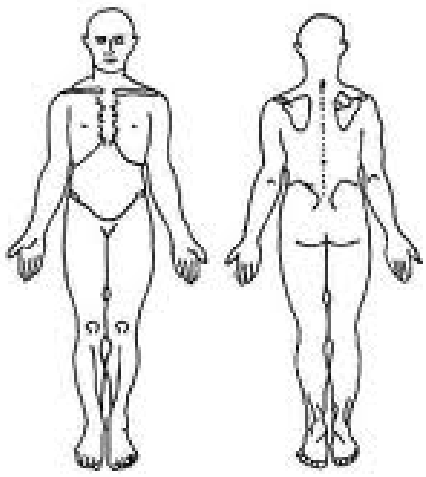
www.vompti.com

KNEE CASE 1

Orthopaedic Manual Physical Therapy Series
Charlottesville 2017-2018

Body Chart



Body Chart--**Initial Hypothesis**:

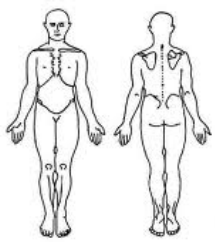
Subjective Exam

**** Subjective Asterisks Signs/Symptoms ****
(Aggravating/Easing Factors, Description/Location of symptoms, Behavior, Mechanism of injury)

- 17yof playing field hockey. "Twisted" knee during a game, had immediate pain, no bruising, no swelling that day but the next noticed some that lasted a few days and then went away.
- Worked with the trainer at school and symptoms resolved after about 2-3 weeks.
- Began working on the HS play (building set, etc) doing a lot of kneeling, squatting, etc a few weeks later and noticed the knee pain returned. Since then the pain has been staying about the same.
- Initially pain sharp at medial knee and worse with standing, walking, changing directions
- Currently pain at medial and anterior knee described as dull achy throughout the day, sharp with certain movements and positions
- Pain increases at night
- Reports feels like knee catches and clicks with motion and activities, no locking reported
- Agg: prolonged sitting in class, stairs, prolonged walking, has stopped all other activities (biking, running, working out), squatting
- Easing: brace (neoprene wrap), ice, advil
- Has seen GP, no imaging yet

STRUCTURE at Fault:

Joints in/refer to the painful region	Myofascial tissue in/refer to the painful region	Neural tissue in/refer to the painful region	Other structures that must be examined – non MSK



Primary HYPOTHESIS <u>after</u> Subjective Examination:

Differential List: (List in ranking order to screen/clear - Rule out)

Physical Exam

**** Physical Exam "Asterisks" Signs/Symptoms ****

(Special Tests, Movement/Joint Dysfunction, Posture, Palpation, etc.)

- Gait: moderately antalgic, decreased knee flexion at swing, hip hike and circumduction to clear swing
- Functional Screen: Double leg squat: limited by pain, weight shift to right; SLS: WNL; Rotation: pain both directions, excessive trunk motion
- AROM -10-115 pain with both flexion and extension (flex>ext)
- Patellar mobility restricted/painful medial glide, WNL lateral glide
- Strength: Hip abduction 4-/5, hip extension 4-/5, HS 5/5, QS 4/5
- Muscle Length Testing: Restricted gastroc/soleus, quad hamstring, hip flexors
- (-) Hip clearing

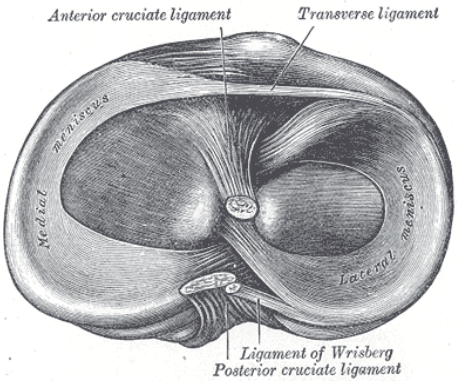
Differential List

- Rule In
  - Meniscus Tear
- Rule Out
  - MCL Tear
  - Plica Syndrome
  - Pes Anserine/Hamstring Strain

Meniscus

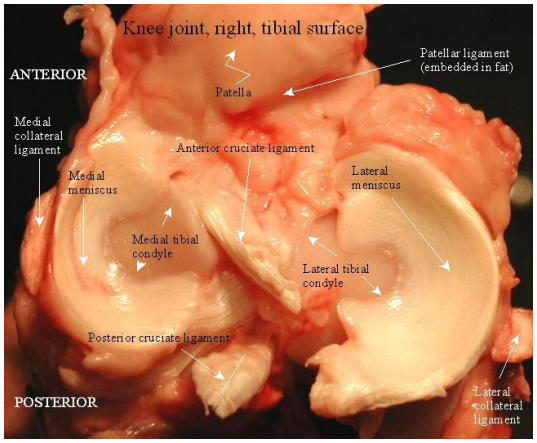
- Second most common knee injury
  - Incidence of 12-14%
- 10-20% of all orthopaedic surgeries in US involve meniscus
  - 850000 patients a year

Anatomy



- Lateral
  - Circular
  - More mobile than medial
  - Connected to:
    - medial meniscus anteriorly by transverse lig
    - patella by patellomeniscal lig
    - posteriorly to popliteus mm and PCL
    - medial femoral condyle by meniscofemoral lig (Ligament of Wrisberg)

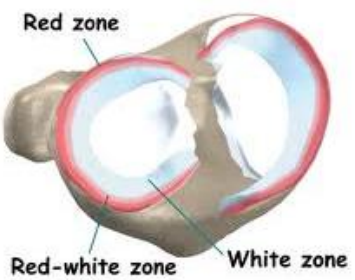
Anatomy



- Medial
  - C shaped
  - Less mobile
  - Connected to
    - transverse and meniscofemoral ligs like lateral
    - semimembranosus mm
    - anterior horn attached to ACL
    - posterior horn to PCL

Anatomy

- Cover 2/3 of tibial plateau
- Red Zone: lateral 1/3
  - Good blood supply from inferior medial and inferior lateral geniculate arteries
- White Zone: remaining 2/3
  - Poor blood supply



Function

- Load transmission
  - Manage 70% of load across knee during activities
- Shock absorption
- Stability
- Congruence
- Proprioceptive
- Transmit joint compressive forces
  - 50% EXT
  - 85% @ 90 degrees
- During flexion move posteriorly, extension move anteriorly
- During rotation, follow motion of femur
  - Most likely due to meniscofemoral ligs

Function

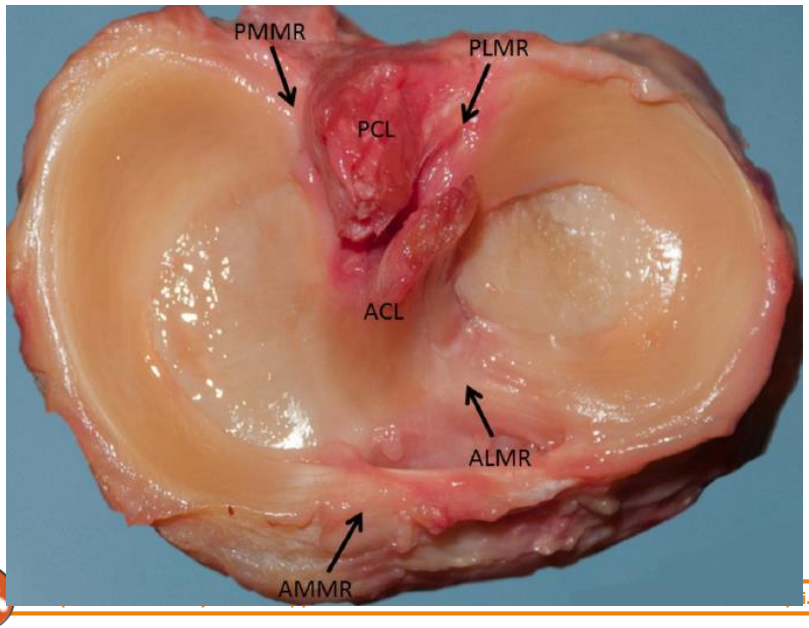
- Weightbearing
  - Knee bears 6x body weight with 70% going through medial tibial plateau
  - Lateral meniscus carries 70% of lateral column force
  - Medial meniscus carries 40% of medial column stress
- Lateral meniscus covers more of tibial plateau surface than medial meniscus
- Loss of 20% of meniscal tissue leads to 350% increase in joint contact forces
- Posterior horns of meniscus transmit more load, especially at 90 deg flexion

Frank; Curr Rev Musculoskelet Med 2015

Meniscal Roots

- Act as an anchor of the menisci to the tibial plateau
- Maintain "hoop stress"
  - Axial loading causes radial force on menisci
  - Resisted by circumferential fibers of meniscus
  - Resulting tensile stress to resist extrusion force of menisci is "hoop stress)
- Medial meniscus posterior root least mobile
  - Highest incidence of tears (10-20% of meniscus tears)
  - 25% increase in medial compartment contact pressure when torn

Meniscal Roots



Meniscal Root Tears

- Mechanism commonly hyperflexion or squatting
- Common Signs
  - Posterior knee pain with deep flexion
  - Joint line tenderness
- No reliable special testing found
  - MRI current gold standard

- Meniscal root tear causing meniscal extrusion

Orthopaedic Manual Physical Therapy Series 2017-2018 www.vompti.com

DAVID S. LOGERSTEDT, PT, MA • LYNN SNYDER-MACKLER, PT, ScD • RICHARD C. RITTER, DPT • MICHAEL J. AXE, MD

Knee Pain and Mobility Impairments: Meniscal and Articular Cartilage Lesions

Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association

J Orthop Sports Phys Ther. 2010:40(6):A1-A35. doi:10.2519/jospt.2010.0304

DIAGNOSIS/CLASSIFICATION

THE ICD DIAGNOSIS OF A MENISCAL TEAR AND THE associated ICF diagnosis of joint pain and mobility impairments are made with a fair level of certainty when the patient presents with the following clinical findings[3,6,51,78,95,115]:

- Twisting injury
- Tearing sensation at time of injury
- Delayed effusion (6-24 hours postinjury)
- History of "catching" or "locking"
- Pain with forced hyperextension
- Pain with maximum flexion
- Pain or audible click with McMurray's maneuver
- Joint line tenderness
- Discomfort or a sense of locking or catching in the knee over either the medial or lateral joint line during the Thessaly Test when performed at 5° or 20° of knee flexion

Orthopaedic Manual Physical Therapy Series 2017-2018 www.vompti.com

Clinical Meniscal Testing

- Source of Controversy
- Research is inconclusive and of poor quality
- Limited research on clusters of tests

There is no "one good clinical test"

Clinical Meniscal Testing

- Things to Consider
  - Pain as a positive test is subjective
  - What is considered a positive test differs

Orthopaedic Manual Physical Therapy Series 2017-2018 www.vompti.com

A meta-analysis examining clinical test utilities for assessing meniscal injury

Brent B Meserve Department of Rehabilitative Medicine, Dartmouth Hitchcock Medical Center, Lebanon,
Joshua A Cleland Department of Physical Therapy, Franklin Pierce College and Rehabilitation Services of Concord Hospital, Concord and **Thomas R Boucher** Department of Mathematics, Plymouth State University, Plymouth, New Hampshire, USA
Clinical Rehabilitation 2008; **22**: 143–161

- Area of Lesion
  - McMurray test
    - 100% reliable for bucket handle tears
    - 92% sensitive for posterior horn lesions
    - 6% and 2% sensitive for middle and anterior horn lesions
- Chronicity of Symptoms

Diagnostic accuracy of the Thessaly test, standardised clinical history and other clinical examination tests (Apley's, McMurray's and joint line tenderness) for meniscal tears in comparison with magnetic resonance imaging diagnosis

HEALTH TECHNOLOGY ASSESSMENT
VOLUME 19 ISSUE 62 AUGUST 2015

- Who is Performing the Test
  - Primary Care Clinicians
    - Thessaly: Sensitivity .66 Specificity .39 Diagnostic Accuracy 54%
    - McMurray: Diagnostic Accuracy 54%
    - Apley: Diagnostic Accuracy 53%
    - Joint Line Tenderness: Diagnostic Accuracy 54%
    - Clinical History: Diagnostic Accuracy 55%
  - Musculoskeletal Clinicians
    - Thessaly: Sensitivity: .62 Specificity .55 Diagnostic Accuracy 59%
    - McMurray: Diagnostic Accuracy 63%
    - Apley: Diagnostic Accuracy 58%
    - Joint Line Tenderness: Diagnostic Accuracy 64%
    - Clinical History: Diagnostic Accuracy 69%

Diagnostic validity of physical examination tests for common knee disorders: an overview of systematic reviews and meta-analysis.

Physical Therapy in Sports (2016), doi: 10.1016/j.ptsp.2016.08.002.

Simon Décary, Philippe Ouellet, Pascal-André Vendittoli, Jean-Sébastien Roy, François Desmeules

- McMurray's Test
  - Highest Sensitivity
- Joint Line Tenderness
  - Highest Specificity
- Recommendation
  - Tests should not be used individually due to poor diagnostic validity
  - Advised combining results of multiple tests

Clusters

Do physical diagnostic tests accurately detect meniscal tears?

Sujith Konan · Faizal Rayan · Fares Sami Haddad

Knee Surg Sports Traumatol Arthrosc (2009) 17:806–811

and 77% for lateral meniscus). The Joint line tenderness test has a far superior diagnostic accuracy (81% for medial meniscus and 90% for lateral meniscus). However, combining the joint line tenderness test with McMurray's test or the joint line tenderness test with Thessaly test further increased the accuracy of physical diagnosis of meniscal tears. Magnetic resonance imaging (MRI) detected 96% of

A Clinical Composite Score Accurately Detects Meniscal Pathology

Douglas J. Lowery, M.D., Timothy D. Farley, M.D., David W. Wing, B.A., William I. Sterett, M.D., and J. Richard Steadman, M.D.

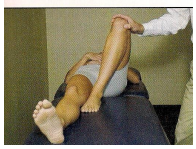
Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 22, No 11 (November), 2006: pp 1174-1179

- Meniscal Pathology Composite Score
  - Cluster of 5 Tests:
    - History of catching or locking
    - Pain with forced hyperextension
    - Pain with maximum flexion
    - Pain or audible click with McMurray's
    - Joint line tenderness to palpation
- 5/5 = 92% PPV 99% Specificity
- 3/5 = 75% PPV 90% Specificity

Meniscus

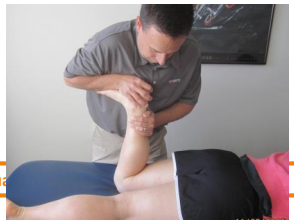
McMurray's Test

Dynamic Test



Thessaly's Test

Apley Compression Test



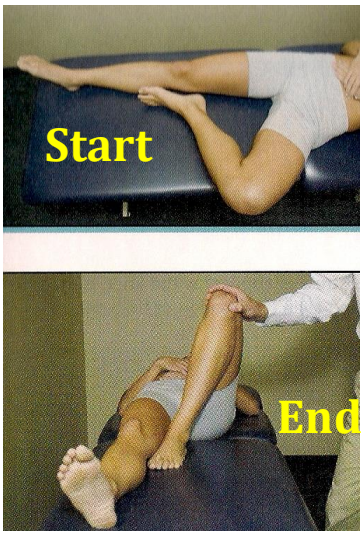
Ege's Test

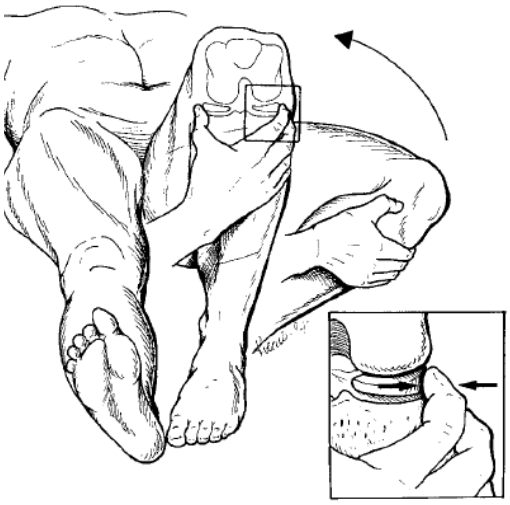
Palpation

- For tenderness and for effusion
- With tibia in IR
  - Anterior portion of medial meniscus
- With tibia in ER
  - Anterior portion of lateral meniscus
- Wide range of sensitivity/specificity varying by study

Dynamic Test

- For lateral meniscus
- Pt supine, hip abducted to 60deg, flexed and ER 45deg, lateral border of foot resting on examination table
- Examiner palpates lateral joint line
- Slowly adducts hip while maintaining knee flexion
- Positive Test
  - Increase in pain greater than elicited by palpation or sharp pain at end of adduction





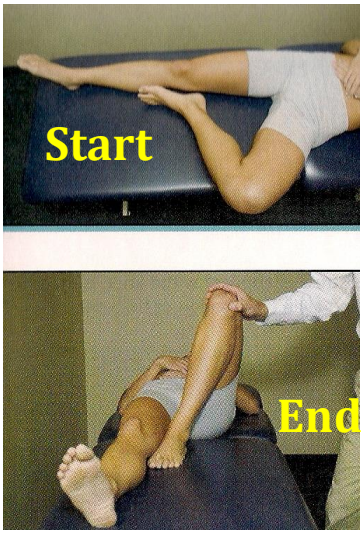
- Knee varus is reduced and the femur IR
- Meniscus is squeezed between the femur and the tibia and outwardly against the examiners finger

Assessment

Dynamic Test

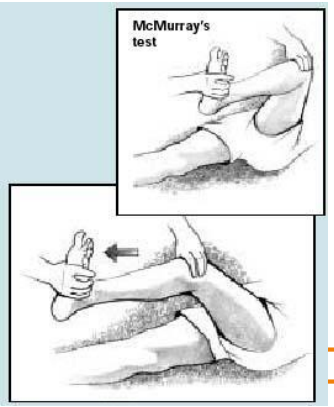
- Sensitivity = 85, LR-= 0.17
- Helps rule out the presence of a lateral meniscus tear

- Specificity = 90,+LR = 8.5
- Use to rule in presence of a lateral meniscus tear



McMurray's Test

- Pt supine, knee flexed passively to end range
- Rotate tibia into ER and slowly extend knee
  - For medial meniscus
- Rotate tibia into IR and slowly extend knee
  - For lateral meniscus
- Positive if pain, clicking or popping provoked



Assessment

McMurray's Test

- Sensitivity=51
- Specificity=91
- LR+=6.3
- LR- =0.53

Use to rule in a meniscus tear

Ege's Test

- Have pt stand, full ER and squat
  - For medial meniscus
- Repeat in full IR
  - For lateral meniscus
- Positive if provocative for pain, locking or catching

Assessment

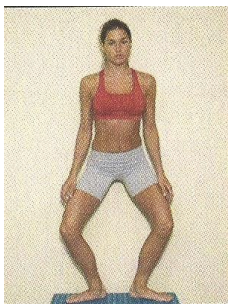
Ege's Test

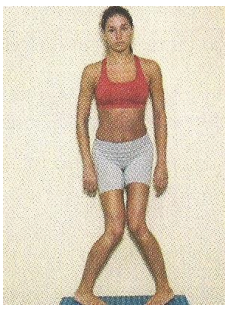
- Sensitivity =67 –LR .41 (medial)
- Specificity=81 +LR 3.5 (medial)

- Sensitivity=64 –LR .4 (lateral)
- Specificity=90 +LR 6.4 (lateral)

- Use to rule in a meniscal tear

- In full ER for medial meniscus, full IR for lateral





Thessaly's Test

- Pt standing in single limb stance with knee flexed approximately 20deg
- Twist each direction
- Positive if provocative for pain, locking or catching

Assessment

Thessaly Test at 20 Degrees

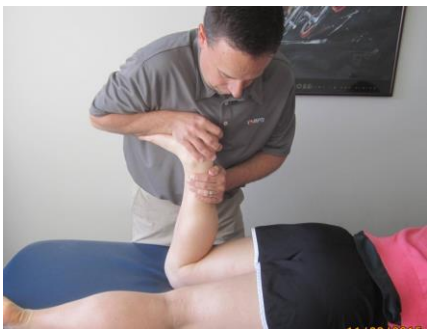
- Sensitivity = 89, LR- = 0.11 (lateral meniscus)
- Sensitivity = 92, LR- = 0.08 (medial meniscus)
- Helps rule out the presence of a meniscus tear
- Specificity = 96,+LR = 23 (lateral)
- Specificity = 97, LR+ =29 (medial)
- Use to rule in presence of a meniscal tear

Apley Compression Test

- Patient Prone with knee bent to 90 deg
- Compress knee and then rotate tibia medially and laterally
- Positive if pain, clicking, catching, popping

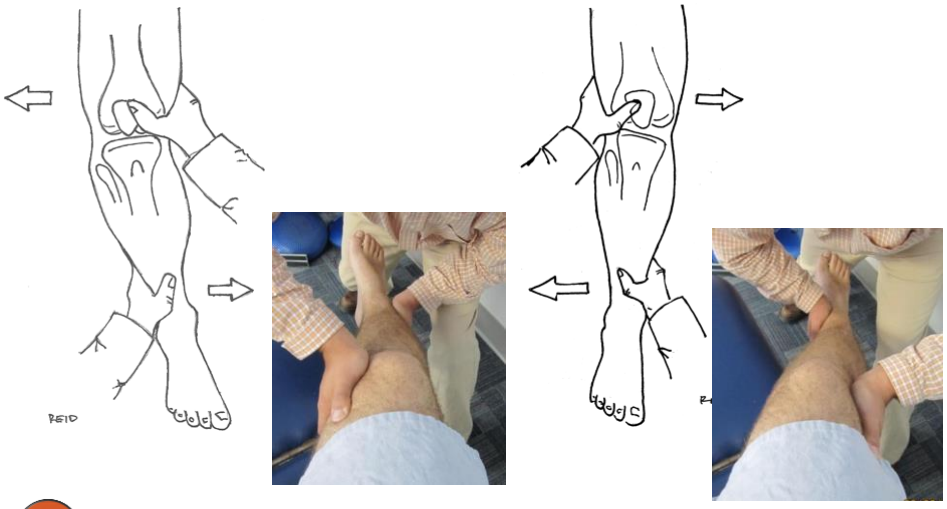
Assessment

- **Apley Compression Test**
  - Sensitivity= 16
  - Specificity= 80
  - LR+= .80
  - LR-= 1.1



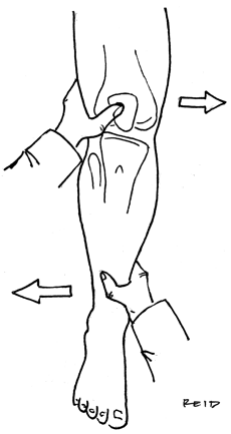
MCL/LCL

Varus/Valgus Stress Test at 0/30deg



Assessment

- Pain with Valgus stress test at 30deg
  - Sens: 78%
  - Spec: 67%
  - +LR: 2.3
  - -LR: .3
- Laxity with valgus stress test at 30deg
  - Sens: 91%
  - Spec: 49%
  - +LR: 1.8
  - -LR: .2

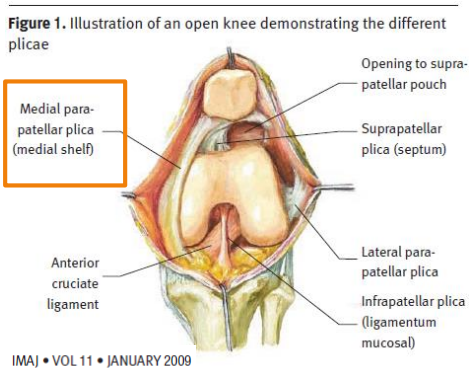


- Fairly good at ruling out MCL tear

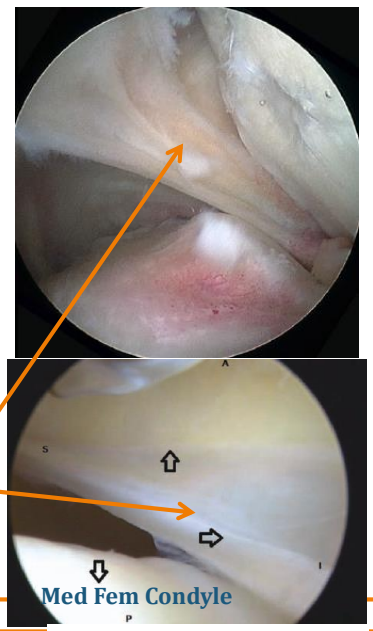
Medial Plica Syndrome

- Plica
  - Thickening, inward folding of synovium
- Plica Syndrome
  - "a painful impairment of knee function in which the only finding to explain the symptoms is the presence of thickened hypertrophic plica"
    - Ewing

Medial Plica Syndrome



Plica



Clinical Anatomy 25:423–428 (2012)

Medial Plica Syndrome

- The plica may become symptomatic via several mechanisms:
  - Direct trauma/blow to anterior knee
  - Blunt trauma
  - Twisting injuries
  - Activities that involve repetitive flexion-extension of the knee (e.g., rowing, cycling, running)
  - Increased activity levels
  - Any mechanism resulting in intraarticular bleeding or synovitis secondary to a loose body, osteochondritis dissecans, a torn meniscus, a subluxing patella or after arthroscopy

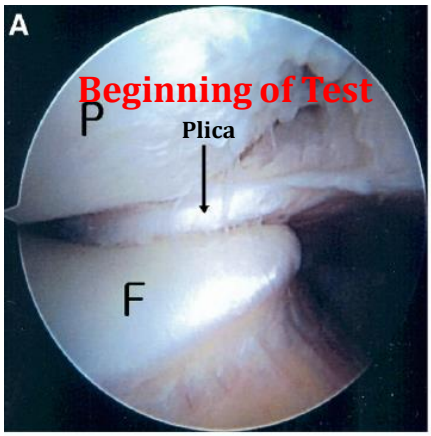
IMAJ • VOL 11 • JANUARY 2009

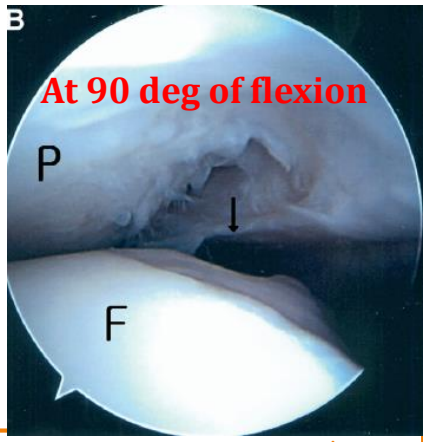
Mediopatellar Plica Test (MPP)

- Patient supine
- Apply manual force to inferomedial patella with thumb
- Patient reports symptoms
- Maintain force and move knee to 90 deg of flexion
- Positive if symptoms decrease

The Relationship Between the MPP Test and Arthroscopically Found Medial Patellar Plica Pathology

Sung-Jae Kim, M.D., Doo-Hyung Lee, M.D., and Tae-Eun Kim, M.D.





Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 23, No 12 (December), 2007: pp 1303-1308

Diagnostic test accuracy of clinical and radiological assessments for medial patella plica syndrome: A systematic review and meta-analysis ☆

Nicholas Stubbings [a], Toby Smith [b,*]

The Knee 21 (2014) 486–490

- Medial Patella Plica (MPP) test is a clinically valuable test
- Sensitivity= .90
- Specificity= .89

Severity Non Min Mod Severe

_Have stopped all activities, disrupting school work ____

Irritability Non Min Mod Severe

_Easily brought on, long duration to decrease back to baseline____

Stage & Stability?

Acute Subacute Chronic Acute on chronic

Stable Improving Worsening Fluctuating

Are the relationships between the areas on the body chart, the interview, and physical exam consistent?

"Do the "Features Fit" a recognizable clinical pattern?" – If "Yes" – what :

_____

If "NO" : Please explain areas that may need clarification _____

_____

_____

_____

_____

_____

_____

Identify any potential risk factors (Yellow, Red flags, non MSK involvement, biopsychosocial)

__High fear avoidance, afraid to move knee and wears brace all the time_____

_____

Differential List

- Meniscus Tear
  - (+) McMurray, (+) Ege, (-)Thessaly (mild discomfort/clicking, no pain), Pain with hyperextension/max flexion, (-) joint line tenderness
- MCL Tear
  - (-) valgus stress test
- Plica Syndrome
  - (+) MPP Test, Painful/limited flexion, painful/limited medial patellar glide
- Pes Anserine/Hamstring Strain
  - (-) pain with HS activation or stretch
  - (-) tenderness over pes anserine

Common Presentations

- Plica Syndrome
  - Subjective
    - Younger patients
    - Clicking/snapping/pseudolocking common
    - Pain typically anterior/medial knee
    - Dull achy intermittent pain
    - Difficulty with prolonged flexion, stairs, running, impact activities
  - Objective
    - Restricted flexion ROM
    - TTP medial knee superior to joint line, palpable taut band
    - (+) MPP Test
    - Moderate quad atrophy possible
    - Tightness to gastroc/hamstrings
- Meniscus Tear
  - Subjective
    - Typically 20-30 yo
    - Medial > Lateral (~3:1)
    - MOI involving squatting, climbing, kneeling or sporting event
    - Pain worsens with time, worse with activity (standing, pivoting, weightbearing)
    - Common symptoms of meniscal tears are pain (92%), discomfort (95%), swelling (56%), a clicking sound (47%), and locking of the knee (12%) (Goosens JOSPT 2014)
  - Objective
    - Swelling comes on gradually
    - Clicking, popping , true locking possible
    - Restricted/painful ROM extension>flex
    - (+) Thessaly, Ege, McMurray
    - (+) Joint line tenderness

Are the relationships between the areas on the body chart, the interview, and physical exam consistent?

"Do the "Features Fit" a recognizable clinical pattern?" – If "Yes" – what : _Medial Plica Syndrome with underlying small meniscal tear

If "NO" : Please explain areas that may need clarification _____
_____
_____

PICO Question A

	Patient or Problem	Intervention	Comparison Intervention	Outcomes
Tips for Building	Starting with your patient, ask "How would I describe a group of patients similar to mine?" Balance precision with brevity	Ask "Which main intervention am I considering?" Be specifiic	Ask "What is the main alternative to compare with the intervention?" Again, be specifiic	Ask "What can I hope to accomplish? Or What could this exposure effect?"
Example	In patients with lateral epicondylitis....	Would adding manipulation to modalities or injection alone....	When compared to modalities or injection alone	Reduce the number of visits to return to pain free function.
Your Patient	In a patient with medial plica syndrome	Is passive treatment effective	compared to active exercise	Decrease pain and increase function

Medial plica irritation: diagnosis and treatment

Chad J. Griffith · Robert F. LaPrade Curr Rev Musculoskelet Med (2008) 1:53–60

- Conservative treatment should focus on quadriceps strengthening and hamstring stretching
  - SLR, TKE, quad sets, leg press, walking program
- Avoid OKC knee extension due to stress through anterior knee
- Conservative treatment successful in about 60% of cases

TREATMENT OF PATHOLOGICAL SYNOVIAL PLICAE OF THE KNEE

Gilberto Luís Camanho CLINICS 2010;65(3):247-50

- Treatment
  - Ensure patients activity level was appropriate
  - Implement stretching program for muscles of lower extremities
    - Quadriceps
    - Gastrocs
    - Hamstrings
  - Instruct in knee extension exercises, especially terminal knee extension
- 90% success rate with conservative treatment

'The Sneaky Plica' revisited: morphology, pathophysiology and treatment of synovial plicae of the knee

Oliver S. Schindler Knee Surg Sports Traumatol Arthrosc (2014) 22:247–262

- Success rates typically low
  - Higher success rate with younger patients, short duration of symptoms and related to trauma
- Treatment should include:
  - Activity modification
  - LE stretching
    - Quads, HS, Gastroc
  - Quadriceps strengthening

PICO Question B

	Patient or Problem	Intervention	Comparison Intervention	Outcomes
Tips for Building	Starting with your patient, ask "How would I describe a group of patients similar to mine?" Balance precision with brevity	Ask "Which main intervention am I considering?" Be specifiic	Ask "What is the main alternative to compare with the intervention?" Again, be specifiic	Ask "What can I hope to accomplish? Or What could this exposure effect?"
Example	In patients with lateral epicondylitis....	Would adding manipulation to modalities or injection alone....	When compared to modalities or injection alone	Reduce the number of visits to return to pain free function.
Your Patient	In a patient with a medial meniscus tear	would physical therapy	when compared to surgery	Have better or worse prognosis to return to full activity level

CLINICAL GUIDELINES

Summary of Recommendations

C CLINICAL COURSE
Knee pain and mobility impairments associated with meniscal and articular cartilage tears can be the result of a contact or noncontact incident, which can result in damage to 1 or more structures. Clinicians should assess for impairments in range of motion, motor control, strength, and endurance of the limb associated with the identified meniscal or articular cartilage pathology or following meniscal or chondral surgery.

C RISK FACTORS – MENISCUS
Clinicians should consider age and greater time from injury as predisposing factors for having a meniscal injury. Patients who participated in high-level sports or had increased knee laxity after an ACL injury are more likely to have late meniscal surgery.

C RISK FACTORS – ARTICULAR CARTILAGE
Clinicians should consider the patients' age and presence of a meniscal tear for the odds of having a chondral lesion subsequent to having an ACL injury. The greater a patient's age and longer time from initial ACL injury are predictive factors of the severity of chondral lesions and time from initial ACL injury is significantly associated with the number of chondral lesions.

C DIAGNOSIS/CLASSIFICATION
Knee pain, mobility impairments, and effusion are useful clinical findings for classifying a patient with knee pain and mobility disorders into the following International Statistical Classification of Diseases and Related Health Problems (ICD) categories: tear of the meniscus and tear of the articular cartilage; and the associated International Classification of Functioning, Disability, and Health (ICF) impairment-based category knee pain (b28016 Pain in joint) and mobility impairments (b7100 Mobility of a single joint).

C DIFFERENTIAL DIAGNOSIS
Clinicians should consider diagnostic classifications associated with serious pathological conditions or psychosocial factors when the patient's reported activity limitations or impairments of body function and structure are not consistent with those presented in the diagnosis/classification section of this guideline, or, when the patient's symptoms are not resolving with interventions aimed at normalization of the patient's impairments of body function.

C EXAMINATION – OUTCOME MEASURES
Clinicians should use a validated patient-reported outcome measure, a general health questionnaire, and a validated activity scale for patients with knee pain and mobility impairments. These tools are useful for identifying a patient's baseline status relative to pain, function, and disability and for monitoring changes in the patient's status throughout the course of treatment.

C EXAMINATION – ACTIVITY LIMITATION MEASURES
Clinicians should utilize easily reproducible physical performance measures, such as single-limb hop tests, 6-minute walk test, or timed up-and-go test, to assess activity limitation and participation restrictions associated with their patient's knee pain or mobility impairments and to assess the changes in the patient's level of function over the episode of care.

C INTERVENTIONS – PROGRESSIVE KNEE MOTION
Clinicians may utilize early progressive knee motion following knee meniscal and articular cartilage surgery.

D INTERVENTIONS – PROGRESSIVE WEIGHT BEARING
There are conflicting opinions regarding the best use of progressive weight bearing for patients with meniscal repairs or chondral lesions.

C INTERVENTIONS – PROGRESSIVE RETURN TO ACTIVITY – MENISCUS
Clinicians may utilize early progressive return to activity following knee meniscal repair surgery.

E INTERVENTIONS – PROGRESSIVE RETURN TO ACTIVITY – ARTICULAR CARTILAGE
Clinicians may need to delay return to activity depending on the type of articular cartilage surgery.

D INTERVENTIONS – SUPERVISED REHABILITATION
There are conflicting opinions regarding the best use of clinic-based programs for patients following arthroscopic meniscectomy to increase quadriceps strength and functional performance.

B INTERVENTIONS – THERAPEUTIC EXERCISES
Clinicians should consider strength training and functional exercise to increase quadriceps and hamstrings strength, quadriceps endurance, and functional performance following meniscectomy.

B INTERVENTIONS – NEUROMUSCULAR ELECTRICAL STIMULATION
Neuromuscular electrical stimulation can be used with patients following meniscal or chondral injuries to increase quadriceps muscle strength.

Exercise therapy versus arthroscopic partial meniscectomy for degenerative meniscal tear in middle aged patients: randomised controlled trial with two year follow-up

Nina Jullum Kise,[1] May Arna Risberg,[2,3,4] Silje Stensrud,[2] Jonas Ranstam,[5] Lars Engebretsen,[3,6,7] Ewa M Roos[8]

Br J Sports Med 2016;**50**:1473–1480.

- 140 patients with MRI findings of degenerative meniscal tear. 96% without OA
- Randomized into exercise or arthroscopic partial menisectomy groups
- Similar results for pain and self reported questionnaires between groups
- Exercise therapy resulted in better muscle strength

12 Week Exercise Program

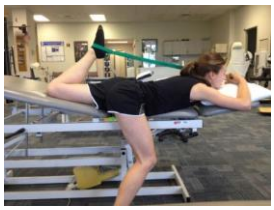
- Bike
- Squat
- Single Leg Squat
- Step Up
- Contra Kicks (Steamboats)
- Hamstring Curls with Swiss Ball
- Single Leg Leg Press
- Seated Knee Extension
- Single Leg Hamstring Curl
- Side to Side Hops (Skating)
- Single Leg Hops (side to side and front/back)

- 2-3 times a week
- Progressing repetitions and resistance

Treatment

- Initial Goals
  - Improve ROM
  - Decrease Pain
  - Decrease stress through medial knee
  - Progressively load knee with appropriate therex prescription

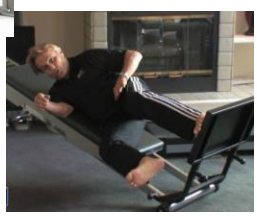
Initial Treatment



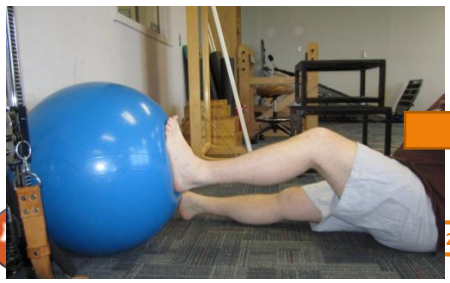
- Stretching
  - Quadriceps
  - Hamstrings
  - ITB
  - Hip Flexors
  - Gastroc/Soleus

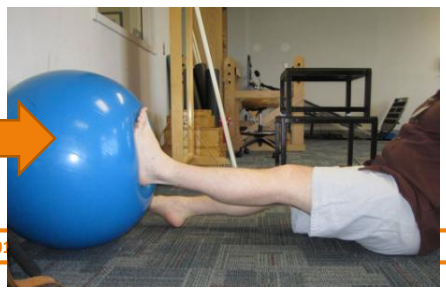
Initial Treatment

- Therex
  - Total Gym Squats Level 2



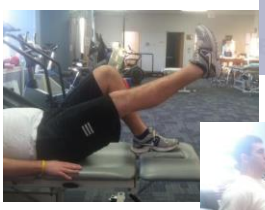
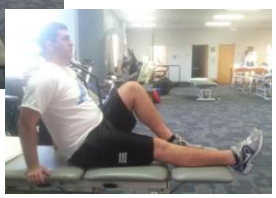
  - Closed Chain Quad Sets



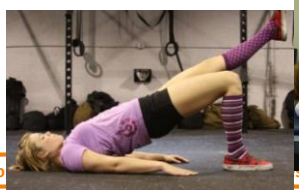


Initial Treatment

- Seated SLR
  - ➡ Supine SLR
  - ➡ Long Sitting SLR

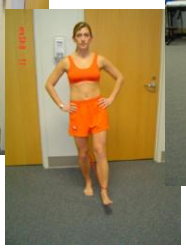




- SLR Abduction/Clams/Unilateral Bridges



Treatment

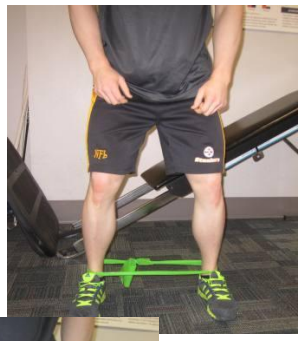
- Steamboats

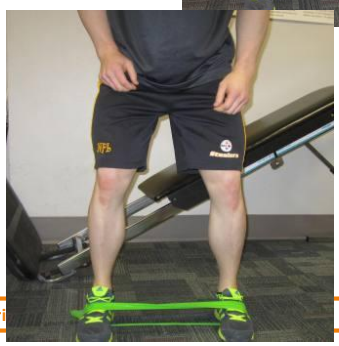
- TKE
  - – Bilateral ➡ Unilateral

Treatment

- Sidestepping
  - Band at Ankles



  - Band at Feet



Treatment

- SEBT

- SLS on Unstable Surface

Treatment

- SEBT with Rotation

- Box Jumps with Rotation

- SLS on Unstable Surface with Rotation