tilt
- + Patellar apprehension
Patellar Tracking Disorder (Right Knee)

Vastus Lateralis Muscle

Vastus Medialis Muscle

Quadriceps femoris tendon

Patellar

Lateral Tracking

Medial Tracking

Patellar tendon

Fibula

Tibia
Patellar Apprehension
Imaging

• Xrays – A/P, lateral, sunrise
  • Assess for osseous trauma/deformity/malalignment

• MRI –
  • if soft tissue damage suspected or no improvement after 6-8 weeks

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TREATMENT
Chronic Dislocation

• VMO Strengthening
• Bracing/Taping
• Proprioceptive therapy
• Surgery (ONLY for osteochondral fracture, intra-articular deformity, major muscle tear)
Patellar Tracking

Knee without tape

Knee with tape

Kneecap out of alignment

Kneecap in normal alignment
Patellar Tendinopathy
Jumper’s Knee

- **History**
- **Anterior suprapatellar pain r/t activity**
- **Phases**
  - 1: after activity
  - 2: during activity, doesn’t impede competition
  - 3: during & after activity, interferes w competition
  - 4: complete tendon disruption

- **Physical Exam**
- **Focal suprapatellar pain, tendon thickening, nodularity, crepitus**
- **Test strength via leg raise, squats**
- **MRI if findings equivocal**
TREATMENT:
Patellar Tendinopathy

• Physical Therapy – 12 weeks
  • Eccentric Training

• 3 PRP injections over 3 weeks
  • 75% return to pre-injury within 90 days
  • Referral to ortho after 3-6 months if no improvement

• Corticosteroids contraindicated

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Patellar Tendonitis (Jumper's Knee) Exercises

Standing hamstring stretch

Quadriceps stretch

Side-lying leg lift

Straight leg raise

Wall squat with a ball

Step-up

Resisted knee extension

Knee stabilization

Quadriceps isometrics
Side Knee Pain

- Iliotibial Band Syndrome (ITBS)
- Medial Plica Syndrome
- Pes Anserine Bursitis
Iliotibial Band Tendinopathy

History
- Lateral pain that worsens with repetitive knee flexion

Diff Dx:
- Lateral meniscus
- Lateral Plica
- Popliteus Tendonitis (Post)

Physical Exam
- + Noble’s Test
- + Ober’s Test
- Pain over lateral femoral condyle
Ober’s Test

- The subject is placed on their side, healthy side down. The knee is flexed 90 degrees and the hip extended to neutral (no flexion.)
- Hold the leg up by the foot. Normally, the knee falls down to the exam table. If the ITB is very tight, the leg hangs up in the air. If it’s moderately tight, the knee falls halfway to the table.
Noble’s Test
TREATMENT: Iliotibial Band Syndrome

- Activity modification
- NSAIDS
- Physical Therapy
  - myofascial release via foam rollers
  - stretching ITB, Tensor fascia latae, gluteus medius;
  - strengthen glutes and core
- 2nd line: Corticosteroid Injections
- Refer: If no improvement after 6 months consider surgical release
ITB Release

I.T.B. stretch
ITB Release

[Image of a person stretching]

[Image of a person using a foam roller]

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ITBS Exercises

Iliotibial Band Syndrome Rehabilitation Exercises

- Side-lying leg lift
- Knee stabilization: A
- Knee stabilization: B
- Knee stabilization: C
- Knee stabilization: D
- Iliotibial band stretch (side-bending)
- Clam exercise
ITB Injection
Medial Plica Syndrome

- Impingement of plica by medial femoral condyle or patellofemoral joint
- Trauma* → inflammation → thickening
  - * repetitive or blunt; sudden increase activity; or transient synovitis
- Distinguish from medial meniscus injury, Medial collateral ligament injury, OA
Synovial Plica Irritation

- Femur Bone
- Knee Cap
- Lateral Collateral Ligaments
- Articular Cartilage
- Lateral Meniscus
- Tibia Bone
- Synovial Plica Irritation
- Medial Meniscus
- Medial Collateral Ligaments
Medial Plica

http://www.kneeguru.co.uk/KNEEnotes/primers/patella-primer/what-plica-syndrome
Medial Plica Syndrome

**History**
- Medial pain, dull achy; vague
- Catching/locking
- Pain with flex/ext esp. between 30 and 60 degrees
- Young, female

**Physical Exam**
- + Medio-patellar plica test
- Palpation of plica
  - Thickened cord parallels medial patellar border
TREATMENT: Plica Syndrome

Physical Therapy
- Quad strengthening

NSAIDs

Corticosteroids

Refer to ortho 3-6 months
- Arthroscopic synovectomy
Pes Anserine Bursitis

- Inflammation of the Pes anserine bursa
- Insertional tendonitis vs overt bursitis
- Prevalence and risk factors unknown
- Higher incidence in some populations
Pes Anserine Bursa

Bursae in the Knee
- suprapatellar bursa
- infrapatellar bursa
- patellar tendon
- prepatellar bursa
- sartorius tendon
- gracilis tendon
- semitendinosus tendon
- pes anserine bursa
- shin bone

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Pes Anserine Bursitis

History
- Medial knee pain
- No trauma
- ++ w Activity
- Co-morbidities
  - Obesity
  - Wide hipped women
  - Diabetes Mellitus
  - Pes planus
  - Arthritis

Physical Exam
- Pain with palpation at insertion of anserine complex – 5 cm. distal to medial joint line, slightly anterior
- Edema not always present
Pes Anserine Bursa
TREATMENT:
Anserine Bursitis

- Rest, ICE, Elevation, NSAIDs
- Pes planus treatment
- Weight loss
- DM management
- Corticosteroid injection – 2nd line Tx*
- Referral

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Pes Anserine Injection

- Iliotibial band
- Medial collateral ligament
- Bursa
- Lateral femoral condyle
- Lateral tibial condyle
- Pes anserine tendons and bursa

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Posterior Knee Pain

Popliteal (Baker’s) Cyst

• Bursa beneath medial head of gastrocnemius muscle and semi-membranous tendon

• Increased articular pressure forces fluid into the bursa

• Increased fluid > expansion and pain
• Causes: idiopathic; internal derangement;
## History
- Posterior pain/fullness
- History of other knee pathology:
  - Trauma
  - OA/RA
  - Meniscal injury
- Older age

## Physical Exam
- Palpable mass in popliteal fossa
- Pain
- Limited ROM
- + Foucher’s sign
  - Painful palpation in full extension improves w flex to 45 deg.
TREATMENT: Popliteal Cyst

• ACUTE PHASE:
  
  Knee flexion
  Ice
  NSAIDs
  Aspiration/corticosteroids

• TREAT UNDERLYING PATHOLOGY!

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Knee Effusion

History
• Knee swelling
• Possibly intermittent
• Worse with activity
• No history of recent trauma
• Gout?

Physical Exam
• Red, hot, swollen
• Elevated temp, HR
• Pain on A/PROM
• XRAY – r/o OA, RA Trauma
• ASPIRATE:
  – WBC w diff
    • >50,000
    • Elevated Protein
    • Low glucose
  – Gram stain w cultures
  – Polarized light microscopy
# Aspirate Findings

<table>
<thead>
<tr>
<th>FINDINGS</th>
<th>NORMAL</th>
<th>NONINFLAMMATORY</th>
<th>INFLAMMATORY</th>
<th>SEPTIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Clear</td>
<td>Yellow</td>
<td>Yellow to green</td>
<td>Yellow</td>
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<tr>
<td>Clarity</td>
<td>Transparent</td>
<td>Transparent</td>
<td>Opaque</td>
<td>Opaque</td>
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<tr>
<td>Viscosity</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Variable</td>
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<tr>
<td>WBC per mm³</td>
<td>&lt; 200</td>
<td>200 to 2,000</td>
<td>2,000 to 150,000</td>
<td>15,000 to 200,000</td>
</tr>
<tr>
<td>PMNs</td>
<td>&lt; 25%</td>
<td>&lt; 25%</td>
<td>&gt; 50%</td>
<td>&gt; 75%</td>
</tr>
<tr>
<td>Mucin clot</td>
<td>Good</td>
<td>Good</td>
<td>Good to poor</td>
<td>Poor</td>
</tr>
</tbody>
</table>

*WBC = white blood cells; PMNs = polymorphonuclear cells.*

Joint aspiration is a must if joint infection is a consideration.

NO INJECTION if infection suspected

Prompt orthopedic referral if infection is suspected.
Knee Dislocation

- Traumatic injury resulting in severe damage
- 3 of 4 major ligaments torn
- Possible Injury
  - Vascular (popliteal)
  - Neurological (peroneal)
  - Tibia, fibula fractures

Medical Emergency – 20-30% loss of limb

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Knee Dislocation

• Sports or work injury; MVA
• Appears visibly deformed, swollen, bruised, painful, immovable
• Possible severe discoloration with *popliteal artery damage*
• Numbness, tingling if *peroneal nerve* involved (foot drop)
• (also with fracture of proximal fibular neck)
• Swelling > compartment syndrome
Peroneal Nerve Injury Due To Knee Joint Trauma
Tx – Knee Dislocation

- Immediate: Splint, immobilize, ice
- Assess foot and ankle pulses, sensation, motor function
- X-ray, MRI, arteriogram (popliteal artery)
- EMG – 4-6 weeks to assess residual nerve damage
- Casting, immobilization
- Surgery controversial – multi-ligament repair/grafting
- 4-6 weeks NWB
- PT – ROM, strengthening (may lose 5-10 degrees)
- Return to sports 6-9 months

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Case Study

- History
- A 20 year-old female presented herself with chronic pain of the patellofemoral joint when going up or down stairs and while sitting with the knee flexed for a long time (e.g. the length of a movie). She felt the pain like a tight bandage around the patella, with the feeling of having ‘something too much’ in her knee joint. Catching and locking occurred under the same conditions. She reported her first symptoms during adolescence. The pain could be relieved by extension after some minutes.
### Exam Findings

<table>
<thead>
<tr>
<th>Pain</th>
<th>Medial pain w snap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenderness</td>
<td>Medial, suprapatellar</td>
</tr>
<tr>
<td>Effusion</td>
<td>Slight w activity</td>
</tr>
<tr>
<td>Swelling</td>
<td>Slight w activity</td>
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<tr>
<td>Patellar position relaxed/contracted</td>
<td>Normal/</td>
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<tr>
<td>Flexion/Extension</td>
<td>/Normal</td>
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<tr>
<td>Patellar mobility</td>
<td>Painful/Normal</td>
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<tr>
<td>Normal</td>
<td>Normal</td>
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<tr>
<td>Exam Findings</td>
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<tr>
<td>• Patellar gliding</td>
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<td>• Patellar apprehension</td>
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<td>• Catching</td>
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<td>• Locking</td>
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<td>• ROM</td>
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<td>• Radiographs</td>
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<tr>
<td>• Other</td>
<td></td>
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<tr>
<td>• With catching</td>
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<td>• Negative</td>
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<td>• Transient, painful</td>
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<td>• Following long flexion</td>
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<tr>
<td>• Limited flexion</td>
<td></td>
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<tr>
<td>• Normal</td>
<td></td>
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<tr>
<td>• + Theatre sign</td>
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</table>
TREATMENT: Plica Syndrome

Physical Therapy
-Quad strengthening
NSAIDs
Corticosteroid injection
Ortho if no improvement 3-6 mos.
-Arthroscopic synovectomy
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References

Thank You

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