

Improving Flexion in TKA The influence of the Approach

Sebastien Parratte, Jean-Manuel Aubaniac
Jean-Noël Argenson

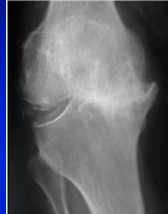


Sainte Marguerite Hospital, Marseille, France
www.chirurgie-arthrose.com




4th Advanced Course on
Knee Surgery
January 22nd – 27th 2012

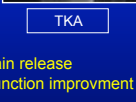


Basic TKA


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Arthritis





TKA

Pain release
Function improvement

Standard Approach

- Invasive surgery
- Longer recovery time

Year 2000: T Coon and A Tria


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**Minimal-Invasive
Of the knee**

Limit the surgical trauma

- Faster recovery
- Return to the ADL and physical activities

MIS in TKA

**Prothèses totales du genou
par miniabord**


S. Parratte, X. Flecher, J.-N. Argenson

**Limited approach
No eversion of the patella**

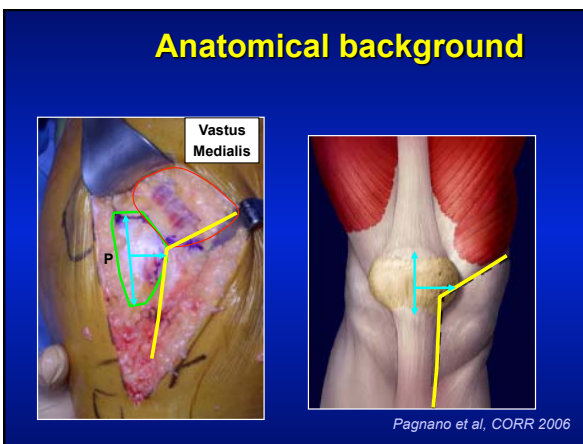
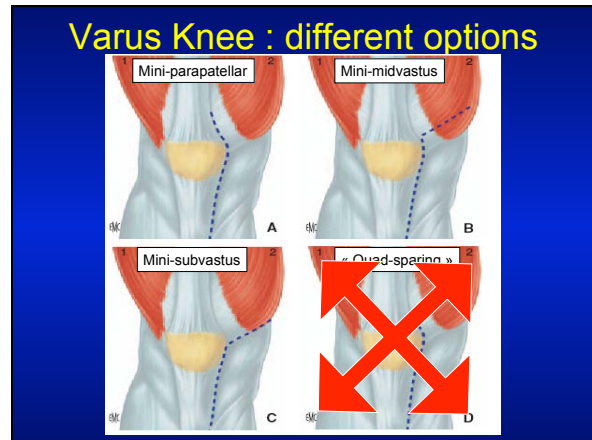


Early results

- Faster recovery of the flexion in the first three months
- Comparable at one year
- 2 cm more proximal in the quad: NO difference
- Positioning comparable



MISE AU POINT
Arthroplastie totale du genou par voie mini-invasive
J.-N. ARGENSON, S. PARRATTE, X. FLECHER



MAYO CLINIC

Limited skin Incisions

Theoretical advantages ?

- Faster recovery
- ROM
- Pain
- Hospital stay

Bonuti et al, JBJS Am, 2004
Pagnano et al, CORR 2006
Pagnano et al, J of Arthroplasty 2006

Potential Draw-backs

- Technically challenging
- Implant malposition
- Increase Surgical time
- Skin, septic complications

Goals of the study

Hypothesis: MIS Subvastus approach will improve early objective results after TKA

2012 Specialty Day Meeting - San Francisco, California

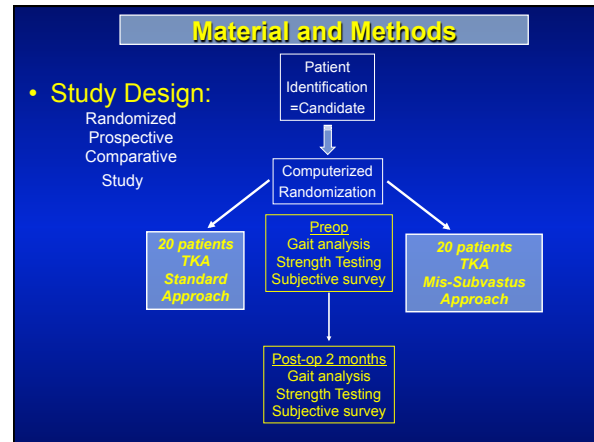
Mark Coventry Award Paper
A Retrieval Analysis of High Flexion Versus Posterior Stabilized Tibial Inserts
 Presenter: Douglas D. R. Naudie, MD, FRCSC
 Co-Author: Nicholas R. Paterson, BSCh, Matthew G. Teeter, BSCh, Steven J. MacDonald, MD, FRCSC, and Richard W. McCalden MD, MPhil(Edin), FRCSC

Chitranjan Ranawat Award Paper
Efficacy of Postoperative Intraarticular Analgesia Following Total Knee Arthroplasty: A Randomized, Double-Blinded, Placebo-Controlled, Prospective Study
 Presenter: Nitin Goyal, MD
 Co-Author: James McKenzie, BS, Peter F. Sharkey, MD, Javad Parvizi, MD, William J. Hozack, MD, and Matthew S. Austin, MD

John Insall Award Paper
A Randomized Controlled Trial of Minimally Invasive TKR: Comprehensive Gait and Strength Testing Outcomes
 Presenter: Mark W. Pagnano, MD
 Co-Author: Julien Wegzyn, MD, PhD, Sebastien Parratte, MD, PhD, Krista Coleman-Wood, PhD, PT, and Kenton R. Kaufman, PhD, PE

MIS Subvastus vs mini-para-patellar

No eversion of the patella in both groups



Material and Methods

- Gait Analysis
- 10 camera real-time system (Motion Analysis, Santa Rosa, CA)
- Ground Conditions
 - Level – 15 m walkway
 - Stairs – 7 steps
 - Ascent
 - Descent

Material and Methods

- Strength Testing

Biodex Systems 3 Pro Isometric Strength Flexion Extension

Material and Methods

- Subjective evaluation
 - Patient Milestone: pain, medications, crutches...
 - SF12: Health related QOL questionnaire
 - Knee Osteoarthritis Outcomes Score (KOOS)
 - 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: **Knee Injury and Osteoarthritis Outcome Score (KOOS) – validation and comparison to the WOMAC in total knee replacement**
Eric H. Reimold, MD and Steven J. Erickson, MD

Results

Gait Pattern: NO difference

| | | | | | |
|-------------------------------------|---------|------|---------|------|---------|
| Calories (kcal/min) | 31.28 ± | 2.72 | 35.68 ± | 5.43 | <0.0001 |
| Stride length (m) | 0.99 ± | 0.14 | 1.09 ± | 0.13 | <0.0001 |
| Kinematics / Kinetics | | | | | |
| <i>Level walking</i> | | | | | |
| Knee varus angle (°) | 8.02 ± | 3.52 | 3.88 ± | 4.21 | 0.005 |
| Knee valgus angle (°) | 1.58 ± | 3.06 | 5.66 ± | 3.10 | <0.0001 |
| Knee varus moment (Nm/kg) | 0.41 ± | 0.18 | 0.32 ± | 0.08 | 0.005 |
| Ankle plantarflexion moment (Nm/kg) | 1.08 ± | 0.18 | 1.18 ± | 0.14 | 0.030 |
| Knee power generation (W/kg) | 0.25 ± | 0.14 | 0.52 ± | 0.18 | <0.0001 |
| Ankle power generation (W/kg) | 1.45 ± | 0.55 | 1.69 ± | 0.51 | 0.014 |
| <i>Upstairs</i> | | | | | |
| Knee flexion angle (°) | 80.45 ± | 5.17 | 89.23 ± | 2.72 | 0.009 |
| <i>Downstairs</i> | | | | | |
| Knee extension moment (Nm/kg) | 0.20 ± | 0.06 | 0.31 ± | 0.02 | 0.007 |
| Knee power absorption (W/kg) | 1.37 ± | 0.44 | 1.55 ± | 0.46 | 0.038 |

Table 4

Results

Patient rated outcomes : NO difference

| | | | | | | |
|--------------------------------------|----------------|----------------|---------|----------------|----------------|---------|
| ADL (/100) | 30 ± 9 | 52 ± 8 | <0.0001 | 29 ± 7 | 52 ± 12 | <0.0001 |
| Sports (/100) | 13 ± 5 | 21 ± 4 | 0.003 | 17 ± 5 | 20 ± 4 | 0.09 |
| QOL (/100) | 9 ± 2 | 16 ± 3 | <0.0001 | 11 ± 3 | 18 ± 3 | <0.0001 |
| SF-12 | | | | | | |
| Physical subscale (/100) | 30 ± 8 | 41 ± 8 | 0.002 | 32 ± 6 | 44 ± 7 | <0.0001 |
| Mental subscale (/100) | 54 ± 9 | 56 ± 7 | 0.600 | 54 ± 8 | 56 ± 6 | 0.4 |
| UCLA activity scale | | | | | | |
| | 4 ± 1 | 7 ± 1 | <0.0001 | 4 ± 1 | 6 ± 1 | <0.0001 |
| Strength of thigh musculature | | | | | | |
| Involved knee extension (N.m) | 73.51 ± 11.98* | 89.26 ± 13.02* | 0.022 | 71.23 ± 12.19* | 83.35 ± 12.02* | 0.01 |
| Involved knee flexion (N.m) | 52.14 ± 19.78* | 53.87 ± 19.51* | 0.630 | 49.84 ± 12.64* | 53.25 ± 12.02* | 0.4 |
| Non involved knee extension (N.m) | 104.51 ± 14.62 | 104.61 ± 14.29 | 0.983 | 101.12 ± 16.63 | 106.22 ± 16.59 | 0.1 |
| Non involved knee flexion (N.m) | 62.93 ± 13.50 | 61.15 ± 12.77 | 0.666 | 63.19 ± 15.06 | 62.36 ± 12.06 | 0.8 |

* which included: Oxycodone, Oxycodone, Percocet, Tylenol #2 or #3, or Demerol.

Results

Strength: NO difference

Table 2

Results

Delay to Return to ADL=> NO difference

| | | | | | |
|--|---------|-------|---------|-------|--|
| without walker/ cane | | | | | |
| To walk a 6-block distance | 27.06 ± | 11.62 | 31.64 ± | 15.46 | |
| To take care for normal daily activity | 11.83 ± | 11.63 | 12.56 ± | 10.00 | |

* which included: Oxycodone, Oxycodone, Percocet, Tylenol #2 or #3, or Demerol.

Discussion=> Real revolution

Not the approach of the knee but the approach of the patient
=> Peri-operative management

- Patient conditioning
- Pain management
 - multi-modal
 - Preemptive
- Faster rehabilitation program

Parratte S and Pagnano M: seminar in arthroplasty

TKA today: High level

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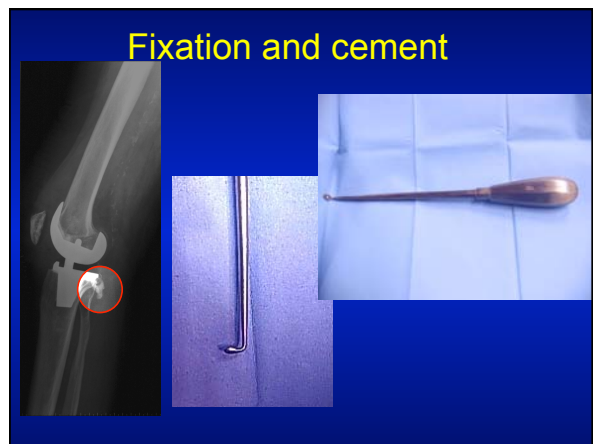
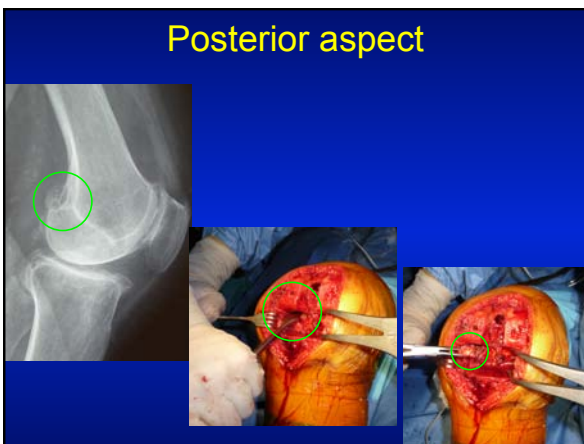
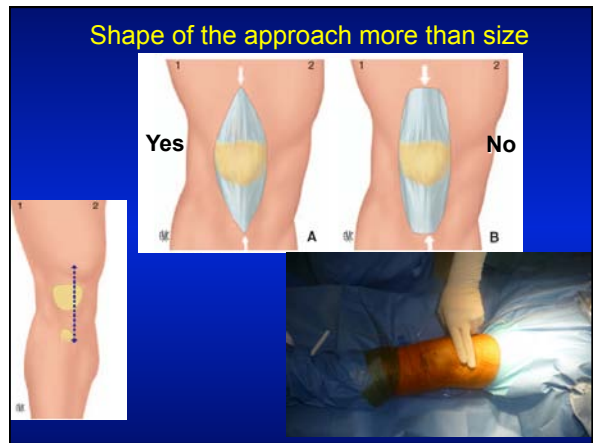
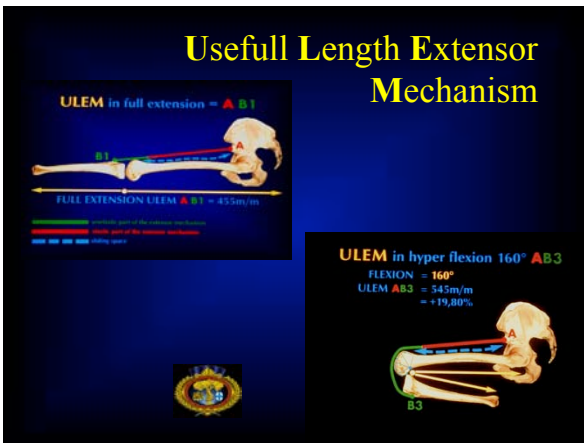
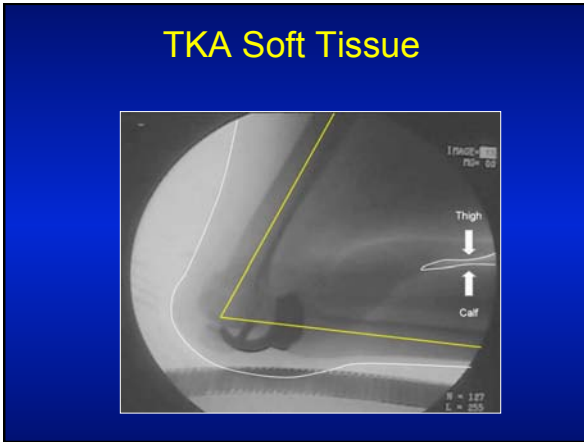
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- Patients are different
- Patients expectations are different

Culture...

Muslim holiday of Ramadan

Japanese table



Optimal implantation

Spaces
Stability/mobility

THE JOURNAL OF BONE & JOINT SURGERY - JBJS.ORG
VOLUME 90-A · NUMBER 1 · JANUARY 2008

Instability After Total Knee Arthroplasty

By Sebastian Parratte, MD, and Mark W. Pagnano, MD
An Instructional Course Lecture, American Academy of Orthopaedic Surgeons

Approach in TKA = Bone and ligaments

FRONTAL: « Known one »
SAGITTAL: « forgotten »
AXIAL: « Mystery »
Align 3D and fill the envelope!!!

Harry Potter
And the perfect TKA
J.K. ROWLING

Kinematics ?

Same pattern Not as good

Legend for graph:
 - Current study (TKA knee)
 - Argenson 2008 (TKA knee)
 - Walker 2008 (TKA knee)
 - Tamen 2008 (TKA knee)
 - Current study (bicompartemental knee)
 - Dennis 2008 (healthy knee)
 - Acland 2007 (healthy knee)
 - Aubaniac 2008 (healthy knee)

Bicompartemental experience Preserve ACL

Since October 2008

S Parratte, JM Aubaniac, JN Argenson
AAOS 2009
Knee Society 2009

Pr Aubaniac 1977

Symposium: Papers presented at the Annual Meetings of the Knee Society

Survival of Bicompartemental Knee Arthroplasty at 5 to 23 Years
Sebastian Parratte, MD, Vincent Pfaefli, MD, Jean-Marc Aubaniac, MD, Jean-Steph Argenson, MD

Conclusion

- Not only the approach of the knee but the approach of the patient
- Knee prosthesis basic principals: spaces
- Is it possible to really obtain good kinematics without preserving the four bar mechanism?
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