

## MCL of the Knee Chronic Lesions



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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
  - ✓ Extended to semimembranosus and tubercle
  - ✓ Rupture @ 425N

## Anatomy & Biomechanics

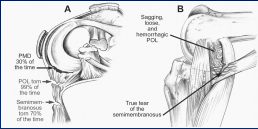
- ✓ Superficial MCL femoral insertion at risk
- ✓ Deep MCL & POL interstitial lesions

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


- ✓ Medial dynamic stabilizers too slow to protect from sport injuries

Semi membranous ++  
Pes anserinus (108%)  
Quadriceps (164%)

*Pope JBJS 1979*



## Epidemiology of athletic knee injuries (10 y study)




- ✓ Major sport related knee injury = 7,9%

*Fetto & Marshall Clin Orthop 1976  
Majewski, Susanne & Klaus Knee 2006*

- ✓ No gold standard for treatment of acute knee MCL tears

## 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*
  - ✓ Sandberg *JBJS Am 1987*
  - ✓ Kannus *Clin Orthop 1988*
  - ✓ Mok *Injury 1989*
  - ✓ Indelicato *Clin Orthop 1990*
- ✓ Combined with ACL
  - ✓ Shelbourne & Porter *AJSM 1992*
  - ✓ Fanelli *Arthroscopy 1996*
  - ✓ Azar *Op Techniques in Sport Med 2003*




## Chronic symptoms

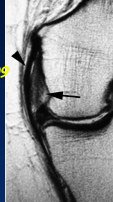
- ✓ Pain
- ✓ Remaining instability
- ✓ Stiffness

### Chronic Medial Pain

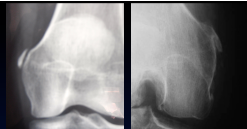
- ✓ 4% Kelberine & Meyer *ISAKOS survey 2009*
- ✓ up to 20% Holden *Am J Sport Med 1983*
- ✓ ≠ with meniscus difficult
- ✓ Pain @ activities w/o locking nor swelling



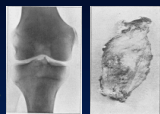
- ✓ Medial neural input
- ✓ Deep MCL (MRI)
  - scarring, attenuation, thickening Jones *The Knee 2009*
- ✓ Rehabilitation
- ✓ Sono guided steroid injection +analgesic
- ✓ Needling



### Pellegrini-Stieda (Augusto-Alfred)




- ✓ Calcific femoral deposit
  - ✓ MCL femoral attachment (avulsion)
  - ✓ Extended to adductus longus
- ✓ To excised sometimes
  - Coltard *Proceedings of royal society of medicine 1938*
- ✓ MCL insufficiency sign Wang *Am J Orthop 1995*
- ✓ If removal pay attention to stability
  - Kurzweil *Sport Med Arth Rev 2006*

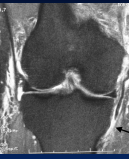


### Persistent instability (with residual laxity)


Robins *Am J Sport Med 1993*  
Azar *Sport Med Arthro Rev 2006*  
2% in Isakos 2009



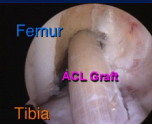
- ✓ POL involvement up to 99%
- ✓ Location of MCL tear (distal)
  - Sims & Jacobsen *AJSM 2004*
- ✓ Especially in grade III Hugston *JBJS 1994*
- ✓ Important to repair in ACLR?
- ✓ Delayed 6 months (1/3) Shahane *The Knee 1999*



### Chronic instability

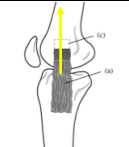
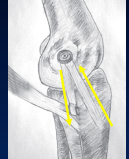



- ✓ Pre op check ++
  - Azar *Sport Med Arthro Rev 2006*
  - Fanelli *Technique in Knee Surg 2007*
- ✓ Special thrust by gait examination
- ✓ Limb axis : Plain radiographs, stress radiographs
- ✓ Check efficacy of other ligaments (repaired or not)
- ✓ Combined surgery
  - ✓ Varisation osteotomy in case of main valgus
  - ✓ Repair other ligaments (testing / GA)
  - ✓ Arthroscopy / check meniscus




### Techniques

- ✓ Reattachment
- ✓ Proximal advancement of MCL
  - Grana *Clin Ortho 1981*
  - Shahane *The Knee 1999*
- ✓ Augmentation
  - ✓ Gracilis Figure of 8 Gorin *Arthroscopy 2003*
  - ✓ Quad tendon Borden *Arthroscopy 2002*
  - ✓ Allograft Phisitkul *Iowa Orthop J 2006*
  - Fanelli *Techn in Ortop 2006*
- ✓ Transposition of semimembranosus (POL++)
  - Yoshiya *AMJS 2005*
  - Kim *JBJS Br 2008*

### Stiffness

- ✓ Stiffness = Iatrogenic ++
  - ✓ Rehab delayed
  - ✓ Timing of surgery
  - ✓ Surgical error (isometry)



Jacobson *Clin Sport Med 1999*  
Phisitkul *Iowa Orthop J 2006*  
Fanelli *Tech on Orthop 2006*

✓ Present way to treat isolated MCL tear of the knee is empirical with results not as good as expected or supposed

#### How to improve?

✓ Indications for surgery

✓ More aggressive rehab?

✓ New horizons :

- Hyperbaric Oxygen Therapy
- Growth Factors

Creighton *Sport Med Arthrosc Rev* 2005

✓ Prevention ++

Peterson *AJSM* 2000, Koehle *AJSM* 2002

MCL ttt algorithm Kelberine & Meyer *ISAKOS* 2009

