Anatomoclinic Correlation for Ligament Injury

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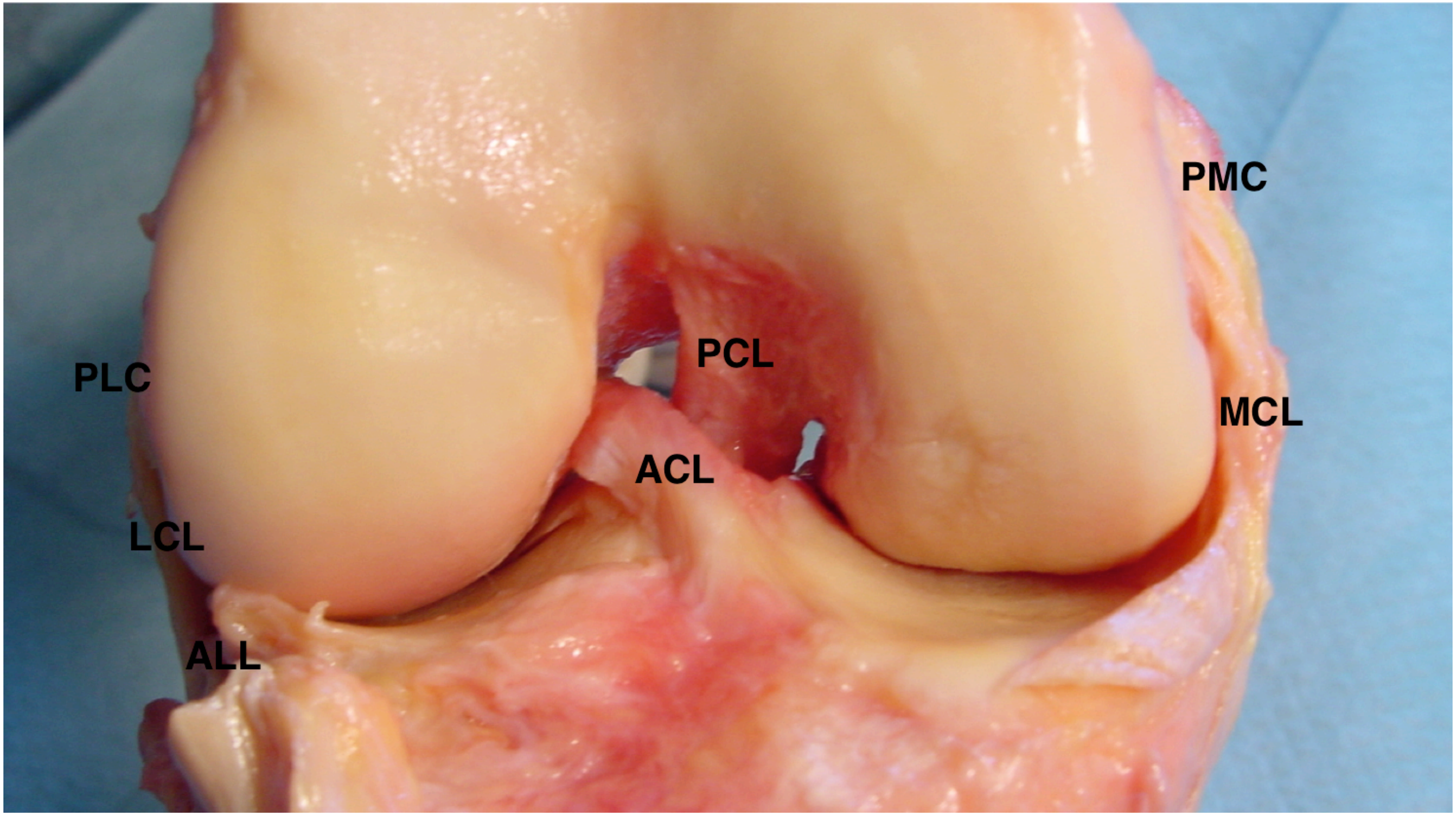
CENTRE OSTÉO-ARTICULAIRE DES CÈDRES


URGENCES
24h / 24h
MEDICEDRES

Mechanism of the Trauma

Which Ligaments?



Knee Tests

- Stress Tests (0-30^0)

Varus/Valgus

- Slide tests

Ant. Drawer Test

Lachman Test

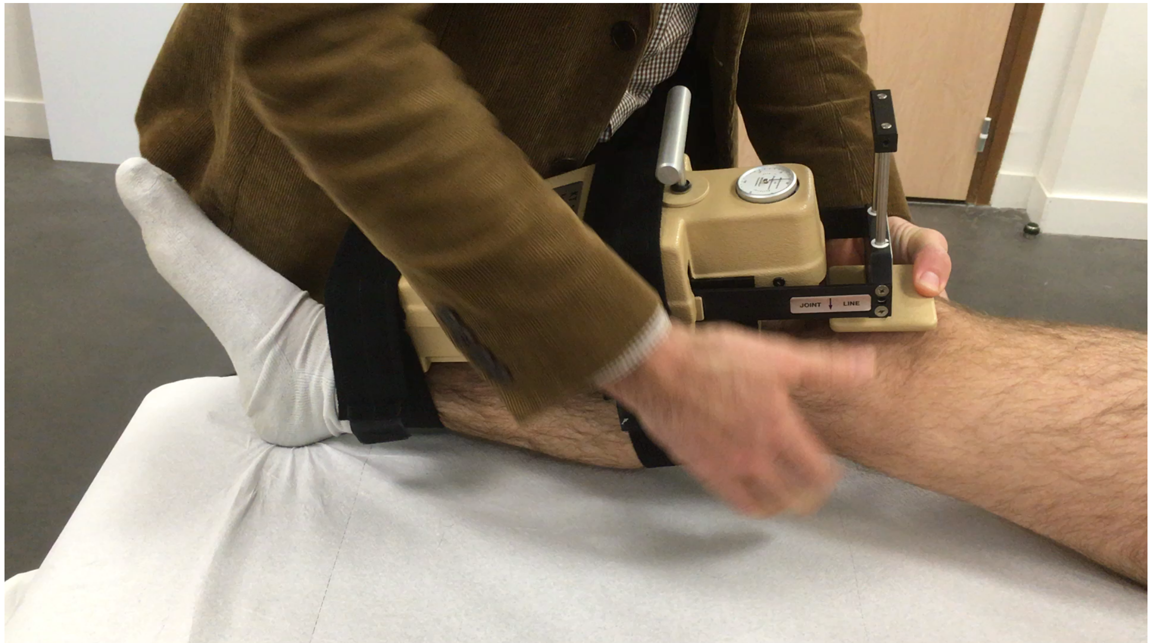
Knee Tests

- Pivot Shift Jerk Tests

- Rotational tests

Dial Test

Laximetry KT-1000



Different Ligament Tear Patterns

Type of Injury

Chronicity

Grade of the Tear (I, II, III)

Concomitant Ligament Injuries

Clinical Suspicion ?

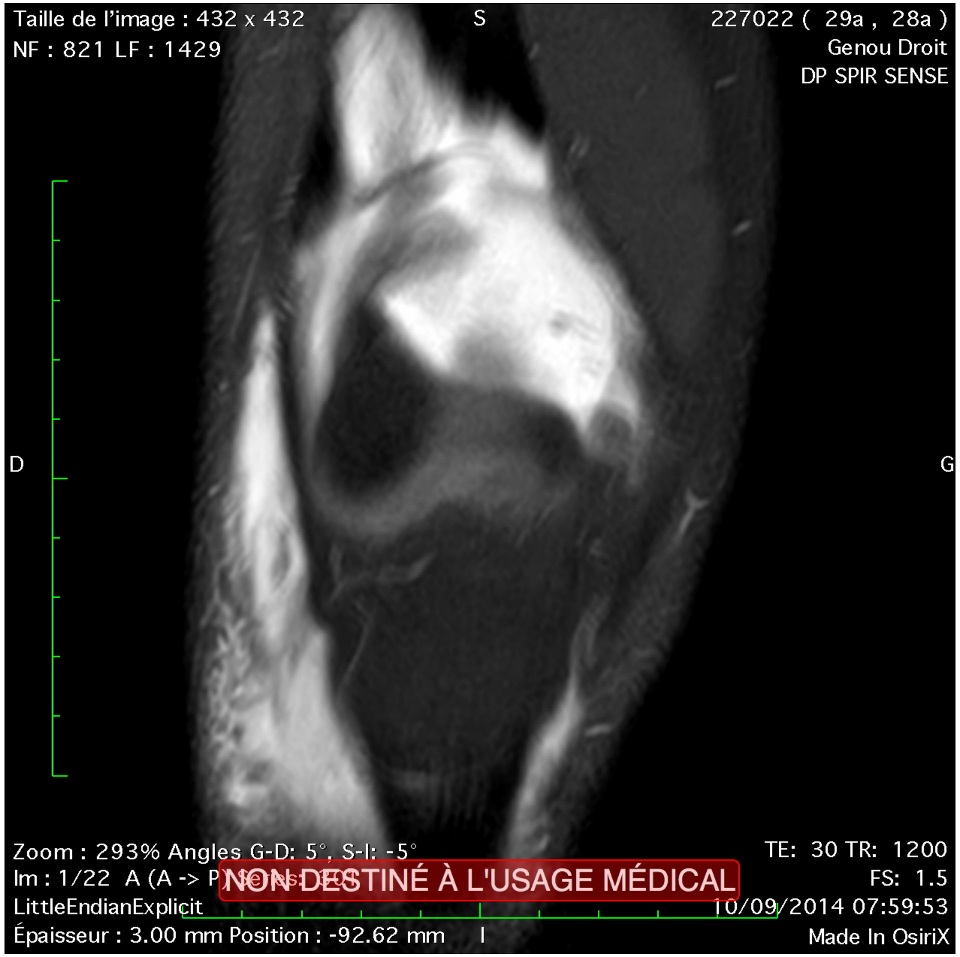
Grading System for Sprains
ex: MCL & LCL

AMA clinical evaluation	MRI
<u>Grade I</u> 0-5 mm opening Hard End-Point	**<u>Grade I</u>** Superficial hyper signal Well oriented No disruption
<u>Grade II</u> 5-10 mm opening Hard End-Point	**<u>Grade II</u>** Superficial hyper signal Well oriented Partial disruption
<u>Grade III</u> >10 mm opening Soft End-Point	**<u>Grade III</u>** Complete disruption

Rossi *et al.* AJSM 2015

MRI to suspect ligament lesions

Multiligament injury



MRI is acurate in Acute Cases

Ex: PCL injuries

Se= 100%

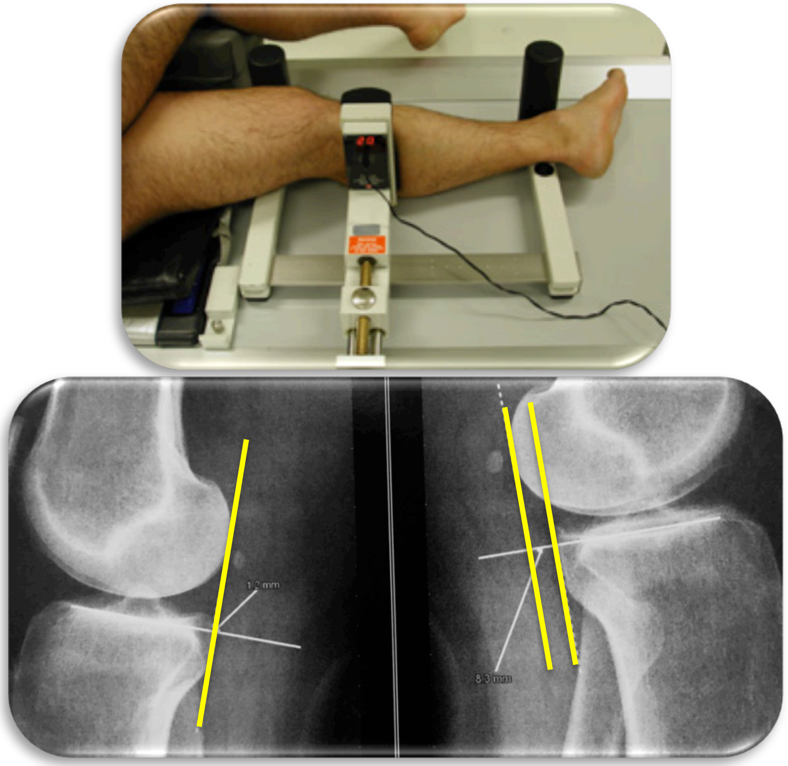
Sp= 97-100%

But in chronic injuries

Healing process could mask the extent of the deficiency

Laprade *et al.* AJSM 2015

Stress Radiography

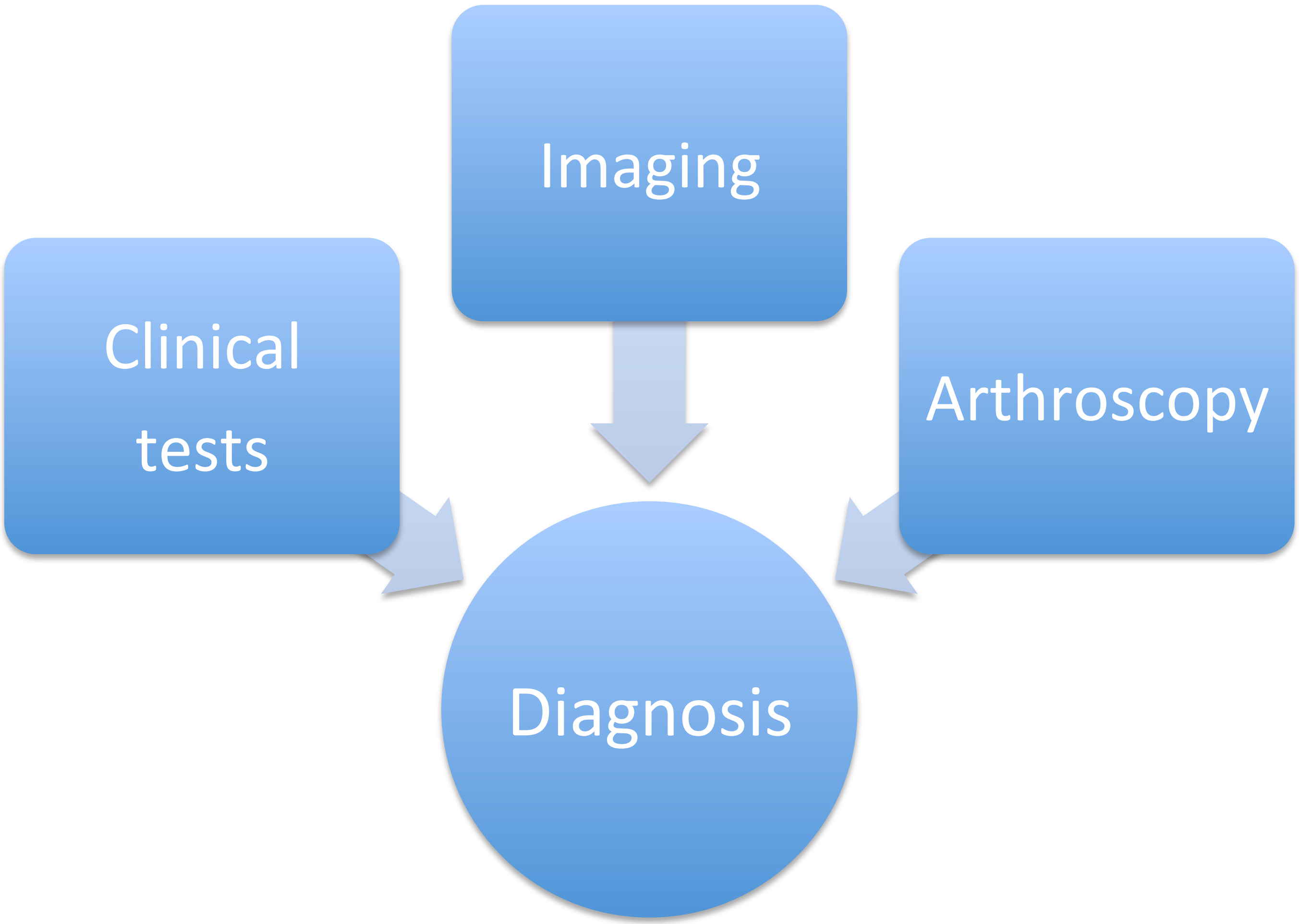


Telos

Valgus Stress

Structural integrity

Correlation Analysis



ISOLATED ACL TEAR

CASE 1

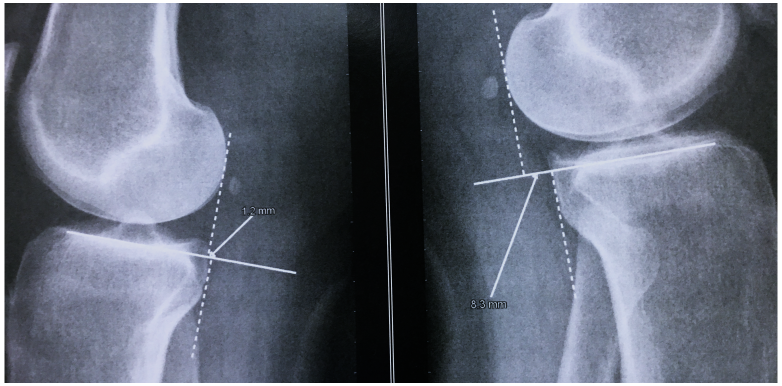
- 40 y.o., Female
- Left Knee- Torsional Injury 3 months ago
- Immediate knee swelling
- Instability of the patient
- Possible Injury Pattern and Characteristics ?

Clinical Examination

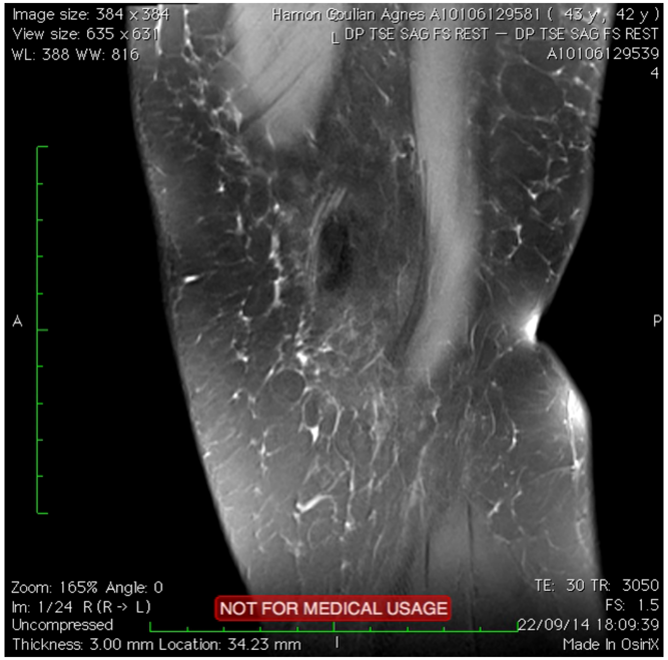
Injured

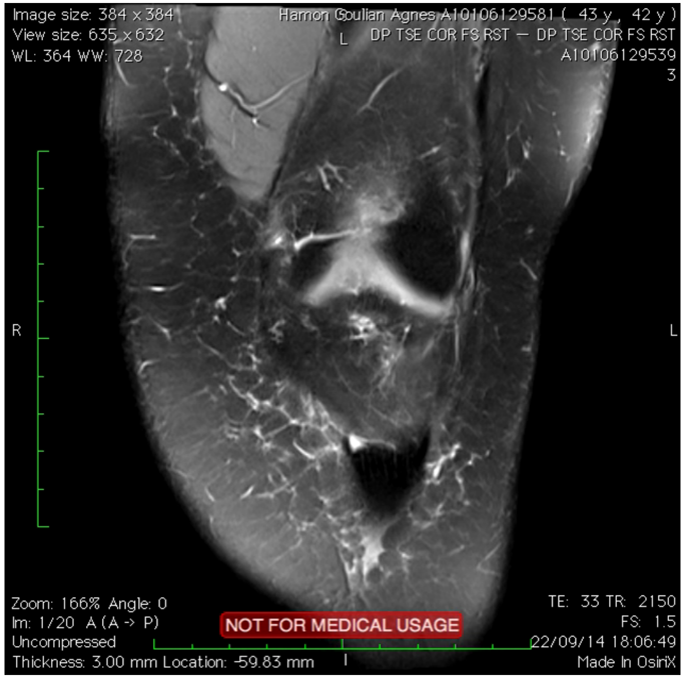
Control Side

MRI & Telos



7mm SSD



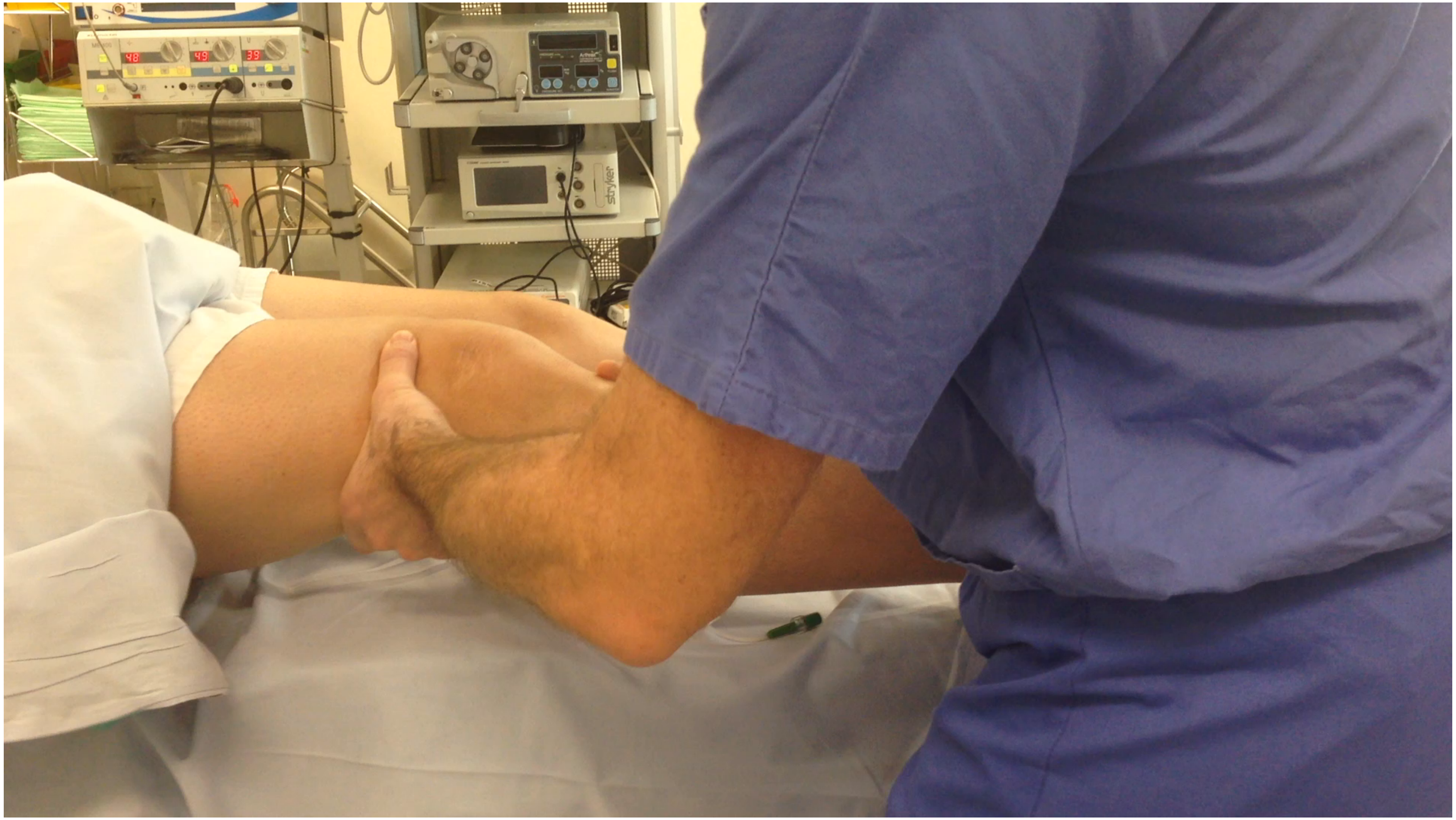


Arthroscopy

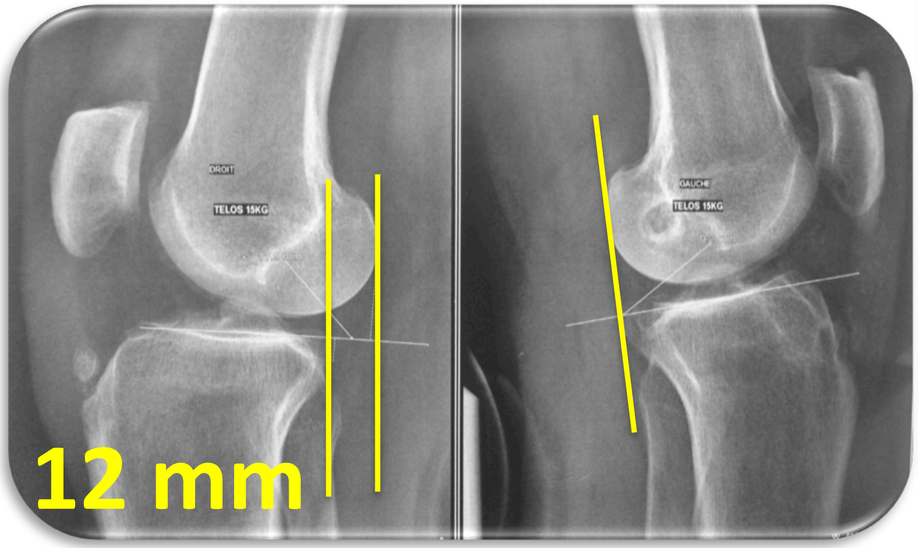
CASE 2

- 46 y.o., Male
- Failure of ACL reconstruction
- Initially Traffic accident (Scooter)
- Effusion+++
- Instability of the patient

Clinical Examination



Laximetry & Meniscal status



Accuracy of Tests

Lachman:

96 % for complete ruptures

68% for partial ruptures

PST:

86 % for complete ruptures

67 % for partial ruptures

Awake < EUA

Meta-analysis : Leblanc *et al.* KSSTA 2015

ACL Diagnostic Accuracy

History

- Popping sound at time of injury
- Giving way
- Effusion
- Pain
- Ability to continue activity

VS

Clinical Examination

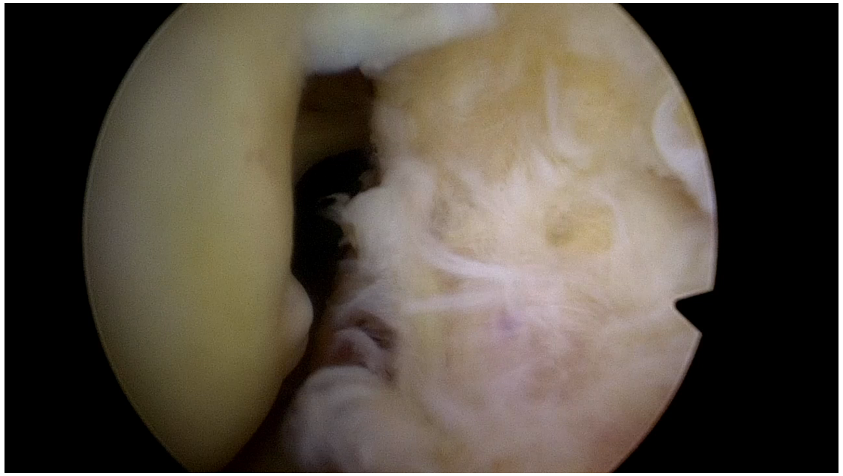
- Anterior drawer test
- Lachman
- Pivot shift

ONLY THE COMBINATION HAS HIGHER DIAGNOSTIC ACCURACY

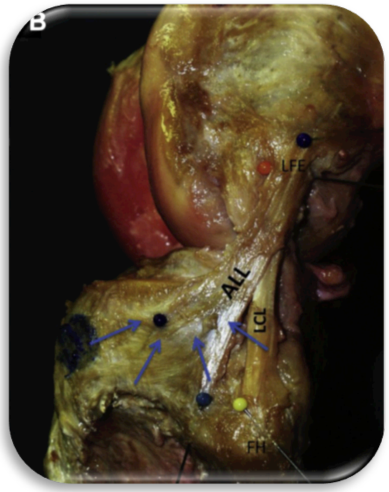
Swain *et al.* Chiropractic & Manual Therapies 2014

Tear Patterns ?

Complete or partial Tear?



ALL ?



Complete or Partial ACL Tears

Lachman

Soft End-Point in 98% Complete tears

Hard Delayed End-Point in 53% Partial tears

Panisset *et al.* OTSR 2012

PST

2 or 3+ in 86% Complete tears

0 or 1+ in 76% Partial tears

Telos

SSD 9.1mm in Complete tears

SSD 5.2mm Partial tears

Dejour *et al.* Arthroscopy 2012

Role of ALL

important **<u>restraint to internal rotation</u>**

significant role in the pivot-shift phenomenon

Monaco *et al.* Orthopedics 2010

Ruptured ALL is prerequisite for **<u>grade 3 PST</u>** in ACL deficient knee

Claes *et al. ISAKOS 2013, AAOS* 2013

Sonnery-Cottet *et al.* AJSM 2015

Isolated ALL cannot control internal

but works in combination with ITB and/or ACL

Sonnery-Cottet *et al. accepted in* AJSM 2016

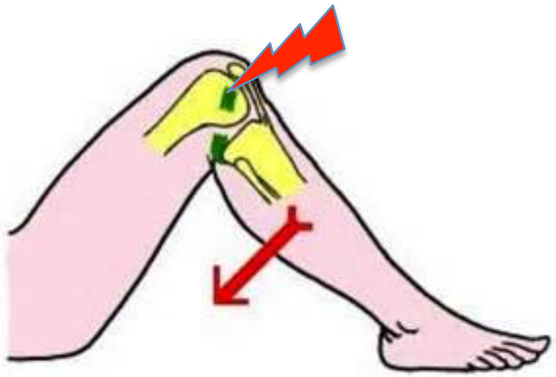
ISOLATED PCL TEAR

History

- Acute PCL tear

-Vague Symptoms
-Mild - moderate effusion
-Pain in the posterior aspect of the knee
-Pain with kneeling
-Dashboard type injury

- Chronic PCL Tear



-Vague anterior knee pain
-Patellofemoral Syndrome

PCL Diagnostic Tests

Posterior Drawer

Posterior Sag

Quadriceps Active

Se- Sp=98-100%

<u>Supplementary tests</u>

Recurvatum test

Reverse pivot-shift test

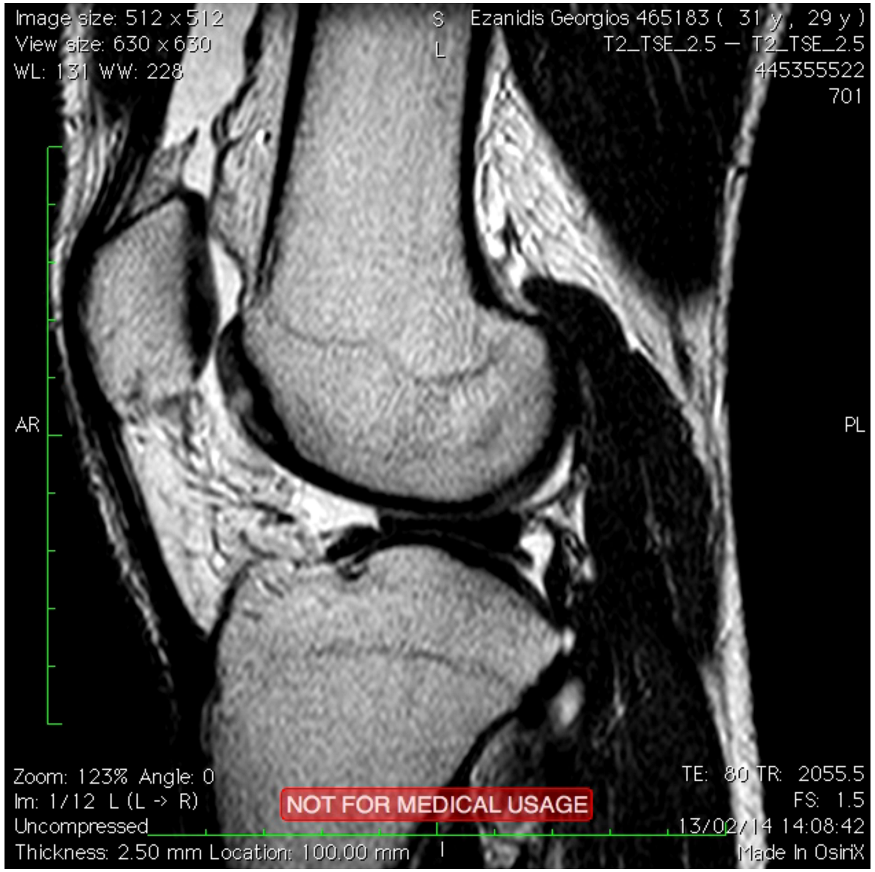
Varus-valgus at 0°-30°

Dial test 30-90^0

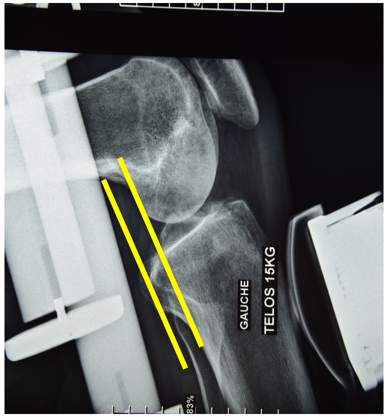
Laprade *et al.* AJSM 2015

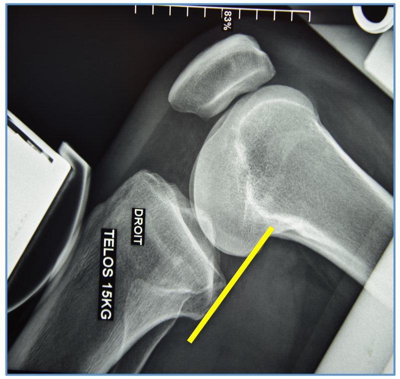
MRI

- Almost 100% Specificity-Sensitivity



Stress Imaging
Telos





Partial PCL tears <8 mm posterior tibial translation

<u>Isolated complete PCL tears in 8-12 mm</u>

Combined complete PCL tears (usually with a PLC injury) >12 mm

Laprade *et al.* AJSM 2015

MULTILIGAMENT INJURY

Stress Tests in Valgus & Varus

Clinically: 0°-30° 83% Sens-90% spec

Stress Radiolography

Sectioning study

MCL : > 3.2 mm

MCL/PMC: >9.8 mm

Laprade *et al.* AJSM 2010

Sectioning study

FCL : > 2.7 mm

FCL/PLC: >4 mm

Laprade *et al.* AJSM 2008

SSD 10° = Combined lesion

Acute PCL + PLC

Recurvatum Test

Chronic PCL + PLC

The Posterolateral
Rotatory Drawer Test

Dial Test ($30-90^0$) & Tibia
reduction + if >SSD 10°

Junk *et al.* CIOR 2009

Example of Multiligament Injury

15 y.o.

Handball injury 45 days ago

Effusion+++

Can walk with severe instability

Varus stress +++ (0° & 30°)

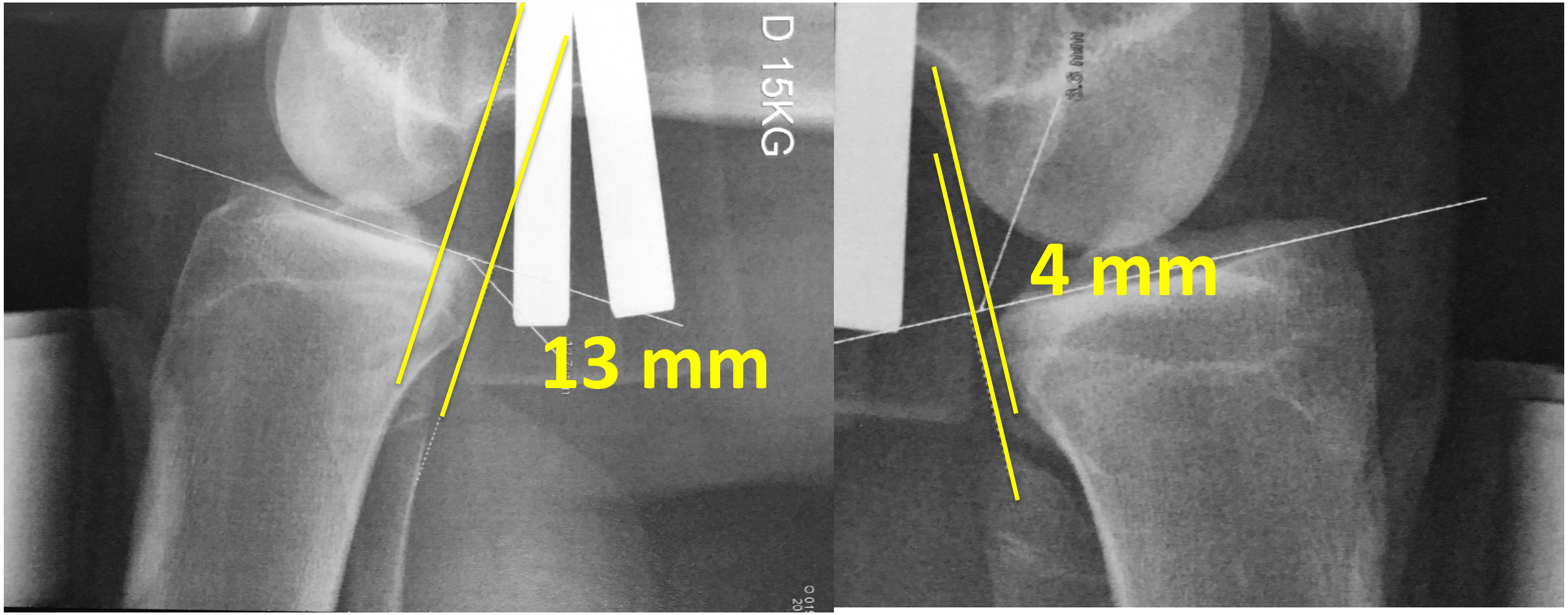
Lachman Soft End-point

Posterior drawer ? doubt

Diagnotic Arthroscopy

MRI

Posterior Telos



Ant. Telos : 9/-2/11
Post. Telos: 13/4/9

Take Home Message

History of trauma

Clinical (bilateral) Examination is essential

Choose the appropriate Combined Imaging

MRI + Stress imaging

↓

Accurate Diagnosis

Aknowlgement for my Fellow

Achilleas Boutsiadis, M.D.

Be Aware of Snow Conditions!

Thank You !