


## Evolution of the Management in Bicruciate Lesions

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## Introduction

### Bicruciate Lesions

- Uncommon :  
3 / y / University Hospital (France)
- Under estimated  
50% spontaneously reduced
- Vascular lesions+++

Symposium SOO 2000  
Washer, Clin Sport Med 2000

## Introduction

### Bicruciate Lesions

Literature : last 15 years, more than 100 articles


But : - mainly about technical considerations  
- low level of evidence

➔ No Consensus


Symposium SOO 2000  
Washer, Clin Sport Med 2000

## Previous management

Symposium ESSKA 1998



Symposium SOO 1998



## Previous management

### Symposium ESSKA 1998

**P. Lobenhoffer and P. Neyret**

10 centers in Europe



- G. Versier (Saint-Mandé)
- N. Friederich (Bâle)
- G. Tuneu (Barcelone)
- A. Marques et F. Fonseca (Coimbra)
- J. Espregueira Mendès (Porto)
- C.D. Harner (Pittsburgh)
- I. Berkes (Budapest)
- K.P. Benedetto (Innsbruck)




## Previous management

### Symposium ESSKA 1998 : Retrospective n= 273

- Etiology
 

Traffic accident	50 %
Sport injury	35 %
Falls	15 %
- Bicruciate with no dislocation 124
- Dislocations 134
- Undetermined 15
- Vascular injury 8 %





### Initial Conservative Treatment

**25%**

3/4 operated after 4 months (19%)

1/4 never operated (6%)


good subjectif result  
low IKDC result (laxity)

### Surgical Treatment

**75%**

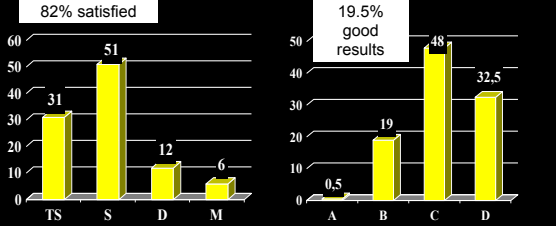
- Various delays
- 50 sorts of repair ou substitution
- reoperations very frequent (50%)




- Results
  - 215 / 273
  - mean follow up: 8 ys ½

82% satisfied

19.5% good results



Résultats subjectifs      Résultats objectifs (L)




### Symposium ESSKA 1998: Retrospective

n= 273

4 messages :



- Complete X-Ray evaluation ++ (translation, opening)
- PCL Reconstruction ++ → collateral stability
- Osteoarthritis at mid-term FU
- New classification according to mechanisms of lesions

and **Prospective studies** are mandatory.




### Previous management

Symposium ESSKA 1998      Symposium SOO 1998

### SOO Symposium 2002

Retrospective n=91  
Mean FU : 8 years (1-28 y)




## Immediate Complications

- Vascular injury : (30%)
  - n=20 : no puls after réduction
  - **5 lesions on arteriography with normal puls**
  - 4 amputations (1 immediate and 3 at 2 days)
- Nerve injury :
  - **40 % immediate**
  - 60 % associated with vascular inj. (p < 0.0001)



## Conservative Treatment

**61%**

- Immobilization with cast
- « surgical immobilization » +/- cast
  - Intra-articular pin
  - Olecranonization
  - External device



## Surgical Treatment

**39 %**

- Assessment = ligament testing under anesthesia (++++)
- Suture Marshall technique
- Fixation : Bone fixation  
Screws



## Surgical Treatment

**39 %**

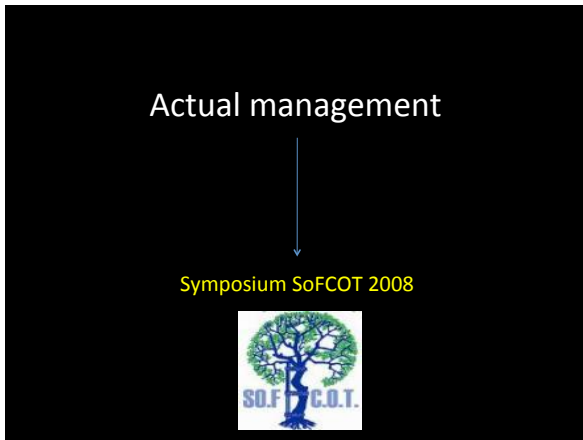
- Mean delay= 5 days (82 % < 15 days)
- Ligament surgery :
  - fixation - suture +++
  - ACL = PCL
  - MCL > LCL

## RESULTS

- 91 patients
  - 9 excluded (2 lost at FU, 1 TKA, 2 arthrodesis, 4 amputations)
- 90 % follow-up
  - Mean follow up : > 8 years [1 y – 28 ys]
- 17 recurrent surgery : (20.7%)
  - 9 isolated ligament reconstruction
  - 4 osteotomies
  - 4 osteotomies + ligament reconstruction

## RESULTS

- Clinical results:
  - Incomplete
  - Conservative treatment = surgical suture
  - ROM↘ and residual laxity
- Radiological results:
  - Osteoarthritis +++ (31% IKDC C ou D)
  - Conservative treatment = surgical suture



### SoFCOT Symposium 2008


Directors : Ph. Neyret and Ph Rosset

- O. Barbier
- S. Boisgard
- Ph. Boisrenoult
- P. Bonneville
- S. Descamps
- F. Dubrana
- B. Galaud
- Ph. Laffargue
- C. Lapra
- S. Lustig
- JL. Paillot
- D Saragaglia
- C Trojani
- G. Versier

### Materials & Methods

Symposium SoFCOT 2008 : Prospective (2007) n=67

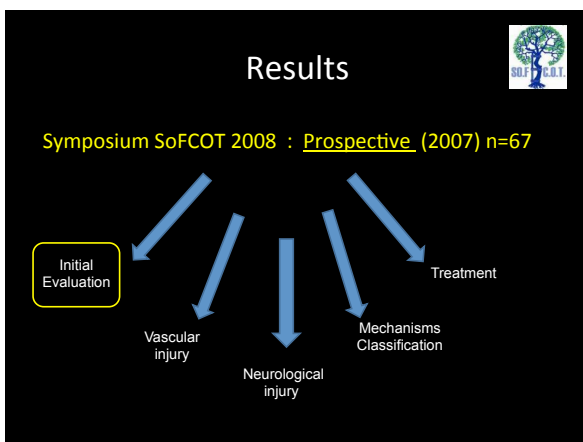
- Etiology : Traffic accident 36 %
- Sport injury 23 %
- Falls 15 %
- High Energy Trauma 68 %
- Dislocations 75 %
- Bicruciate lesions 25 %
- Vascular injury 12 %



### Materials & Methods



Symposium SoFCOT 2008 : Prospective (2007) n=67

ACL + medial	1
PCL ' ' isolated ' '	4
ACL + PCL	3
ACL + PCL + medial	17
ACL + PCL + lateral	15
ACL + PCL + medial + lateral	13




Initial Evaluation    Vascular injury    Nerve injury    Mechanisms Classification    Treatment

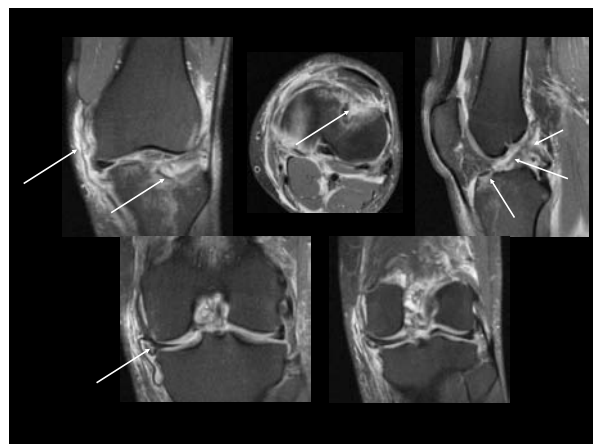
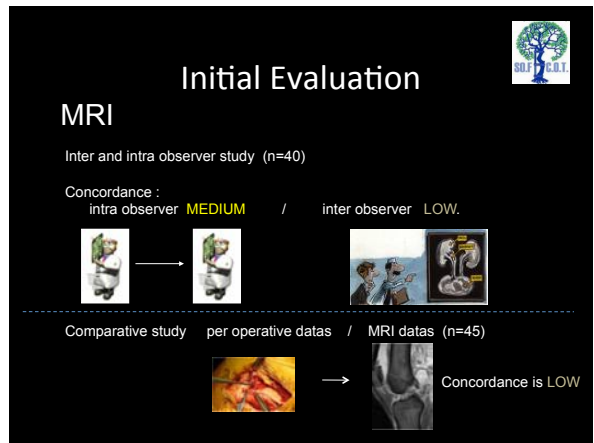
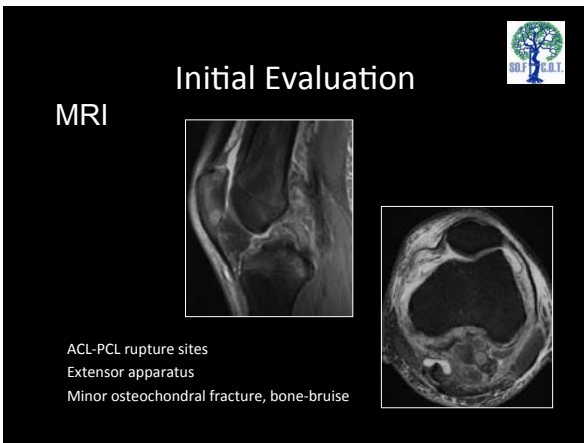
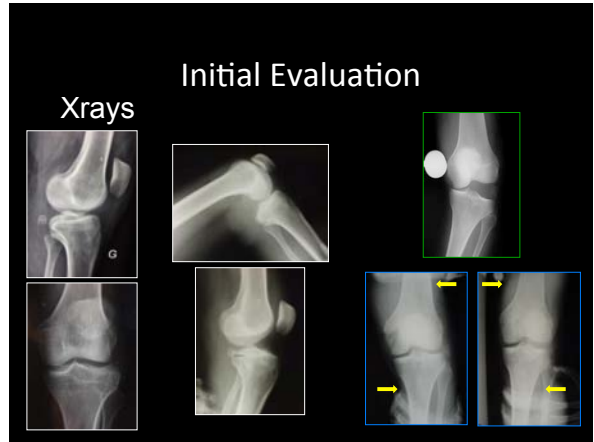
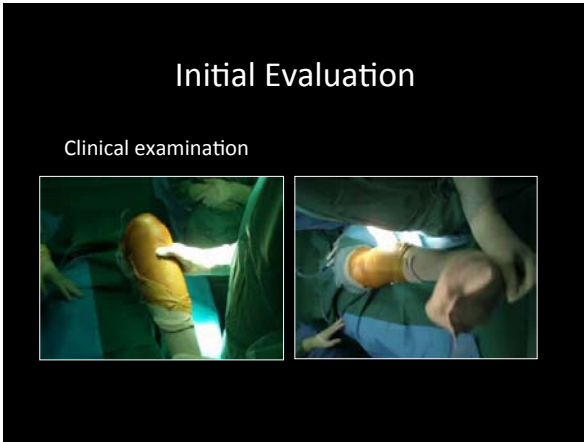
### Initial Evaluation

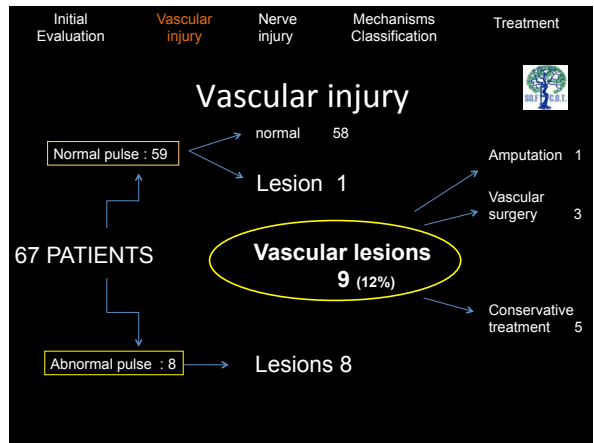
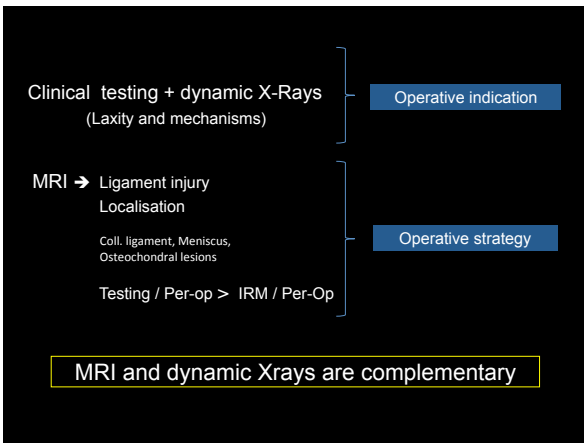
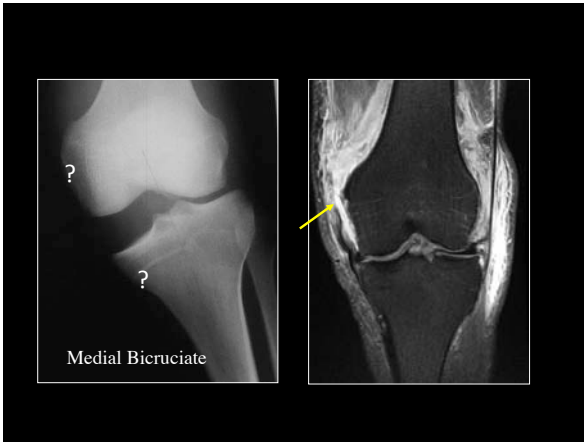



Knee dislocations



Pentades





**Vascular injury**

Ischemia      Abnormal pulse without Ischemia      Normal pulse

- Arteriography in Operative Room
- Immediate vascular surgery

**Vascular injury**


Ischemia      Abnormal pulse without Ischemia      Normal pulse

Angio TDM ≥ Arteriography

Vascular + Orthopaedic surgeons management


### Vascular injury

Ischemia



Arteriogram

Abnormal pulse without Ischemia




Angio TDM

always

Normal pulse

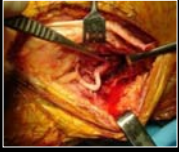
Initial Evaluation	Vascular injury	Nerve injury	Mechanisms Classification	Treatment
<h2>Nerve injury</h2>				
Peroneal Nerve → n=12 (17%) : 5 partial , 7 complete				
Ligament lesion:				
- ACL PCL + Lateral	8	++		
- ACL PCL + Medial	3			
- ACL PCL + Lateral + Medial	1			



### Nerve injury

- **Partial** : Clinical follow-up and EMG
- **Complete** : Clinical follow-up and EMG  
Nerve grafting is discussed after 3 months

If ligamentous lesions lead to approach lateral structures, the extremities of the nerve must be identified and fixed.



### Mechanisms

I  
N  
J  
U  
R  
Y

Low energy, Forced, prolonged

High energy moto,...

→ Triad

→ Pentade

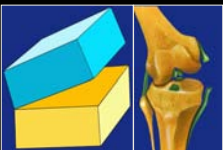
→ Dislocation

- opening

- stripping


**Simple** (pentade)

Medial



**Combinated** (dislocation)

Medial (lateral dislocation)




- opening

- stripping


**Simple** (pentade)

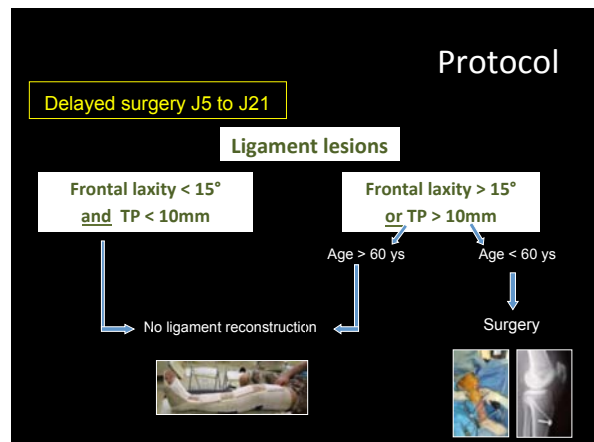
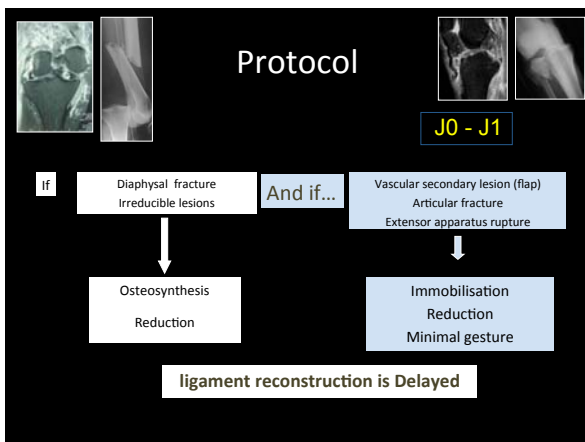
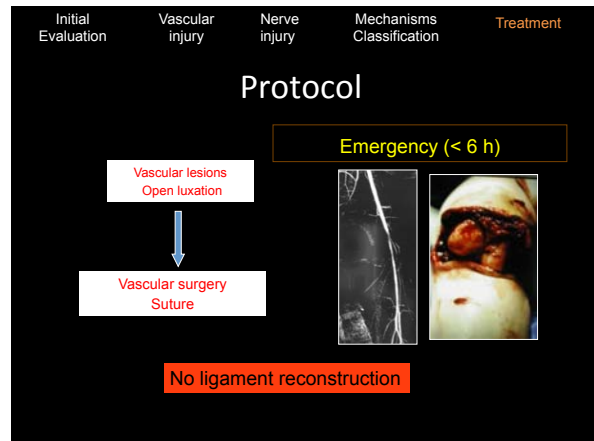
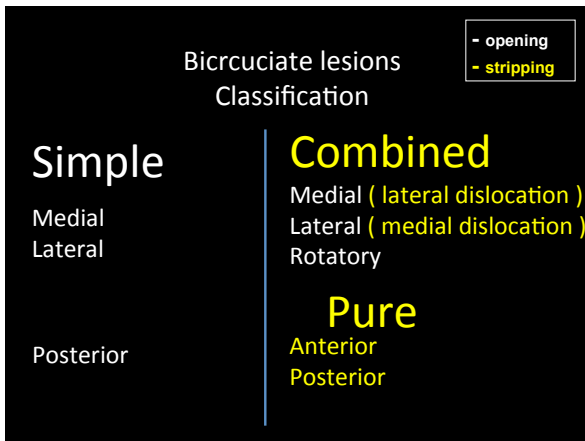
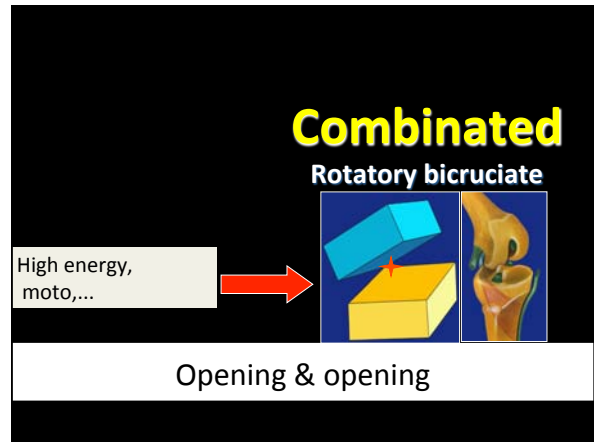
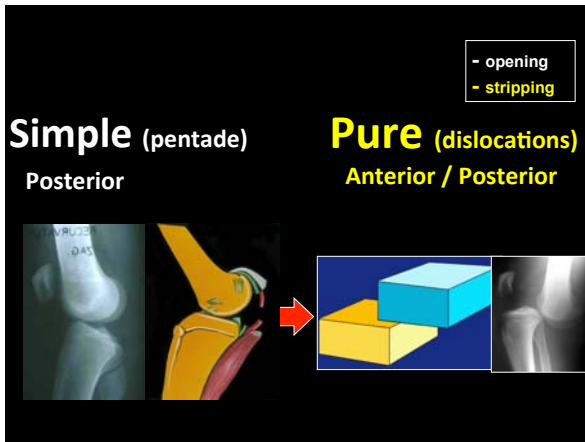
Lateral



**Combinated** (dislocation)

Lateral (medial dislocation)







### Protocol

**Surgical Technique**

Arthroscopy or Arthrotomy

- No ACL reconstruction
- PCL
- Lateral structures
- Medial structures

} Reconstruction



### Preliminary results at 6 months

**Ligament reconstruction (n=41)**

- Mobility : \* Mean flexion : 85° (40-130)  
\* Arthroscopic arthrolisis : 10 / 41 ( 24.5 % )
- Residual Laxity : ( IKDC: normal or almost normal)

PCL	10 %	} Good results
Medial structures	20 %	
Lateral structures	50 %	} Medium results

### Preliminary results at 6 months

**No ligament reconstruction (n=12)**

- Mobility : \* Mean flexion : 95° (40-120)  
\* Lack of extension : 2 (-5°)
- Residual Laxity ( IKDC: normal or almost normal)

• Anterior	: 50%	} Correct But very selected population
• Posterior	: 20 %	
• Lateral	: 10 %	
• Medial	: 20 %	

### Conclusions

Prospective study ++

Good control of posterior and medial laxity

Incomplete control for lateral laxity

Need for another study with PCL and ACL reconstruction (Stiffness ?...)

### Vascular lesions associated with bicruciate knee ligamentous injury

P.BOISRENOULT,S.LUSTIG, P.BONNEVIALE, E.LERAY, G.VERSIER, Ph.NEYRET, P ;ROSSET, D.SARAGAGLIA et la société française de chirurgie orthopédique et traumatologique ( )

Lésions bicruiciées du genou et lésions vasculaires : stratégie de prise en charge et place de l'angioscanner

•

• Revue de Chirurgie Orthopédique et Traumatologique Vol 95 N °8 (2009) 751-757

•

## Bicruciate ligament lesions and dislocation of the knee : Mechanisms and classification

S.BOISGARD, G. VERSIER, S.DESCAMPS, S.LUSTIG, C.TROJANI, P.ROSSET, D.SARAGAGLIA, Ph.NEYRET et l'association française de chirurgie orthopédique et traumatologique ( )

Mécanismes et classification des luxations et des lésions ligamentaires bicruciales du genou

Revue de Chirurgie Orthopédique et Traumatologique Vol 95 N°8 (2009) 758-763

## Common peroneal nerve palsy complicating knee dislocation and bicruciate ligaments tears.

P.BONNEVIALLE, F.DUBRANA, B.GALAU, S.LUSTIG, O.BARBIER, Ph.NEYRET. P.ROSSET. D.SARAGAGLIA, la SFA

Lésions traumatiques du nerf fibulaire commun dans les lésions bicruciales ou luxations du genou

Revue de Chirurgie Orthopédique et Traumatologique Vol 96 N°1 (2009) 64-70

## Dislocation and bicruciate lesions of the knee : Epidemiology and acute stage assessment in a prospective series

S.LUSTIG, E.LERAY, P.BOISRENOULT, C.TROJANI, P.LAFFARGUE, D.SARAGAGLIA, P.ROSSET, Ph.NEYRET et la société française de chirurgie orthopédique et traumatologique ( )

Luxations et lésions bicruciales du genou : épidémiologie et bilan des lésions d'une série prospective

Revue de Chirurgie Orthopédique et Traumatologique Vol 95 N°8 (2009) 743-750

Revue de chirurgie orthopédique et traumatologique (2009) xxx, xxx-xxx

Disponible en ligne sur ScienceDirect Elsevier Masson France EMconsulte www.sciencedirect.com www.em-consulte.com

MÉMOIRE ORIGINAL

Luxations et lésions bicruciales du genou : épidémiologie et bilan des lésions d'une série prospective\*

Dislocation and bicruciate lesions of the knee: Epidemiology and acute stage assessment in a prospective series

S. Lustig<sup>a</sup>, E. Leray<sup>b</sup>, C. Trojani<sup>c</sup>, P. Laffargue<sup>d</sup>, D. Saragaglia<sup>e</sup>, P. Rosset<sup>f</sup>, P. Neyret<sup>g,\*</sup>, Société française de chirurgie orthopédique et traumatologique 56, rue Boissonnade, 75014 Paris, France

<sup>a</sup> Centre Albert Trillat, groupement hospitalier Nord, 69034 Lyon, France  
<sup>b</sup> Hôpital Ponchaillou, 2, rue Henri-Le-Guillevic, 35033 Rennes, France  
<sup>c</sup> Hôpital de L'Arche-III, 151 route de Saint-Antoine-de-Gillesmer, 06002 Nice, France  
<sup>d</sup> CHU Lille, 2, avenue Oscar-Lombard, 59000 Lille, France

## Entorses récentes du genou chez l'adulte

Acute ligament injuries in the adult knee

P. NEYRET\*



P. Neyret

revue de chirurgie orthopédique et traumatologique

Revue de chirurgie orthopédique et traumatologique

Vol 95 - n° 8 - Décembre 2009



15<sup>th</sup> ESSKA Congress  
MAY 2-5, 2012  
GENEVA/SWITZERLAND

**ESSKA**

[www.esska-congress.org](http://www.esska-congress.org)

**Early registration deadline:**  
**February 10, 2012**

**Congress President** ESSKA President  
**Scientific Chairs**  
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**Venue**

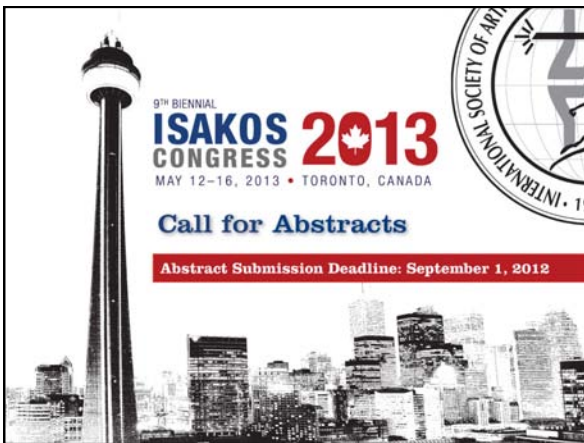
The poster features a vertical strip on the left with four small images: 'SPORTS REHABILITATION', 'WORK-SHOPS', 'CHILDREN'S BASED AND FOCUSED', and 'LATEST MEDICAL RESEARCH AND SCIENTIFIC'. The background is a light blue and white pattern.



9<sup>th</sup> BIENNIAL  
**ISAKOS CONGRESS 2013**  
MAY 12-16, 2013 • TORONTO, CANADA

**INTERNATIONAL SOCIETY OF ARTHROSCOPY**

The poster features a collage of images including the CN Tower, a bridge, a modern building, and a tennis court. Three red maple leaves are overlaid on the bottom half. The background is a light grey and white pattern.



9<sup>th</sup> BIENNIAL  
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**Call for Abstracts**

**Abstract Submission Deadline: September 1, 2012**

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The poster features a black and white image of the CN Tower and a city skyline. The background is a light grey and white pattern.