

 **Decision Making in Treatment of MCL tears of the Knee**

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Anatomy & Biomechanics

Grood JBJS 1981, Robinson J Biomech 2005

- ✓ Superficial MCL (10 cm X 1,5cm)
 - ✓ 78% @ 25° of flexion, 57% @ 5°
 - ✓ Rupture @ 534N
- ✓ Deep MCL
 - ✓ Anchors medial meniscus to bone
 - ✓ Rupture @ 194N
- ✓ Posterior oblique ligament
 - ✓ Capsular thickening to semimembranosus and tubercle
 - ✓ Rupture @ 425N



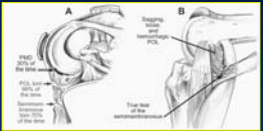

Anatomy & Biomechanics

- ✓ Superficial MCL femoral insertion at risk
- ✓ Deep MCL & POL interstitial lesions

Bergfeld Am J Sport Med 1979
Gardiner Clin Orthop 2001
Robinson J Biomech 2005

- ✓ Medial dynamic stabilizers too slow to protect from injuries

Semi membranous ++
Sartorius (108%)
Quadriceps (164%)
Pope JBJS 1979

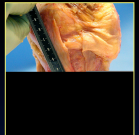


Anatomy & Biomechanics

- ✓ No gold standard for treatment of knee MCL tears
- ✓ Major sport related knee injury = 7,9%
 - Fetto & Marshall Clin Orthop 1976

Epidemiology of athletic knee injuries : a 10-year study.
• Majewski, Susanne & Klaus Knee 2006

- ✓ International survey / actual overview of +++
 - Kelberine & Meyer ISAKOS 2009




Decisional Issues

- ✓ Grading the tear
- ✓ Location of the tear
- ✓ Isolated vs Combined lesions
 - ✓ Type I, III & V of Schenck's classification
- ✓ Acute vs Chronic

Grading the MCL tear / Clinically

- ✓ Literature
 - ✓ Hugston JBJS Am 1976 , Bergfeld Am J Sport Med 1979
 - ✓ Pain, laxity in 20° flexion & in extension
- ✓ Fanelli Techniques Knee Surg 2007 A,B,C (or I, II ,III)
- ✓ Sim & Jakobsen Am J Sport Med 2004 : III or C often combined with acl tear and/or posterior extended tear up to 78%
- ✓ Reliability++ of clinical examination Kastelein Am J Med 2008
- ✓ ISAKOS Survey
 - ✓ Immediate pain 100 %, VAS > 5/10 78%
 - ✓ 58% condyle, 25% joint line, 17% tibia
 - ✓ Swelling 33%, Ecchymosis 17%
 - ✓ Instability and / or inability to weight bearing : 68%
 - ✓ Laxity ++ or +++ @ flexion 20° 68%, extension + 46%

Grading the MCL tear / Clinically

✓ Sometimes difficult in Schenck III & V

✓ Lachman and drawers increased
✓ Valgus stresses @ 0° & 20°

✓ Medial opening joint space
in full extension is THE sign
(over 10mm = from ant to post)



Grading the MCL tear / Imaging

✓ Stress X rays within 8 days / joint line opening ?

✓ Kennedy & Fowler *JBJS Am* 1971
✓ Jakobsen *Acta Orthop Scand* 197
✓ Sawan *Knee* 2004 but GA and 15° flexion (!)
ratio > 2 = ACL or PCL combined...

✓ MRI = associated lesions

✓ Gardiner *Clin Orthop* 2001
✓ Nakamura *Am J Sport Med* 2003
✓ Twaddle *JBJS Am* 1996
✓ Usefull in grade II more than III



✓ Sonography

✓ De Maeseneer *Am J Roentgenol* 1998, 2002

✓ ISAKOS Survey

✓ 83% X rays, 44 % MRI, 5% sonography. 51% no investigation !!!

Grading

✓ ISAKOS survey

✓ Sprain severity = subjective
mild 22%, moderate 49%, severe 29%

✓ Treatment

✓ Functional 24% Unlimited ROM & weight bearing based / pain
✓ Physical 69% Rigid or dynamic hinged brace or cast
✓ Surgical 7% High level athlete/grade III/bucket handle mm



Reasons ?

!! MCL heals well spontaneously !!

✓ Experimental on rabbits Woo & al *J Biomechanics* 1997 & 2006

✓ repair = non repair
✓ isolated MCL and combined ACL+MCL when ACL is repaired

✓ Isolated

✓ Ellsasser *JBJS* 1974
✓ Hasting *Clin Orthop* 1980
✓ Indelicato *JBJS Am* 1983
✓ Jones *Clin Orthop* 1986 (grade III / hight level athletes)
✓ Sandberg *JBJS Am* 1987 (comparative surg vs conservative)
✓ Kannus *Clin Orthop* 1988
✓ Mok *Injury* 1989
✓ Indelicato *Clin Orthop* 1990

✓ Combined with ACL (comparative study : risk = arthrofibrosis)

✓ Shelbourne & Porter *AJSM* 1992
✓ Fanelli *Arthroscopy* 1996
✓ Azar *Op Techniques in Sport Med* 2003

Orthopaedic treatment

✓ Strict immobilization is detrimental
Woo *J Biomechanics* 2006

✓ Early controlled motion / rehab

✓ Hinged brace

Reider *Am J Sport Med* 1993

✓ Non operative treatment is not always
successfull

✓ Pain, calcification, instability,...

✓ In the literature all grade III in extension are
quite always excluded = associated lesion...

Surgery in acute cases ?

✓ Isolated MCL

✓ Hughston *J Bone Joint Surg* 1973, O'Donoghue *J Bone Joint Surg* 1973

✓ Grade III in hight level athletes ?
Hughston *JBJS Am* 1994, Kim *JBJS Br* 2008

✓ Entrapment
Muller *The Knee Springer* 1983
Robins *Am J Sport Med* 1993



✓ Combined MM tear (meniscus stuck to deep MCL)

✓ Spontaneous healing 50% Frank & Beaufils *Annales de la SFA* 1993
✓ Bucket handle?

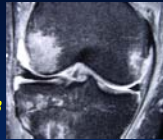


✓ Multiligament injuries

✓ Ballmer & al *Arch Orthop Trauma Surg* 1991
✓ Prohaska & Harner *Sport Med Arthro Rev* 2001
✓ Kim *Current Opinions in Orthopaedics* 2003

ACL + MCL (Schenck I)

- ✓ ACL reconstruction > rehab / MCL healing
 - Pressman *Arthroscopy* 2003
 - Noyes *Am J Sport Med* 1995
 - Shelbourne *Am J Sport Med* 1992
- ✓ Delay to recover posttrauma unpredictable (depend on trauma energy)
- ✓ Combined acute repair
 - Hugston *JBJS* 1983
 - Froke *Knee Surg Sport Trauma Arthrosc* 1998
- ✓ Risk of stiffness ++
 - Petersen *Acta Orthop Trauma Surg* 1999



Bi cruciate + MCL (Schenk 3 or 5)

- ✓ Acute (week # 1-3) w/o emergency
 - ✓ Monitor vascular status
 - ✓ Reduce swelling
 - ✓ Imaging
 - ✓ Experienced team
 - ✓ Plan surgery



Bi cruciate + MCL (Schenk 3 or 5)

- ✓ Delayed > week # 3 (not yet chronic)
 - ✓ Skin conditions
 - ✓ Vascular repair
 - ✓ Delayed referral
- ✓ No influence of delayed MCL reconstruction
- ✓ Repair or reconstruction



Techniques / MCL

- ✓ No allograft available in acute cases!!
- ✓ After intra articular reconstruction (PCL++)
 - ✓ Find the « zero » point
 - Versier & al, *Athlete's knee*, Sauramps 2002
- ✓ Per-op testing
- ✓ POL to fix first
 - ✓ Included meniscus
- ✓ Reattachment, augment or repair
 - ✓ Near full extension
- ✓ Semi Tendinosus transfer



Indications MCL repair / acute cases

- ✓ Displaced meniscal tear
- ✓ Extensive medial disruption
- ✓ MCL flipped : articular or over pes anserinus (Stener)
- ✓ Location : midsubstance or tibial avulsion > femoral detachment
 - Shelbourne *JBJS Am* 1995, Nakamura *AJSM* 2003
- ✓ Remaining frank medial laxity per operatively



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