Mobile is better?
S Parratte, A Ashour, X Flecher, JM Aubaniac, JN Argenson
Sainte Marguerite Hospital, Marseille, France
www.chirurgie-arthrose.com

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!
Background

Mobile-bearing concept
Buechel, 1986

Goodfellow, 1988

Limited rotation of the Polyethylene

Mobile bearing knees

Background

Mobile-Bearing Knee Replacement: Clinical Results
A Review of the Literature

John J. Collins, 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 Bearing Bounce?

Douglas A. Brown, MD; Richard M. Krenkel, MD; Mohamed H. Helou, MD; Fu-Tung Francis Kuo, MD; Adejoke A. Shonubi, MD

<table>
<thead>
<tr>
<th>Implant Type</th>
<th>Femoral (mm)</th>
<th>Tibial (mm)</th>
<th>Polyethylene (mm)</th>
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<tbody>
<tr>
<td>Basic</td>
<td>2.2</td>
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<td>LPS Flex D</td>
<td>3.5</td>
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<td>LPS Flex B</td>
<td>5.9</td>
<td>5.1</td>
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</table>

LPS Flex Mobile Design

LPS-Flex
Congruous contact to LPS-LPP Passive

PRESSURE DISTRIBUTION
10° FLEXION (3210 N)

LPS
D femur
yellow tibia

LPS-Flex Mobile
D femur
D tibial
TM1209.00
Background

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

Goals of the study

1. Objective functional outcomes as measured by the Knee Society Score and range of knee flexion?
2. Subjective outcomes and the knee-related quality of life?
3. Participation of sportive activities?
4. Correlation between objective and patient-reported outcomes?

Anterior Tibial Recess: Reduces Patellar Impingement

Reduced Impingement

Kinematics

- 3D Fluoroscopic studies
**Material and Methods**

- Study design: prospective study

<table>
<thead>
<tr>
<th>Time</th>
<th>Data Collection</th>
<th>Prospective</th>
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</thead>
<tbody>
<tr>
<td>2001</td>
<td>Primary TKA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Osteoarthritis/RA/ONA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zimmer® LPS Flex mobile-bearing</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>Inclusion Criteria</td>
<td>1 center</td>
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<tr>
<td>2007</td>
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</table>

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

**Range of knee flexion**
- Same independent observer
- Two-arms goniometer

**Material and Methods**

- **Knee Society Score**
  - Rationale of the Knee Society Clinical Rating System: Insall et al, CORR, 1989
- **UCLA Score**
  - Value of patient activity level in the outcome of THA: Beaule et al, JOA, 2006
  - Self-administered questionnaire (1 mn)
  - 10 points scale (0: completely inactive/10: High impact sport)
- **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 and Methods**

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

**Results**

1. **Objective results**
   - Range of knee flexion
   - Preoperative: Mean=117 ± 13° (80 to 140°)
   - Postoperative: Mean=128 ± 4° (85 to 155°)
   - *p<0.0001

**Ability and return to previous level of activity**

1. **UCLA Score**
   - Value of patient activity level in the outcome of THA: Beaule et al, JOA, 2006
   - Self-administered 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 and Methods**

**Subjective evaluation**

- Knee Osteoarthritis Outcomes Score
  - Self-administered questionnaire (8 to 10 mn)
  - Free access: www.koos.nu
  - "Improved WOMAC"
  - Validated and correlated with SF-36 QOL questionnaire

**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:
    - OA: 474 (92)
    - Others*: 42 (6)

* = post-traumatic OA, ONA, systemic disease
2. Subjective results: patient perception

- General overall satisfaction
  - 94%

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

4. Correlations between objective and subjective scores

- Postoperative flexion and KOOS
  - * = p<0.001

- 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
3. Post-op
4. Function restauration

Survivorship?

Material & Methods

116 knees in 112 patients Minimum 10 years?

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

Etiology: N knees %

<table>
<thead>
<tr>
<th>Etiology</th>
<th>N knees</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA</td>
<td>106</td>
<td>92</td>
</tr>
<tr>
<td>Others*</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

Results minimum 10 years

Knee Society Knee Score

Pre-op
Mean = 55 ± 7
10 to 70

Post-op
Mean = 96 ± 3
42 to 100

* p < 0.001

Results

Knee Society Function Score

Pre-op
Mean = 38 ± 12
5 to 65

Post-op
Mean = 91 ± 6
42 to 100

* p < 0.0001

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 38 months
- 2 revisions for infection
  - previous surgery ++
  - 18 and 24 months
  - 2 stage revision

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