

## Medial patellofemoral ligament reconstruction using autogenous semitendinosus tendon for patellar dislocation

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## Surgical procedures for patellar dislocation

- 1) proximal realignment (soft tissue balancing)
- 2) distal realignment (mainly bony transfer)
- 3) combination of proximal and distal realignment

Over 100 different surgical methods have been reported to correct patellofemoral instability.

## Habitual patellar dislocation

Tibial tuberosity transfer (Hauser procedure) was done at 9 yrs old  
17 years later, hypoplasia of lateral tibial plateau and femoral condyle was marked.



26 years old

## Management of Patellar Dislocation in Skeletally Immature Patients

Transposition of tibial tuberosity deteriorates growth of lateral tibial plateau.

However, in case of habitual patellar dislocation in skeletally immature patients, it is not possible to precisely correct patellofemoral instability only with a standard proximal realignment such as Insall's procedure.

## Medial patellofemoral ligament (MPFL)

Primary restraint to prevent lateral patellar dislocation

MPFL dysfunction is deeply related to habitual, recurrent and traumatic patellar dislocation.



Sally PJ et. al. Am J Sport Med 1996  
Burks RT et. al. Am J Knee Surg 1998  
Nomura E et. al. J Knee Surg 2004  
Farahmand L et. al. Knee 2004

## MPFL reconstruction

Prior to English literatures on MPFL, Dr. Suganuma in Japan reported on the procedure of MPFL reconstruction using Leed-Keio artificial ligament at Tokyo Knee Meeting in 1986.

However, he did not investigate the length change of the fixed femoral and patellar points during knee motion.



After investigating MPFL anatomy using cadaveric knees, I have started to reconstruct MPFL by transferring semitendinosus tendon, especially for habitual or recurrent patellar dislocation with open growth plate since 1986.

**► Our method for MPFL reconstruction**

Since 1986

4. suture onto the surface of the patella

3. the tendon is rerouted to the patella

2. posterior one third of the femoral insertion of the MCL is used as a pulley

1. tendon harvest

**Length change between the two fixation points**  
Ochi M. Japanese Knee society 1987

A) Patellar fixation point

B) Femoral fixation point

A-B (mm)

Our MPFL reconstruction procedure shows relative isometry from 0 degree to 90 degrees.

**Length pattern of the two fixation points after selecting several points**

► Smirk C et. al. Knee. 2003 ▲  
The anatomy and fixation points of the MPFL

Our MCL pulley point is near F3

Our MCL pulley point

Smirk C et. al. Knee. 2003  
The anatomy and fixation points of the MPFL  
The results shown here were similar to our previous results.

**Cases (5 to 10-year follow-up)**

► 1986 - 1995

65 patients were treated with our surgical procedure

43 patients (46 knees) were included in this study

Male: 9, Female: 34

Age: 19.2 years

Habitual dislocation patellae ; 6  
Recurrent dislocation patellae ; 26  
Traumatic dislocation patellae ; 10  
Unstable patellae ; 4

**► Post operative rehabilitation**

~2 weeks immobilized with a soft knee brace

2 weeks ~ range of motion exercise

3 weeks ~ partial weight bearing.

4 - 5 months ~ sports activity

## Clinical Evaluations

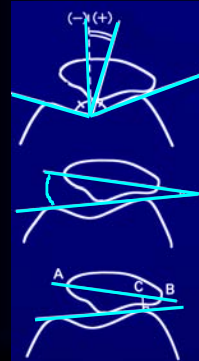
### Kujala Score

Kujala score (Arthroscopy 1993) consists of several evaluation items

- 1) Limp
- 2) Support
- 3) Walking
- 4) Stairs
- 5) Squatting
- 6) Running
- 7) Jumping
- 8) Prolonged sitting with the knees flexed
- 9) Pain
- 10) Swelling
- 11) Abnormal painful patellar movement
- 12) Atrophy of thigh
- 13) Flexion deficiency

**Total 100**

## Radiographic Evaluations (Skyline view)



**Congruence angle (CA)**  
Normal -20~5 degrees

**Tilting angle (TA)**  
Normal (TA) 5~15 degrees

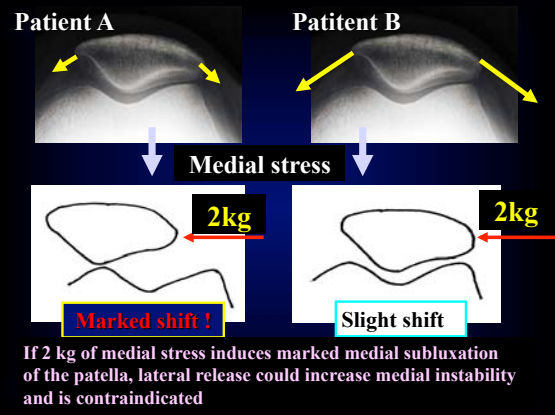
**Lateral shift ratio (LS)**  
 $BC/AB \times 100$  (%) 3~15%

## ► Stress skyline view

Applying 2kg stress



We used this stress view to examine the degree of lateral and medial instability of the PF joint



If 2 kg of medial stress induces marked medial subluxation of the patella, lateral release could increase medial instability and is contraindicated

## Operative procedure

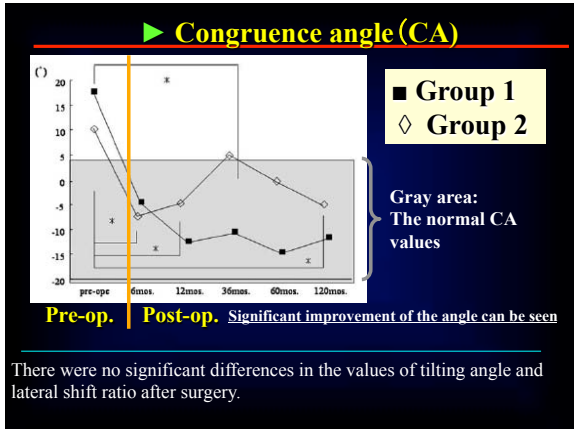
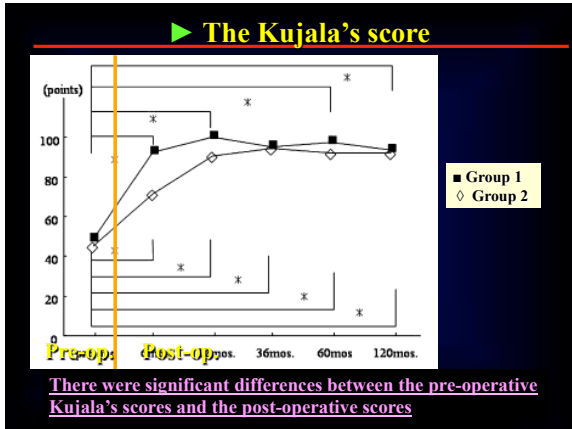
### Group 1

1. MPFL reconstruction
2. Vastus medialis advancement

### Group 2

1. MPFL reconstruction
  2. Vastus medialis advancement
  3. Lateral release
- (It depends on the results of stress skyline view)

## Results



### Our MPFL reconstruction method

**Advantages**

- ▶ The direction of force is medially directed
- ▶ The length pattern is relatively isometric during the knee flexion
- ▶ Applicable to children and adolescent with growth plates

Deie, Ochi, et al: JBJS Br 2003  
Deie, Ochi, et al: KSSTA 2005

### ▶ Case; 6 y.o. boy: Lt habitual dislocation

#### MPFL reconstruction with Insall method

Laterally dislocated patella

Axial view

Lateral femoral condyle

Contact area with patella

### Case; 6 y.o. Male: Lt habitual dislocation

#### 10 years after the surgery

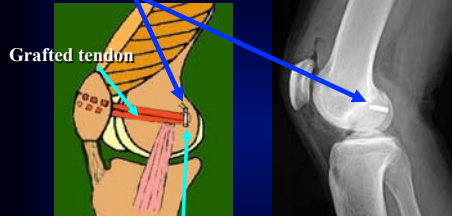
The patella was well corrected and the patellar groove was formed

### Our recent MPFL reconstruction procedure (since 2002)

(closed physes)

### Recent MPFL reconstruction

- ▶ A metal staple is used for fixation of the graft



MPFL attachment at the femur 17 years old female

Anatomical attachment of MPFL is close to growth plate  
This method is only for patients with closed physes



### ▶ X-rays after Surgery



### Cases

- ▶ 2002 – 2008

31 knees (29 cases) of recurrent patellar dislocation were treated with the surgical procedure

lateral release + 27 knees  
lateral release - 4 knees

Male: 5, Female: 26

Age: 22.2 years (12- 34 y.o.)

Follow-up period : 2.2 years ( 1-5 years)

Deie, Ochi Am J Sports Med 2010

### ▶ Results

31 knees 29 cases

Kujala's score: 94.5 points (79-100 points)

Re-dislocation: No case 1 case

Apprehension sign (+): 1 case

### Conclusion

There are several predisposing factors such as increased Q angle in acute or recurrent patellar dislocation.

Although no single surgical procedure is applicable for all types of patellar dislocation with different predisposing factors,

**We believe that MPFL reconstruction is one of the most effective and theoretically reasonable procedures.**

