

## Mobile is better?

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4<sup>th</sup> Advanced Course on  
Knee Surgery  
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## 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!

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that maintaining the anterior cruciate ligament  
advantageous in terms of survivorship, stairclim  
ity, patient satisfaction, and joint kinematics [3,  
31]. Historically, the first available UKAs were  
fixed-bearing all-polyethylene UKA [17]. In 198  
fellow and O'Connor described a mobile-bearin  
backed UKA designed to improve wear charac

## Background

**Mobile-bearing concept**

Buechel, 1986

LCS

The Oxford Knee

Goodfellow, 1988

**CEMENTED ROTATING-PLATFORM TOTAL KNEE REPLACEMENT**

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

BY ERIC J. COLLIGAN, MD, MICHAEL E. O'BRIEN, MD, MICHAEL E. SONG, DSc, STEVE S. LEE, MD, PATRICK S. COOPER, MD, FRACS, A. VITTORI, MD, PATRICK M. SULLIVAN, MD, AND DEBRA L. KRAMER, 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*

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH  
Number 392, pp. 21-25  
© 2001 Lippincott Williams & Wilkins, Inc.

John J. Callaghan, MD

*"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?*

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH  
Number 440, pp. 98-105  
© 2005 Lippincott Williams & Wilkins

Douglas A. Dennis, MD<sup>†‡</sup>; Richard D. Komistek, PhD<sup>†‡</sup>; Mohamed R. Mahfouz, PhD<sup>†‡</sup>; Joel T. Outten, BS<sup>§</sup>; and Adrijta Sharma, MS<sup>§</sup>

Implant Type	Femur/PE (degrees)	PE/Tibia (degrees)	Femur/Tibia (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

Force (Newtons) vs Flexion Angle (deg)

Legend: LPS (dashed line), LPS-Flex (solid line)

## LPS Flex Mobile Design

**PRESSURE DISTRIBUTION**

**10° FLEXION (3210 N)**

**LPS**

D femur

yellow tibia

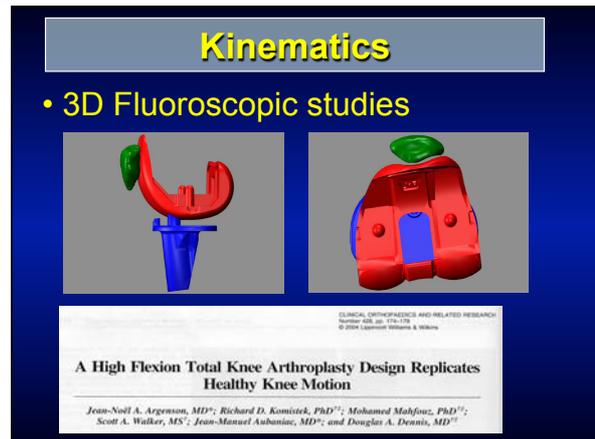
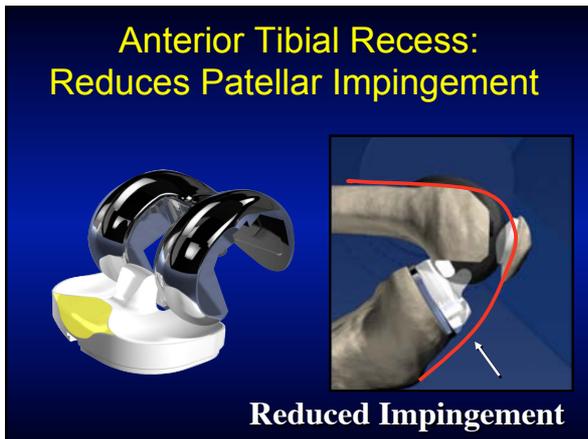
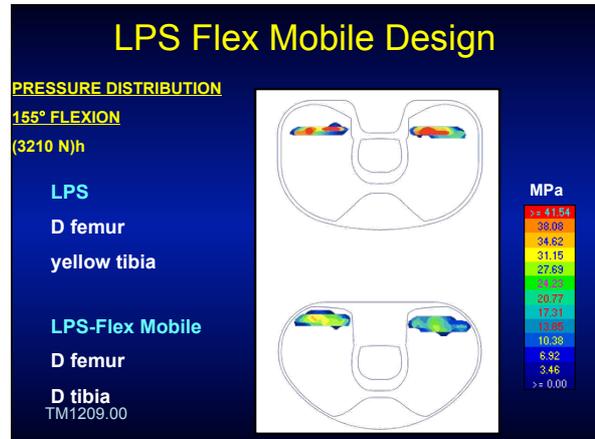
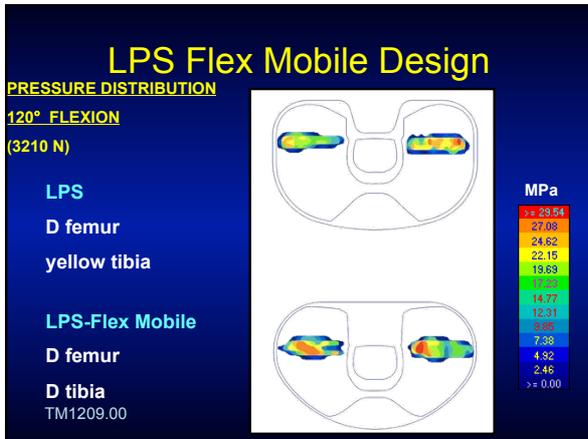
**LPS-Flex Mobile**

D femur

D tibial TM1209.00

MPa

- >= 24.00
- 22.00
- 20.00
- 18.00
- 16.00
- 14.00
- 12.00
- 10.00
- 8.00
- 6.00
- 4.00
- 2.00
- >= 0.00



### 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

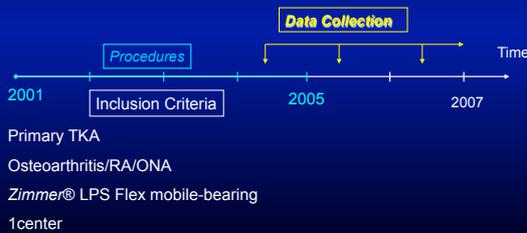
SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE KNEE SOCIETY

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

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

## Material and Methods

- Study design: **prospective study**



## 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

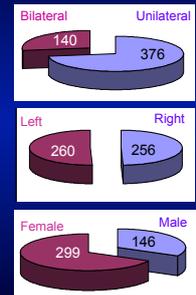
1. **UCLA Score** *the value of patient activity level in the outcome of THA. Beaulé et al, JOA, 2006*
  - Self-administrated questionnaire (1 mn)
  - 10 points scale ( 0: completely inactive/ 10: High impact sport)
2. **Patient perception of Sport and Activities :**
  - Delay?
  - Type of activity?
  - 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/m<sup>2</sup>

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

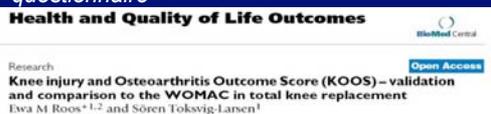


\* = post-traumatic OA, ONA, systemic disease

## Material and Methods

### 2. Subjective evaluation

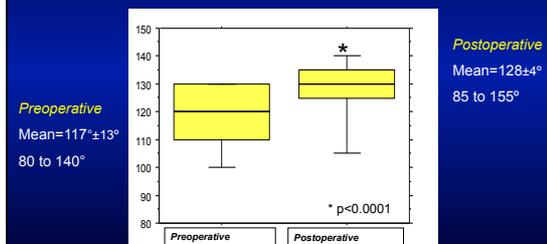
- **Knee Osteoarthritis Outcomes Score**
  - self-administrated questionnaire (8 to 10 mn)
  - Free access: [www.koos.nu](http://www.koos.nu)
  - “Improved WOMAC”
  - Validated and correlated with SF-36 QOL questionnaire



## Results

### 1. Objective results

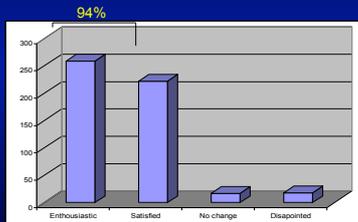
#### Range of knee flexion



## Results

### 2. Subjective results: patient perception

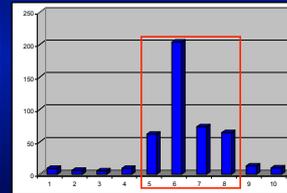
#### General overall satisfaction



## Results

### 3. Sports and activity results

#### UCLA SCORE



• Mean UCLA : 6.9 ±1.6

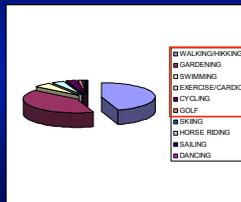
• 82% involved in sportive activities (373 out of 455)

• 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

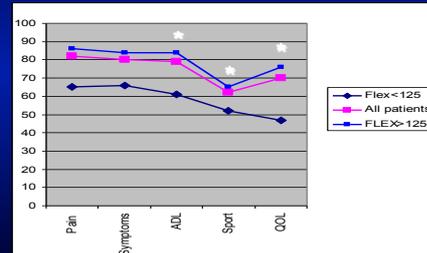
1. None: 35%
2. Slight: 50%
3. Major: 14%



## Results

### 4. Correlations between objective and subjective scores

#### Postoperative flexion and KOOS

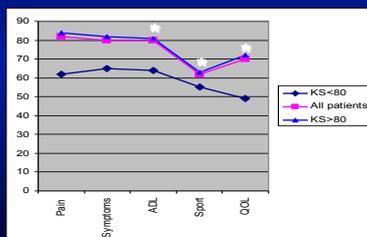


0.001

## Results

### 4. Correlations between objective and subjective scores

#### Postoperative Knee Score and KOOS



0.001

## Discussion

#### High-flexion mobile-bearing postero-stabilized TKA

1. Satisfying objective functional outcomes
3. Satisfying Subjective outcomes and knee related quality of life?
5. Return to previous activity level
6. 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
4. Fonction restauration



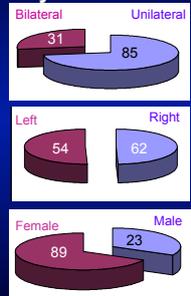
Survivorship ?

## Material & Methods

116 knees in 112 patients Minimum 10 years ?

- Age= 69.4 ± 7 years
- BMI= 28 ± 5 Kg/m<sup>2</sup>

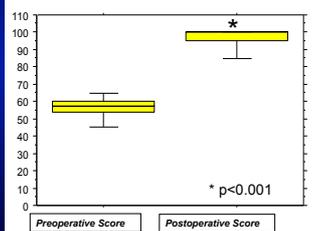
Etiology :	N knees	%
OA	106	92
Others*	10	6



## Results minimum 10 years

### Knee Society Knee Score

Pre-op  
Mean=55±7  
10 to 70

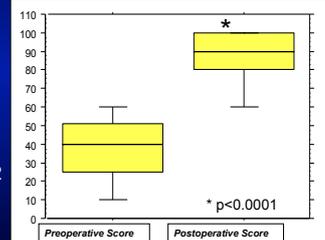


Post-op  
Mean=96±3  
42 to 100

## Results

### Knee Society Function Score

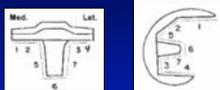
Pre-op  
Mean=38±12  
5 to 65



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

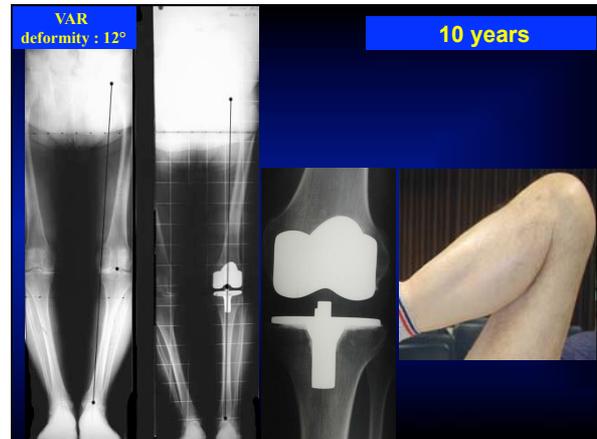
- 1 revision for tibial loosening  
- tibial revision at 36 months
- 2 revisions for infection  
- previous surgery ++  
- 18 and 24 months  
- 2 stage revision

### Results



**Survivorship at 10 ans**  
98.2% considering all revisions





## 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