Fixed or Mobile bearing in Unicompartmental Knee Arthroplasty

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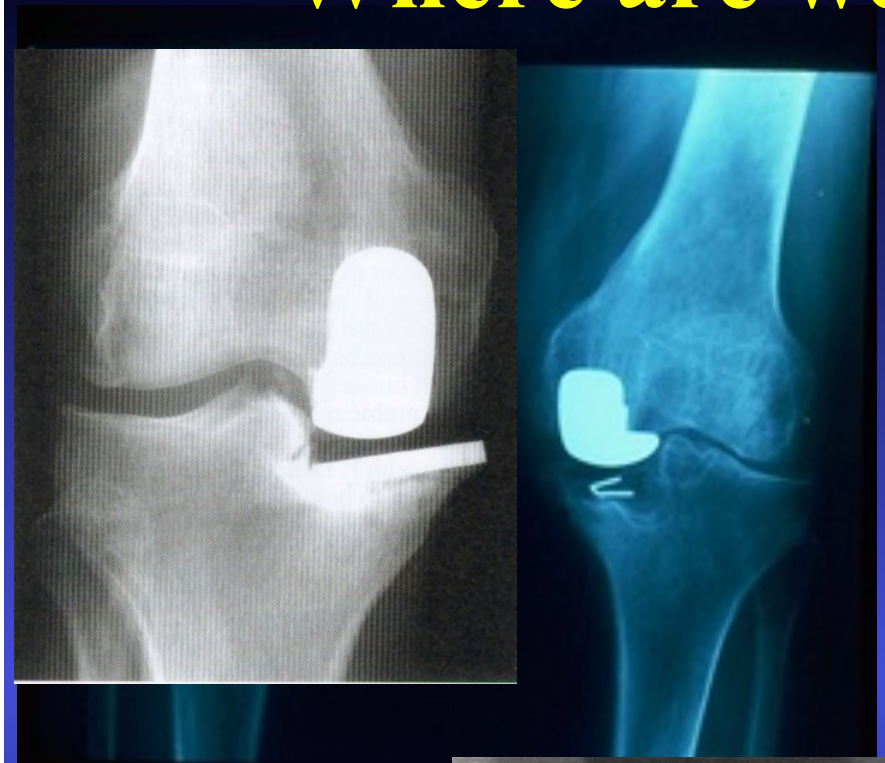
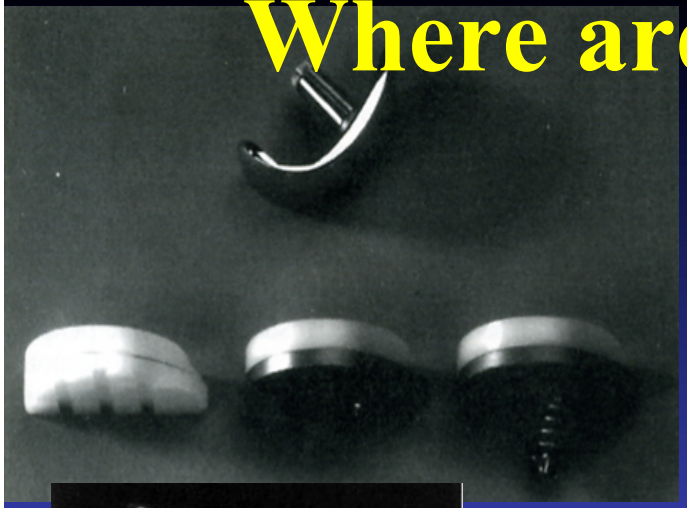
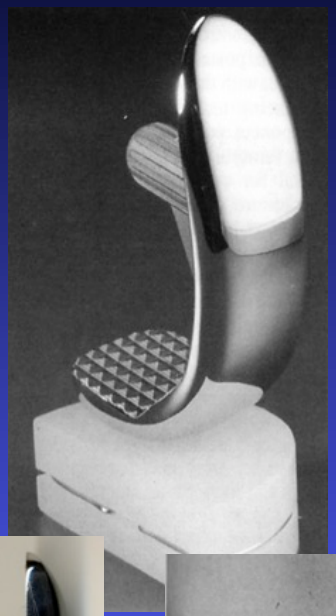
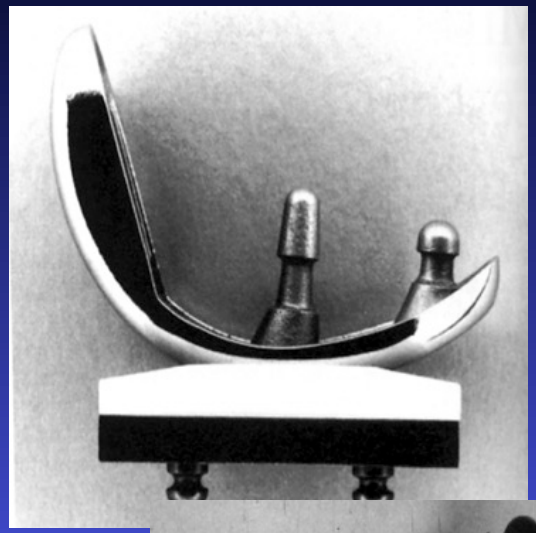
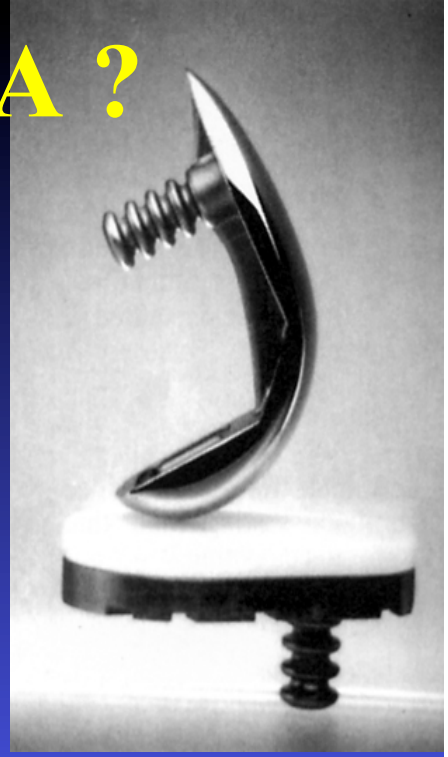
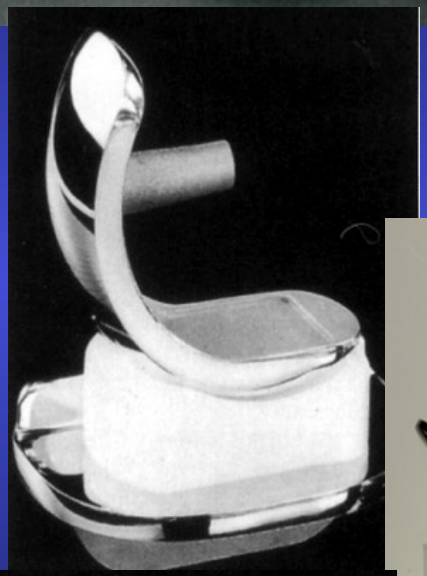
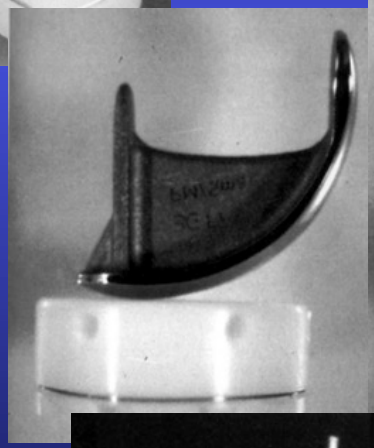
Where are we for Design in UKA ?

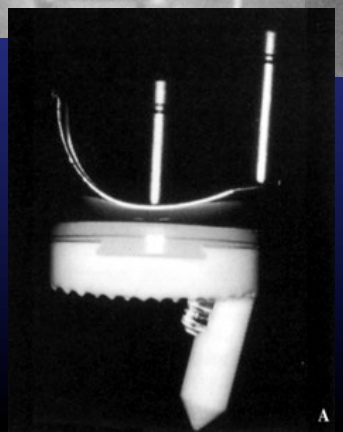


- 1980's : The Marmor type experience
- 1990's : Metal-backing, fixed and mobile bearings
- 2000's : Designs for matching new patient expectations

Where are we for Design in UKA ?



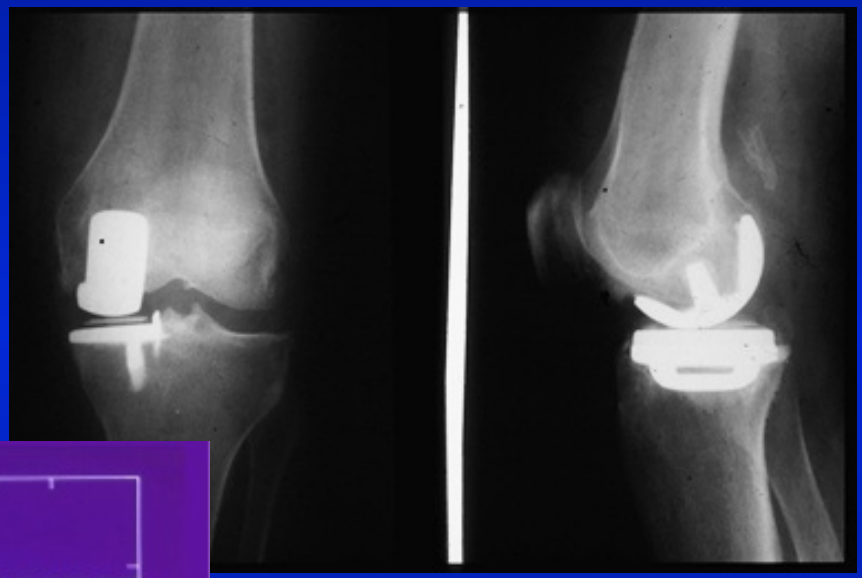



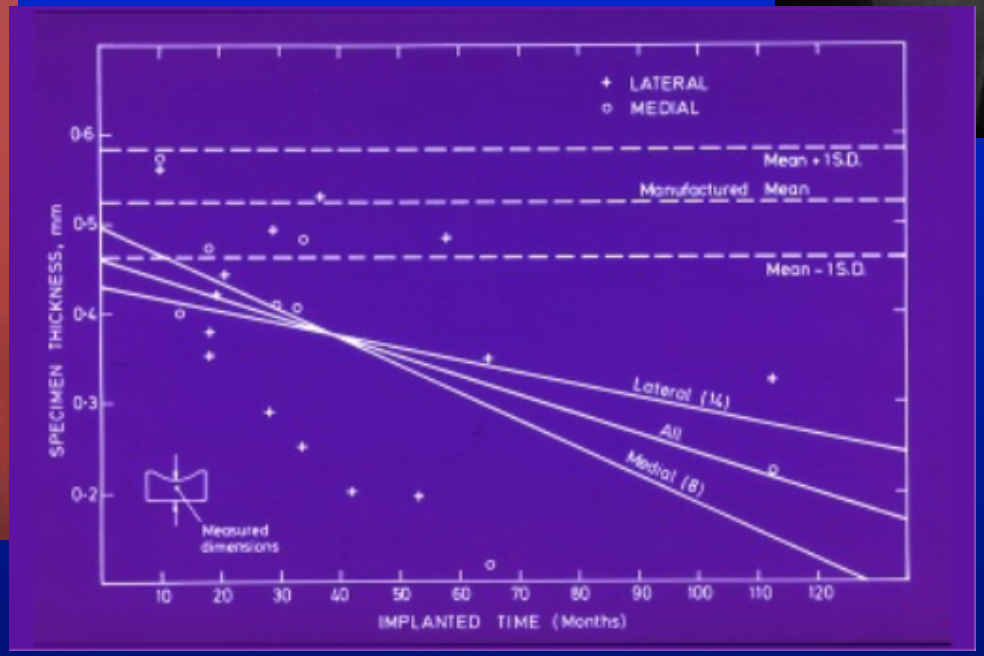

Fixed or mobile !

Polyethylene Wear in UKA ?

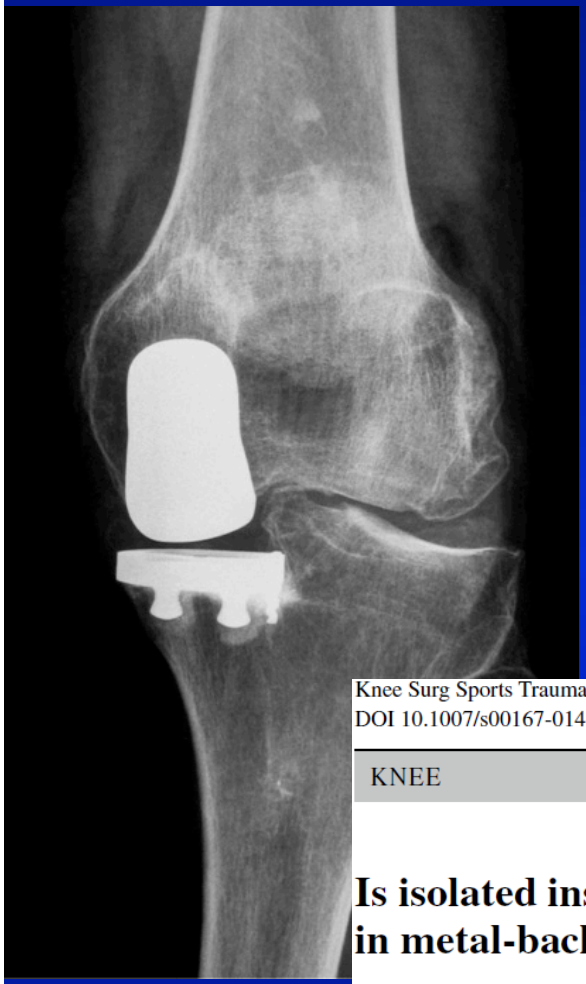
JW.Goodfellow, JJ.O' Connor, CORR 1986,Surface arthroplasty of the tibiofemoral joint

JN.Argenson, JJ.O' Connor, JBJS Br 1992,Polyethylene wear in meniscal knee replacement





Full poly or metal-back ?



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

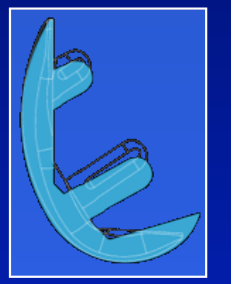
KNEE

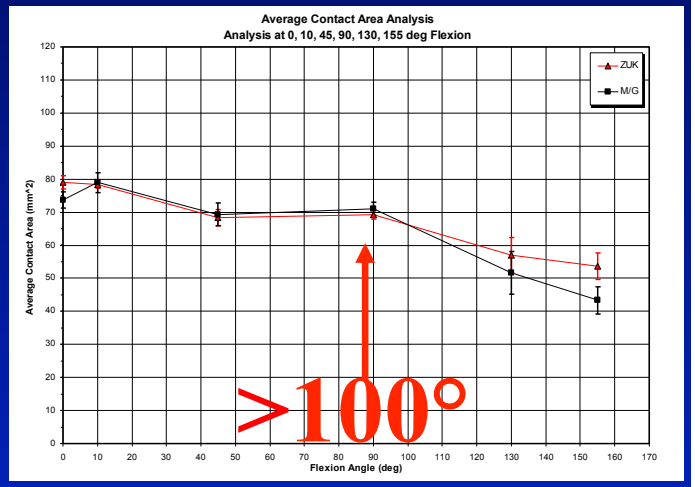
Is isolated insert exchange a valuable choice for polyethylene wear in metal-backed unicompartmental knee arthroplasty?

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

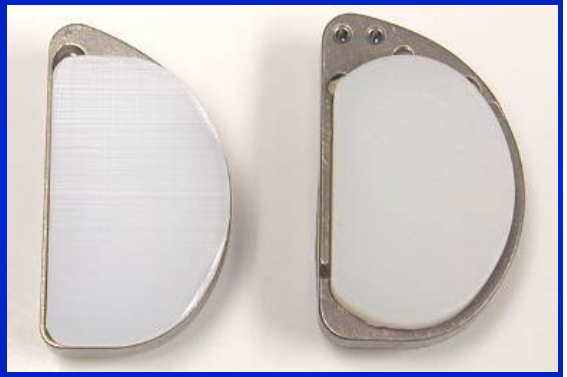
Received: 3 June 2014 / Accepted: 15 October 2014

Where are we going for Design in UKA ?



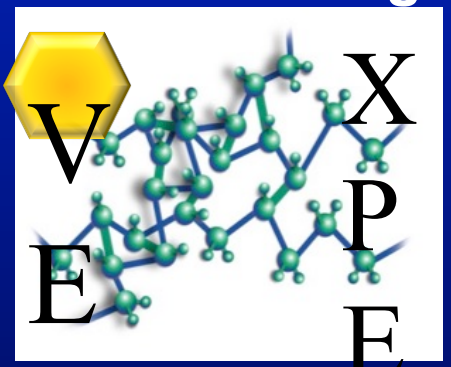


- Improve area of contact and Improve anatomical fit
- Improve poly coverage
- Improve material properties



87.8% **poly coverage**

72.4% **poly coverage**



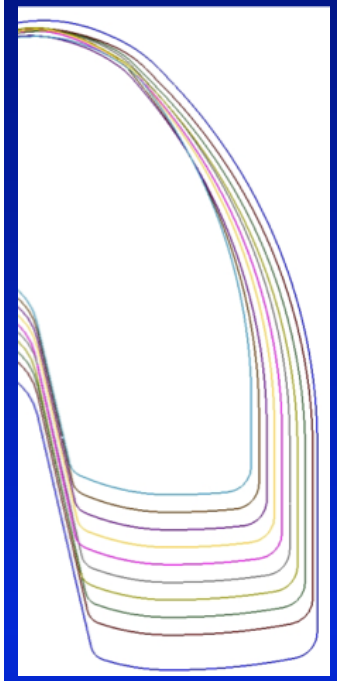
UKA a Solution for the "young"arthritic knee ?

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

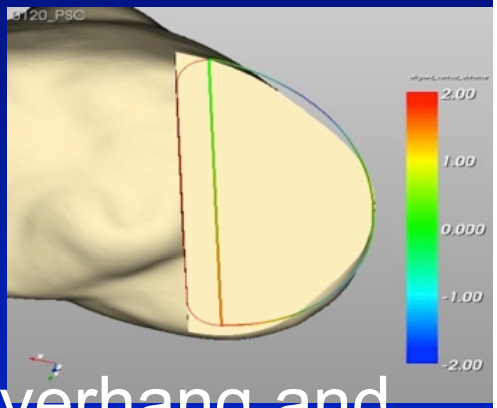
By Jean-Noël A. Argenson, MD (moderator), Sebastien Parratte, MD, Antoine Bertani, MD, Jean-Manuel Aubaniac, MD, Adolph V. Lombardi Jr., MD, Keith R. Berend, MD, Joanne B. Adams, BFA, Jess H. Lonner, MD, Ormonde M. Mahoney, MD, Tracy L. Kinsey, MSPH, Thomas K. John, MD, and Michael A. Conditt, PhD

Go for Personalized Fit

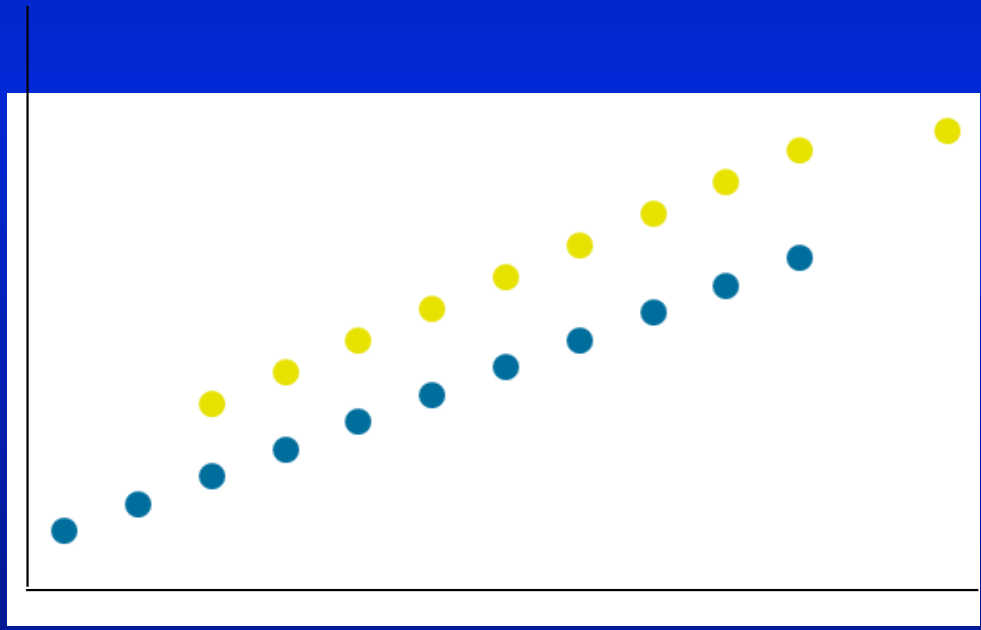


Need for shape

1. AP/ML fit
2. Coverage
3. Minimize overhang and underhang



Patella kinematics



Need for sizes

Medial unicompartmental knee replacement in the under-50s

VOL. 91-B, No. 3, MARCH 2009

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

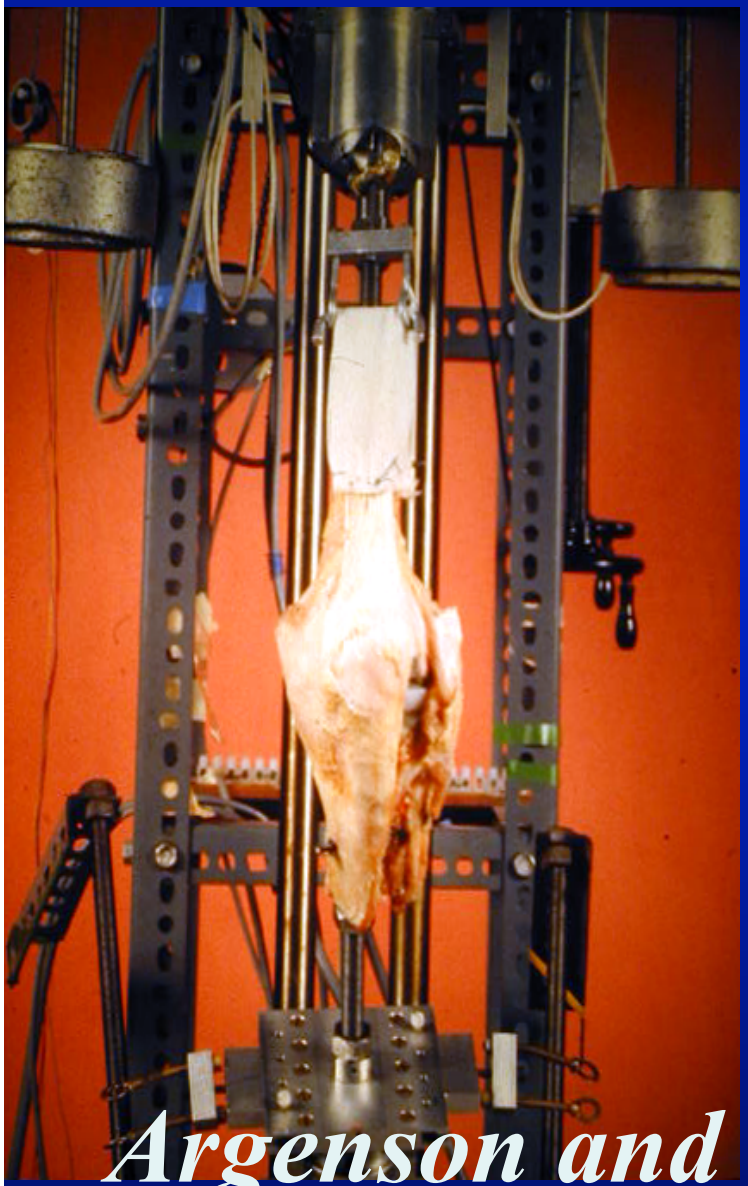
From Aix-Marseille University, Marseille, France

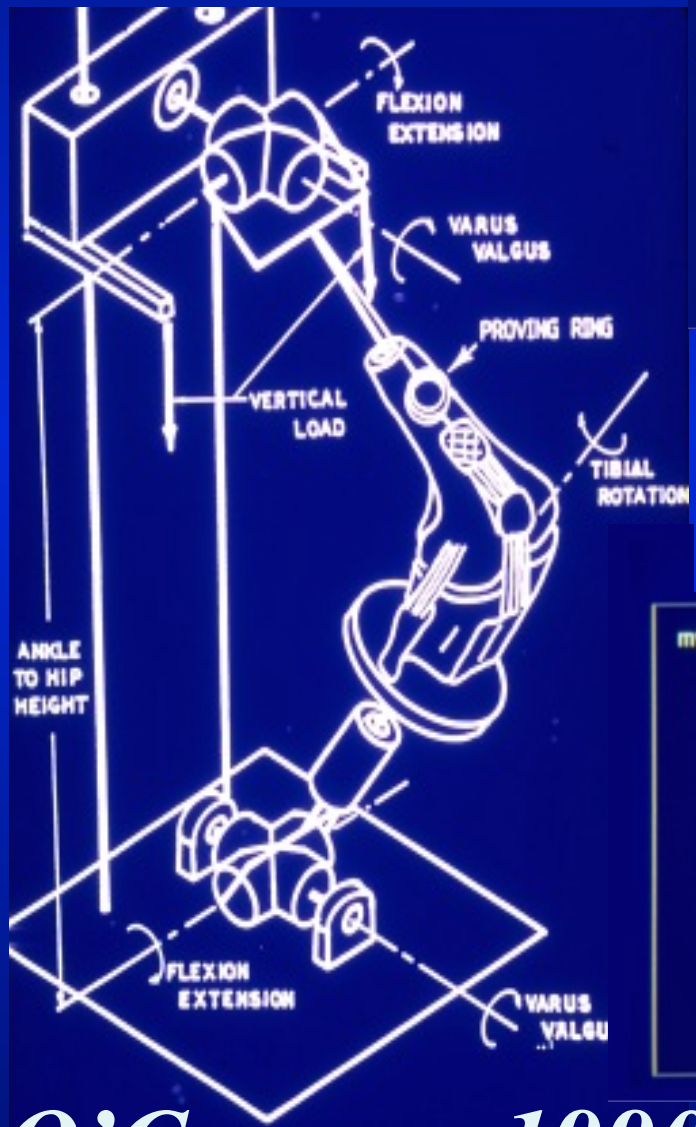
We retrospectively reviewed 35 cemented unicompartmental knee replacements performed for medial unicompartmental osteoarthritis of the knee in 31 patients ≤ 50 years old (mean 46, 31 to 49). Patients were assessed clinically and radiologically using the Knee Society scores at a mean follow-up of 9.7 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.

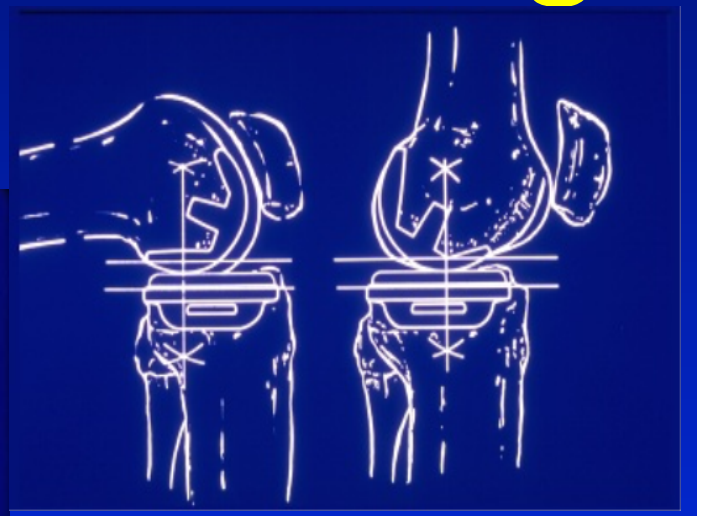
The 12-year survival according to Kaplan-Meier was 80.6% with revision for any reason as the endpoint. Despite encouraging clinical results, polyethylene wear remains a major concern affecting the survival of unicompartmental knee replacement in patients younger than 50.

- **Fixed bearing UKA = reliable solution for unicompartmental arthritis in active patients younger than 50 ?**
- **QOL restoration and return to physical activities**

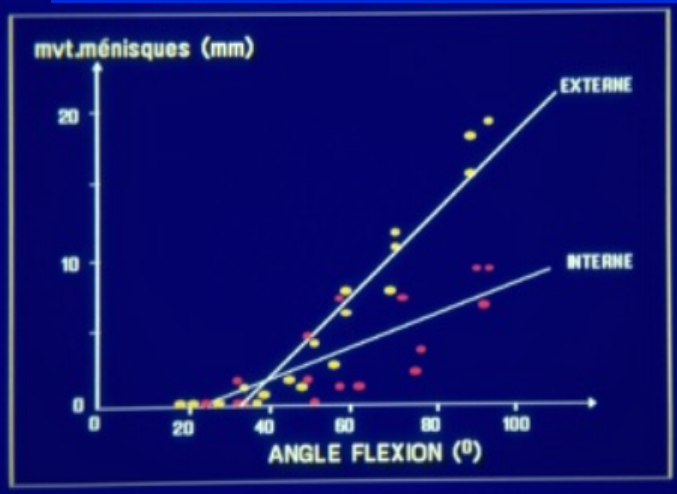
Knee : Six degrees freedom rig







Bearing movement

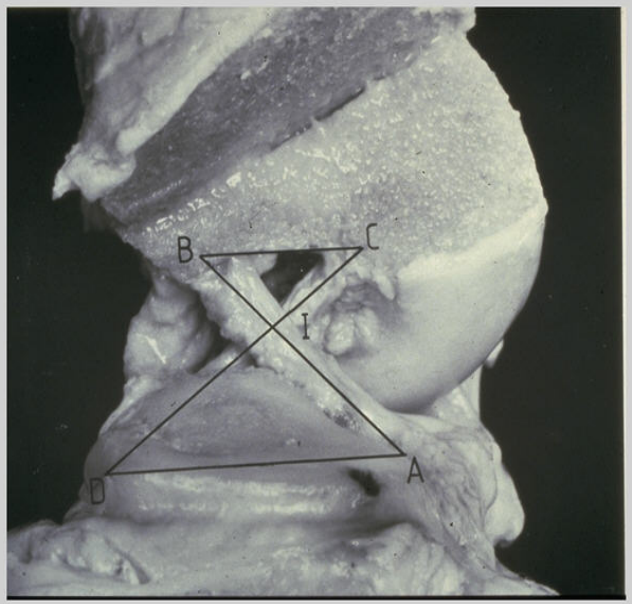


Argenson and O'Connor, 1990

Results Vs ACL

- **Lessons :**
  - **no posterior slope > 7° (Hernigou *JBJS 2004*)**
  - **no mobile bearing (Goodfellow *CORR 1992*)**
  - **active or sedentary: fixed bearing**

The Four bar linkage



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

Comparative Study at 17 years

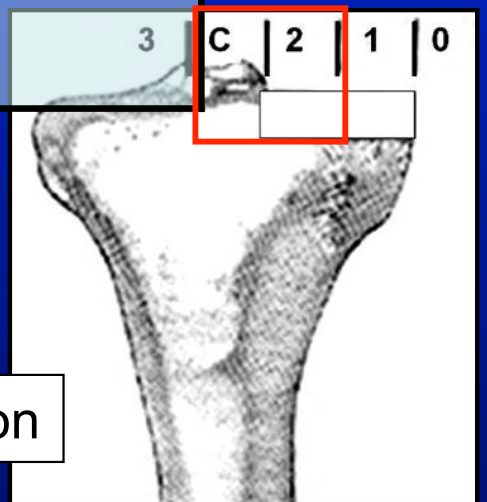
- Study design: retrospective comparative study
  - *Fixed-Bearing: 79 consecutive knees*
  - *Mobile-bearing: 77 consecutive knees*

	Knee Society Knee Score		***Knee Society Function Score***		***p***
	Pre-op	*Post-op*	*Pre-op*	*Post-op*	
Group FB	Mean=52±8 21 to 66	Mean=82±2 55 to 100	Mean=60±570 70 to 100	Mean=88±2 60 to 100	NS
Group MB	Mean=49±4 22 to 70	Mean=81±2 66 to 100	Mean=89±3 72 to 100	Mean=89±5 75 to 100	NS

Radiological Results ?

Restoration of the mechanical axis

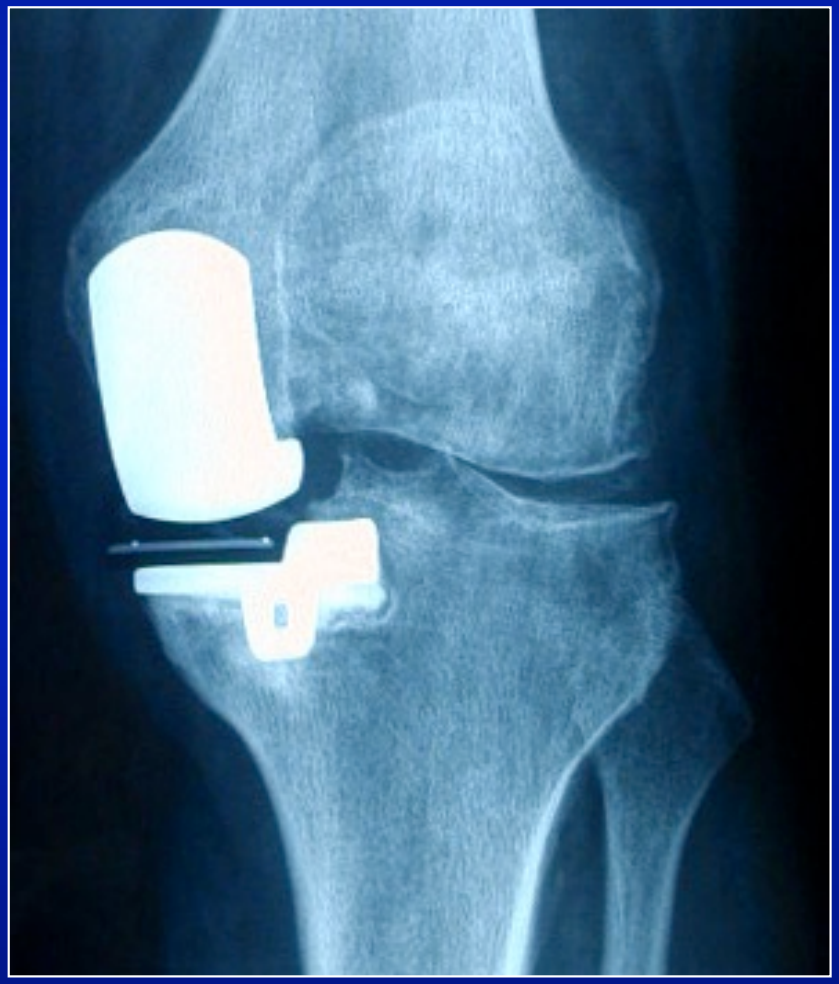
Type	N FB	N MB
1	4	1
2	57	34
C	17	36
3	1	6

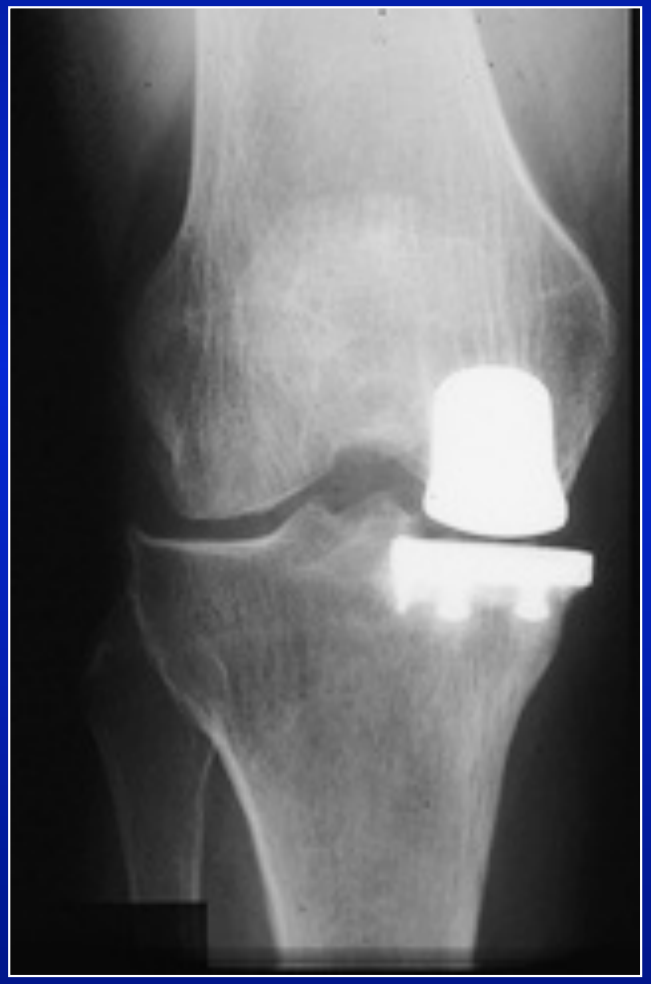


Kennedy classification

Results

Reactive lines <1mm





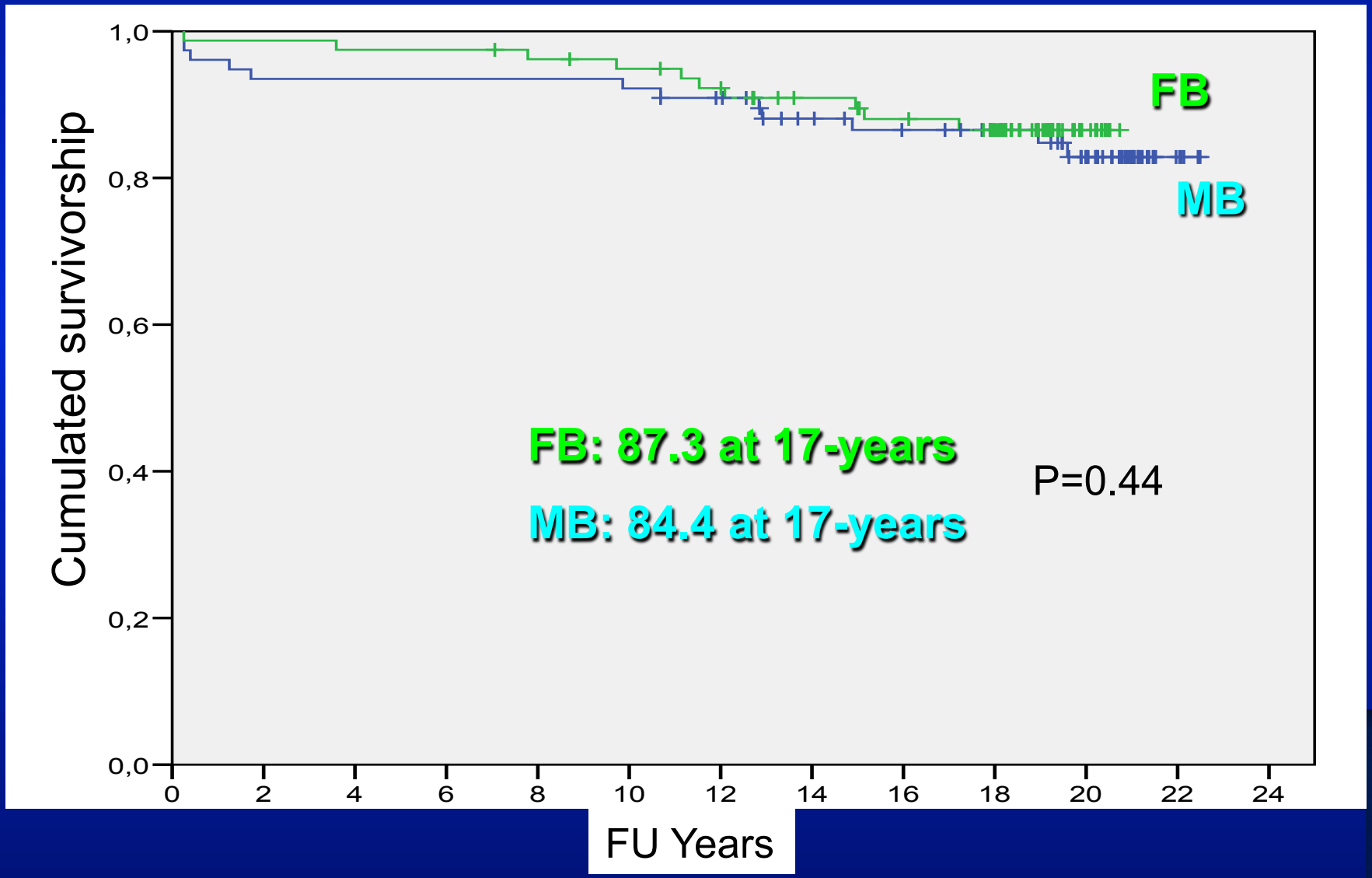
MB: 69%

P<0.0001

FB: 24%

Survival Results ?

Kaplan-Meier survivorship analysis



Discussion

FB survivorship

- Argenson et al., Jbjs Am 2002, 94% at 10 years
- Pennington DW, Jbjs Am 2003, 92% at 11 years
- Naudie et al,Jbjs Am 2004, 90% at 10 years
- Berger et al, JBJS Am 2005, 98% at 10 years

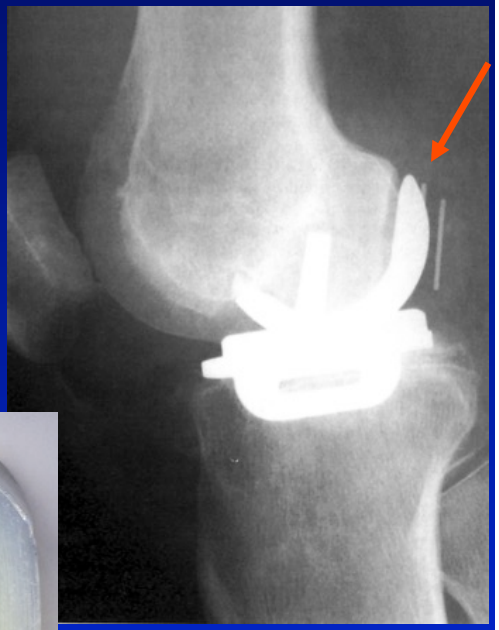
MB survivorship

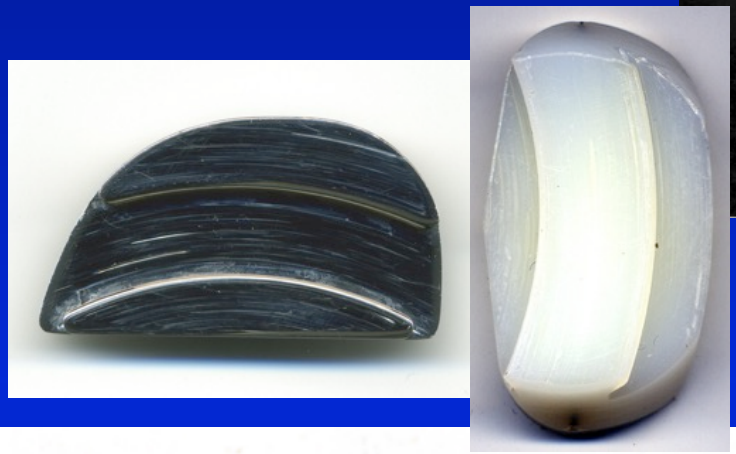
- Price AJ and Svard U, Oxford, CORR 2010 91% at 16-year and at 20 years
- Murray et al., JBJS Br 1998, 98% at 10 years

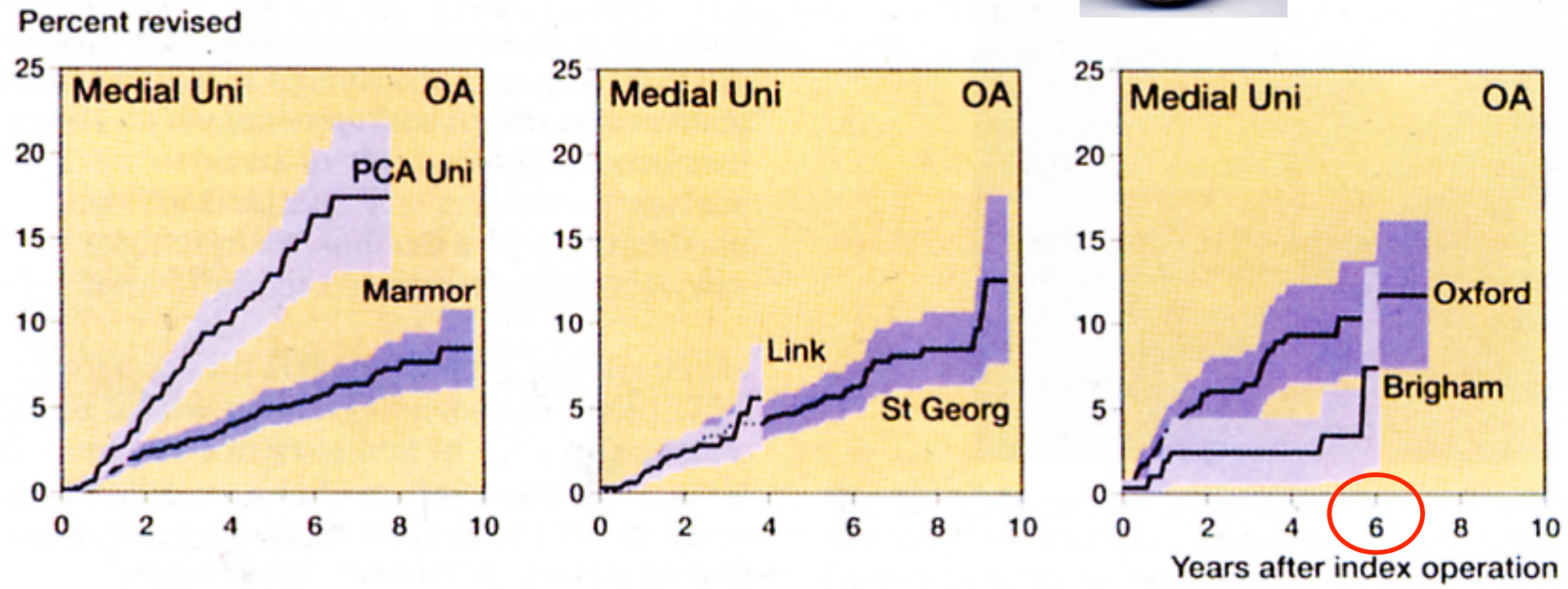
- Vorlat et al. KSSTA 2006, 82% at 10 years
- Emerson and Higgins, Texas, Jbjs Am 2008, 85% at 10 years
- Whittaker et al, London, CORR 2010, 85% at 5 years

Lessons from registers

- Learning curve to avoid early failure
- Longer with MB
- 20 cases per year







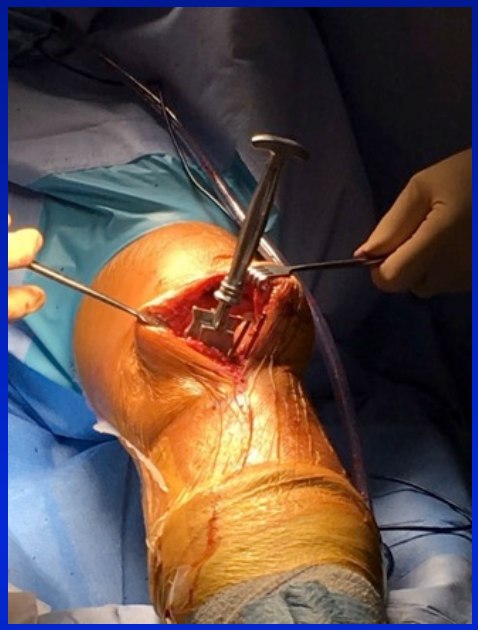
Discussion

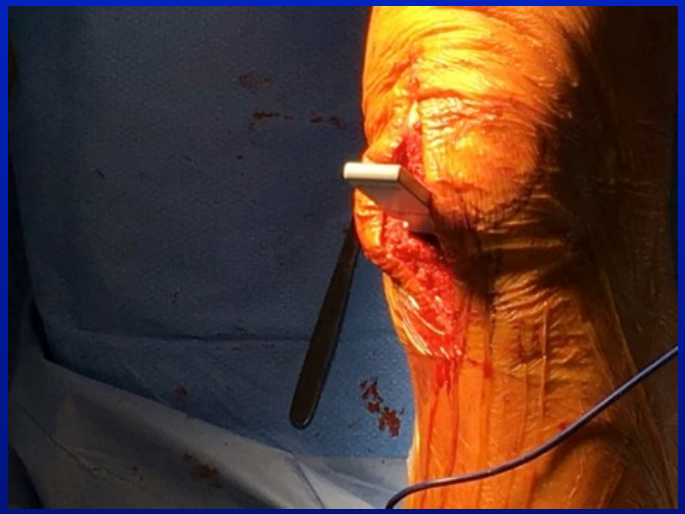
Comparative study FB/MB at 5 years

Whittaker JP, Naudie DR, McAuley JP, McCalden RW, McDonald SJ, Bourne RB CORR 2010

- **No difference in KS and WOMAC scores**
- **Survival at 5 years: 88% for MB, 96% for FB**
- **Predominant cause of failure:**
  - **PE wear for FB at mean of 8.8 years**
  - **Aseptic loosening for MB at mean of 2 years**

Reproducible and comparable to TKA





The Chef !

Use the Spoon !

Real debate: UKA vs TKA

- ***Lancet 2014;****384:1437-45* ***Liddle, Judge, Pandit, Murray***
  101,330 matched patients in the NJR
  - Higher re-operation in UKR at 8 years
  - However: lower mortality, length of stay, complications (DVT, MI, stroke) and re-admit
- ***Lancet 2014***: 467,779 knee replacements
  - UKR had substantially lower death and major complications at 45 days

What about long term results ?

Unicompartmental Knee Arthroplasty

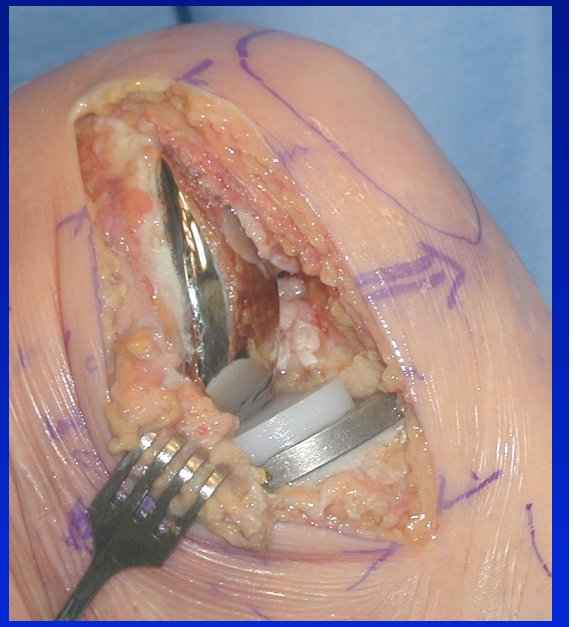
Study	Implant	Follow-Up (yrs)	Survivorship (%)
Argenson et al (2002) [11]	Miller-Galante (n=160)	10	94%
Lidgren et al (2002) [12]	Oxford (n=749)	10	86%
Romanowski et al (2002) [13]	Repicci (n=136)	8	96%
Gioe et al (2003) [14]	Multiple Designs (n=473)	10	89%
Naudie et al (2004) [15]	Miller-Galante (n=113)	10	86%
O'Rourke et al (2005) [16]	Marmor (n=136)	24	86%
Price et al (2005) [17]	Oxford (n=439)	15	93%
Newman et al (2009) [18]	St George Sled (n=52)	15	90%
O'Donnell et al (2010) [19]	Repicci II (n=114)	10	78%

Total Knee Arthroplasty

Study	Implant	Follow-Up (yrs)	Survivorship (%)
Ritter et al (2001) [20]	AGC (n=4,583)	15	99%
Rand et al (2003) [21]	Multiple Designs (n=11,606)	10	91%
		15	84%
		20	78%
Dixon et al (2005) [22]	PFC Total Knee (n=136)	15	93%
Tarkin et al (2005) [23]	Porocoat LCS (n=70)	17	76%
Vessely et al (2006) [24]	PFC Total Knee (n=1008)	15	96%
Newman et al (2009) [18]	Kinematic (n=50)	15	79%

Courtesy DF Dalury

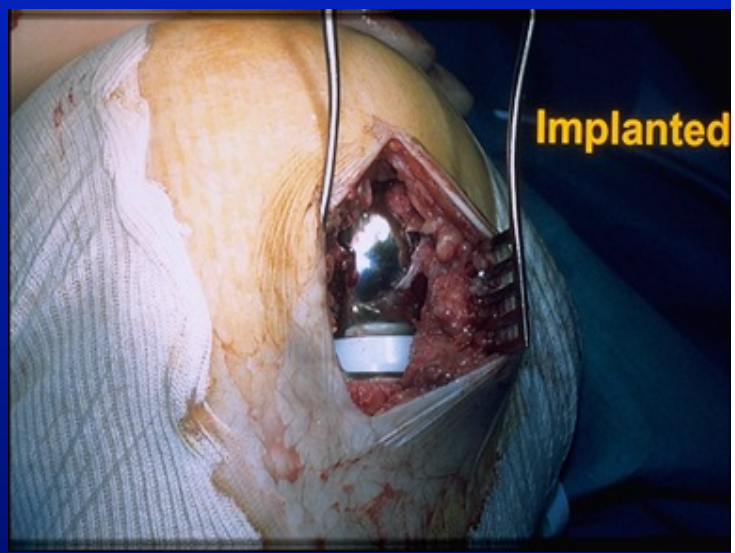
Conclusion



- **Comparable survivorship**

- **Specific complications**
  - FB: **Wear**
  - MB: **- Dislocation**=> fear=> overcorrection=> **arthritis progression**

    - Loosening



- **Volume of UKA per year**