

## Partial versus Complete ACL Reconstruction

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Pro
Con

### Partial Tears

Not a new concept (36 papers since 1976)

- Buckley : AJSM 1989 ; The natural history of conservatively treated partial ACL tears
- Sandberg CORR 1987 : Natural course of 29 partial ruptures

### Partial vs Complete Reconstruction

- Biomechanics ? Does exist the concept of partial tear ?
- Diagnosis ? Are we sure it is a partial tear ?
- Rationale for partial reconstruction ?
- Technique – Results ?
  - Advantages
  - Risks - Disadvantages

### Epidemiology : pro

- SFA 2007 ; 418 knees ; partial tears 27%

Category	Percentage
No ACL	50%
Scar PCL	23%
AM intact	11%
PL intact	16%

- Ochi Arthroscopy 2006 : 10%
- Zantop CORR 2007 : 25%
- Sonny Cottet Arthroscopy 2009 : 21%

### Biomechanics : pro

- Selective cutting study
  - AM bundle = main stabilizer in 60° and 90° of knee flexion
  - PL bundle = main stabilizer close to extension

Zantop T Am J Sports Med 2007

### Biomechanics : pro

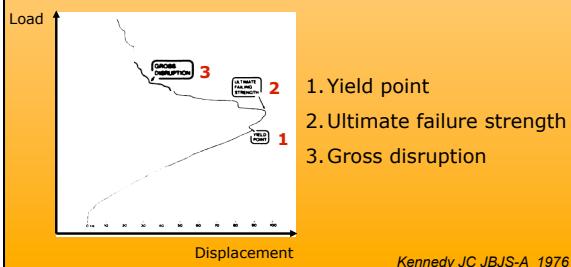
- Pivot shift loading
  - Selective cutting study
    - Between 0° and 30°
  - PL bundle = main stabilizer against anterior tibial translation AND internal rotation

Valgus: 10 Nm  
Internal rotation: 4 Nm

Zantop T Am J Sports Med 2007

## Biomechanics: con

Back in time ?



## Biomechanics: con

Back in time ?



Kennedy JC JBJS-A 1976

## Biomechanics: con

Back in time ?

The concept of failure of a ligament which remains visibly intact poses diagnostic and therapeutic problems.

The findings of this study demonstrate that ligaments may be stressed to ultimate failure in the absence of macroscopic disruption.

The clinical implications of this finding need further study.

Kennedy JC JBJS-A 1976

## Pre op Diagnosis : is difficult

Partial rupture

- Short time injury to surgery
  - Partial : 7.5m
  - Lost ACL : 24m (SFA2007)



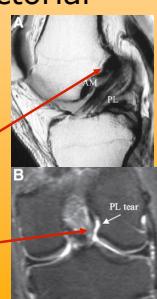
Umans AJR 95

- MRI ? Umans AJR 1995
  - Duc Act Rad 2005
  - Hypersignal
  - Wave aspect
  - Focal thin ACL

## Diagnosis : multifactorial

Partial rupture

- MRI ? Siebold & Fu Arthroscopy 2008
  - Diagnosis in 2 or 3 planes necessary
  - AM bundle in contact with Blumensaat line
  - Empty lateral wall (PL tear)



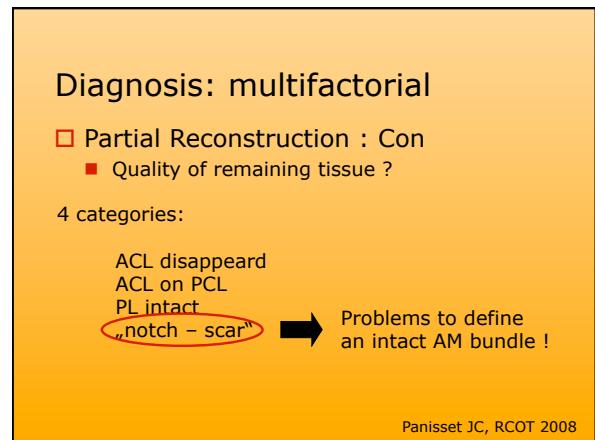
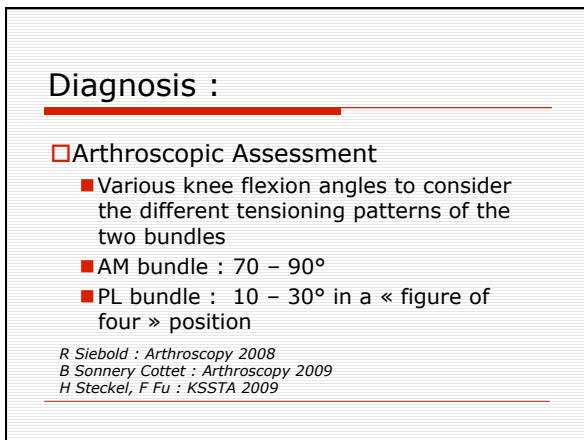
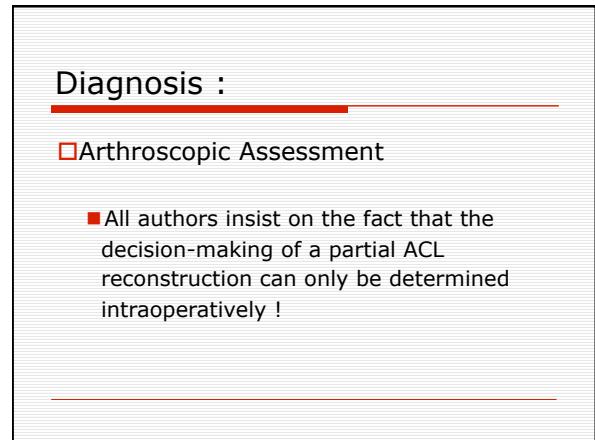
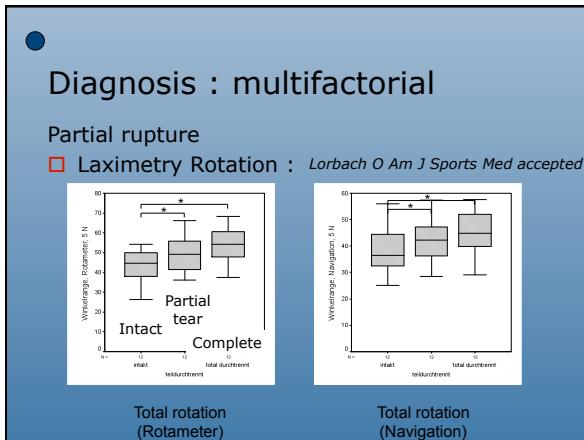
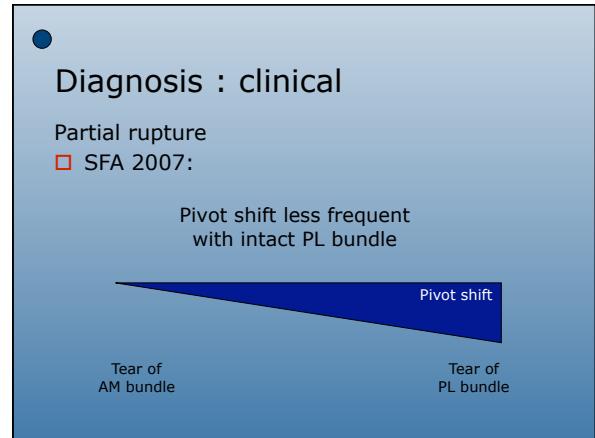
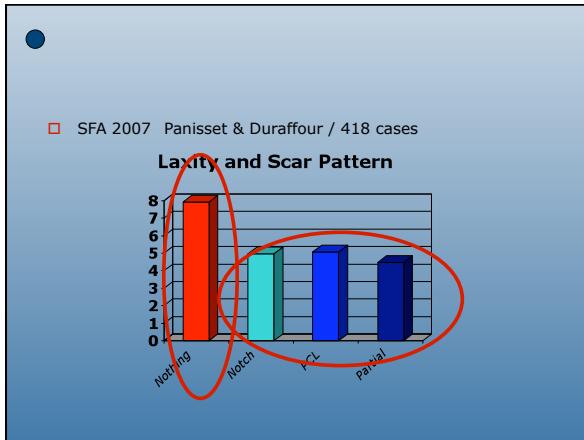
Siebold & Fu Arthroscopy 2008

## Diagnosis : multifactorial

Partial rupture

- Laximetry :
  - firm end point lachman
  - Mild side to side laxity : <3mm (Bach JBJS 90)
  - GNRB Robert OTSR 2009 :

	>3mm Complete tear	<1.5mm Partial tear
Sensitivity	70%	80%
Specificity	99%	87%



**Diagnosis: multifactorial**

- Partial Reconstruction : Panisset, RCOT 2008
  - Quality of remaining tissue ?

PL intact:  
Easier to evaluate

**Diagnosis: multifactorial**

- Partial Reconstruction : Con
  - Quality of remaining tissue ?

AM intact ???

Panisset JC, RCOT 2008

**Rationale for partial reconstruction**

- Vascularization
- Proprioception
- Laxity

- Crain Arthroscopy 2005 ; Variation in anterior cruciate ligament scar pattern...

« Resection of the ACL scar resulted in a measurable increase in passive anterior laxity in a subset of ACL-deficient knees... We recommend caution in resecting the torn ACL or scar tissue because removal of this tissue contributed to increased anterior laxity »

**Technique – Partial Reco : pro**

B Sonnery Cottet KSSTA 2009, Arthroscopy 2009  
R Siebold : Arthroscopy 2009

N Pujol

**Technique -**

- Partial Reconstruction : Tibia
  - Tibial square model

Condylus med.  
posterior  
PBr  
PL  
ALR  
AMR  
14 mm  
5 mm PL tunnel  
6 mm AM tunnel  
2 mm security zone  
Left knee  
1cm reference marker

Siebold R, Arthroscopy 2009

**Technique -**

- Partial Reconstruction : Tibia
  - Tibial square model: limitations

Condylus med.  
posterior  
PBr  
PL  
ALR  
AMR  
ABAM  
1cm reference marker  
Left knee

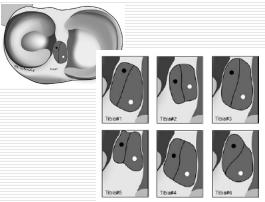
Small knees:  
confluent AM and  
PL tunnel

Risk to damage the  
remaining bundle in  
partial reconstructions !

Siebold R, Arthroscopy 2009

**Technique -**

- Partial Reconstruction : Tibia
  - Tibial square model: limitations



Interindividual variations  
Risk to damage the remaining bundle in partial reconstructions !

Colombet P, Arthroscopy 2006

**Results**

- Partial Reconstruction : Con
  - R Siebold : Arthroscopy 2008 *However, an isolated reconstruction of the AM or PL bundle is an advanced arthroscopic procedure*
  - Panisset J Lyon 2008
    - 51 pts
    - 24% flexion contracture
    - 4 arthrolysis

B Sonnery Cottet KSSTA 2009, Arthroscopy 2009  
R Siebold : Arthroscopy 2008

**Results : partial reconstruction**

	Number	FU	Post op laxity	Score	Complic
Ochi	45	2Y	0.5 mm	Lysholm 100	0
Sonnery Cottet	36	2Y	0.8mm	IKDC 74%A	4 arthrolysis
Panisset	51	2Y		IKDCA+B 94%	2 arthrolysis ,1graft rupture
Buda	47	5Y		95.7% exc and good	0

But no comparative studies !

**Conclusion : pro or con**

- Are we moving too fast ?
- 80 % of surgeons < 20 ACL reconstructions / year
- Most ACL revision procedures related to technical problems at primary surgery
- New (old) complications

10 slides  
Pro

?

10 slides  
Con