

Mobile is better?

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4th Advanced Course on
Knee Surgery

January 22nd – 27th 2012



Magic Mobile bearing Potion I fall down when I was a kid





Seb, For the nice cars, you need a
good flexion!



JN Argenson in the JM Aubaniac car!



I can be objective!

Clin Orthop Relat Res (2012) 470:61–68

DOI 10.1007/s11999-011-1961-4

SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE KNEE SOCIETY

No Long-term Difference Between Fixed and Mobile Medial Unicompartmental Arthroplasty

**Sebastien Parratte MD, Vanessa Pauly MS,
Jean-Manuel Aubaniac MD, Jean-Noel A. Argenson MD**

Background



➡ *Mobile-bearing concept*

Buechel, 1986



Goodfellow, 1988



CEMENTED ROTATING-PLATFORM TOTAL KNEE REPLACEMENT

A CONCISE FOLLOW-UP, AT A MINIMUM
OF FIFTEEN YEARS, OF A PREVIOUS REPORT*

BY JOHN J. CALLAGHAN, MD, MICHAEL R. O'ROURKE, MD, MICHAEL F. IOSSI, BS, STEVE S. LIU, MD,
DEVON D. GOETZ, MD, DAVID A. VITTETOË, MD, PATRICK M. SULLIVAN, MD, AND RICHARD C. JOHNSTON, MD

2005 BY THE JOURNAL OF BONE AND JOINT SURGERY,

Tibial Rotation



High flexion requires internal and external rotation of the tibia

CHU Sud Marseille

Mobile bearing knees

Background

Mobile-Bearing Knee Replacement: Clinical Results

A Review of the Literature

John J. Callaghan, MD

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 392, pp. 221–225
© 2001 Lippincott Williams & Wilkins, Inc.

“surgeons must remember that although the best-fixed bearing knee replacement designs performed well, there were numerous designs that did not perform well. This also is likely to be the case with mobile-bearing designs”

Mobile-Bearing Total Knee Arthroplasty

Do the Polyethylene Bearings Rotate?

Douglas A. Dennis, MD†‡; Richard D. Komistek, PhD*†‡; Mohamed R. Mahfouz, PhD*†‡;
Joel T. Outten, BS*; and Adrija Sharma, MS**

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 440, pp. 88–95
© 2005 Lippincott Williams & Wilkins

Implant Type	Femur/PE (degrees)	PE/Tibla (degrees)	Femur/Tibla (degrees)
Sigma at 3 months	2.2	3.1	5.3
Sigma at 15 months	0.1	2.1	2.2
LCS RP	2.3	5.8	9.0
LCS RP Deep Dish	-0.2	5.5	3.8
LCS APG	0.9	5.1	5.9



**Limited rotation of the
Polyethylene**

Background

2000: New specific mobile-bearing TKA design

Characteristics

1. High-flexion
2. Postero-stabilized
3. Mobile bearing

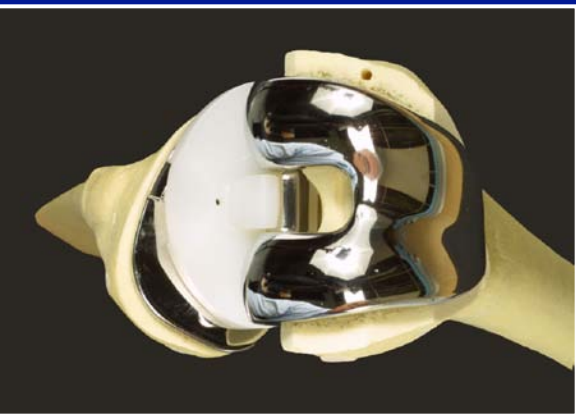


Goals

1. Restore normal knee kinematics
2. Increase ROM
3. Restore patient function
4. Minimize wear and improve survivorship



*Comprehensive
Step by step
Validation Approach*

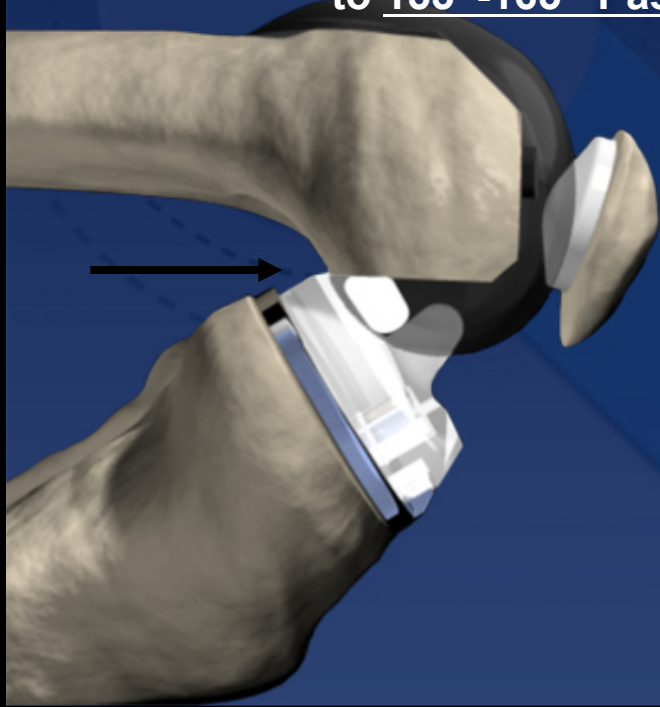


LPS Flex Mobile Design

LPS-Flex

Congruous contact

to 155°-165° Passive



LPS Flex Mobile Design

PRESSURE DISTRIBUTION

10° FLEXION

(3210 N)

LPS

D femur

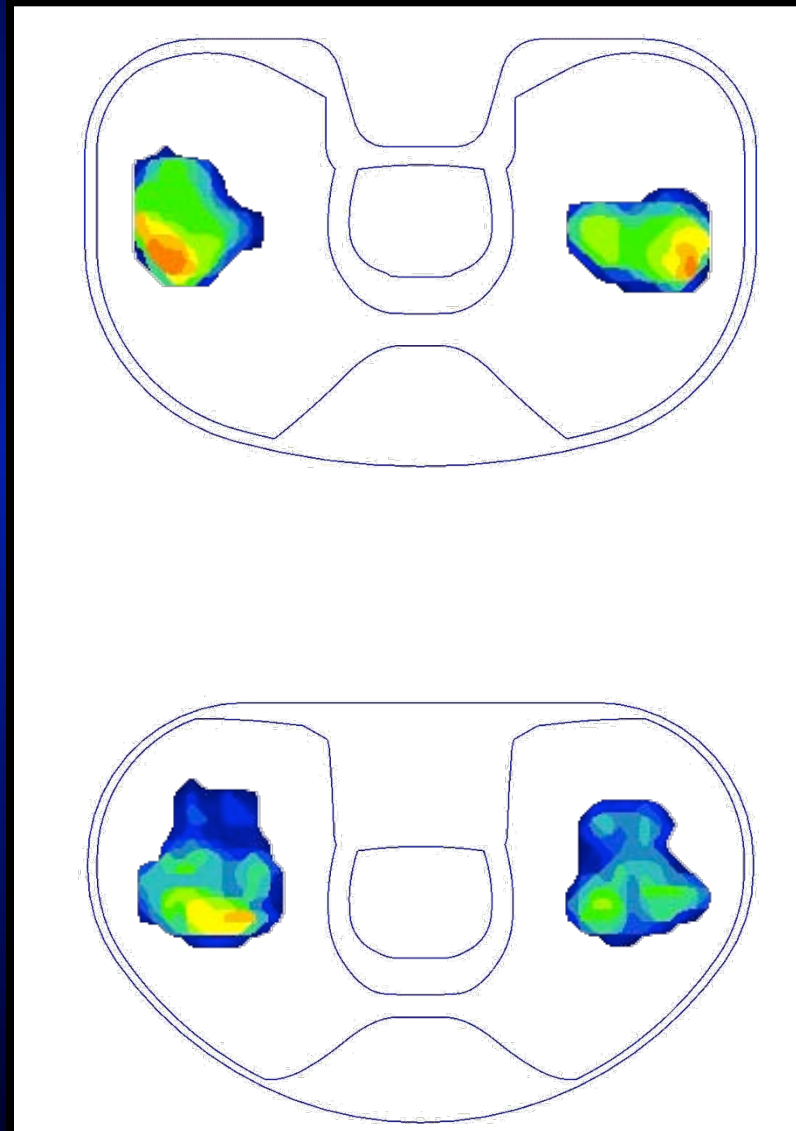
yellow tibia

LPS-Flex Mobile

D femur

D tibial

TM1209.00



LPS Flex Mobile Design

PRESSURE DISTRIBUTION

120° FLEXION

(3210 N)

LPS

D femur

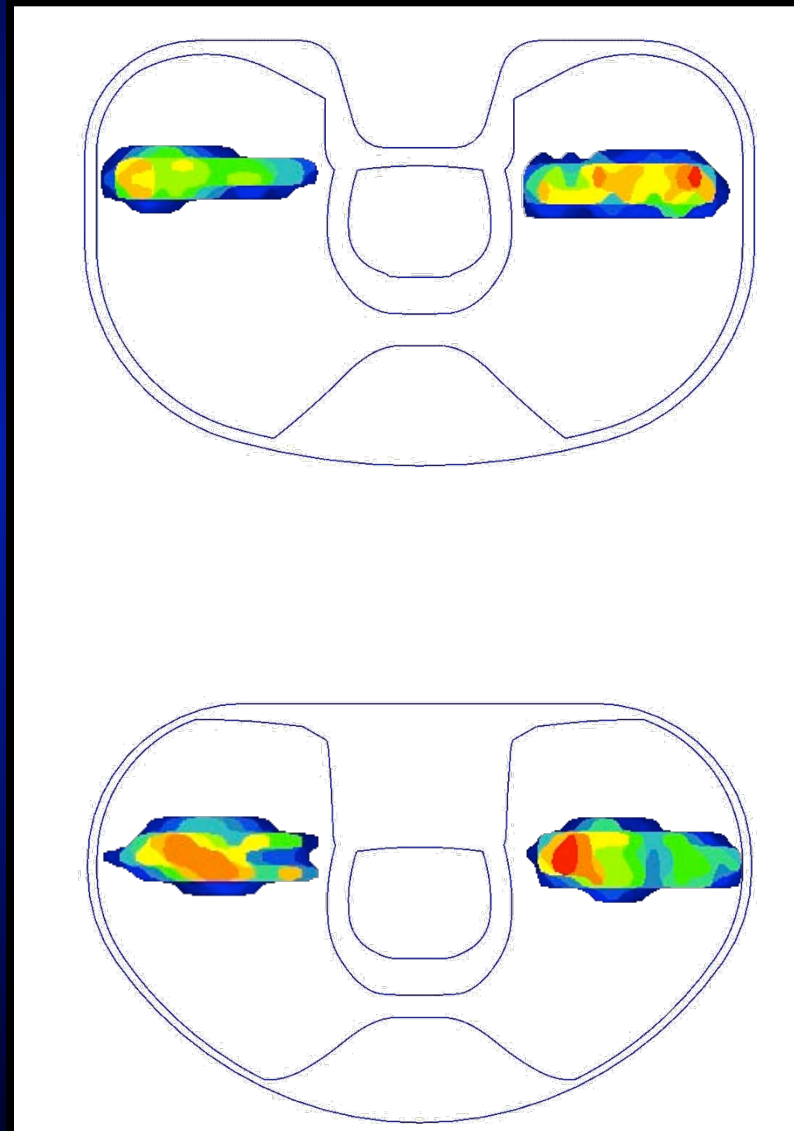
yellow tibia

LPS-Flex Mobile

D femur

D tibia

TM1209.00



LPS Flex Mobile Design

PRESSURE DISTRIBUTION

155° FLEXION

(3210 N)h

LPS

D femur

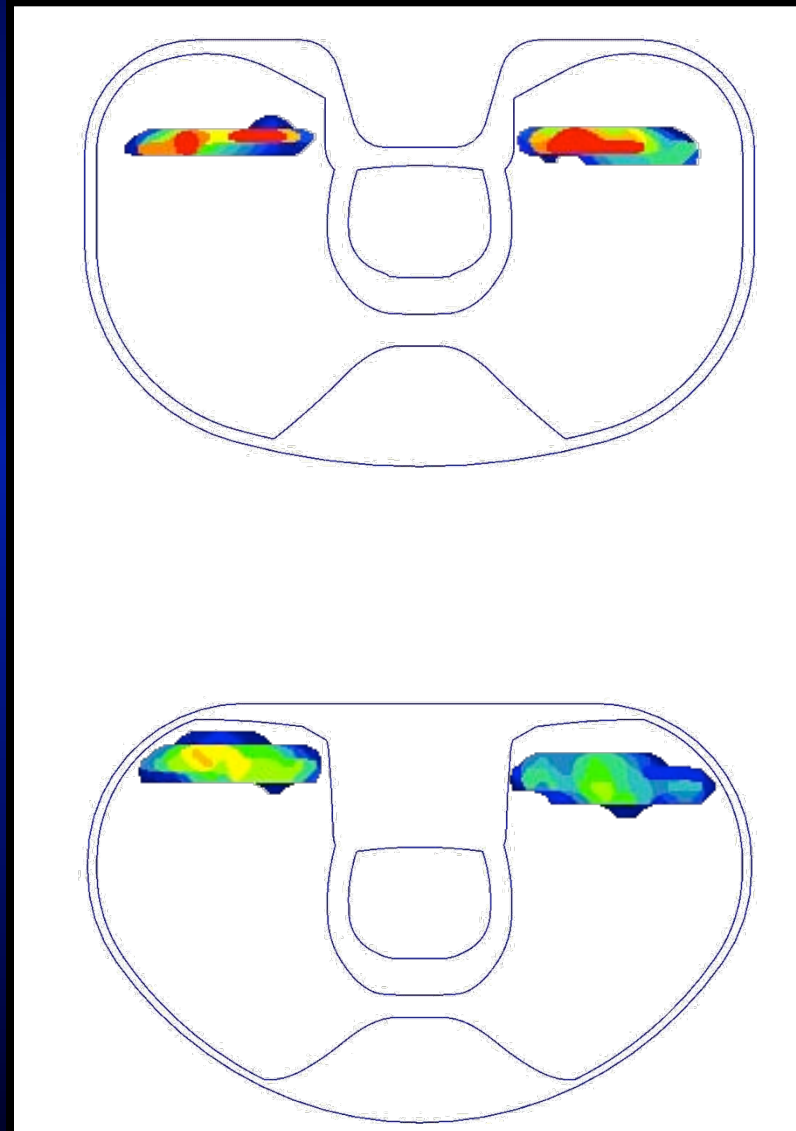
yellow tibia

LPS-Flex Mobile

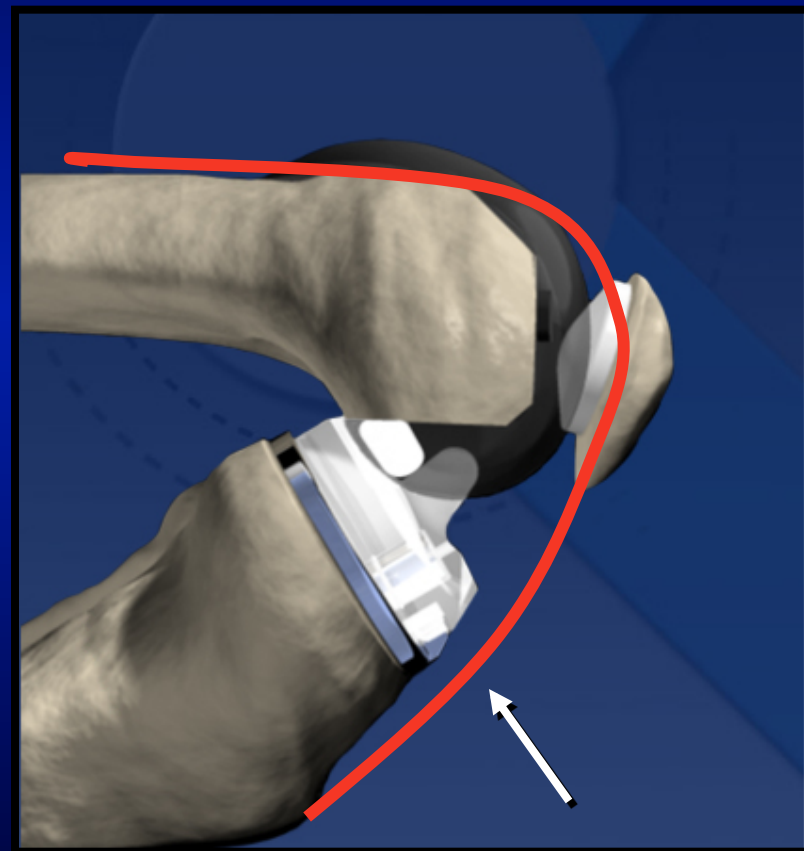
D femur

D tibia

TM1209.00



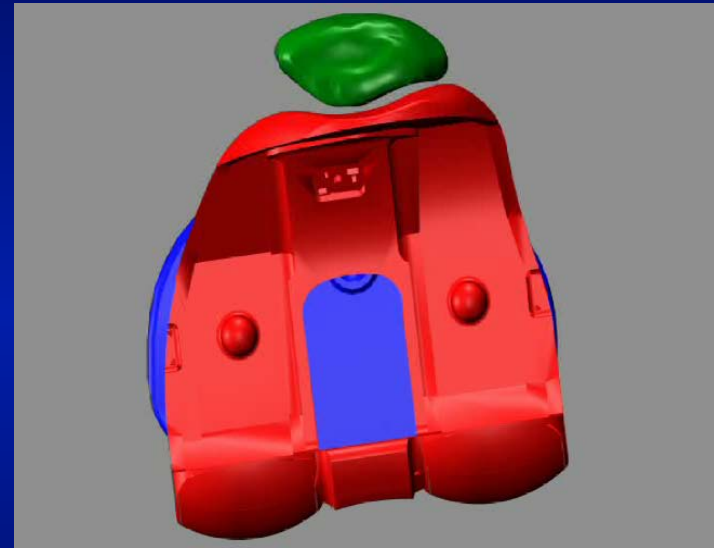
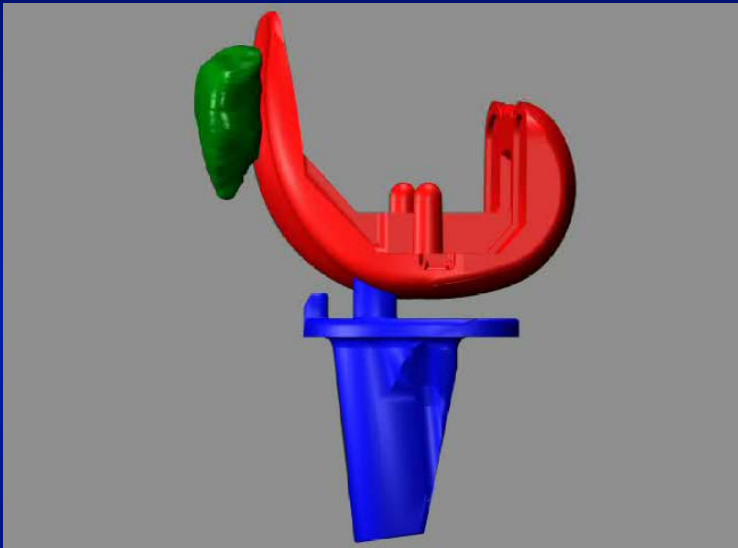
Anterior Tibial Recess: Reduces Patellar Impingement



Reduced Impingement

Kinematics

- 3D Fluoroscopic studies



CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 428, pp. 174–179
© 2004 Lippincott Williams & Wilkins

A High Flexion Total Knee Arthroplasty Design Replicates Healthy Knee Motion

*Jean-Noël A. Argenson, MD**; *Richard D. Komistek, PhD^{†‡}*; *Mohamed Mahfouz, PhD^{†‡}*;
Scott A. Walker, MS[†]; *Jean-Manuel Aubaniac, MD**; and *Douglas A. Dennis, MD^{†‡}*

Background

Goals

1. Restore normal knee kinematics
2. Increase ROM
3. Restore patient function
4. Minimize wear and improve survivorship

YES

?



Goals of the study

⇒ *High-flexion mobile-bearing postero-stabilized TKA*

1. Objective functional outcomes as measured by the Knee Society Score and range of knee flexion?

2. Subjective outcomes and the knee related

Clin Orthop Relat Res (2008) 466:2669–2676

DOI 10.1007/s11999-008-0418-x

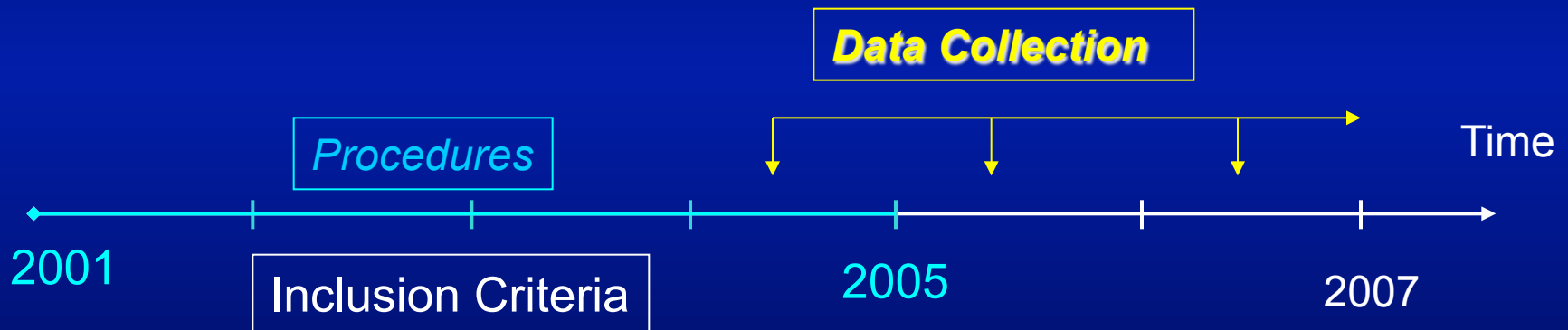
SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE KNEE SOCIETY

Patient-reported Outcome Correlates With Knee Function After a Single-design Mobile-bearing TKA

Jean-Noel Argenson MD, Sebastien Parratte MD,
Abdullah Ashour MD, Richard D. Komistek PhD,
Giles R. Scuderi MD

Material and Methods

- Study design: prospective study



Primary TKA

Osteoarthritis/RA/ONA

Zimmer® LPS Flex mobile-bearing

1center

Material and Methods



1. Objective evaluation

- **Knee Society Score**

- Physical exam and clinical evaluation
- Independent observer (Sandra Coudreuse)
- Knee score and Function Score

Rationale of the Knee Society Clinical Rating System: Insall et al, CORR, 1989

- **Range of knee flexion**

- Same independent observer
- Two-arms goniometer



Range-of-motion measurements: Lea & Gerhard, Jbjs Am, 1995

Material and Methods



Ability and return to previous level of activity

1. **UCLA Score** *the value of patient activity level in the outcome of THA Beaulé et al, JOA, 2006*

- Self-administrated questionnaire (1 mn)
- 10 points scale (0: completely inactive/ 10: High impact sport)

2. **Patient perception of Sport and Activities :**

- Delay?
- Type of activity?
- Return to previous level?
- Patient perception of limitation related to the knee during sport practice?

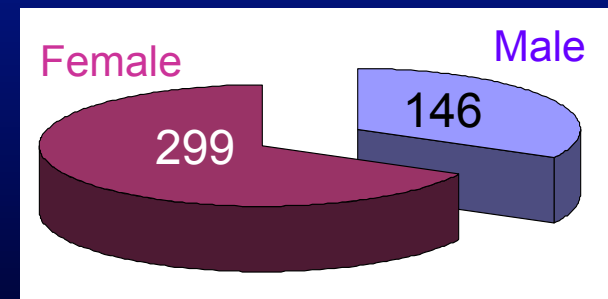
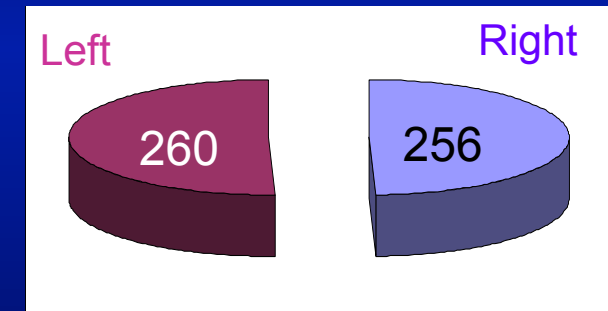
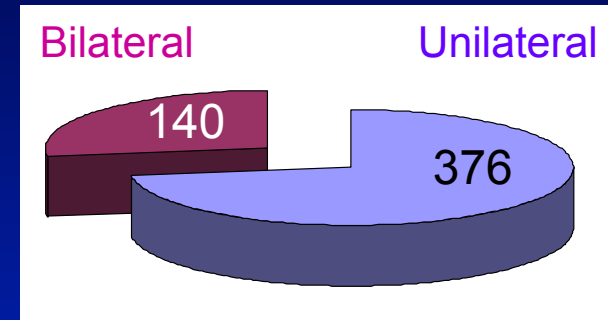
Material & Methods

The series: 516 knees in 445 patients

- Mean Age= 71.6 ± 8 years old
- Mean BMI= 28.3 ± 4.6 Kg/m²

Etiologies :	N knees	%
OA	474	92
Others*	42	6

* = post-traumatic OA, ONA, systemic disease



Material and Methods



2. Subjective evaluation

- **Knee Osteoarthritis Outcomes Score**
 - self-administrated questionnaire (8 to 10 mn)
 - Free access: www.koos.nu
 - “Improved WOMAC”
 - *Validated and correlated with SF-36 QOL questionnaire*

Health and Quality of Life Outcomes



Research

Open Access

Knee injury and Osteoarthritis Outcome Score (KOOS) – validation and comparison to the WOMAC in total knee replacement

Ewa M Roos*^{1,2} and Sören Toksvig-Larsen¹

Results

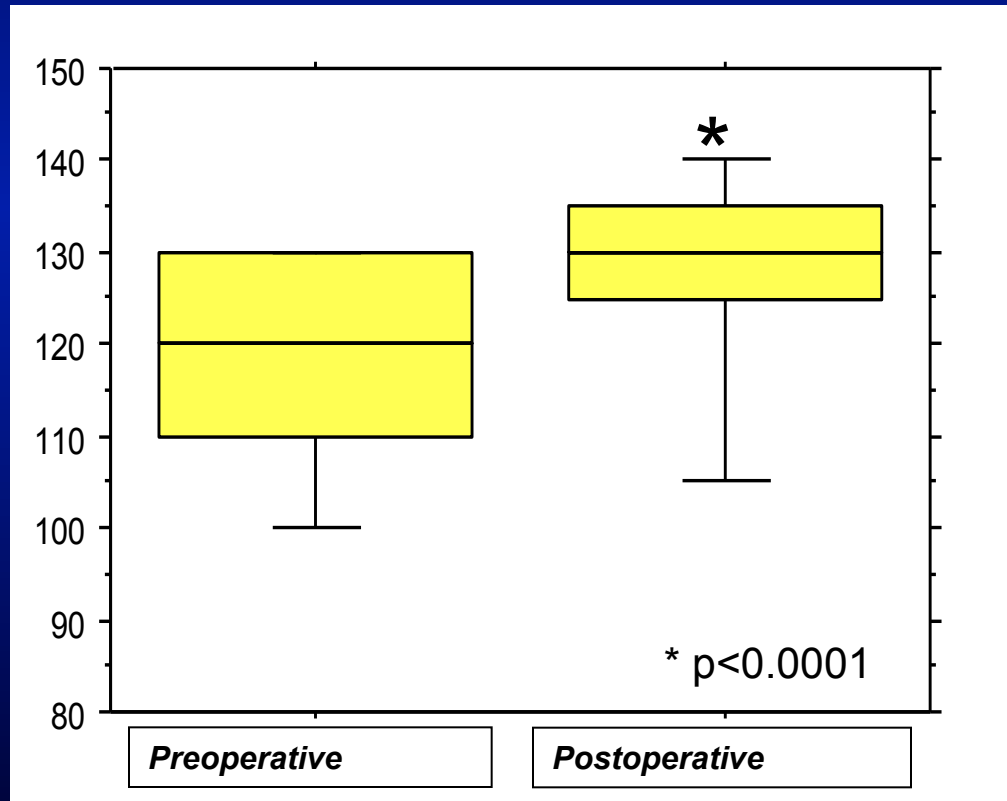
1. Objective results

Range of knee flexion

Preoperative

Mean=117°±13°

80 to 140°



Postoperative

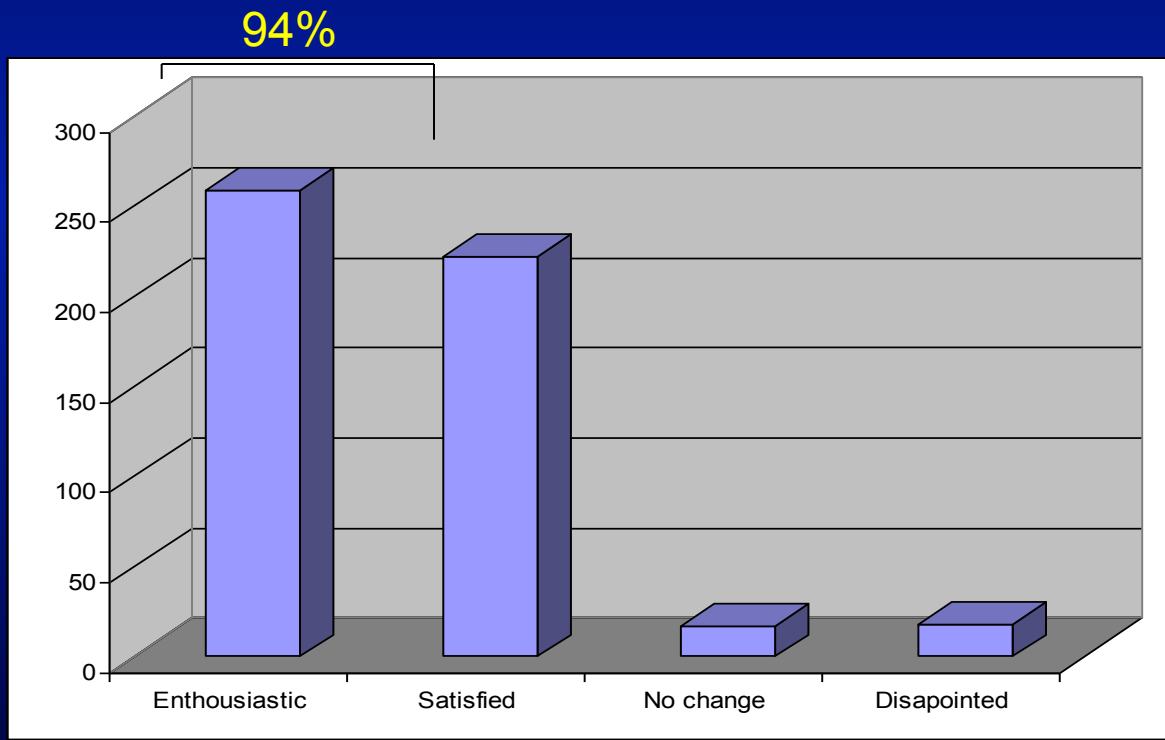
Mean=128±4°

85 to 155°

Results

2. Subjective results: patient perception

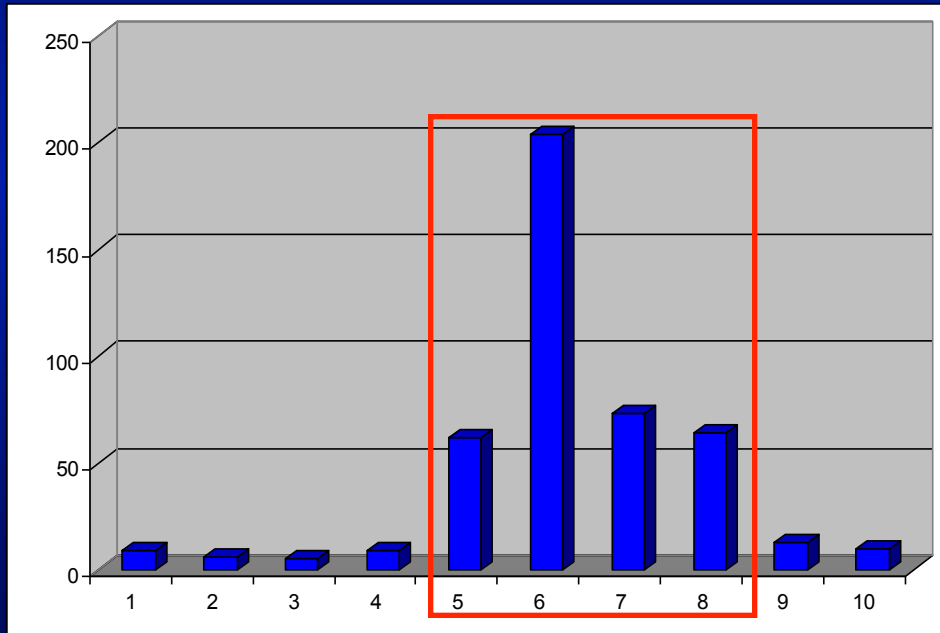
General overall satisfaction



Results

3. Sports and activity results

UCLA SCORE



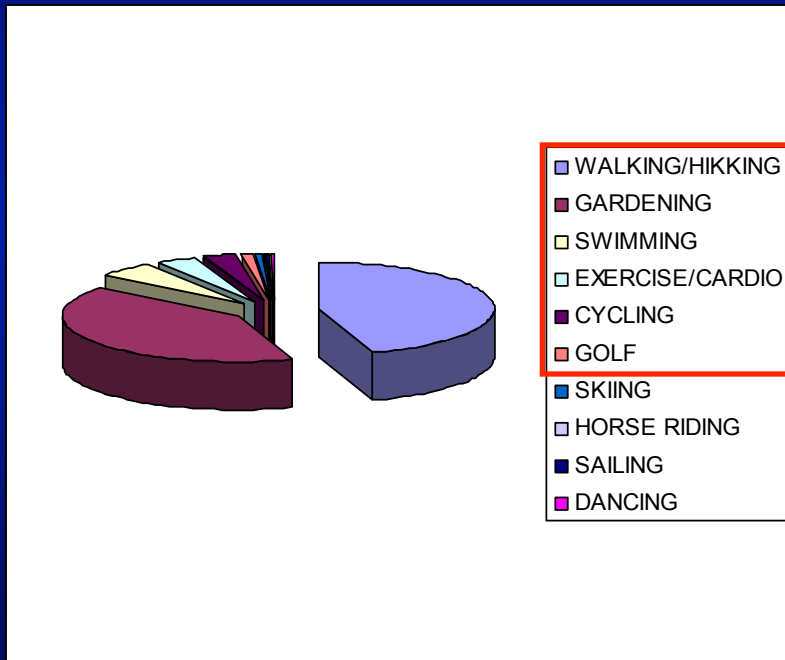
- Mean UCLA : 6.9 ± 1.6
- 82% involved in sportive activities
(373 out of 455)
- Delay before return : 6 ± 4 months

Results

3. Sports and activity results

Type of activity

Patient perception



1. Ability to performed the activity/previous level

1. Better: 72%
2. Same: 13%
3. Lower: 14%

2. Percept knee related limita activities

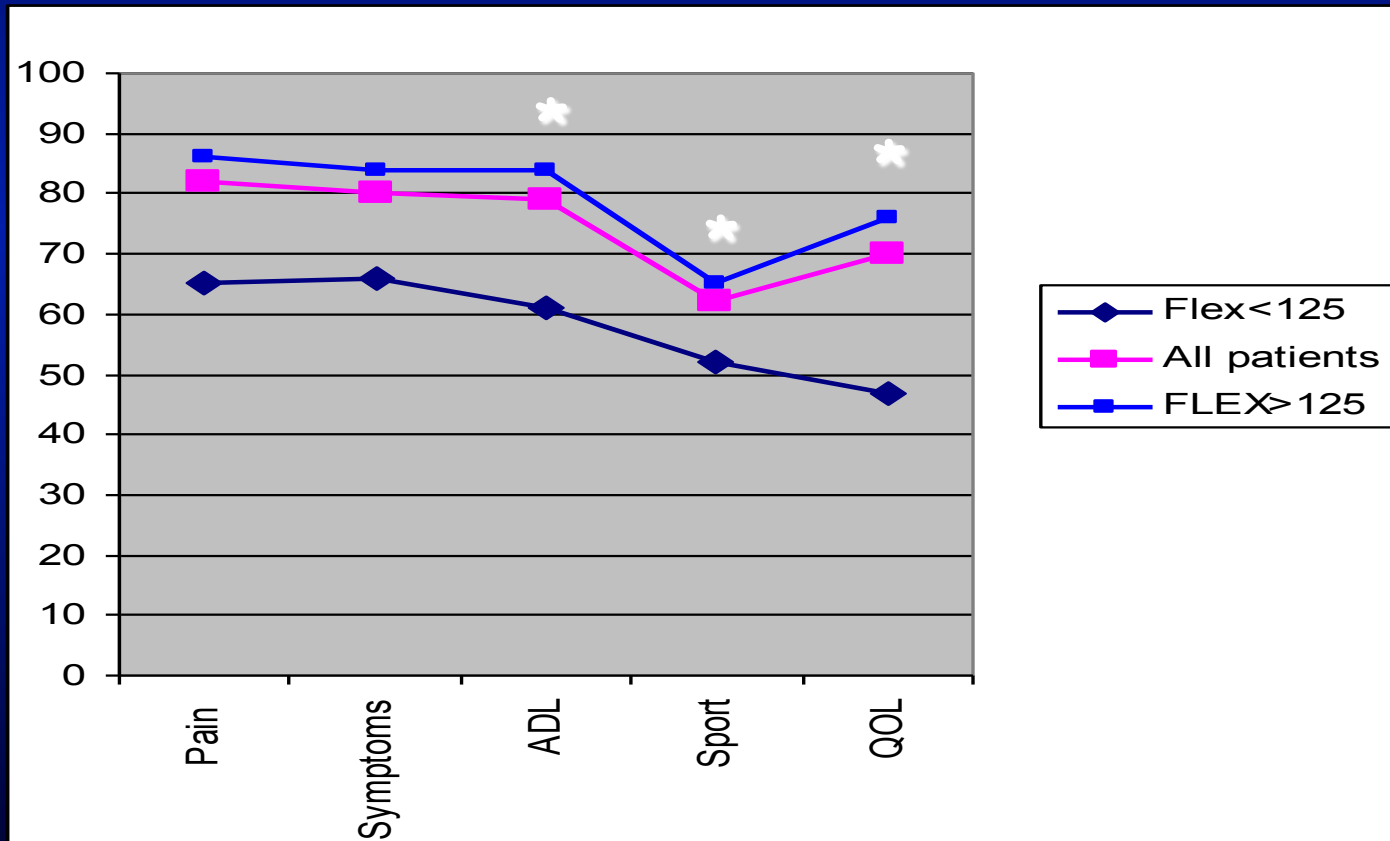
1. None: 35%
2. Slight: 50%
3. Major: 14%



Results

4. Correlations between objective and subjective scores

Postoperative flexion and KOOS

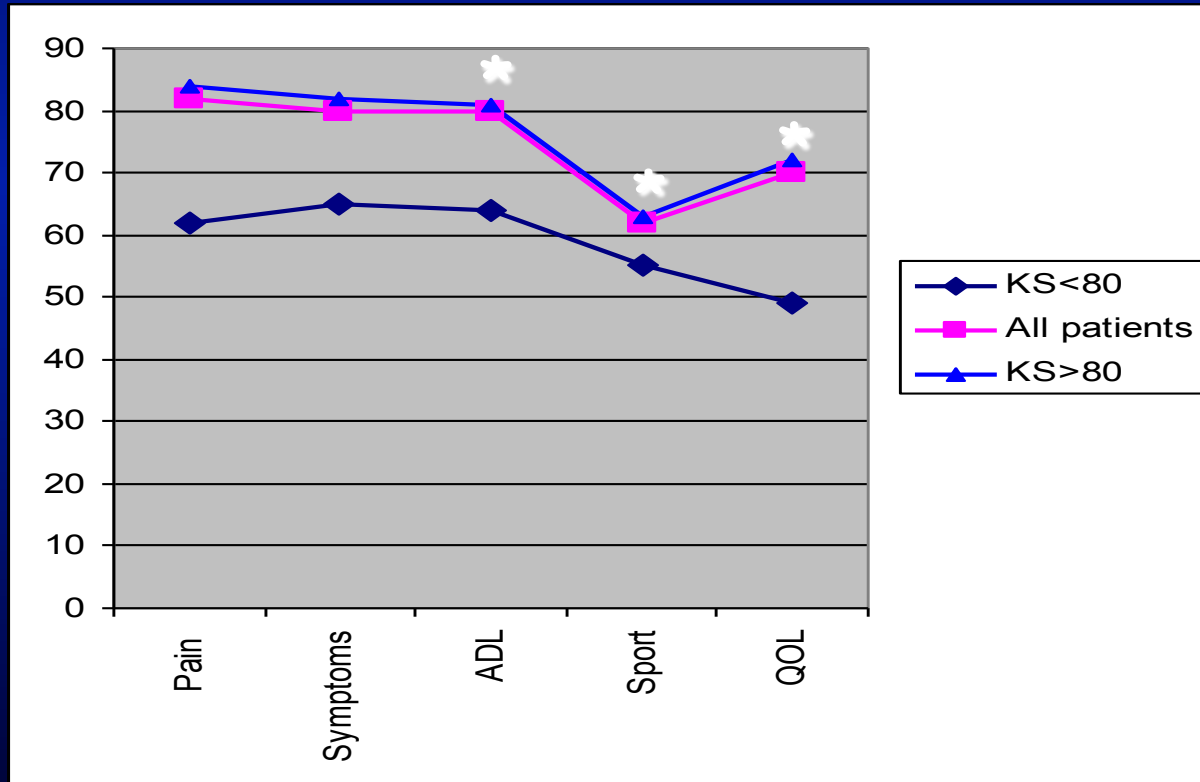


0.001

Results

4. Correlations between objective and subjective scores

Postoperative Knee Score and KOOS



$p < 0.001$

Discussion

⇒ *High-flexion mobile-bearing postero-stabilized TKA*

1. **Satisfying objective functional outcomes**
2. **Satisfying Subjective outcomes and knee related quality of life?**
3. **Return to previous activity level**
4. **Correlation between objective and patient-reported outcomes :**
 - **High flexion and Knee score and function during ADL**
 - **High flexion and Knee score and function during sport**
 - **High flexion and Knee score and QOL**

Discussion

1. Kinematics

2. Improve ROM

3. Fonction restauration



The Outcome of Rotating-Platform Total Knee Arthroplasty with Cement at a Minimum of Ten Years of Follow-up

Survivorship ?

The Journal of Bone and Joint Surgery

Author(s): Paragraph text formatting will be adjusted prior to publication.

Galley Page 2

Jean-Noël A. Argenson, MD, Sebastien Parratte, MD, Abdullah Ashour, MD, Bertrand Saintmard, MD, and Jean-Manuel Aubaniac, MD

Investigation performed at the Aix-Marseille University, Center for Arthritis Surgery, Marseille, France

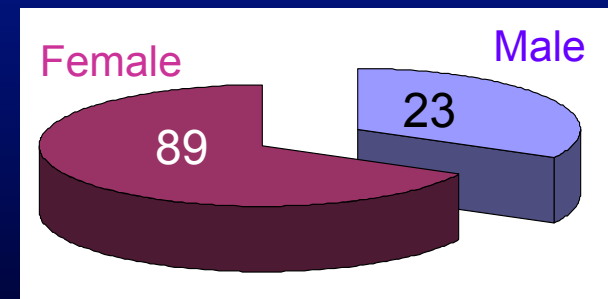
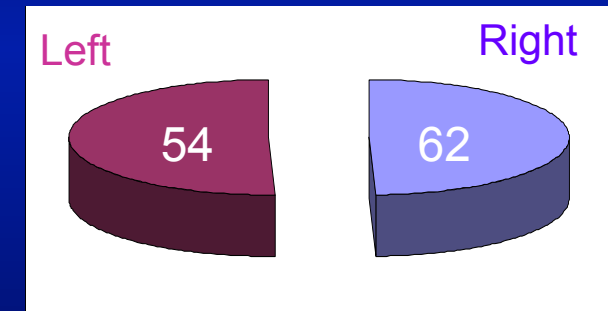
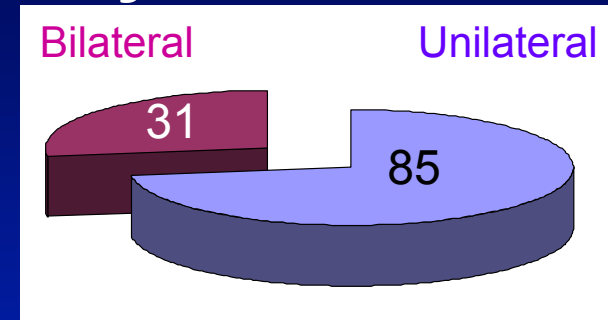
Material & Methods

116 knees in 112 patients Minimum 10 years ?

- Age= 69.4 ± 7 years
- BMI= 28 ± 5 Kg/m²

• Etiology :

Etiology :	N knees	%
OA	106	92
Others*	10	6



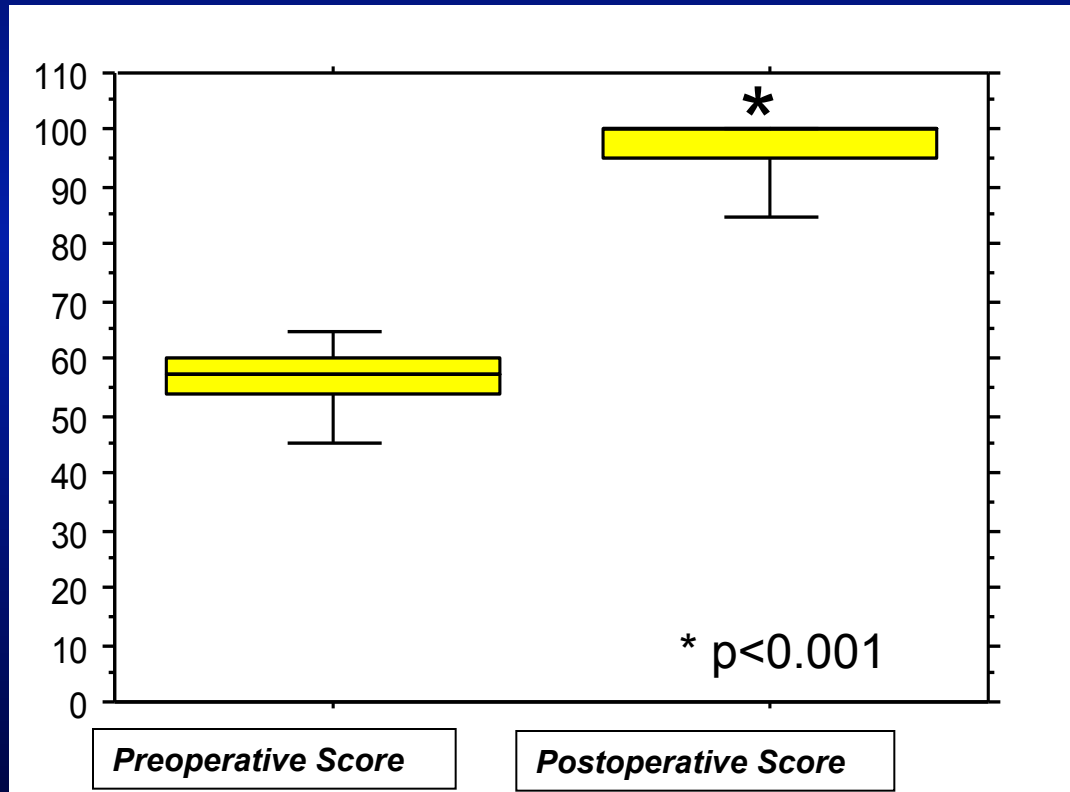
Results minimum 10 years

Knee Society Knee Score

Pre-op

Mean=55±7

10 to 70



Post-op

Mean=96±3

42 to 100

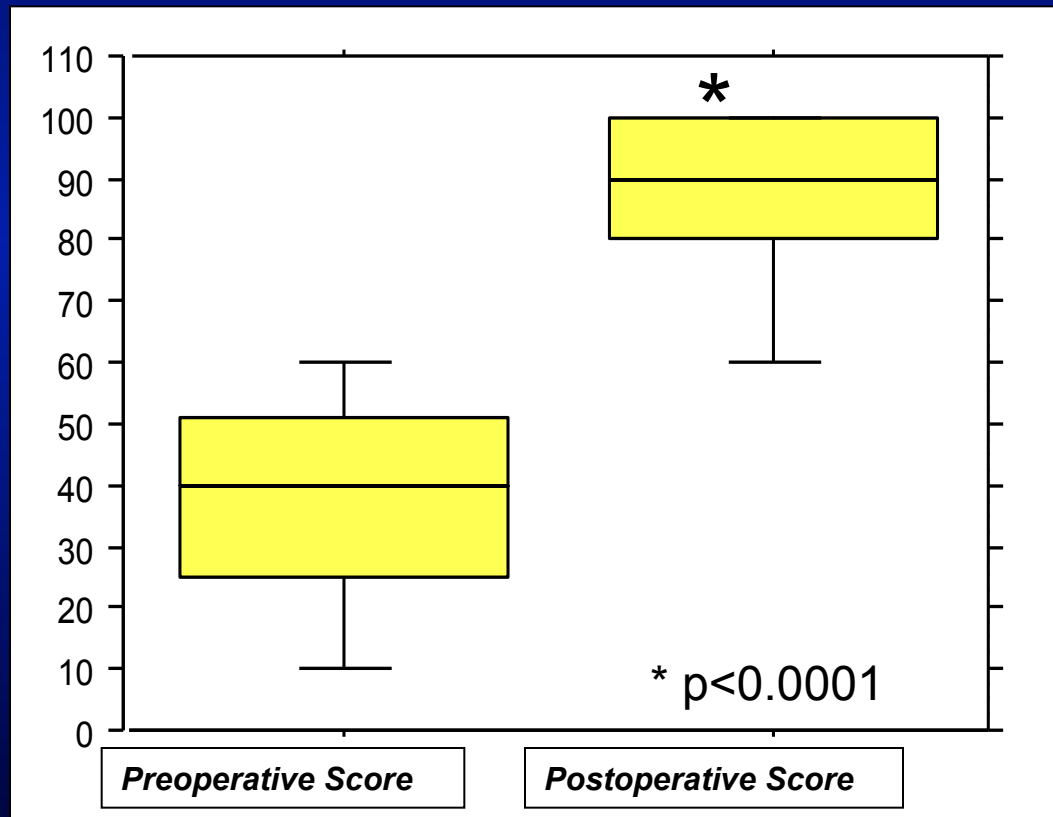
Results

Knee Society Function Score

Pre-op

Mean=38±12

5 to 65



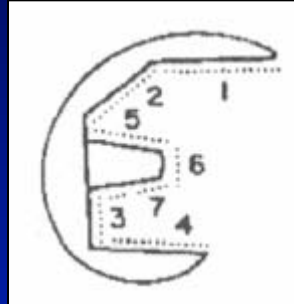
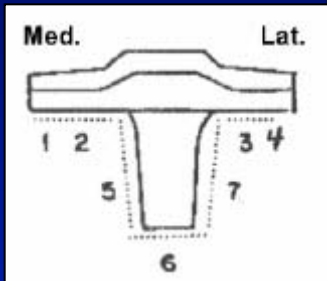
Post-op

Mean=91±6

42 to 100

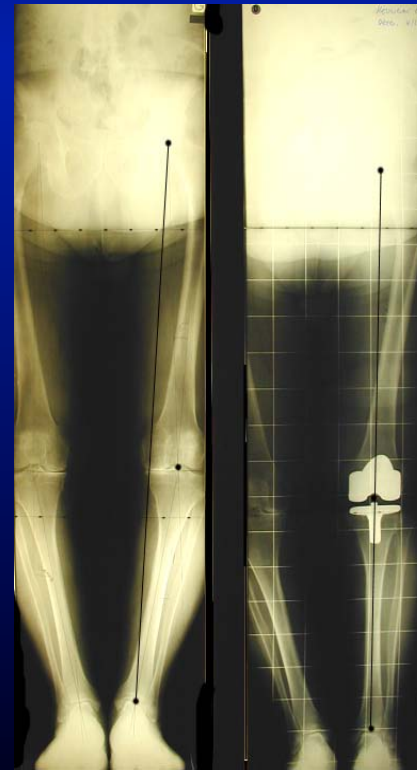
Results

➡ Radiological Evaluation



- 15 non progressive lucencies
- No PF complications

HKA	178
Tibial Angle	86°
Femoral Angle	90°
Tibial Slope	5°



Revision

- 1 revision for tibial loosening
 - tibial revision at 36 months
- 2 revisions for infection
 - previous surgery ++
 - 18 and 24 months
 - 2 stage revision

Survivorship at 10 ans

98.2% considering all revisions

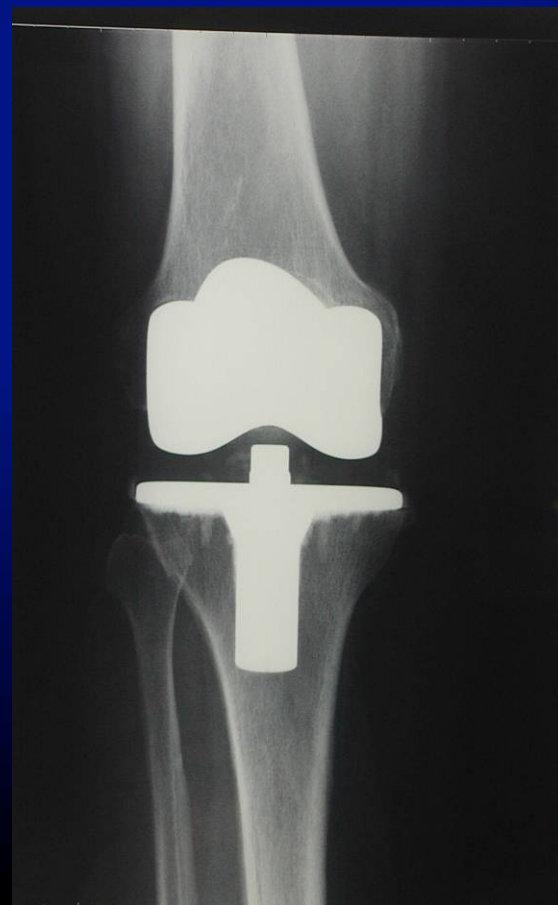
Results



VALG
deformity : 8°



Follow-up : 10 years



VAR
deformity : 12°



10 years



Conclusion

- Not comparative
- Step by step comprehensive validation approach with more than 10 years of experience
- Basic surgical principals remains the most important keys of succes after TKA