CHANGES IN MY KNEE ARTHROPLASTY PRACTICE ?

Jean-Noel Argenson, Sebastien Parratte, Matthieu Ollivier, Xavier Flecher

Center for Arthritis surgery

Sainte Marguerite Hospital, Marseille, France

IML

Institut du Mouvement et de l'appareil Locomoteur

Aix*Marseille université

CHANGES IN MY ENVIRONMENT

Institute for Locomotion

« A Project for excellence »

Bone and Joint Radiology

Physiotherapy

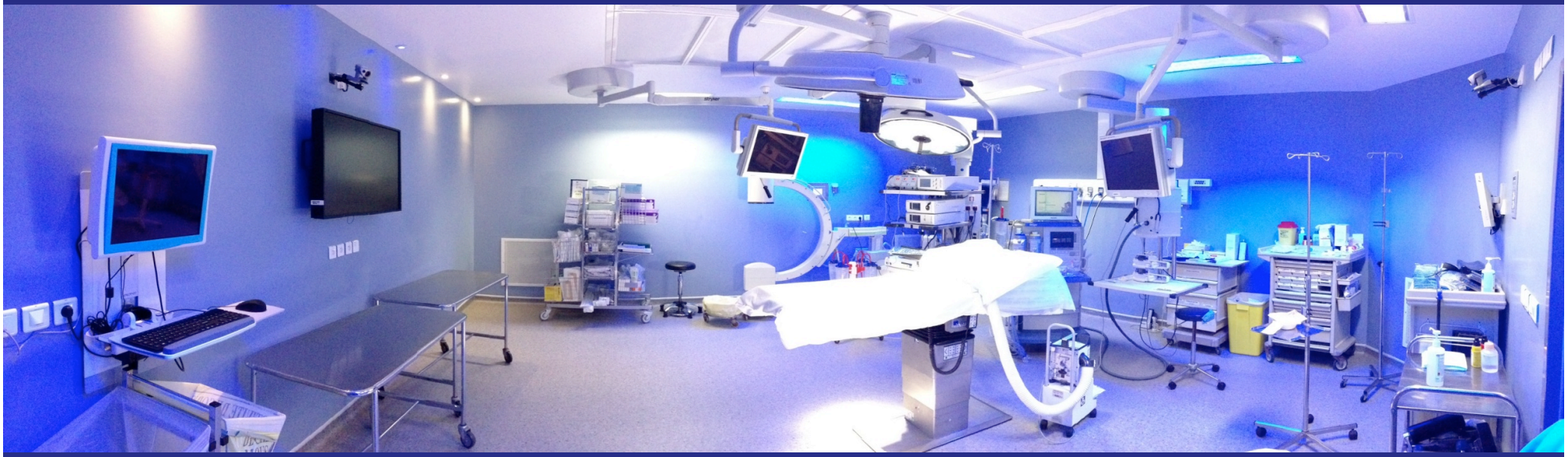
Orthopedic Surgery

Rhumatology

Sport Med & Trauma

Environment for patient

Environment for surgeon



Environment for Health Team

Environment for Teaching

Environment for Research

Des partenaires

Bouygues Telecom · mecalog · TIME · AESCULAP · CENTRALE PARIS · esil · Centrale Marseille · Assistance Publique Hôpitaux de Marseille · LMA · irphe · ORPHEME · artemis · ANR

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UNIVERSITÉ DE LA MÉDITERRANÉE AIX-MARSEILLE II

CONTACT

Patrick CHABRAND
Institut des Sciences du Mouvement

UMR 6233 CNRS & Université de la Méditerranée
Groupe Interdisciplinaire de Biomécanique Ostéoarticulaire
Faculté des Sciences du Sport, CP 910

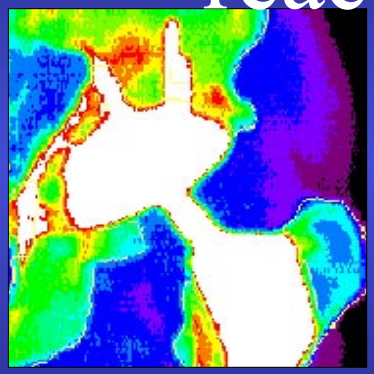
av. de Luminy F-13288 Marseille cedex 09 (FRANCE)
☎ : (33) (0)4 91 26 62 38 🖷 (33) (0)4 91 41 16 91
✉ patrick.chabrand@univmed.fr
Web : http://www.laps.univ-mrs.fr/

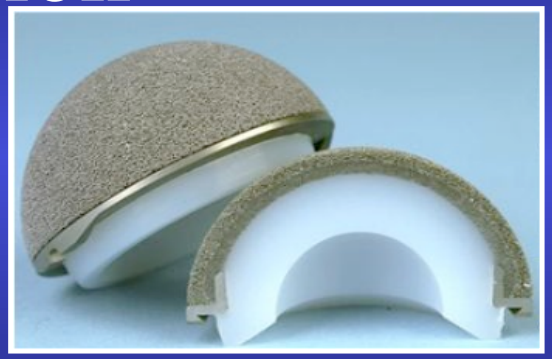
Research

Kinematics

Motion

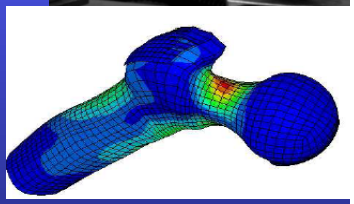
Implant reaction

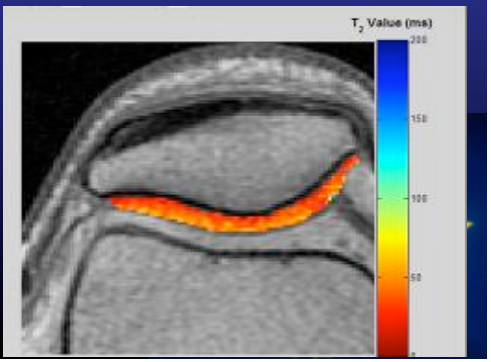




Osteoporosis

Osteoarthritis

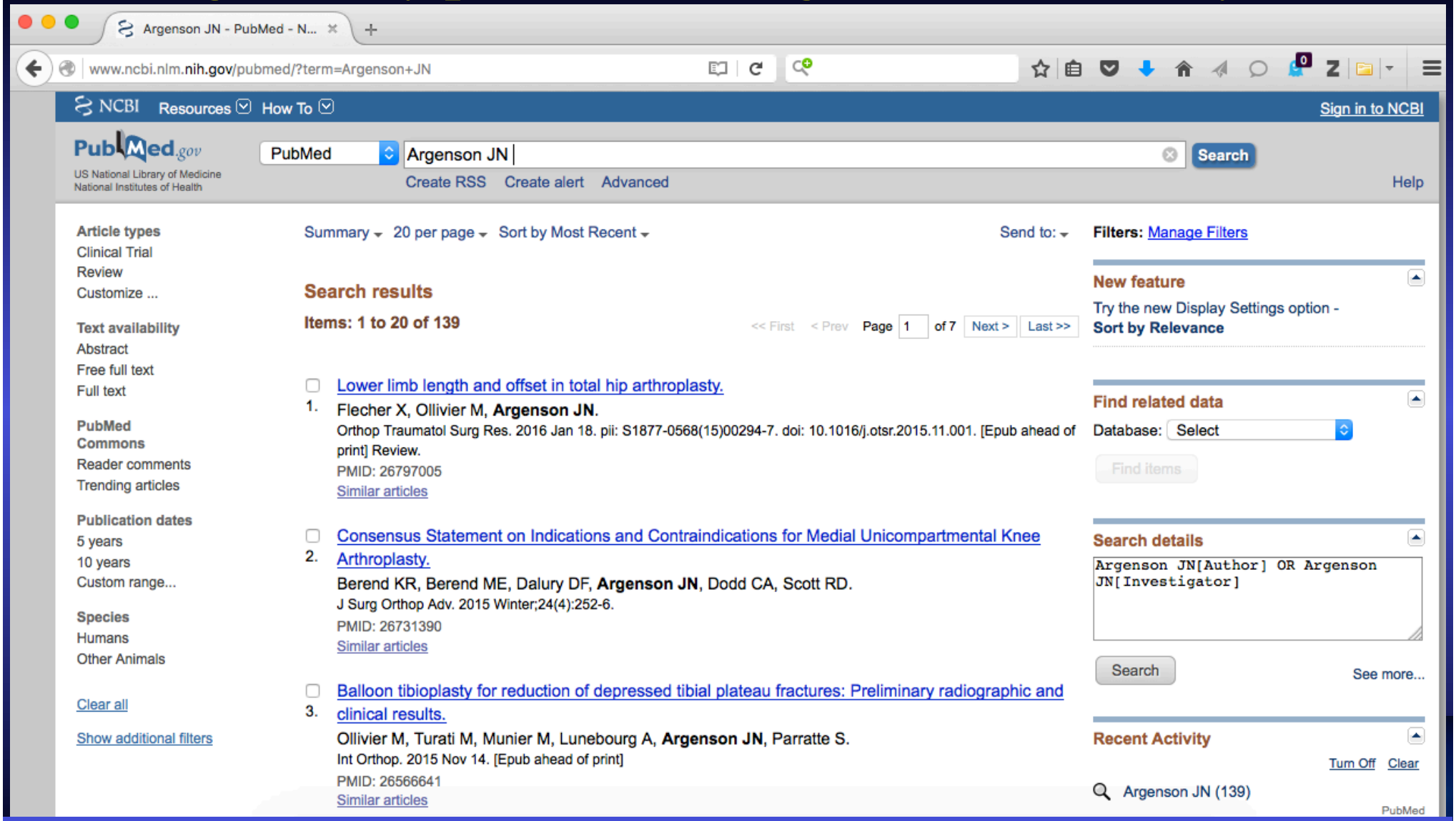




- Hip
- Knee
- Trauma

Building a team

Changes in my practice during these last three years ?



Last 3 years, referenced publications related to the knee practice: 32

CHANGES IN MY APPROACH TO THE PATIENT

New Expectations

What is a "young" arthritic Knee?

J Bone Joint Surg Am. 2009;91 Suppl 5:43-8 • doi:10.2106/JBJS.I.00406

The New Arthritic Patient and Arthroplasty Treatment Options

By Jean-Noël A. Argenson, MD (moderator), Sebastien Parratte, MD, Antoine Bertani, MD, Jean-Manuel Aubaniac, MD, Adolph V. Lombardi Jr., MD, Keith R. Berend, MD, Joanne B. Adams, BFA, Jess H. Lonner, MD, Ormonde M. Mahoney, MD, Tracy L. Kinsey, MSPH, Thomas K. John, MD, and Michael A. Conditt, PhD

Patient Perception

Patients' Expectations of Knee Surgery

By Carol A. Mancuso, MD, Thomas P. Sculco, MD, Thomas L. Wickiewicz, MD, Edward C. Jones, MD, Laura Robbins, DSW, Russell F. Warren, MD, and Pamela Williams-Russo, MD, MPH

Investigation performed at the Outcomes Unit, Department of Orthopaedic Surgery, Hospital for Special Surgery, New York, NY

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 404, pp. 172–188

What Functional Activities Are Important to Patients With Knee Replacements?

Jennifer M. Weiss, MD; Philip C. Noble, PhD*; Michael A. Conditt, PhD** Harold W. Kohl, PhD*; Seth Roberts, BS*; Karon F. Cook, PhD*; Michael J. Gordon, MD*; and Kenneth B. Mathis, MD**

Our Clinical Experience

Acta Orthopaedica 2015; 86 (1): x–x

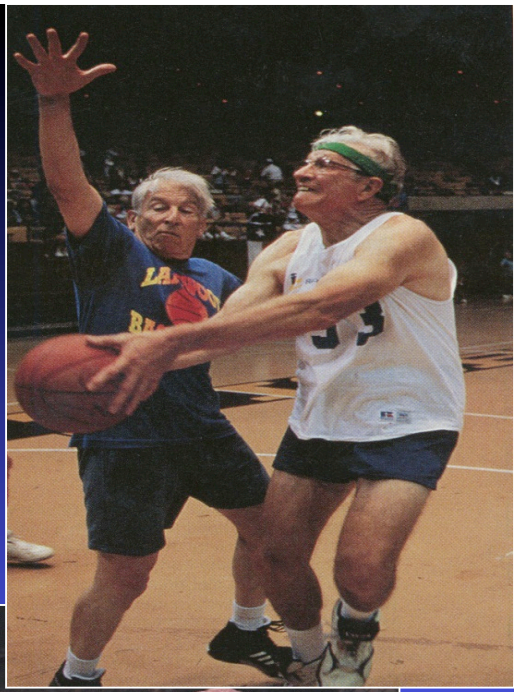
Lower function, quality of life, and survival rate after total knee arthroplasty for posttraumatic arthritis than for primary arthritis

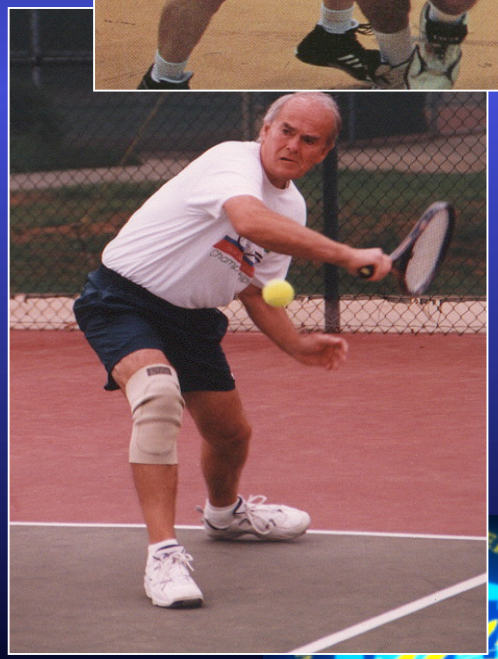
Alexandre LUNEBOURG [1,3], Sebastien PARRATTE [1,3], André GAY [2,3], Matthieu OLLIVIER [1,3], Kleber GARCIA-PARRA [1], Jean-Noël ARGENSON [1,3]

Increased number of patients involved in not recommended activities after TKA

Out of 1206 patients:

- **17% involved in not recommended or high impact activities**
- Mean UCLA activity score = 7.1
- Regularly participate in active event, such as bicycling= 75%



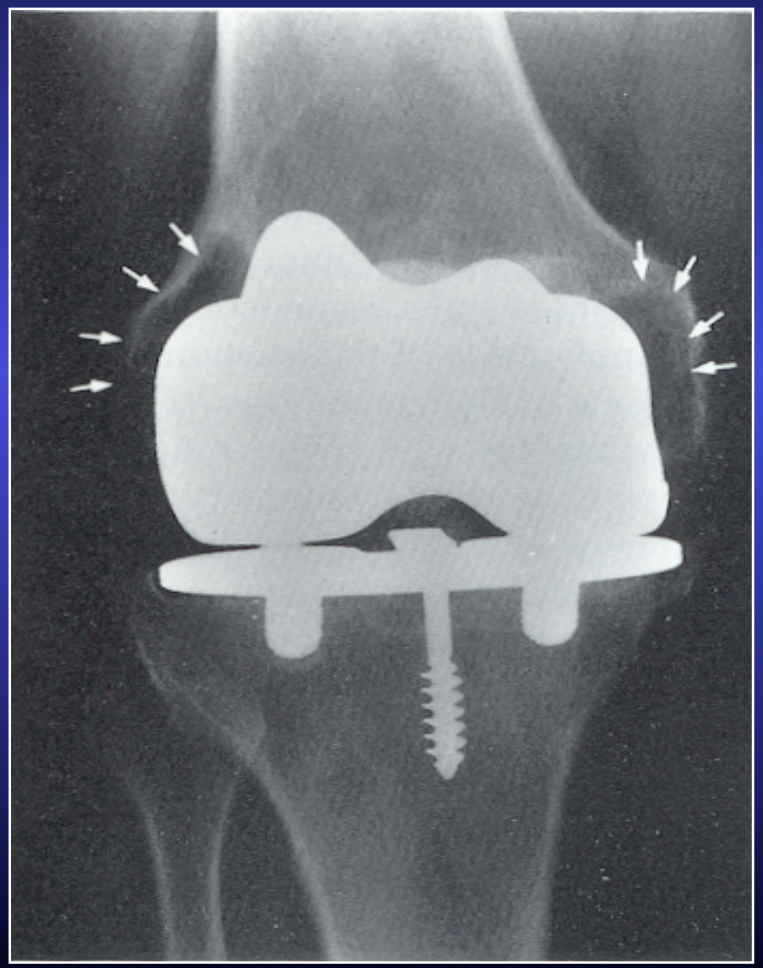


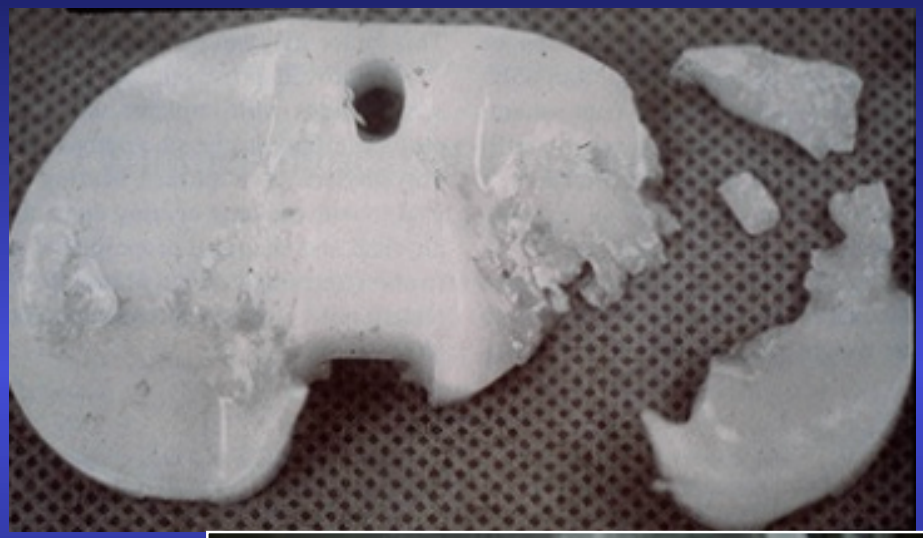
The Journal of Arthroplasty Vol. 23 No. 3 2008

Patient-Reported Activity Level After Total Knee Arthroplasty

Diane L. Dahm, MD,* Sunni A. Barnes, PhD,† Jeffrey R. Harrington, MD,†
Siraj A. Sayeed, MD,* and Daniel J. Berry, MD*

Consequences for Arthroplasty?





THE JOURNAL OF BONE & JOINT SURGERY (BRITISH)
VOL. 91-B, No. 3, MARCH 2009

Medial unicompartmental knee replacement in the under-50s

S. Parratte,
J.-N. A. Argenson,
O. Pearce,
V. Pauly,
P. Auquier,
J.-M. Aubaniac

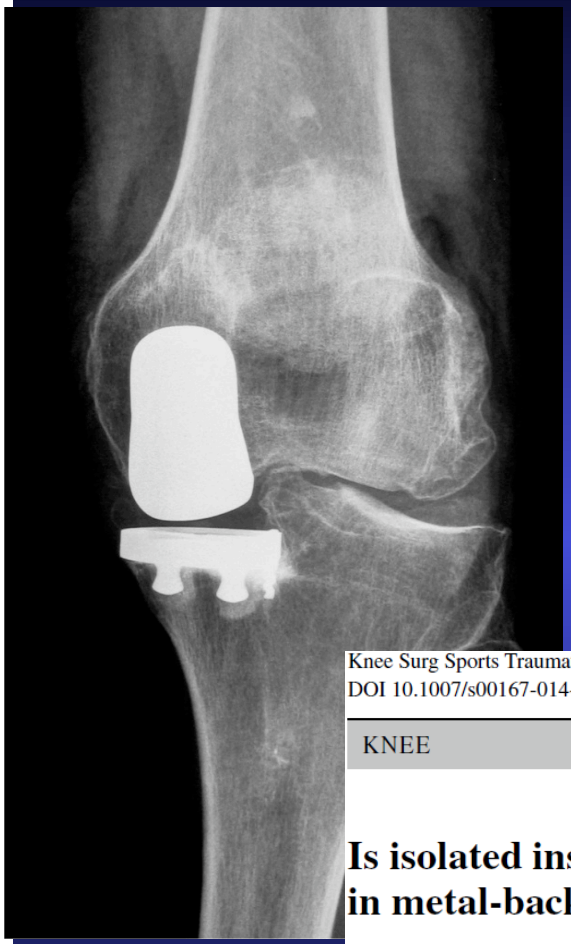
From Aix-Marseille University, Marseille, France

We retrospectively reviewed 35 cemented unicompartmental knee replacements performed for medial unicompartmental osteoarthritis of the knee in 31 patients ≤ 50 years old (mean 46, 31 to 49). Patients were assessed clinically and radiologically using the Knee Society scores at a mean follow-up of 9.7 years (5 to 16) and survival at 12 years was calculated. The mean Knee Society Function Score improved from 54 points (25 to 64) pre-operatively to 89 (80 to 100) post-operatively ($p < 0.0001$). Six knees required revision, four for polyethylene wear treated with an isolated exchange of the tibial insert, one for aseptic loosening and one for progression of osteoarthritis.

The 12-year survival according to Kaplan-Meier was 80.6% with revision for any reason as the endpoint. Despite encouraging clinical results, polyethylene wear remains a major concern affecting the survival of unicompartmental knee replacement in patients younger than 50.

- **UKA = reliable solution for unicompartmental arthritis in active patients younger than 60**
- **QOL restoration and return to physical activities** (study including UCLA and KOOS scores)
- **Wear remains a problem**

Full poly or metal-back ?



Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-014-3392-8

KNEE

Is isolated insert exchange a valuable choice for polyethylene wear in metal-backed unicompartmental knee arthroplasty?

Alexandre Lunebourg · Sébastien Parratte · Alexandre Galland · François Lecuire · Matthieu Ollivier · Jean-Noël Argenson

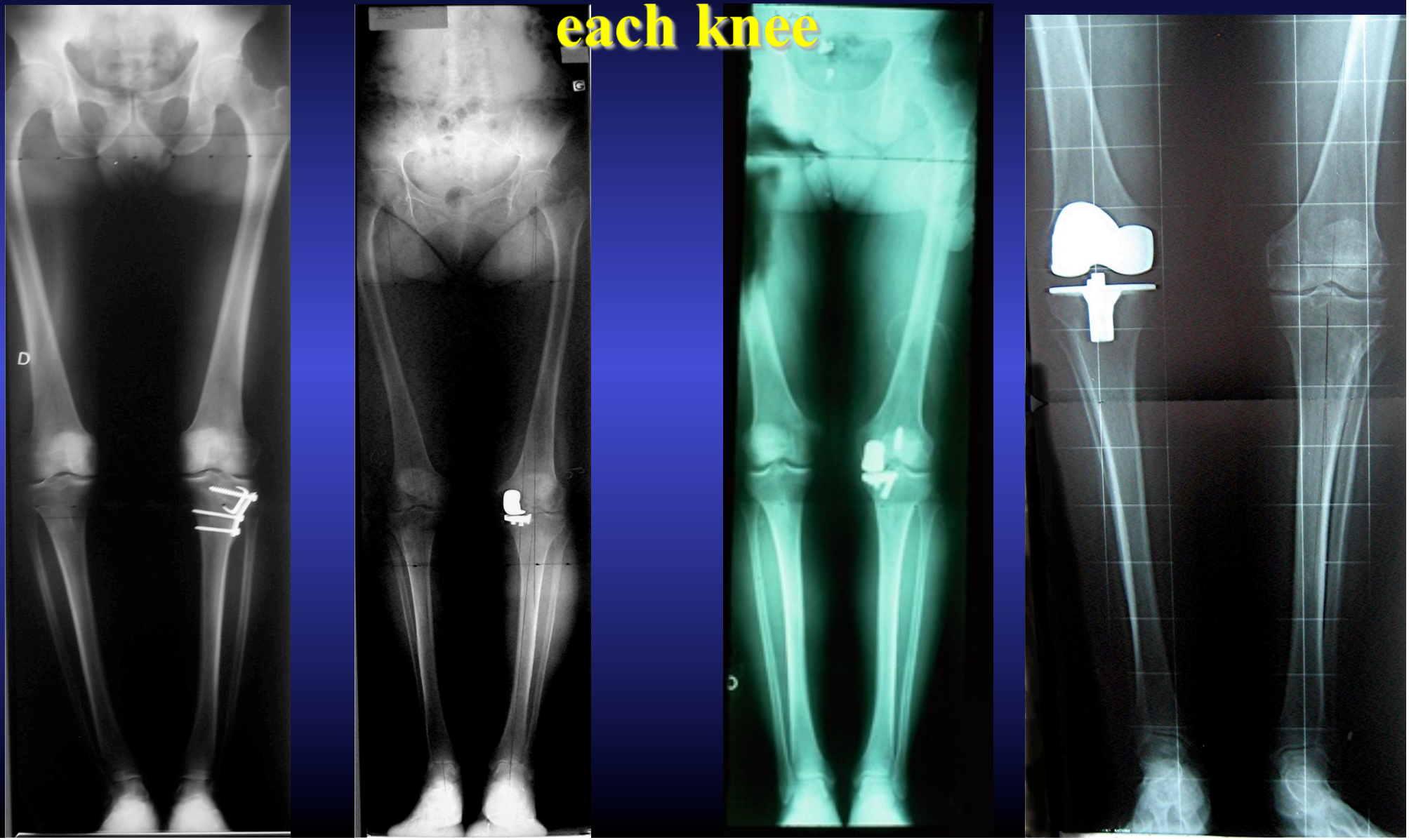
Received: 3 June 2014 / Accepted: 15 October 2014

Patient : Customization

Compared to the 70' the same 65-year old patient having TKA in 2016:

- Will be 20% heavier
- Will have 25% longer life expectancy with his implant
- Will perform 20% more activities, including those in flexion

A personalized solution for each patient…for each knee



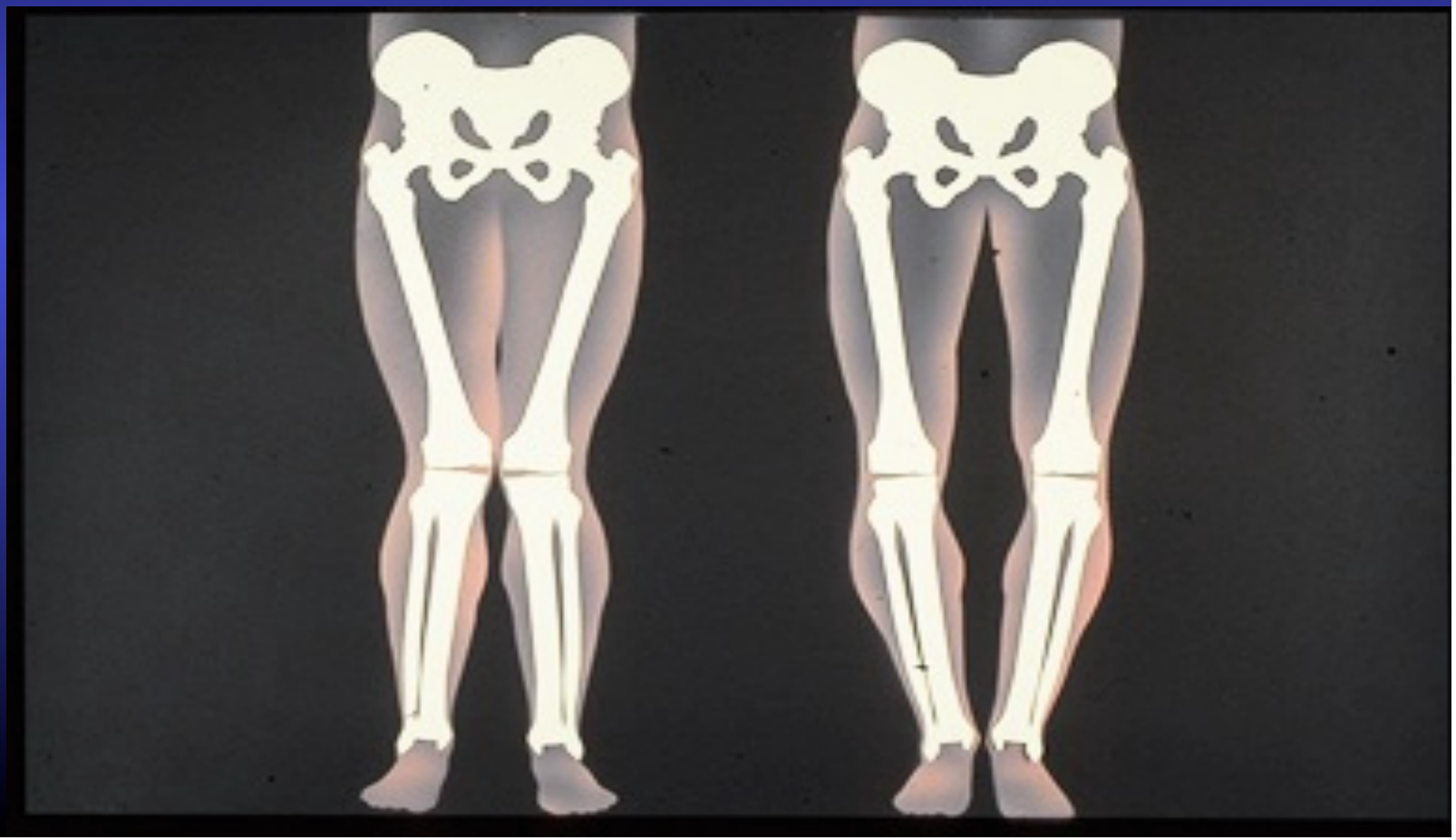
Peri-operative management

- **DVT Prophylaxis: LMWH, oral**
- **Multimodal Pain Control: Regional anesthesia, Nerve block, Intra-articular injection**
- **Bleeding control: Tranexamic acid, ferritin, bleeding kinetics**
- **Fast-track**

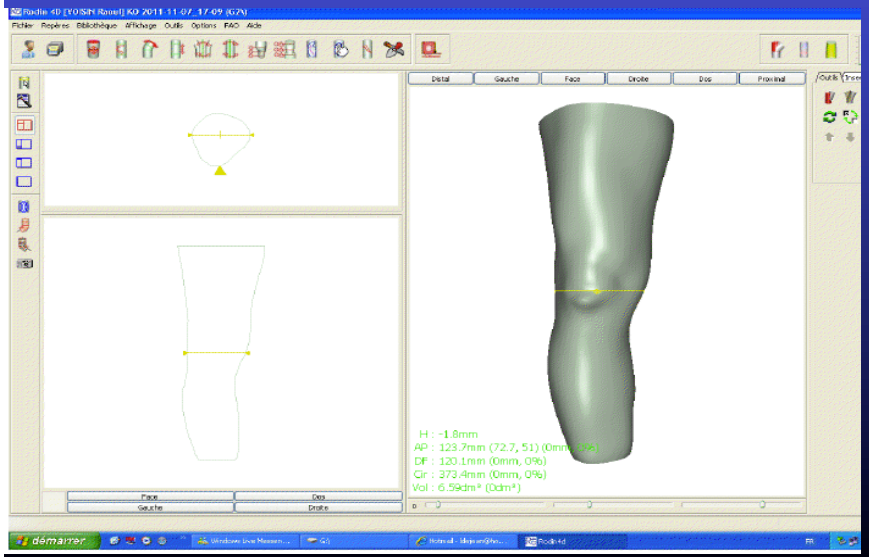
Perioperative management based on kinetics of bleeding during total primary arthroplasty. Irisson E, Kerbaul F, Parratte S, Hemon Y, Argenson JN, Rosencher N, Bellamy L. Ann fr Anesth Reanim 2013;32:170-4

CHANGES IN MY APPROACH TO THE COMPARTMENTAL KNEE

Full Limb View : mechanical axis origin of the deformity ?



Role of Unloading-Braces



UNIVERSITE DE LA MEDITERRANEE
AIX-MARSEILLE II

Role of HTO

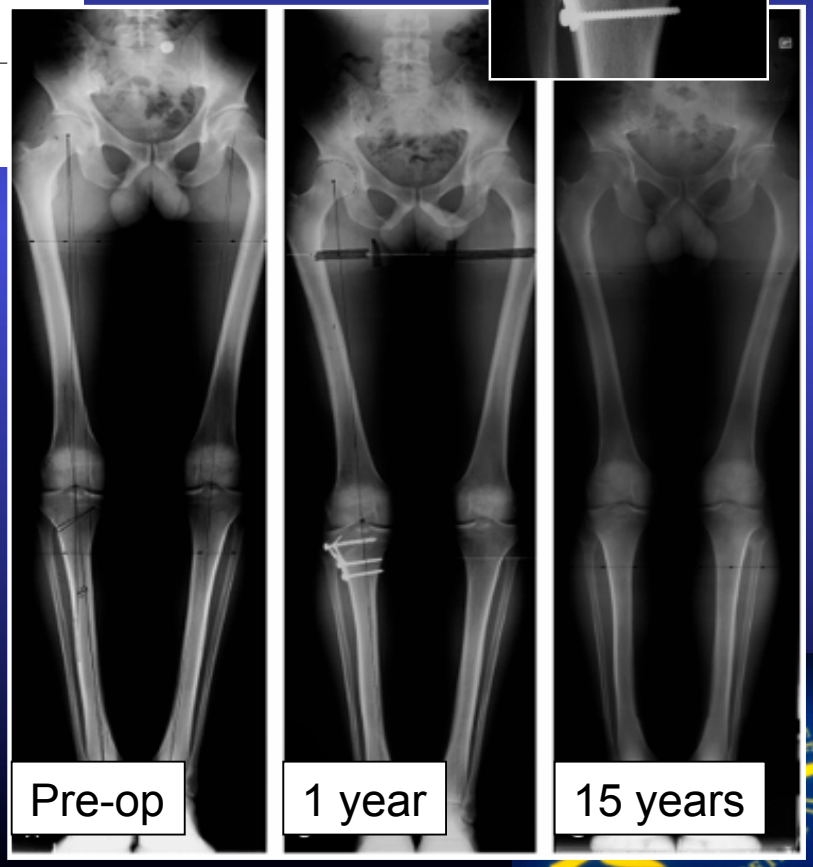
- **High Tibial Osteotomy**

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 452, pp. 91–96

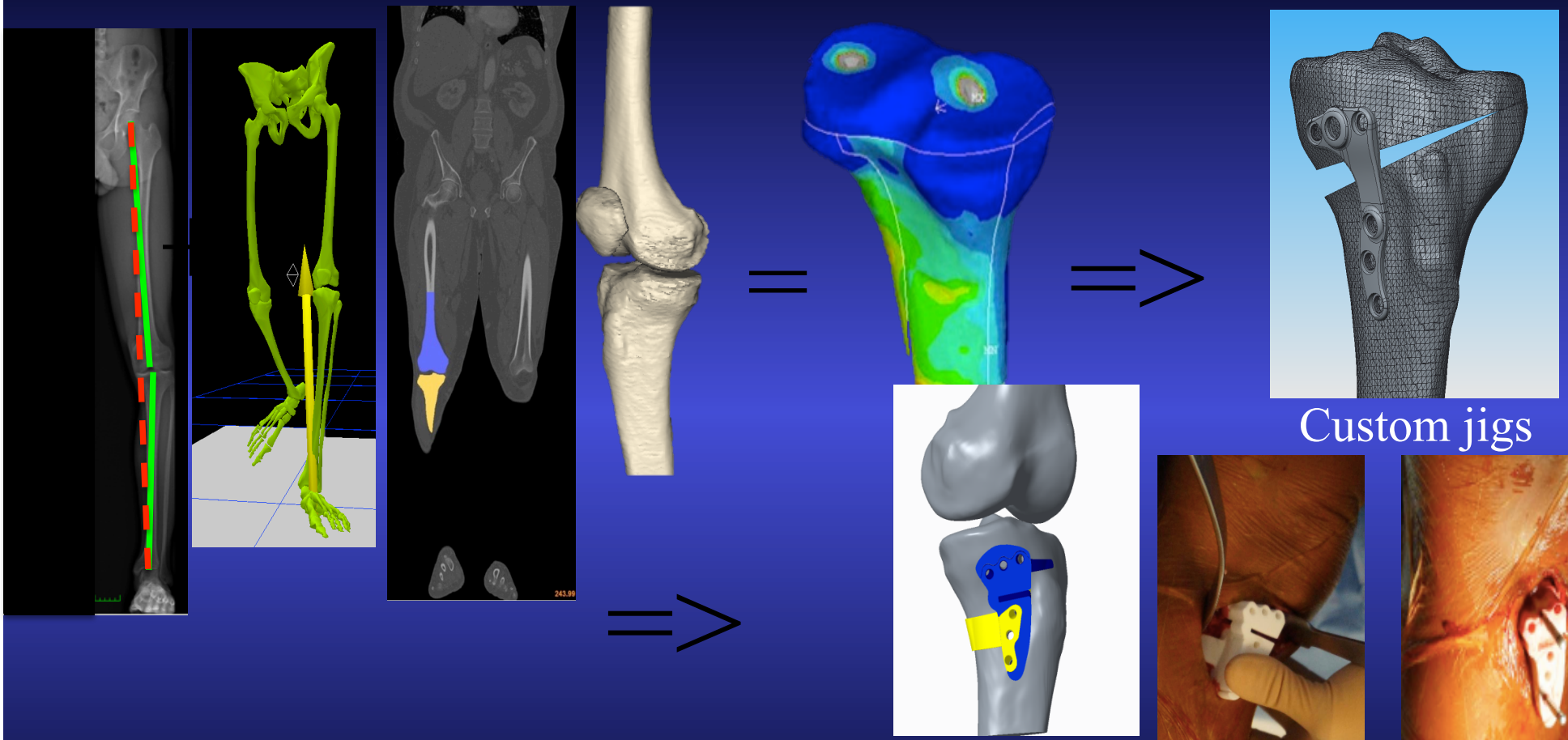
A 12–28-Year Followup Study of Closing Wedge High Tibial Osteotomy

Xavier Flecher, MD; Sebastien Parratte, MD; Jean-Manuel Aubaniac, MD; and Jean-Noël A. Argenson, MD

Parameter	Value	Hazard Ratio	p Value
Gender	female	1.07	p = 0.8
Operative age	> 50	2.1*	p = 0.014
BMI	< 30	0.27*	p = 0.02
Postoperative valgus angle	> 6°	0.46*	p = 0.02
Ahlback	< 3	0.29*	p = 0.01



New technologies for HTO



Custom jigs

Osteotomy: Individual 3-D planning

Journal of Surgical Orthopaedic Advances

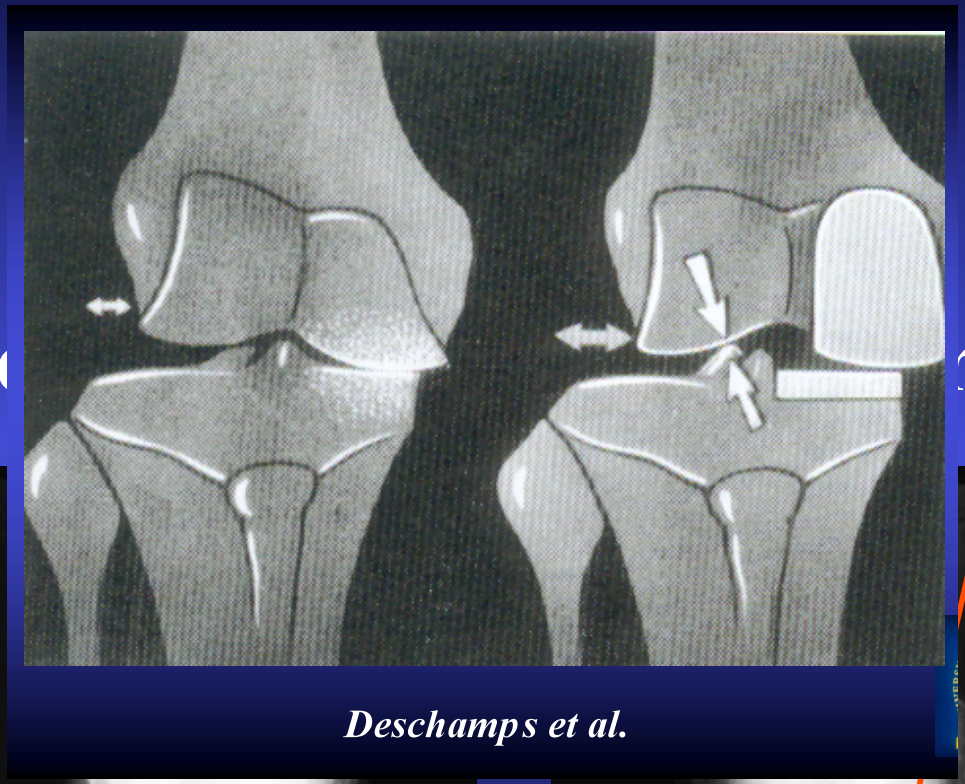
Consensus Statement on Indications and Contraindications for Medial Unicompartmental Knee Arthroplasty

Keith R. Berend, MD[1]; Michael E. Berend, MD[2]; David F. Dalury, MD[3]; Jean-Noel Argenson, MD[4]; Chris A. Dodd, MD[5]; and Richard D. Scott, MD[6]

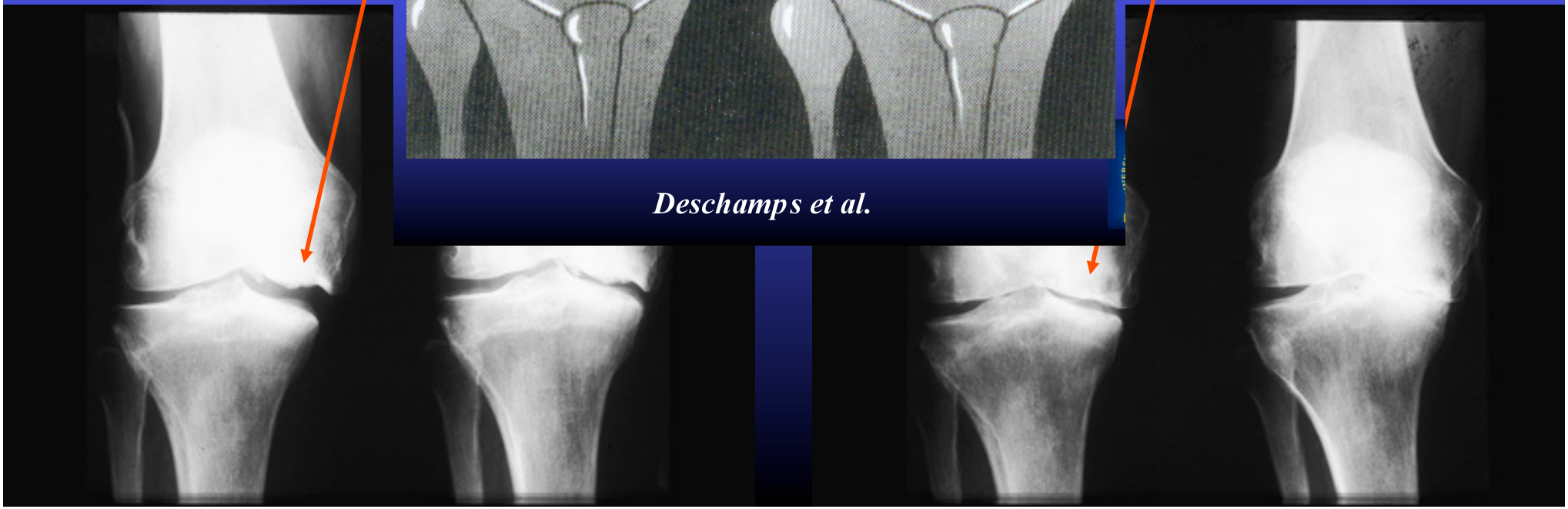
Previous work, now nearly 30 years dated, is frequently cited as the "gold standard" for the indications and contraindications for medial unicompartmental knee arthroplasty (UKA). The purpose of this article is to review current literature on the indications and contraindications to UKA and develop a consensus statement based on those data. Six surgeons with a combined experience of performing more than 8,000 partial knee arthroplasties were surveyed. Surgeons then participated in a discussion, emerging proposal, collaborative modification, and final consensus phase. The final consensus on primary indications and contraindications is presented. Notably, the authors provide consensus on previous contraindications, which are no longer considered to be contraindications. The authors provide an updated and concise review of the current indications and contraindications for medial UKA using scientifically based consensus-building methodology. (Journal of Surgical Orthopaedic Advances 24(4):252–256, 2015)

UKA : Frontal Instability

Full corr rrection



Deschamps et al.



Knee Function after UKA ?

- Function restoration

Clin Orthop Relat Res (2012) 470:61–68
DOI 10.1007/s11999-011-1961-4

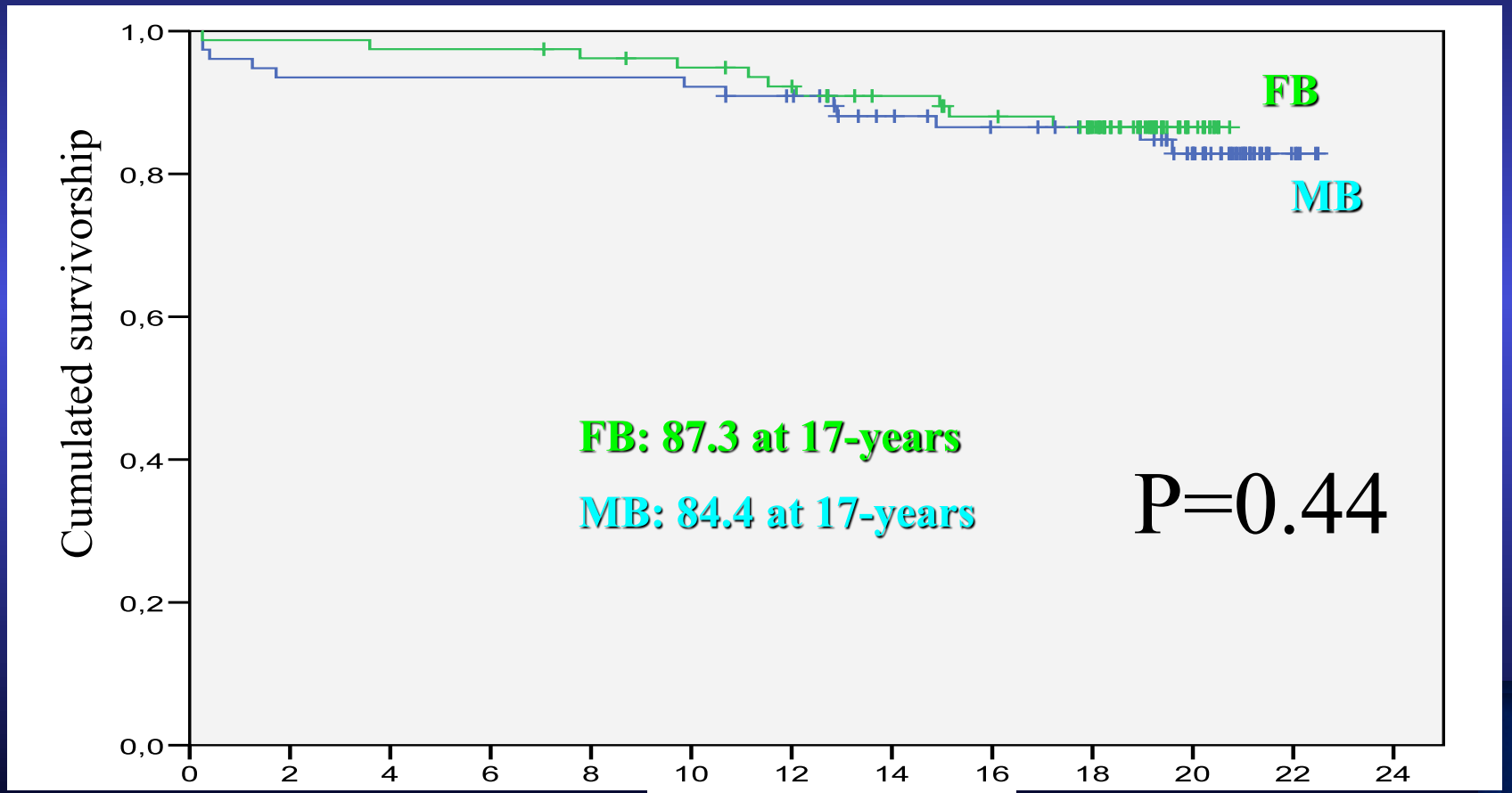
SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE KNEE SOCIETY

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

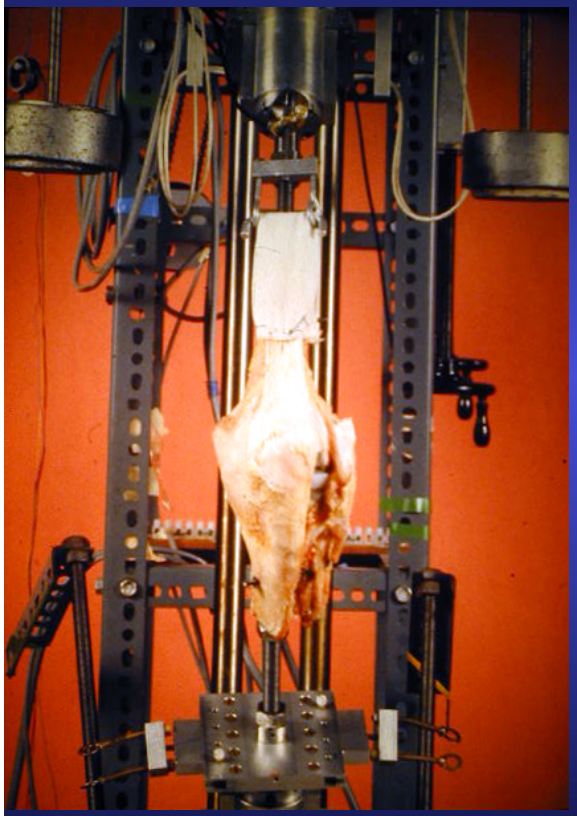
Survival Results ?

Kaplan-Meier survivorship analysis



Knee : Six degrees freedom rig

A full load (2 X BW) physiologic lunge activity was simulated using a **KUKA KR500**



6 degrees of freedom robotic arm: Force-torque control were taken from joint kinetics from live patients during the lunge activity

2010

Argenson and O'Connor, 1990

6 degrees of freedom Oxford rig

The Journal of Arthroplasty Vol. 17 No. 8 2002

In Vivo Determination of Knee Kinematics for Subjects Implanted With a Unicompartmental Arthroplasty

Jean-Noël A. Argenson, MD,* Richard D. Komistek, PhD,†
Jean-Manuel Aubaniac, MD,* Douglas A. Dennis, MD,† Eric J. Northcut, MS,†
Dylan T. Anderson,† and Serge Agostini, MD‡

The 2015 John Insall Award

Compare in a prospective randomized study
PSI versus Standard technique

1. Radiological : NO DIFFERENCE
2. Function : NO DIFFERENCE
3. Gait : NO DIFFERENCE

Clin Orthop Relat Res
DOI 10.1007/s11999-015-4259-0

and Relate
A Publication of The Associat

SYMPOSIUM: 2015 KNEE SOCIETY PROCEEDINGS

John Insall Award Paper

No Functional Benefit After Unicompartmental Knee Arthroplasty Performed With Patient-specific Instrumentation: A Randomized Trial

Matthieu Ollivier MD, Sebastien Parratte MD, PhD, Alexandre Lunebourg MD, Elke Viehweger MD, PhD, Jean-Noel Argenson MD, PhD

Discussion

Modern Unicompartmental Knee Arthroplasty with Cement

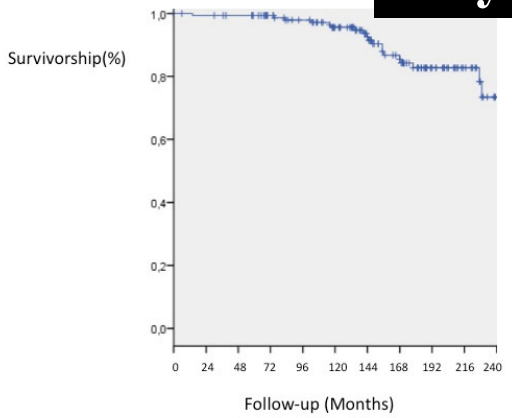
A Concise Follow-up, at a Mean of Twenty Years, of a Previous Report*

Jean-Noel A. Argenson, MD, Guillaume Blanc, MD, Jean-Manuel Aubaniac, MD, and Sebastien Parratte, MD

Investigation performed at the Institute for Locomotion, Aix-Marseille University, Marseille, France

94 % at 10 years

74 % at 20 years



What about Lateral UKA?

- **Primary Osteoarthritis (valgus): 24 knees**
- **Post-traumatic: 12 knees**
- **Avascular Osteonecrosis: 4 knees**

Lateral Unicompartmental Knee Arthroplasty Relieves Pain and Improves Function in Posttraumatic Osteoarthritis.
***Lustig S**, Parratte S, Magnussen RA, Argenson JN, Neyret P.*
Clin Orthop Relat Res. 2012 470: 61-8

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH
Number 440, pp. 50–53

Patellofemoral Arthroplasty

An Update

Jean-Noël A. Argenson, MD; Xavier Flecher, MD; Sebastien Parratte, MD; and Jean-Manuel Aubaniac, MD

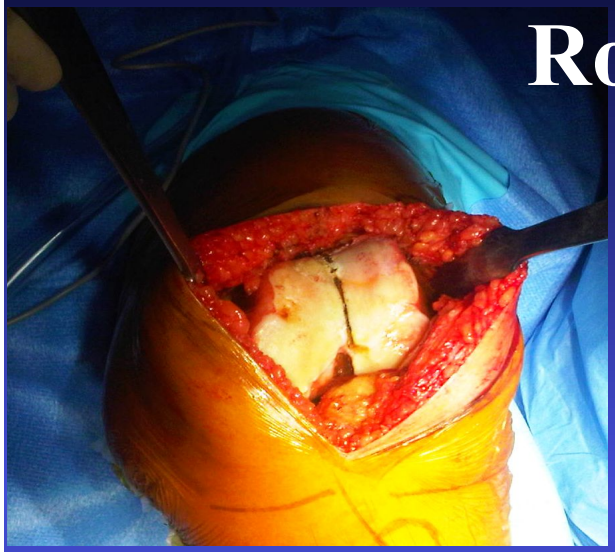
1. Primary Arthritis with no F-Tdeformity

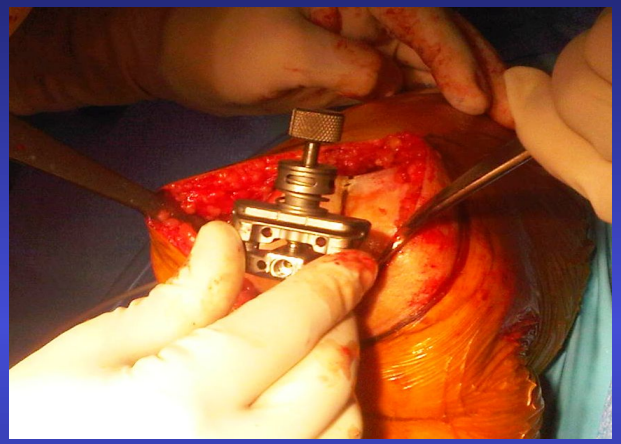
2. P-F Instability with aligned extensor mechanism

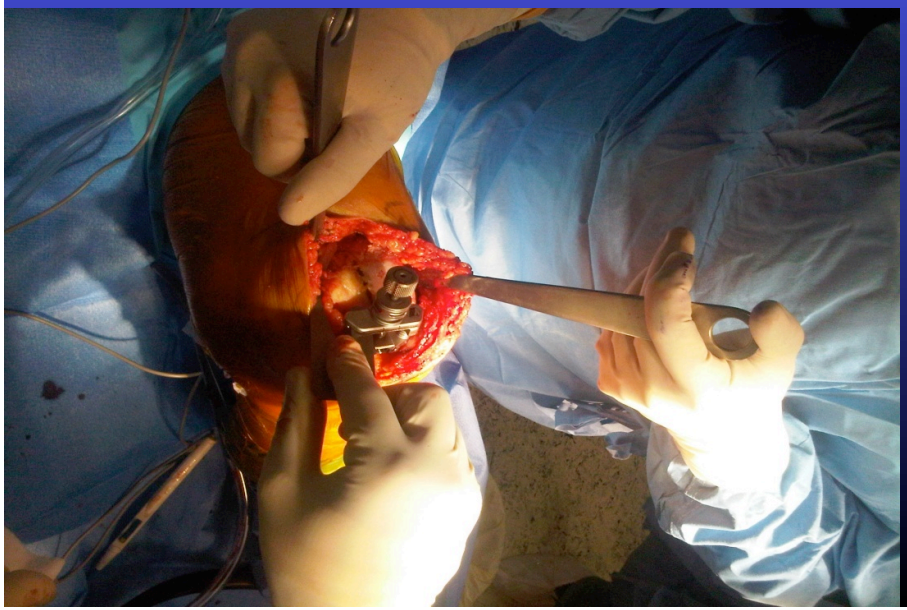
3. Post-traumatic: good mobility, no patella barra

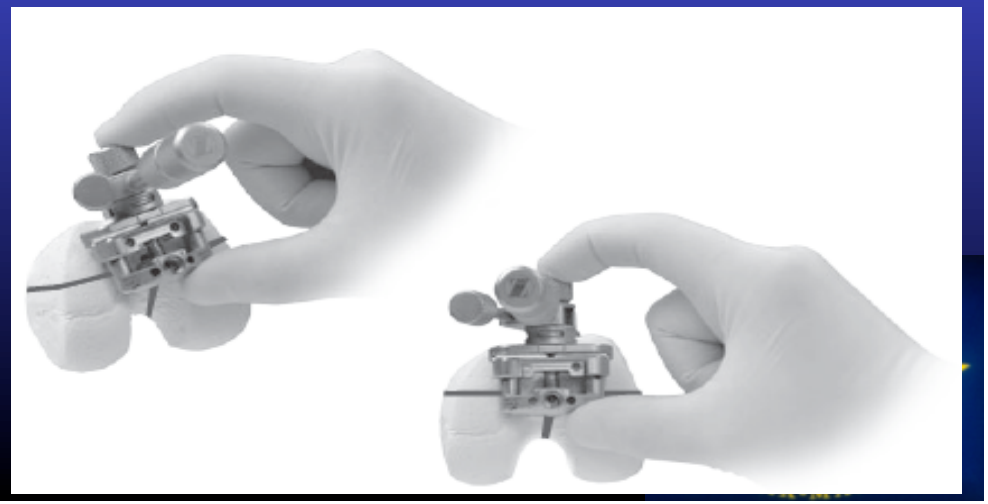
Anterior Cut

Rotation: Whiteside line









More than one compartment ?

S Parratte JM Aubaniac JN Argenson

009

Original article

Orthopaedics & Traumatology: Surgery & Research

OTSR 2015;101:547-52

Is knee function better with contemporary modular bicompartmental arthroplasty compared to total knee arthroplasty? Short-term outcomes of a prospective matched study including 68 cases

S. Parratte[a,*], M. Ollivier[a], G. Opsomer[b], A. Lunebourg[a], J.-N. Argenson[a], E. Thienpont[b]

[a] *Institut du mouvement et de l'appareil locomoteur, UMR CNRS 787/AMU, hôpital Sainte-Marguerite, CHU Sud, 270, boulevard de Sainte-Marguerite, 13009 Marseille, France*

[b] *Département de chirurgie orthopédique, cliniques universitaires Saint-Luc, avenue Hippocrate 10, 1200 Brussels, Belgium*

UKA : easy revision ?

Revision of UKA: Is There a Difference Compared to Primary TKA and Revision TKA?

Parratte S, Lunebourg A, Pauly V, Flecher X, Aubaniac JM, Argenson JN

Institute for Locomotion
Center for Arthritis Surgery
Sainte-Marguerite University Hospital,
Marseille, France

JOA 2015;30:1985-9

AAOS 2013
Chicago

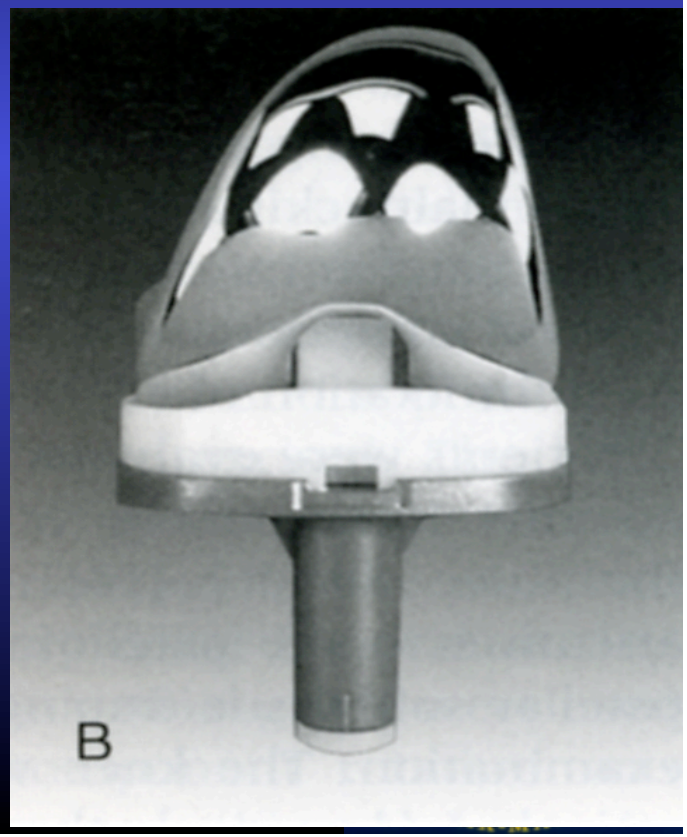
IML
Institut du Mouvement et de l'appareil Locomoteur

Conclusions

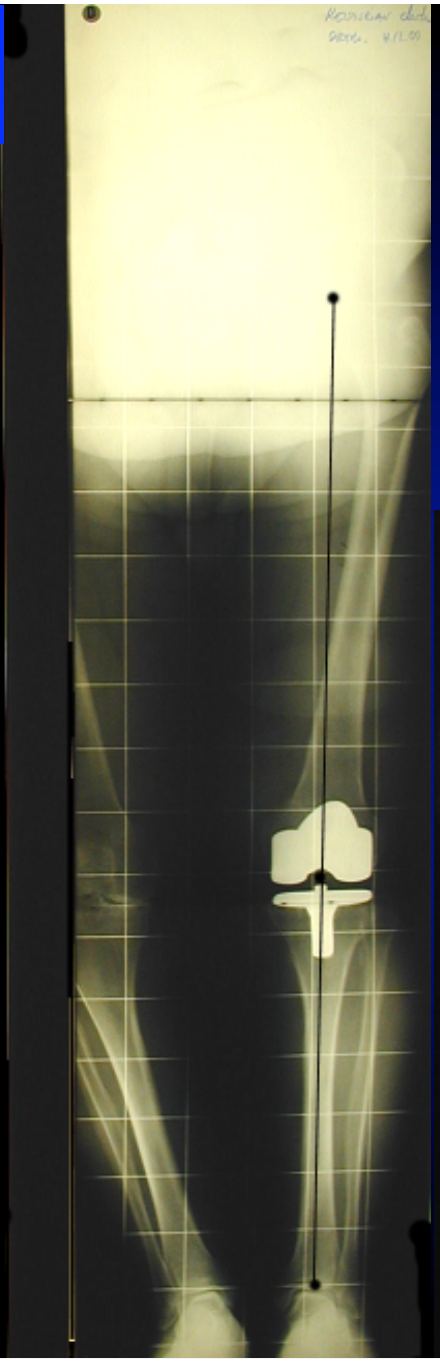
- **Results of TKA after UKA :** not as good as for a primary TKA
- **Rev UKA easier than a revision TKA** and more bone stock
- **Rate of re-revision:** Rev-TKA > Rev-UKA
- **When you do a UKA:** do it for a long time !

CHANGES IN MY APPROACH TO THE TOTAL KNEE

Improving design of TKA



VAR deformity : 12°



Follow-up : 11 years

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

Jean-Noel 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

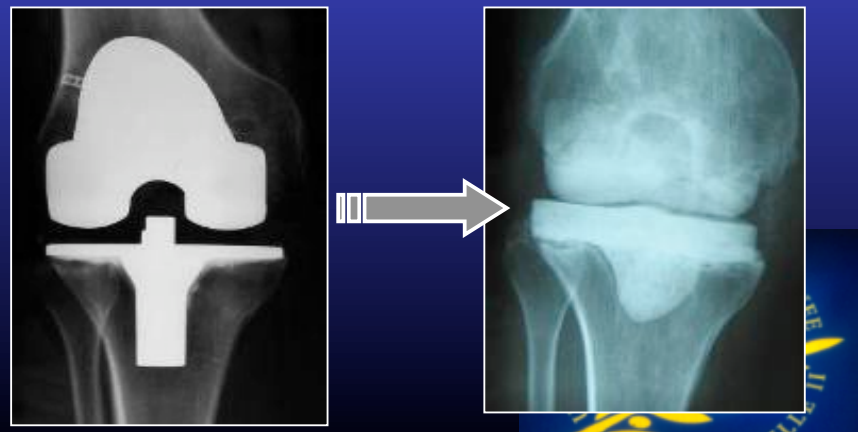
Results

Revision

- 1 revision for failure MCL after fall
  - revision at 12 months
- 1 revision for infection
  - previous surgery ++
  - 18 months
  - 2 stage revision

Survival at 10 years

98.3% considering all revisions



Long term Results TKA

Revue de chirurgie orthopédique et traumatologique (2013) 99, 321—326

ELSEVIER MASSON

MÉMOIRE ORIGINAL

Analyse de survie de la prothèse totale de genou à un recul minimum de dix ans : une étude française multicentrique nationale portant sur 846 cas☆

Survival analysis of total knee arthroplasty at a minimum 10 years' follow-up: A multicenter French nationwide study including 846 cases

J.-N. Argenson[a,*], S. Boisgard[b], S. Parratte[a], S. Descamps[b], M. Bercovy[c], P. Bonnevialle[d], J.-L. Briard[e], J. Brilhault[f,g], J. Chouteau[h], R. Nizard[i], D. Saragaglia[j], E. Servien[k], la Société française de chirurgie orthopédique et traumatologique (SOFCOT)[l]

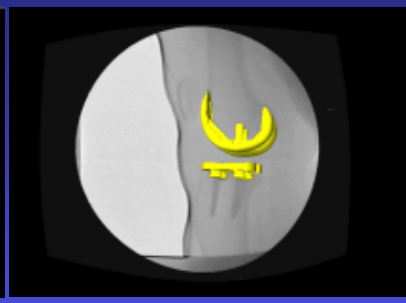
[a] *Service de chirurgie orthopédique, hôpital Sainte-Marguerite, CHU de Marseille, 270, boulevard Sainte-Marguerite, 13009 Marseille, France*

[b] *Service de chirurgie orthopédique, hôpital Gabriel-Montpied, CHU de Clermont-Ferrand, 56, rue Montalembert,*

Design Considerations Related to Anatomy or Kinematics ?

ACL Retaining

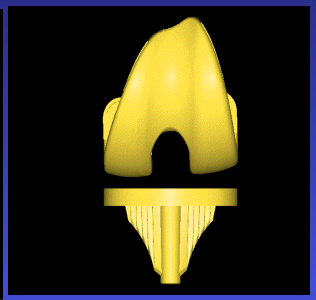
PCL Retaining



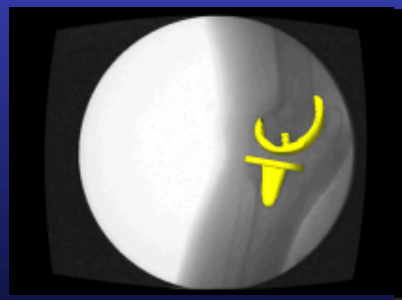
Posterior Stabilized

PS: Flat Insert

Single Radius



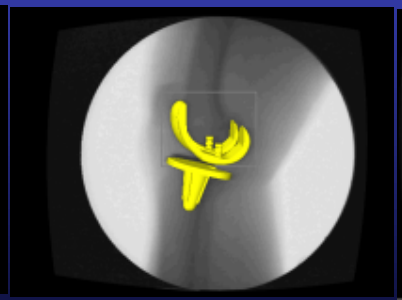
Rotating Platform



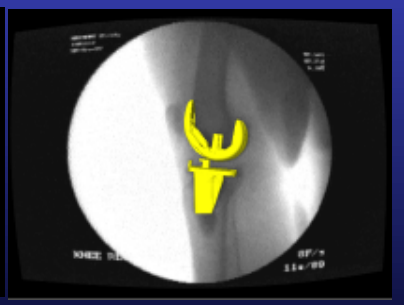
PS RP

PCR RP

PCR APG



PCR MBK



Richard D. Komistek, Ph.D.
University of Tennessee, Knoxville, TN

Bone Atlas: Morphology

	Ant. ML	Post. ML	TEA ML	Medial AP	Lateral AP	Central Height	AP Angle	Medial Z-Height
Male	36.3	53.6	86.6	66.9	68.5	59.9	5.20	5.08
Female	31.9	47.9	77.2	60.6	63.2	55.1	7.59	3.67
Male Std. Dev.	3.71	3.77	3.83	3.66	2.78	2.94	2.30	1.76
Female Std Dev.	3.43	3.52	3.55	3.07	3.02	2.99	3.15	1.32
Difference (μ_m-μ_f)	4.35	5.66	9.41	6.28	5.28	4.79	-2.39	1.41
T-Test	**<.01**	**<.01**	**<.01**	**<.01**	**<.01**	**<.01**	**<.01**	**<.01**

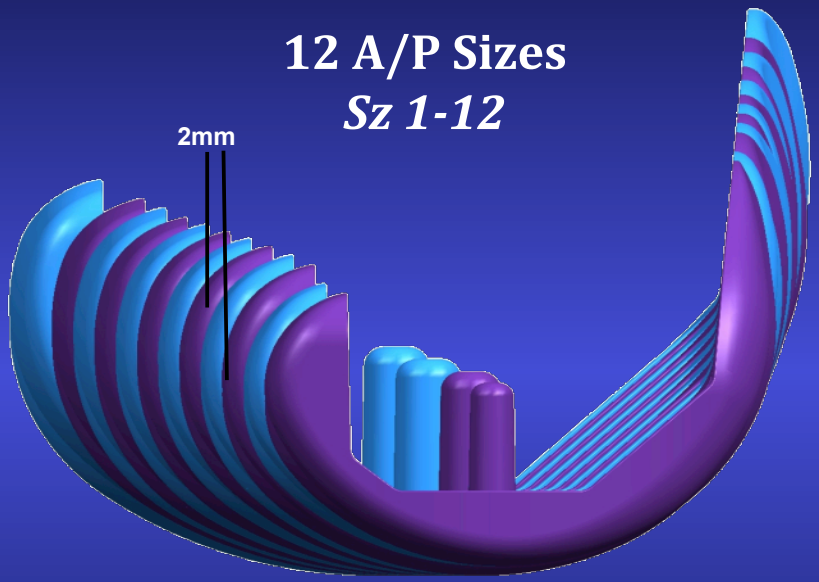
Automatic methods for characterization of sexual dimorphism of distal adult femora. ***Comput Methods Biomech Biomed Engin. 2007 Dec; 10(6):447-6.*** **M.Mahfouz, R. Booth,B.Merkl,E.Fatah, JN. Argenson.**

Personalized Fit

Sizing/Shape Refinements

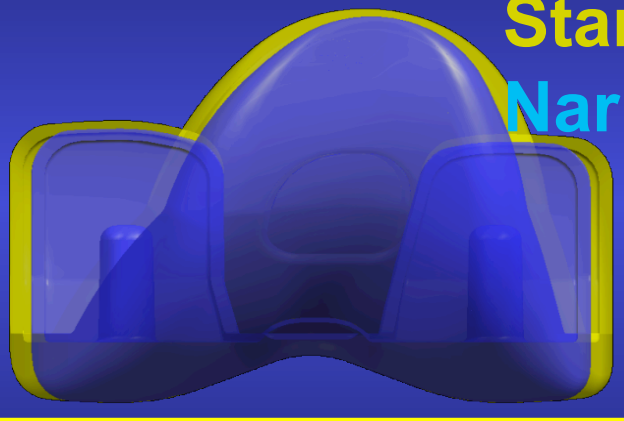
High-Fidelity Femoral Sizing

12 A/P Sizes
Sz 1-12



+

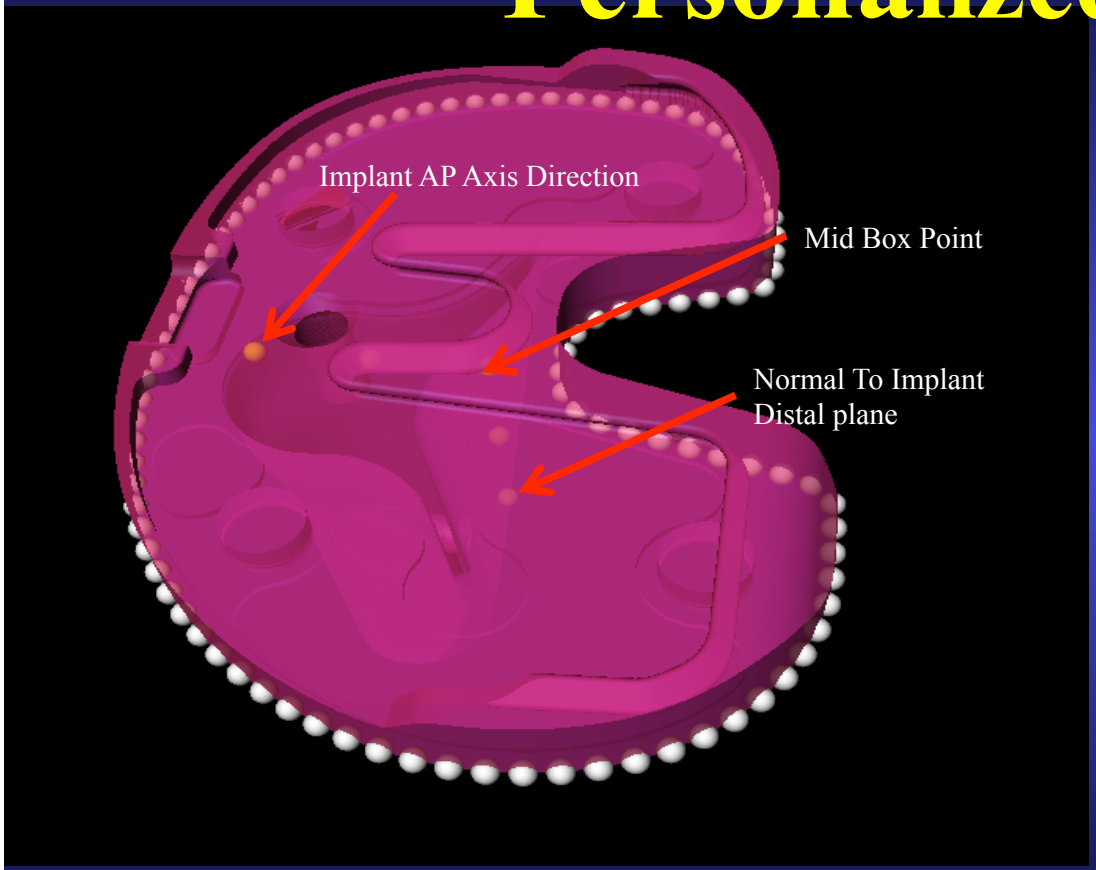
2 M/L Widths
Standard/Narrow

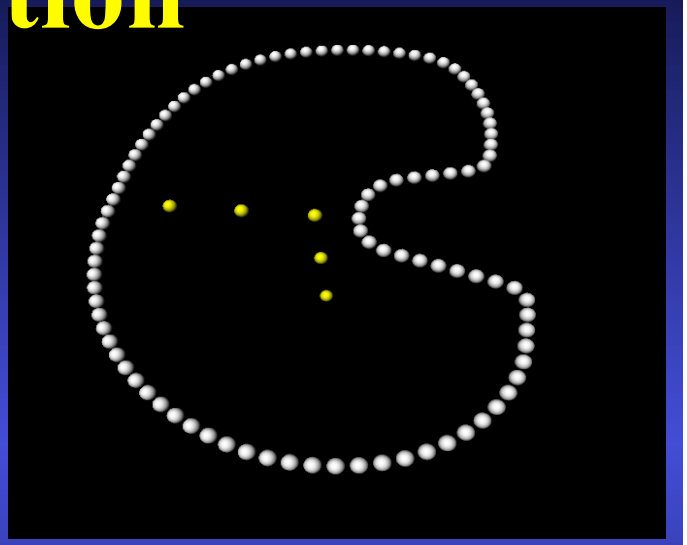


Persona Size	1	2	3	4	5	6	7	8	9	10	11	12
Corr. NexGen Size	B		C		D		E		F		G	H
Corr. N-K Flex Size	00		0		1		2		3		4	5

➢ **21 distincts femoral profiles**

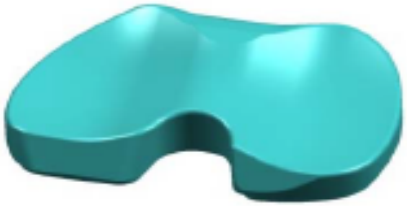
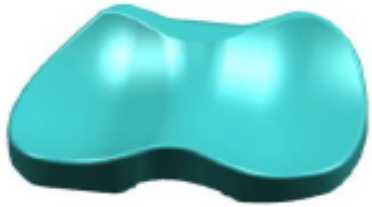
Optimizing standard design for a Personalized solution





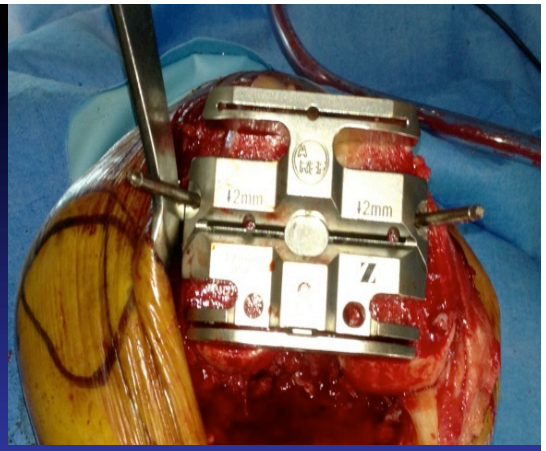
- Align Implant AP axis and Distal plane normal to bone projected AP axis and resection plane normal

Intra-operative Continuum of Stability

Cruciate Retaining	Ultracongruent	Posterior Stabilized	Constrained Posterior Stabilized (CPS)
			
• Asymmetric femoral condyles mated with asymmetric art surfaces •1mm increments	•Maintain High flexion Kinematics •Reduce sharp edge contact MCL/LCL •1mm increments	• Increased lateral mobility Enhanced post geometry 1mm increments	•Intermediate constraint b/t PS & CCK •Moderate V/V & rotational constraint •2mm increments

Experience Persona

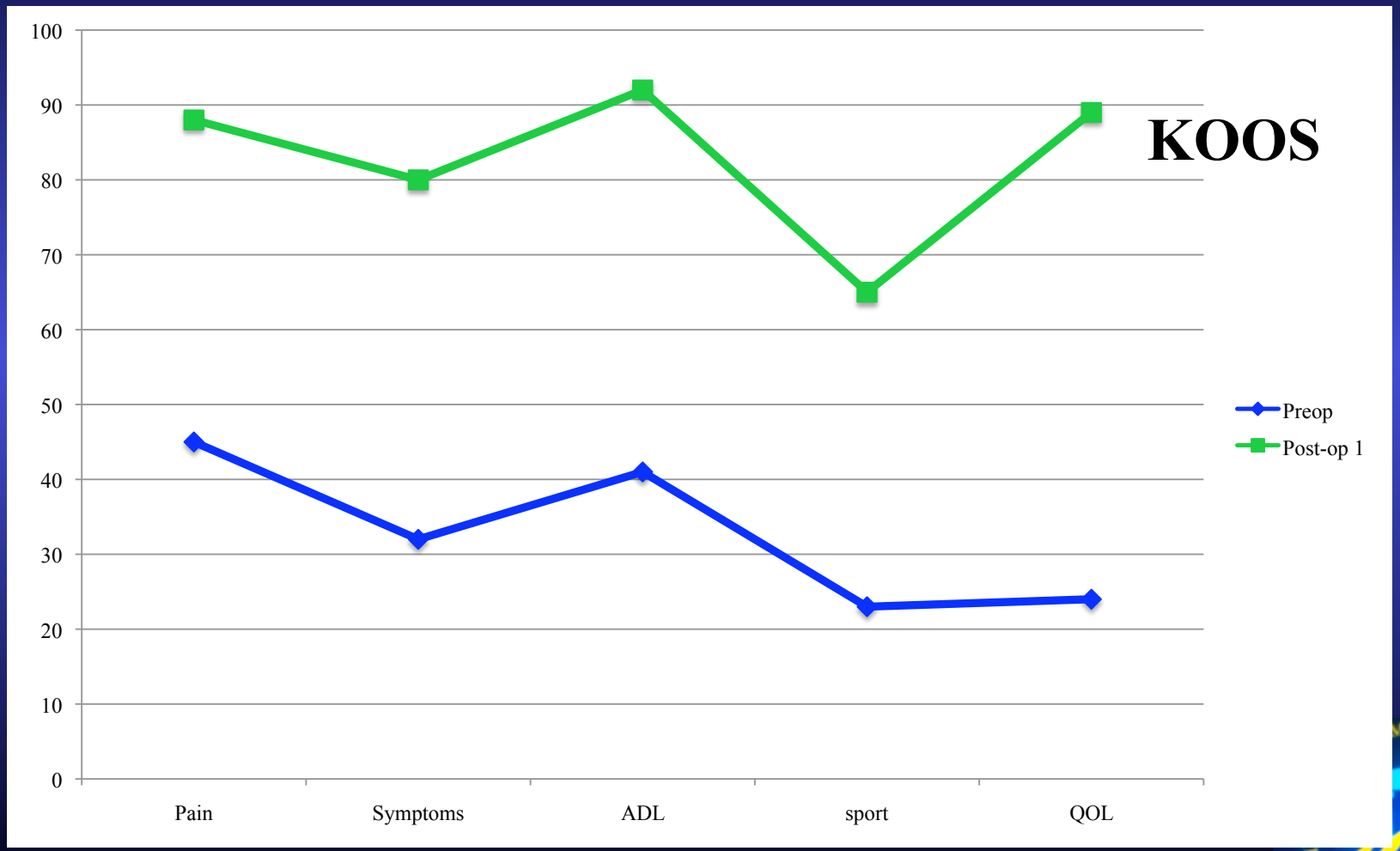
100 first Persona, min. 2 Y FU



No tourniquet, medial parapatellar approach

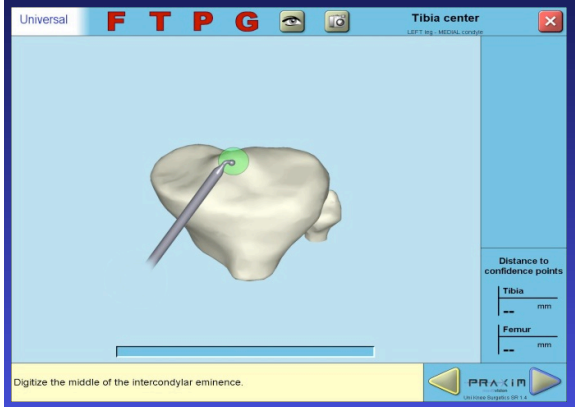
Persona® The Personalized Knee System

PROMS

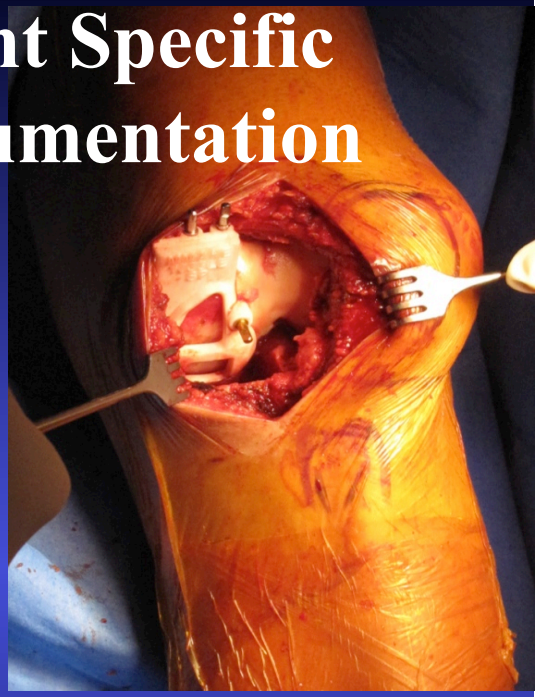

KOOS
100
90
80
70
60
50
40
30
20
10
0
Pain
Symptoms
ADL
sport
QOL
Preop
Post-op 1

Solutions in 2020 ?

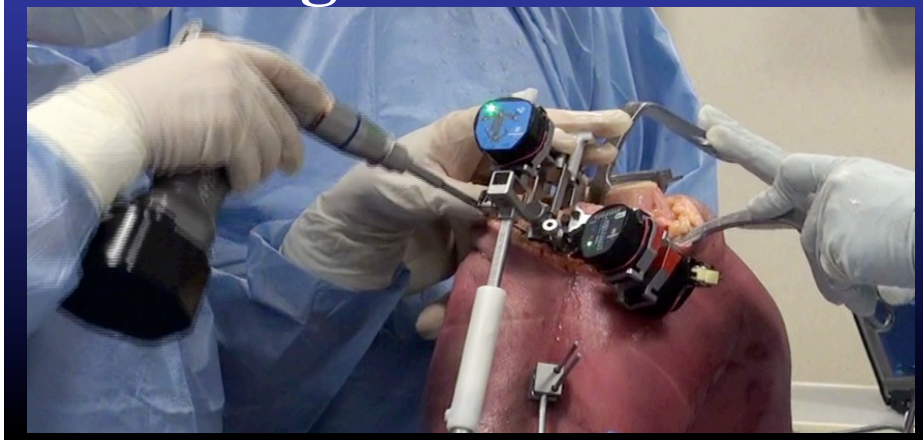
Navigation



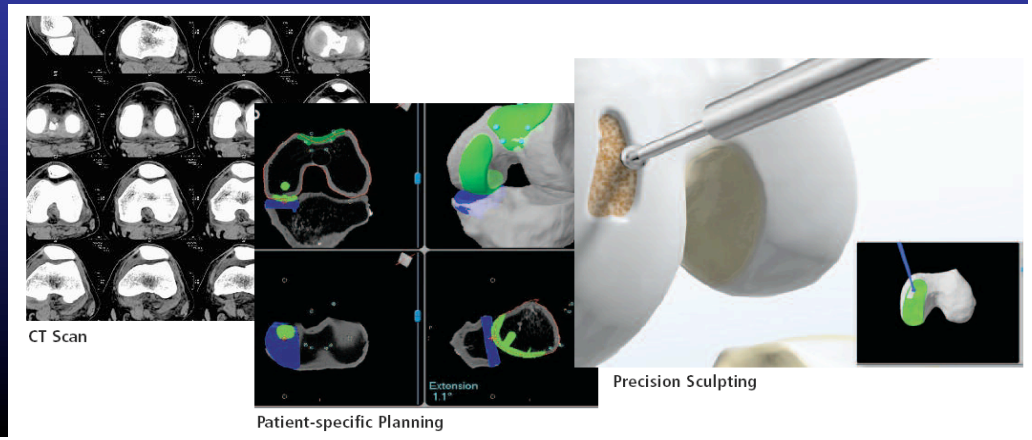
Patient Specific Instrumentation



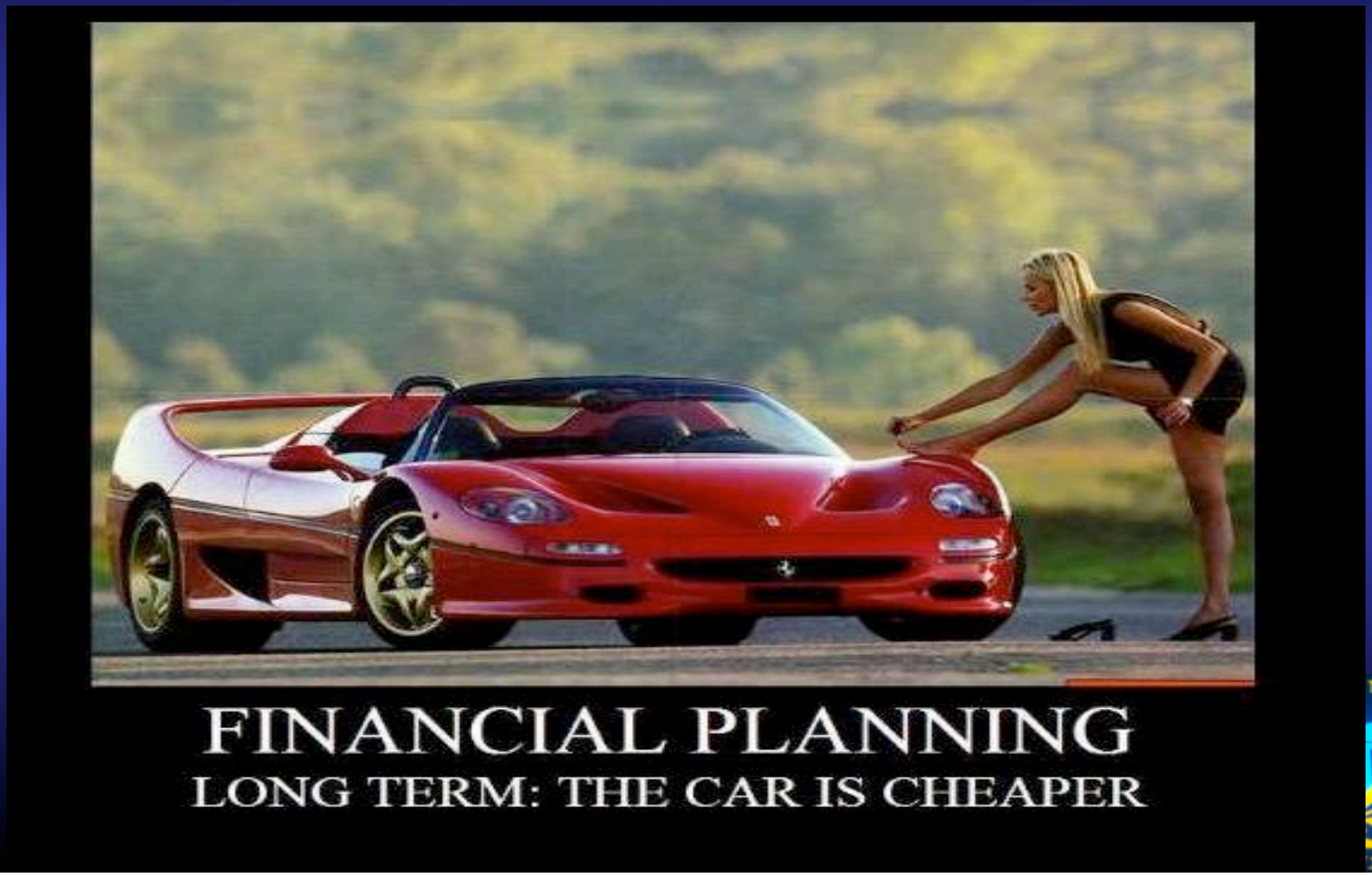
« Intelligent cutting guides »



Robot



Cost ?



The new Orthopedic Practice

CONCLUSION

- We know the 10 to 15 year results of UKA and TKA based on correct patient selection
- We need to evaluate and match every patient expectation
- We need to incorporate in our arthroplasty practice the pain and bleeding control technologies
- Design evolutions and reproducible instrumentation can match every surgeon expectations

EKS Open Meeting
19-21 April, 2017
London, UK

European Knee Society
EKS