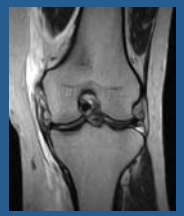
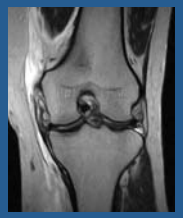
Treatment of MCL rupture



Mitsuo Ochi MD
Professor and chair
Department of Orthopaedic Surgery,
Hiroshima University , Japan

Introduction



Although there is a consensus that conservative treatment is the first choice for grade I and II isolated MCL injury, controversy still exists regarding the optimal treatment for high-grade isolated MCL injury or combined injury with ACL or PCL.

Valgus stress test and stress X-P

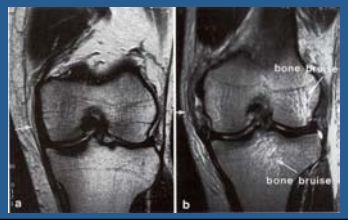
Valgus stress test with the knee 20~30˚ of flexion and fully-extended position to assess the severity of MCL injury.

Grade I	Grade II	Grade III
Localized tenderness with no laxity	Localized tenderness Partially torn MCL	Complete disruption
3-5 mm laxity	6-10 mm laxity	>10 mm laxity
No laxity	Laxity only in flexion	Laxity in both extension and flexion

Valgus laxity in both extension and flexed position implies severe medial aspect injury of both superficial MCL and POL, or sometimes concomitant cruciate ligament injuries.

MRI

MRI is indispensable examination for MCL injury, which can gives us not only status of injured MCL but also other structures, such as cruciate ligaments, meniscus, or cartilage.
Those information is also indispensable for deciding treatment options.



Basic research on MCL healing

Several basic researches using various animal models of MCL injury widely demonstrated that immobilization has negative effect on MCL healing.

Woo SL. Et al. Am J Sports Med 1987 (dog model)
Frank CB. et al. Acta Orthop Scand 1995 (rabbit model)
Thornton GM. et al. J Orthop Res 2005 (rabbit model)

Thornton GM. et al. J Orthop Res 2005
They used rabbit model to demonstrate that immobilization leads to significant difference in failure load at 6 and 14 weeks in the MCL injured knee.

Enhancement of MCL healing

Recent studies have investigated the effects on MCL biomechanical characteristics and composition.

- Ultrasound: Sparrow KJ, et al. Am J Sports Med 2005
  Warden SJ, et al. Am J Sports Med 2006
- Gene Therapy: Nakamura N, et al. Gene Ther 1998
  Shimomura T, et al. Tissue Res 2003
- Growth Factors: Hildebrand KA, et al. Am J Sports Med 1998
  Deie M, et al. Mech Ageing Dev 1997
- Stem Cell Therapy: Tei K, et al. Stem Cells 2008
  Watanabe N, et al. Microsc Res Tech 2002
  Nishimori M, et al. Presentation at ORS in 2010

Brace for MCL injury

After pain subsides, the patient put on a hinged knee brace against Valgus stress or external rotation for several weeks.

Conservative treatment for MCL injury

Surgical treatment of high grade MCL injuries remains controversial.
Multiple series showed excellent results with both surgical and non-surgical treatment.

Hughston JC, et al. J Bone Joint Surg 1983 (repair)

Jones RE, et al. Clin Orhtop Relat Res 1986 (non operative)

Reider B, et al. Am J Sports Med 1994 (non operative)

Indelicato PA, et al. Clin Orthop Relat Res 1990 (non operative)

Grade III MCL injury

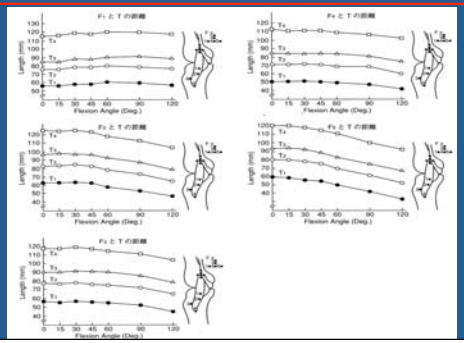
Our fundamental protocol for management of Grade III MCL injury is non-surgical treatment with emphasis on early functional rehabilitation.

Surgical treatment is considered when a patient complains of persistent valgus instability.

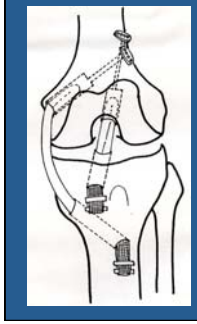
We usually follow the patients with stress radiography and MRI.

Isometric point of MCL for MCL reconstruction

Ochi M, et al: Cadaveric study of isometric point of MCL. 1989



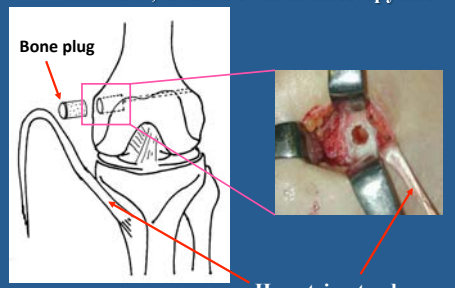
MCL reconstruction using Endobutton™



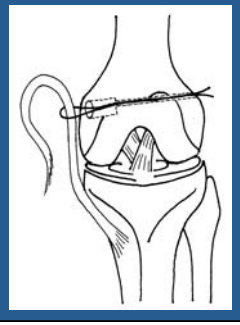
Our previous technique

MCL reconstruction using bone plug

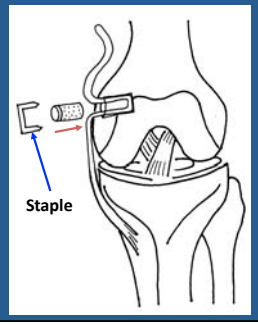
Adachi N, Ochi M et al. Arthroscopy 2006



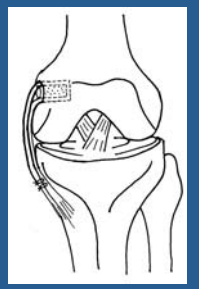
MCL reconstruction using bone plug



MCL reconstruction using bone plug



MCL reconstruction using bone plug



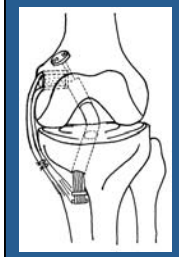
Case: 31-year-old man with PCL + MCL injury

Diff. of Post laxity: 12mm

Valgus laxity: 2 deg in healthy knee

Valgus laxity: 7 deg in injured knee

Case: 31-year-old man with PCL + MCL injury



PCL + MCL Reconst.

Preop

1 year after reconst.
SSD 3 mm in posterior sag

MCL reconstruction using bone plug

Reconstructed MCL

MCL reconstruction using bone plug

In this technique , the distance between the fixation points of the grafted tendon can be minimized which can reduce the tendon's bungee effect.

Moreover, because only a short bone socket is necessary for reconstruction, the interferences between the bone tunnels is less likely when reconstructing multiple ligaments.

The grafted bone can potentially enhance the healing between the graft and the bone tunnel.

Repair VS reconstruction for MCL injury

Conservative treatment should be done even in Grade 3 injury at the acute phase except the condition that a ruptured MCL stump is flipped and trapped between the femur and the tibia and medial meniscus is markedly dislocated on MRI.
If instability remains, reconstruction should be done.
Thus there is a limited space for MCL repair and few space for MCL reconstruction at the acute phase.

Thank you for your attention!