

Case conference



R2 吳俊良
VS 詹益聖
20110505

Basic Information

- Name: 林XX
- Age: 28 y/o
- Gender: male
- ID: 2142392
- Admission Date: 2011/04/11

Chief complaint

- Left lower extremity weakness after traffic accident about 10 days ago

Present Illness

- Suffered from T.A, first aid at 陽明 H
- Right pneumothorax and left hemothorax were noted s/p chest tube and pigtail insertion
- Severe back pain and left lower extremity weakness
- Left knee unable to move
- Perineum area pain and tenderness

Past history

- No diabetes mellitus
- No hypertension
- No other system underlying disease

Personal history

- NKDA
- No Smoking
- No Drinking

Physical Examination

Muscle power

	Right	Left
Hip flexion	3	1-2
Knee extension	4	1-2
Ankle dorsiflexion	5	5
Toe dorsiflexion	5	5
Ankle plantarflexion	5	5

Self voiding and defecation: intact

DTR



Severe back pain and tenderness

Physical Examination

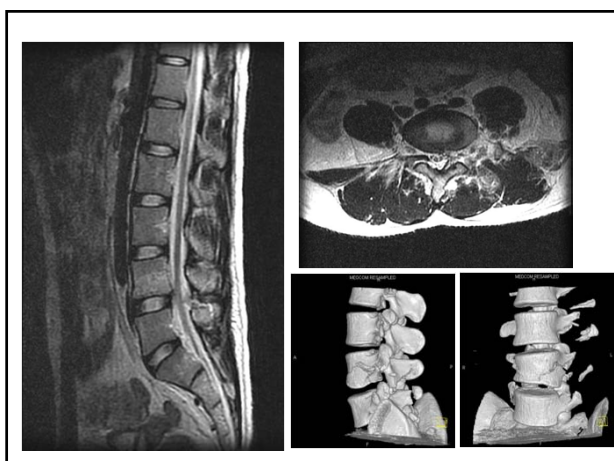
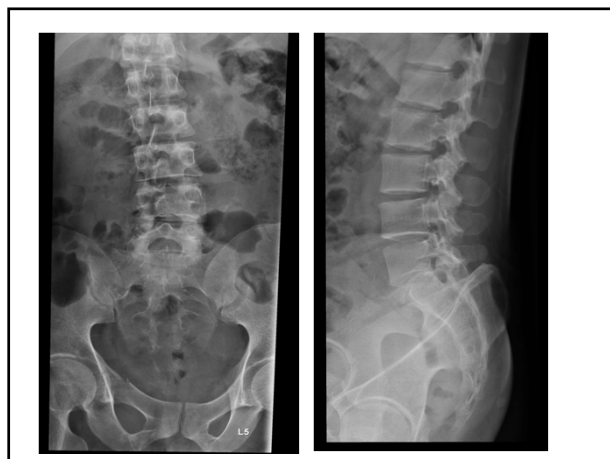
Left lower extremity

- Mild ROM limited due to pain
- Anterior drawer test: negative
- Posterior drawer test: positive
- Unable to check due to pain

Lab

- CBC/DC
- BCS

-- All within normal level



Diagnosis

- Right sacral fracture, zone I
- Right pubic superior ramus fracture
- L4 compression fracture with fracture-distraction injury
- Suspected left PCL avulsion fracture
- Left lower extremity weakness, R/O lumbosacral plexus injury
- Right pneumothorax s/p chest tube insertion
- Left hemothorax s/p pigtail insertion

Operation Note 4/13

- **Pre-Op:**
right sacral fracture
- **Post-Op:**
right sacral fracture
- **OP method:**
Closed reduction and internal fixation with iliosacral screw

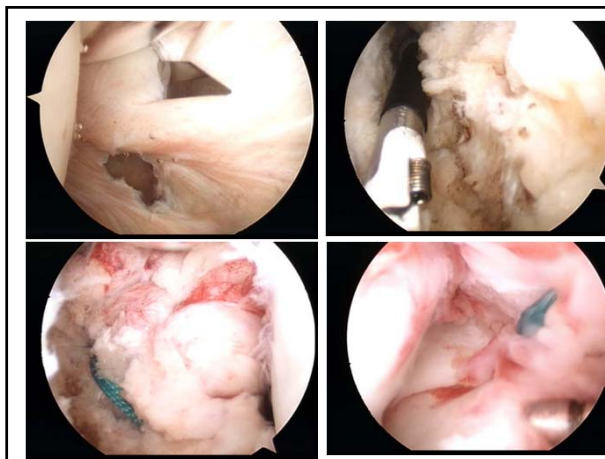
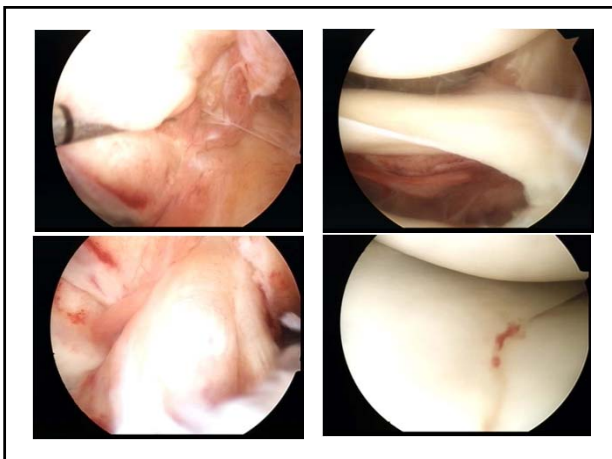
Operation Note 4/19

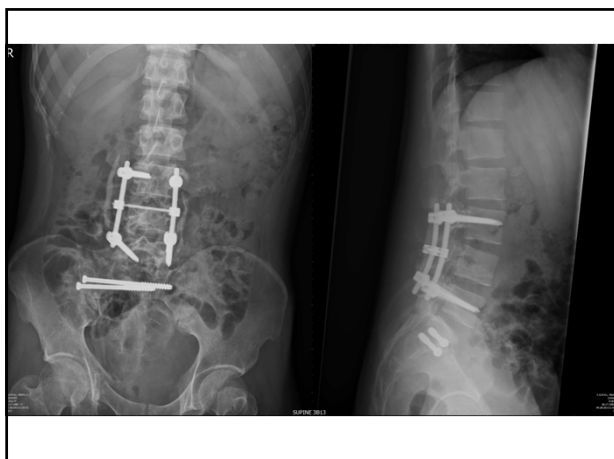
- **Pre-Op:**
L4 compression fracture with fracture-distraction injury
- **Post-Op:**
L4 compression fracture with fracture-distraction injury
- **OP method:**
 1. Open reduction with TPS, smartloc, L3-5
 2. lateral fusion with Genex

Operation Note 4/27

- **Pre-Op:**
 1. Left knee posterior cruciate ligament displaced avulsion fracture
 2. Left knee Segond fracture with posterolateral complex capsule rupture
- **Post-Op:**
 1. Left knee posterior cruciate ligament displaced avulsion fracture
 2. Left knee Segond fracture with posterolateral complex capsule rupture
- **OP method:**
 1. Lt knee arthroscopic PCL avulsion **pullout suture fixation** using No 5 Ethylbone + No 1 PDS
 2. ORIF with Staple+ Washers fixation for Segond fracture and post-lat capsule repair

Intact MM/LM/ACL/popliteal tendon/PFC

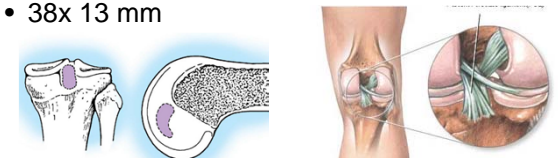




*Posterior Cruciate Ligament
Injury*


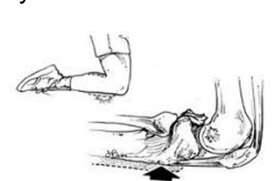
PCL anatomy

- Origin- broad crescent-shaped area anterolaterally on the medial femoral condyle
- Insertion- tibial sulcus below the articular surface
- Anterolateral and posteromedial bundle
- 38x 13 mm



The mechanism of PCL injury

- Dashboard injury
- Hyperflexion
- Hyperextension
- Posterior rotation injury of the knee

Classified

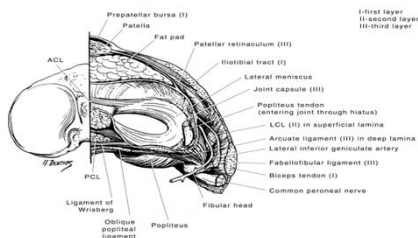
- Grade I (partial) ~ grade III (complete)
- Isolated or combined

-- Isolated PCL disruption most commonly occurs as avulsion at its tibial insertion (40%–55%)

Hunter JC AJR 1995

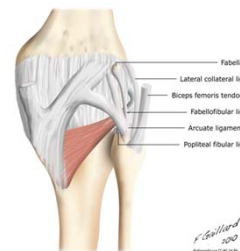
Associated injury

- Medial collateral ligament
- Posterolateral complex



Posterolateral complex

- *Lateral collateral ligament*
- *Popliteal tendon*
- *Popliteofibular ligament*
- Iliotibial band
- Arcuate ligament
- Lateral capsule
- Biceps



Diagnosis

- History
---- mechanism
- Physical examination
- Image



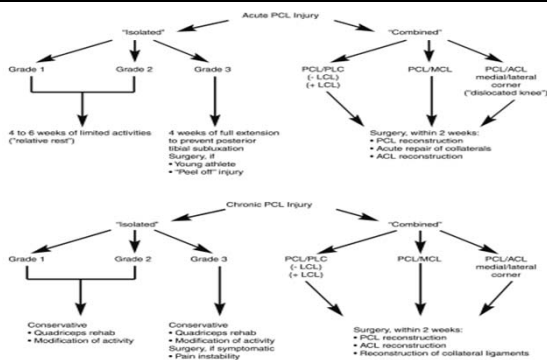
Physical examination

- Posterior drawer test
- Tibial sag
- Dial test
- External rotation recurvatum
- Reversed pivot
- Varus/valgus stress



Treatment

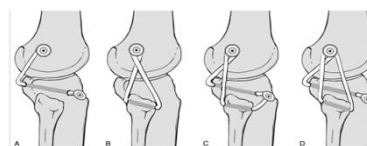
Harner CD Am J Sports Med 1998



PLC treatment

- Acute repair combined with reconstruction is advocated
- A failure rate of 45% with repair compared to 4% with reconstruction
- Principally the LCL, popliteofibular ligament and popliteus

Levy BA, Am J Sports Med 2010



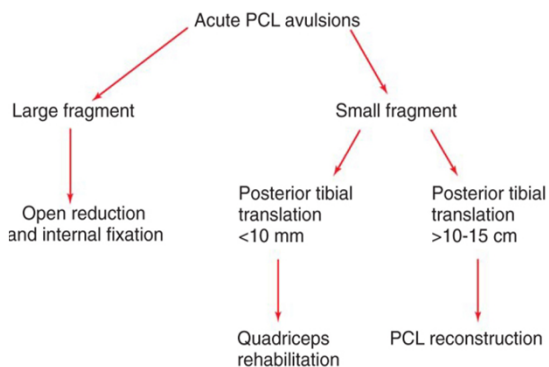
Miller MD, Review of sports medicine and arthroscopy, 2nd ed

PCL avulsion fracture

- Non-displaced
- Displacement



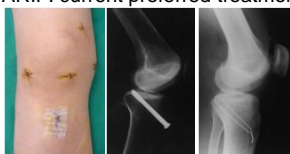
Meyers MH JBJS A 1970



Veltri DMJ Am Acad Orthop Surg 1993

Treatment option

- Non-displaced fragment
 - Casting
- Displaced fragment
 - ORIF: high morbidities and disadvantage
 - ARIF: current preferred treatment

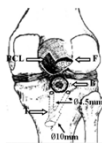


Surgical option

- *small bone fragment (<10 mm) with comminution*
 - fixed with use of multiple sutures
- *small bone fragment without comminution*
 - fixed with 23-gauge wires
- *medium-sized fragment (10 to 20 mm)*
 - fixed with Kirschner wire
- *large single fragment of bone (>20 mm) that involved the condyles*
 - fixed with one or two cannulated screws

Sung-Jae Kim JBJS A 2001

- **Jinzhong Zhao** *Arthroscopy 2006*
 - suture fixation through Y-shaped bone tunnel

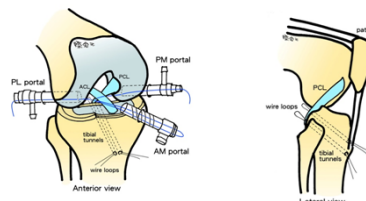


- **Jianchao Gui** *Arthroscopy 2009*
 - single tunnel suture fixation of PCL avulsion fracture



Ours

- No fragment size limitation
- 2 tibial tunnels below PCL stump
- Four-strand NO.5 Ethibond



Segond fracture

- Avulsion fractures of the lateral aspect of the proximal tibia below the articular surface



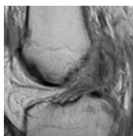
Mechanism

- excessive varus force and internal rotation applied to the lower leg



Associated Injury

- Tear of the anterior cruciate ligament (75-100%).
- Injuries of the medial and lateral menisci (66-70%).
- Avulsion fracture of the fibular head.
- Avulsion fracture of the Gerdy tubercle.



Lateral Capsular Sign Associated With Posterior Cruciate Ligament Tear

- 38y/o struck by a car across the lateral aspect of right knee
- Valgus laxity noted and
- Suggestive of ACL injury
- Under anaesthesia
 - Valgus laxity
 - Normal Lachman test
 - no Varus laxity



- **Segond fracture with PCL and MCL and MM injuries**

PCL tibial avulsion with an associated medial meniscal tear in a child: a case report on diagnosis and management

- PCL avulsion fracture
- Posterior horn medial meniscal tear off the posterior capsule
- Open reduction and internal fixation for fracture
- Suture repair of the meniscal tear

Solayar GN, J Pediatr Orthop B 2011

PCL injury treatment goal

- Identify the associated injuries
- Restore the anatomic position and functional stability
- Early intervention for high grade isolated and combined PCL injuries

Thanks!!