

Type C : tibial rotation ↑
varus instability 10mm ↑
than normal knee at 30° knee flexion
varus stress test

Popliteofibular lig
Popliteus tendon
LCL

Lat. capsular avulsion in addition to
cruciate lig. disruption

Lesion of ligament structure of PLC classified

Minimal, Partial, Complete tearing

LaPrade et al Sport Med Arthroscop Nov 1997

Grade I - not associated with
abnormal joint motion

Grade II - associated with slightly to
moderately abnormal joint motion

Grade III - associated with marked
abnormal joint motion

Noyes FK et al 1989 JBJS 71 A 465-72

Lesion of ligament structure of PLC classified

Mild (1+)

Moderate(2+)

Severe(3+)

Hugston et al JBJS 58 A 173,1976

Baker et al JBJS 65 A 614-8,1983

others

1+ (0 to 5 mm with definite end point)

2+ (6 to 10 mm with definite end point)

3+ (greater than 10 mm with definite
end point)

Acute Injury of PLC

Grade I, II → can be conservative Tx.

But residual laxity in Grade II

Acute III isolated or combined injury

→ Direct repair of possible or else by
augmentation or reconstruction of
all injured ligaments

Chronic injury of the posterolateral corner

Reconstruction PLC + Reconstruction
of any cruciate ligament injury

Failure of Dx. & Tx. In injury of PLC
If, left untreated → failure of cruciate
reconstruction

Injury posterolateral corner

Elusive Dx. → A Sound P.E.

A high index of clinical suspicion (for
possible injury of the PLC)

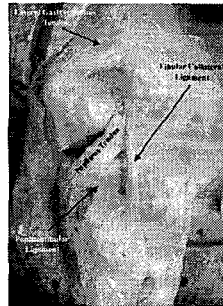
Dose not usually, occur isolation but
often associated with injury of the ACL
or PCL

1998 ICL Albright & Brown

Popliteofibular ligament

- Short external lateral ligament
- Popliteafibula fascicles
- Fibular origin of the popliteus
- Popliteus muscle with origin from the Fibular head
- Popliteofibular fiber
- anatomy textbook – disappear 20C
rediscovered recently

Popliteus Complex



- Popliteus attachment on Femur
 - 2 cm from FCL
 - Attaches on anterior fifth of popliteal sulcus

The Most frequent ligament deficiency to accompany PLRI is ACL deficiency with ALRI
Less frequently PCL deficiency

ICL 369-1988 Albright & Brown

Natural History

23 pts non op Tx. Grade II & III
Average F/U 8yrs
6/12 Grade III → post traumatic A.
No Pt with Grade II Arthritic change

Kannus P. Am J sports Med 1989

Diagnosis

Peroneal N. injury 13% (71 pts)
16% (25 pts)
Acute isolated posterolateral instability
- DeLee(12/735 knees, 1.6%)

Am J sports Med 1983

Mechanism of injury (PLRI)

- Isolated injury of the posterolateral complex
 - relatively uncommon
- Posterolaterally directed blow to the medial part of the tibia → Knee hyperextension
- Non-contact hyperextension and external rotation forces (to the knee)
- Pure hyperextension injury
- Anteromedial blow to the flexed knee
- Fall on knee
- Motor – vehicle accident

Mechanism of the PLC Injury

- Direct blow to the tibia with the knee flexed, extended, or a twisting injury to the knee
- Acute combined ACL & posterolateral injury, the majority Patients had sustained a hyperextension injury with a varus component.

Biomechanics, Primary Function

- LCL is primary restraints to varus opening. Posterolateral structures provide considerable restraints as secondary stabilizers.
- Lateral & posterolateral structures act as primary restraints in limiting ext. rotation of the tibia.

Secondary fuction

- The lat. & Posterolateral complexes act as secondary restraints to limit anterior. & post. translation of the knee.
- Section ACL + posterolateral lig. - section
↑AP-translation maximal at 30° flexion
- Popliteus – 2nd restraint to posterior translation, LCL + PLS – major 2nd restraint from full extension to 30° flexion
- Popliteal complex- popliteal & popliteofibular lig. resisting post. translation, varus rotation, and ext. rotatoin

When combined injured of the PCL and posterolateral corner

Varus rotation, external rotation & posterior translation are increased at all angle of the knee flexion.

When *multiple lig instability* are present with a PLRI, one must suspect knee dislocation and spontaneous reduction.

⇒ *neurovascular exam.*

Pt. always keeps one knee in 15°-20° flexion during the stance phase

⇒ PLRI clue

*Hugston JC. Norwood LA : CORR
147,86,1980*

Sectioning Posterolateral Complex

- Increase Ext. rotation of the knee

at 30° flexion - 13°

90° flexion - 5.3°

Good et al JBJS 1988 ; 70(A) 88

Posterolateral corner injury

Observation of the gait pattern, limb alignment is essential

Acute posterolateral injury

antalgic gait (knee flexed & internal rotation in an effort to avoid hyperextension and ext. rotation)

Chronic posterolateral injury

Exhibit a varus thrust or hyperextension varus thrust of the injured knee during the stance phase of gait.

=>Preop. standing radiographs hip to knee are important to assess limb alignment.

A-P translation is tested at 30° and 90° of knee flexion slightly increased post translation of 30° but not at 90°-PL injury .

post translation 30° & 90° suggest injury to PCL

Sectioning

PCL + Posterolateral

- 30° knee flexion

→ 18° Ext. rotation

- 90° knee flexion

→ 20.9° Ext. rotation

Good et al JBJS 1988 70(A) 88

Posterolateral Laxity

Clinical Test

- 1) Post.lat. Drawer test
- 2) External rotation of the tibia on the femur 30°, 90° flexion
- 3) Reversed pivot shift test
- 4) External rotation recurvatum

Varus-Valgus Rotation

Varus-Valgus stress testing

knee in 30° flexion, in full extension

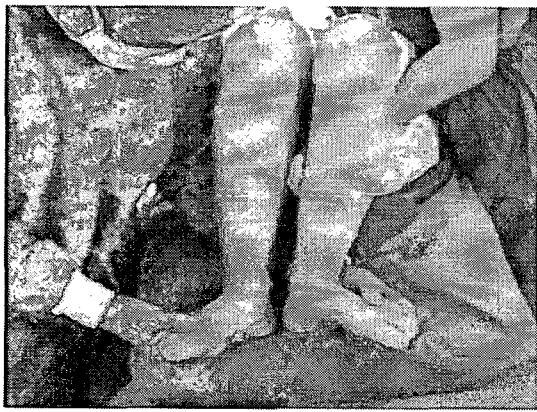
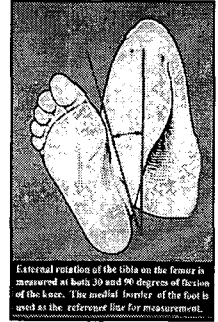
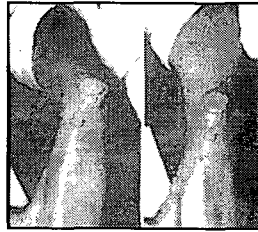
injuries of LCL & Posterolateral corner =>increase varus opening with varus stress in 30°

A large amount of varus instability in full extension
→ PLRI and PCL or ACL injury

External Rotation ,Dial Test

- 30° Flexion / 90° Flexion
- Easily performed with the Pts Prone
- DDx : Positive Dial Test
: AMRI vs PLRI

Albright JP & Brown AW. ICL 1998.371



Posterolateral Drawer Test

Lateral side of tibial plateau

—————→ Posterior

Medial side of tibial plateau

—————→ Not move

Grossly positive (3+) : PLRI + PCL



External rotation recurvatum

: Recurvatum of the involved knee when standing

Chronic PLRI : positive

Acute PLRI : negative

prevent hyperextension by

ACL & Post.med.Capsule

External rotational recurvatum test

Arcuate Lig. Complex
ACL

DDx : AMB & Intermediate B.
of ACL injury
→ Hyperextension
Possible PCL injury



Reverse pivots shift Test

Foot external rotated a valgus stress applied slowly flexed 90°

Pivot occur-30° flexion

Under Anesthesia 35%

asymptomatic knee : positive

Cooper, JBJS 73A 30-36

One knee : positive-significant

Jacobs



Normal Knee

• Reverse pivot shift sign

Prevented by

- Popliteus tendon,
- Arcuate ligament,
- Fibular collateral lig.

Jacobs RP et al Acta orthop. Scand.

Suppl.181,1981

Summary

PLRI

1. Post.lateral drawer sign
30° flexion
90° flexion
2. Tibial external rotation
(Dial test)
3. Reverse pivot shift test

Tx. of PLRI

- Failures of ACL reconstruction can be the results of untreated PLRI

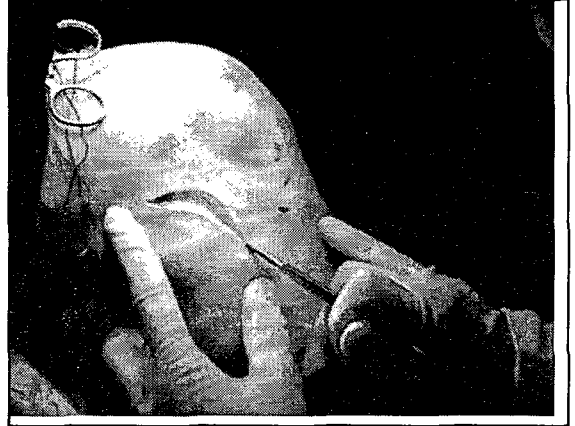
O'Brien & Warren JBJS 1991

- If not Tx. Of PLRI

→ PCL, ACL reconstruction failure
Acute – primary repair or augmentation

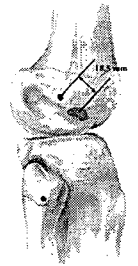
Tx. of chronic PLRI

- 1) Hughston & Jacobson - proximal advancement -
Noyes - 5 to 7mm in width postolateral structures - LCL
3 to 4 mm thick to be functional
- 2) Clancy - biceps tenodesis
not anatomically recreate the popliteus T or
popliteofibular lig - partial reconstruction of posterolateral
corner
- 3) Albright & Brown - PLCS -> 87%. (26/30) good result
- 4) Noyes , LCL, patellar tendon autograft or allograft
- 5) Posterolateral Corner Sling through Fibular head



Femoral Attachment Relationships

- Spatial Relationships
- (LaPrade, 2000)
 - Average 18.5 mm distance between FCL and PLT femoral attachments
 - Important to recognize this relationship for repair, recess, reconstruction, and advancement procedures



Popliteofibular ligament

- Originates at musculotendinous junction
- Anterior / Posterior divisions
- Static stabilizer of ER
- "Arcuate ligament" in old literature

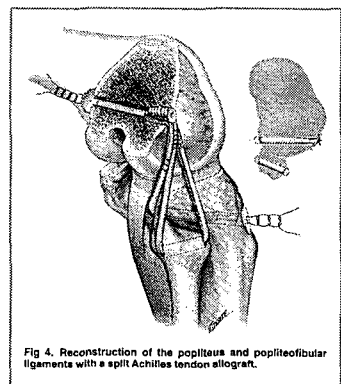
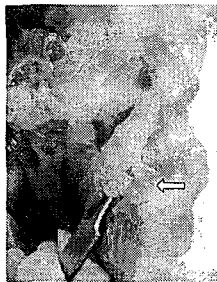


Fig 4. Reconstruction of the popliteus and popliteofibular ligaments with a split Achilles tendon allograft.

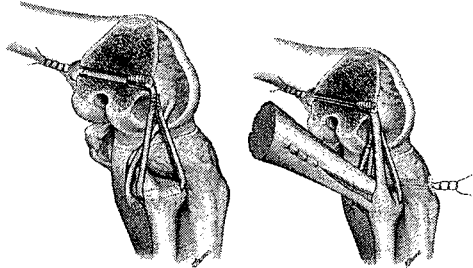


Fig 8. Reconstruction of the popliteofibular ligament and lateral collateral ligament in a patient with moderate, chronic posterolateral corner instability. The popliteus tendon is intact.

Fig 9. In severe, chronic posterolateral corner instability, the popliteus and popliteofibular ligament are reconstructed using a split Achilles tendon allograft and the lateral collateral ligament with a strip of biceps tendon.

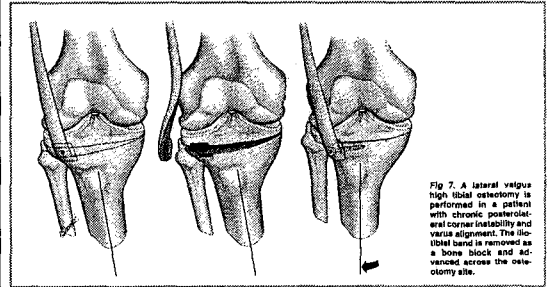


Fig 7. A lateral valgus high tibial osteotomy is performed in a patient with chronic posterolateral corner instability and varus alignment. The tibial band is removed as a bone block and advanced across the osteotomy site.

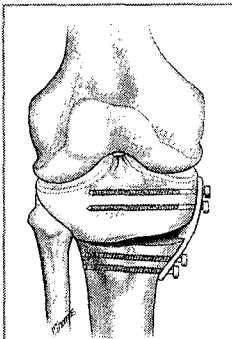


Fig 6. In a varus knee with mild posterolateral corner instability and associated medial laxity, a medial valgus high tibial osteotomy restores flexion to the medial side of the knee and corrects limb alignment.

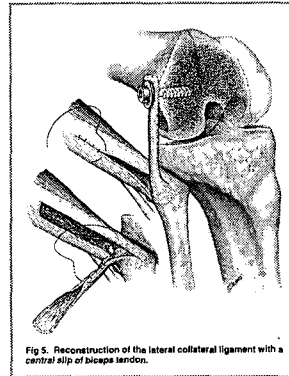


Fig 5. Reconstruction of the lateral collateral ligament with a central slip of biceps tendon.

Material & Method

From Jan. 1993 to Dec. 2000

39 cases of PLRI (F/U > 12 months)

: HJ repair – 10 cases

: Biceps tenodesis – 15 cases

: PLCS – 14 cases

Material & Method

Combind lig. Injury

PCL : 31

ACL : 5

Isolated Injury

3 / 39 cases

Results

IKDC score	HJ repair	BT	PLCS
A (normal)	1 (10%)	0 (0%)	1 (7%)
B (nealy normal)	7 (70%)	11 (73%)	9 (64%)
C (abnormal)	2 (20%)	4 (27%)	4 (29%)
D (severely abnormal)	0 (0%)	0 (0%)	0 (0%)

Results

OAK Score	Pre OP	F/U
HJ repair	66	82
BT	63	80
PLCS	61	80

Genu recurvatum

CASE K. M. S. (M / 48)

Pedestrian traffic accident

TD: Aug. 28. 97

Dx.: Genu recurvatum both (Rt > Lt)

PCL / PLRI rupture knee Rt.

PLRI knee Lt.

Tx : High tibial osteotomy Rt. - Aug. 31. 2000

PCL tensioning & augmentation with allograft

PLRI reconst. (PLCS) - Nov. 23. 2000

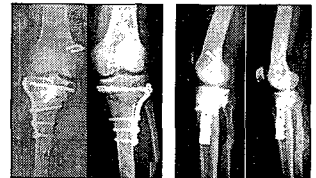
High tibial osteotomy Lt. & PLRI reconst. (PLCS)

- Feb. 5. 2001

Pre OP



Follow-up



Pre OP

