



## Solutions for the Young Arthritic Knee? HTO, UKA ...

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## Background

What is a young arthritic Knee?




J Bone Joint Surg Am. 2009;91 Suppl 5:43-8 • doi:10.2106/JBJS.100406

### The New Arthritic Patient and Arthroplasty Treatment Options

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

## Background

### Knee osteoarthritis in young patients

• **Primary OA in the standard population :**

- 1% between 55 et 64 years old versus
- 2% men , 6.6 % women between 65 and 75

• **Risk factors increasing this mean rate** SANDMARK & VINGARD, 1999

- Gender
- Hereditary factors
- Alignment factors
- Obesity
- Sport and Micro traumatism
- Traumatism

## Background

⇒ Young + Unicompartmental osteoarthritis = Challenging problem

**Therapeutic goals**

1. Alleviating pain
2. Restore knee function

**Therapeutic solutions**


1. Non operative
2. Arthroscopic debridement
3. High Osteotomy
4. UKA
5. TKA

1. Efficient
2. Durable
3. Safe
4. Preserve the bone stock

Pagnano et al: Surgical treatment of the middle-aged patient with arthritic knees. Instr Course Lect. 2005

## Background

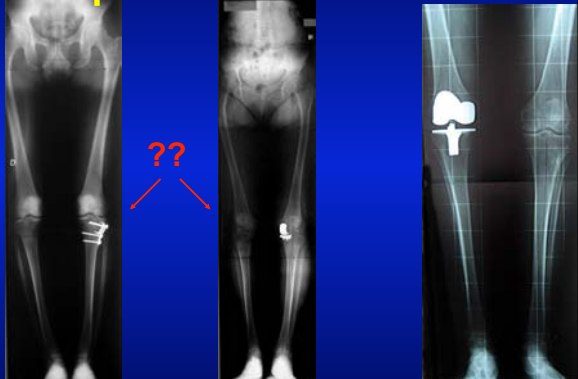
First Step : classification



### Ahlbäck Grade

Ahlbäck S: Osteoarthritis of the Knee. A radiographic investigation. Acta Radiol Diagn. 1968

## Options Medial OA Knee



## Background

**High Tibial Osteotomy**

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

Pre-op    1 year    15 years

## HTO DATA

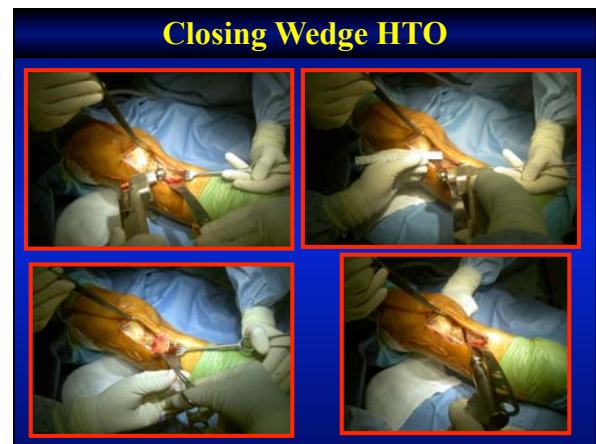
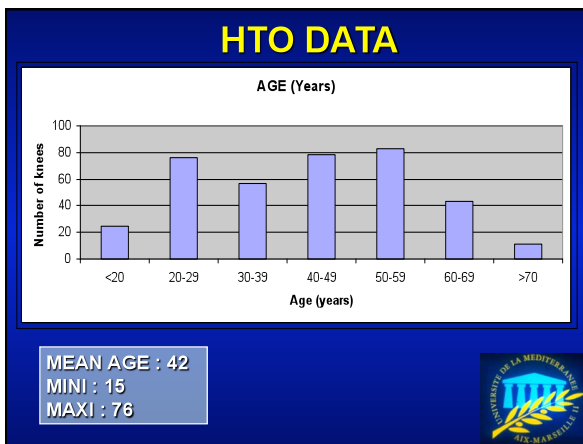
- 372 HTO performed in 313 patients
- Between May 1975 and December 1990

**GENDER**

Male: 62 %  
Female: 38%

**HTO SIDE**

Right HTO: 194  
Left HTO: 178



## Closing Wedge HTO

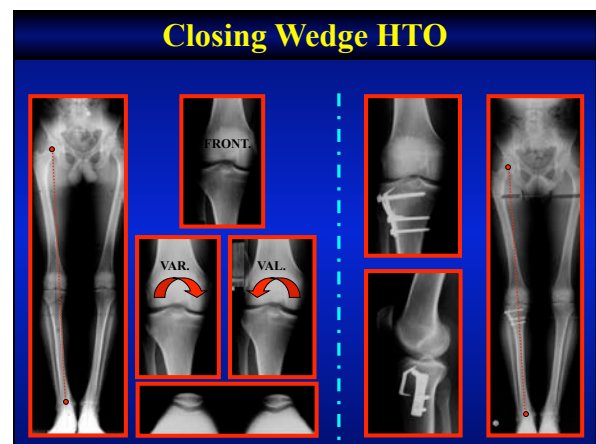
**FIXATION :**  
Blount staple  
AO Half-tube plate with 3 screws

**MEAN OP. TIME :** 55 mn (25-120mn)

**MEAN BLOOD LOSS :** 258 ml (57-496)



**AVERAGE DEGREE OF CORRECTION :** 6.9° ( 2°to 20°)

**POSTOPERATIVE REHABILITATION**  
Early full motion program  
Early weight bearing protected by crutches for 45 days




### Summary HTO: our study

- Age : < 50 years
- Sex : male gender
- Stage of OA : < Ahlbäck 3
- Preop. Deformity : bony defor.
- Post-op angle : 6° valg.

### Background for Arthroplastic Solutions


**UKA**



*Schai, J Arthroplasty, 1998*  
*Pennington, Jbjs Am, 2003*  
*Price, Jbjs Br, 2005*  
*Springer B, CORR, 2006*

**TKA**

OR




*Lonner, CORR, 2000*  
*Mont, J Arthroplasty, 2002*  
*Hofmann, CORR, 2002*  
*Morgan, J Arthroplasty, 2007*

### UKA or TKA ?

**UKA:**

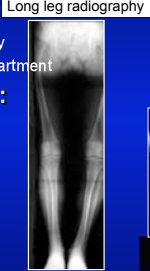




- Better range of motion
- Fastest recovering
- Lower cost
- ± Long term survivorship




*•Cameron HU, 1988, Orth. Rev.,*  
*•Kozinn SC, 1989, JBJS*  
*•Laurencin CT, 1981, CORR*

### Indication UKA

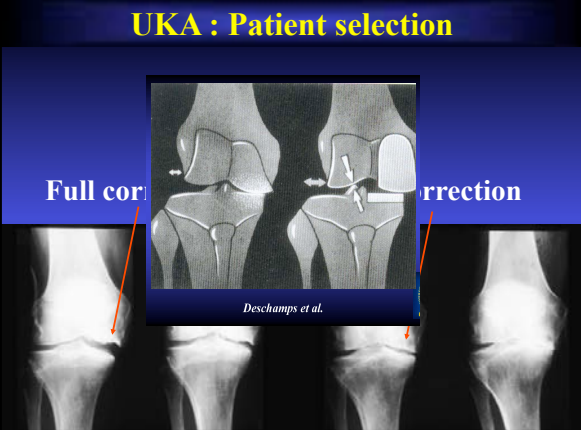
- 1. Clinical evaluation:**
  - Full range of knee motion
  - Frontal and sagittal knee stability
  - Status of the "uninvolved" compartment
- 2. Radiological evaluation:**

### Indications



### UKA : Patient selection



Full cor... rrection

*Deschamps et al.*

## Etiology

### AVN ?

**Unicompartmental Knee Arthroplasty for Avascular Osteonecrosis**

Sebastien Parratte, MD; Jean-Noël A. Argenson, MD; Julien Damas, MD; and Jean-Manuel Aubaniac, MD

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH  
Number 352 pp 350-355  
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## UKA : New Interest MIS

**Unicompartmental Knee Arthroplasty**  
*Technique Through a Mini-incision*

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

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH  
Number 352 pp 346-350  
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### Per-operative confirmation of the indication

## UKA : Kinematics

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†

## UKA : Kinematics

Average pre-op flexion : 119°  
(range, 85 - 135°)

Average post-op flexion : 128°  
(range, 90 - 145°)

## Background

### Overall equation

Unicompartmental OA

+

UKA

=

1. Efficient (Pain / Function)
2. Durable
3. Safe
4. Preserves the bone stock

➡ But what about this equation for young patients?


### Goals of the study

→ UKA and patients younger than fifty

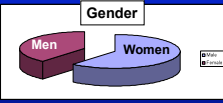
- Objective functional outcomes as measured by the Knee Society Score and range of knee flexion?
- Radiological results as measured by the Knee Society Roentgenographic Score
- Durability as measured by the Kaplan-Meier survivorship to revision at 12 years?

### The Series

- 35 cemented UKA implanted in 31 patients
- Between 1989 and 2001
- 33 medial UKA and 2 lateral
- Mean age =  $46 \pm 3.8$  ( range; 41- 49 years)
- Mean Body Mass Index =  $26 \pm 3$  Kg/m<sup>2</sup>

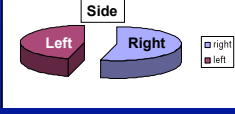


**Gender**



Women: 21  
Men : 10

**Side**

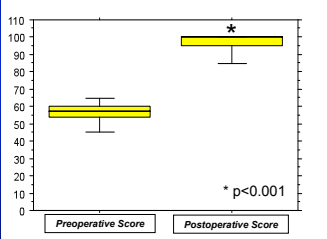


Right : 19  
Left : 16

### Results

At Final Follow-up=  $9.7 \pm 3.3$  years

#### Knee Society Knee Score



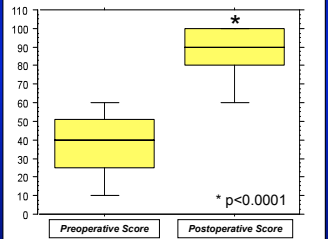
Preoperative Mean=  $54 \pm 9$   
43 to 75

Postoperative Mean=  $97 \pm 3$   
85 to 100

\* p<0.0001

### Results

#### Knee Society Function Score




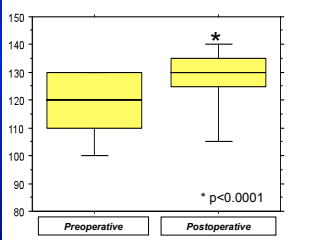
Preoperative Mean=  $44 \pm 6$   
25 to 64

Postoperative Mean=  $89 \pm 2$   
80 to 100

\* p<0.0001

### Results

- Objective results
  - Range of knee flexion

Preoperative Mean=  $110^\circ \pm 7$   
95 to 125°

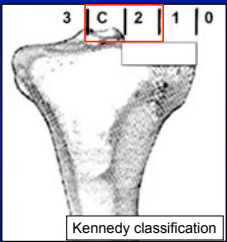
Postoperative Mean=  $132^\circ \pm 6$   
120 to 150°

\* p<0.0001


### Results

#### Restoration of the mechanical axis

Type	N	%
1	2	6
2	20	57
C	12	34
3	1	3



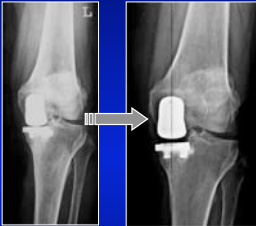
Kennedy classification



## Results

**Complications**

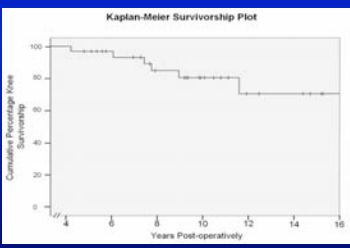

- 4 revisions for isolated liner exchange
  - Poly wear without osteolysis
  - At 76, 93, 112 and 145 months
  - Knee Society Score after exchange
    - 95 at 99 months
    - 95 at 120 months
    - 94 at 140 months
    - 96 at 178 months
- One revision for progression of OA
  - 97 months
- One revision for aseptic loosening
  - 53 months



## Results

- Mean Follow-up: 9.7 years (range:5 to 16 years)

**Kaplan-Meier survivorship: 80.6% at 12 years**

**Medial unicompartmental knee replacement in the under-50s**

S. Parratta, J.-N. A. Argenson, O. Prazic, V. Pauli, E. Aquas, 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 48). 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 64 points (25 to 84) 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 (ongoing study including UCLA and KOOS scores)**
- **Wear remains a problem**

## Discussion

### UKA: A Solution for the Young Arthritic Knee?


Yes

1. Efficient (Pain / Function)
2. Durable
3. Safe
4. Preserves the bone stock

- Lower rate of OA progression due to better patient selection
- Poly wear remains a problem but direct exchange of the liner is reliable
- Simple revision with a standard implant when necessary

## UKA for Arthritis in the Young

- Younger high-demand patients are more vulnerable to prosthetic wear problems compared with older patients with similar followup receiving the same design



*Eng and McAuley, Instr Course Lect, 1999*

## Conclusion

- **HTO**: bony deformity, < Ahlbäck 3, less than 50
- **UKA**: can be considered as a reliable solution for the young arthritis knee
- Poly wear remains a concern
- Patient selection / New design / New ancillaries
  - Reproducible procedure
  - Reproducible results