

# Painful Total Knee Replacement Diagnosis and Indications for Revision



Ph NEYRET  
S LUSTIG, E SERVIEN  
Centre Albert Trillat  
Lyon, France





One of the authors of the next presentation have identified potential conflicts of interest  
With Amplitude



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# Diagnosis

Infection ??

# Diagnosis

- **Clinical history**
  1. **Pain characteristics:** Location, duration, at rest or at night
  2. **Physical examination:** tenderness, ROM, laxity, alignment, laxity...
- **Radiographs (+stress)**
- **Blood tests**
- **Bone scan**
- **CT scan**
- **Test infiltration, aspiration**

# Diagnosis

## ■ Clinical history

### 1. Anamnesis

**Pain characteristics** : Location, duration, at rest or at night

- Recent dental, digestive or urinary invasive procedure
- Risk factors for infection
  - Age (old)
  - Malnutrition
  - Obesity
  - Corticotherapy
  - Skin lesions
  - Inflammatory disease

# Pain after TKA

- **No pain-free period**
  - Infection
  - Instability: unbalanced ligamentous knee
  - Soft tissues impingement
  - Oversizing

No Honey moon

# Pain after TKA

- **After a pain-free period**
  - Aseptic loosening
  - PE wear
  - Secondary instability
  - Hematogenous infection
  - Stress Fracture

After a honey moon

After a honey moon

# Blood Tests

CRP < 10

+

ES

Rate < 30 mm/h

No infection (94 %)



# Diagnosis

1. Clinical Exam
2. Radiographs (+stress)
3. Blood Tests

4.

CT Scan

Bone Scan (Tc)

Aseptic

Septic

# Diagnosis

- Radiolucency, Loosening
- Osteolysis
- Component positioning



3D > 2D CT-Scan

[J Bone Joint Surg Br.](#) 2011 May;93(5):629-33. doi: 10.1302/0301-620X.93B5.25893.

**The position and orientation of total knee replacement components: a comparison of conventional radiographs, transverse 2D-CT slices and 3D-CT reconstruction.**

[Hirschmann MT](#), [Konala P](#), [Amsler F](#), [Iranpour F](#), [Friederich NF](#), [Cobb JP](#).

Department of Orthopaedic Surgery and Traumatology, Kantonsspital Bruderholz, CH-4101 Bruderholz, Switzerland. [michael.hirschmann@ksbh.ch](mailto:michael.hirschmann@ksbh.ch)

# Diagnosis

## Bone Scan (Tc)

- **Bone scan Technetium**
  - Negative=highly predictive of absence of complication (NPV = 80-89%)
  - Periprosthetic signal > 1 year: 90% tibia, 60% femur. *Rosenthal, Radiology 1979*

# Diagnosis ≠ (Non TKA)

Bone Scan (Tc)

- **Coxarthrosis Arteriosclerosis**
- **Peri-prosthetic Fracture**
- **Neurological disease**
  - Spine
  - Radiculopathy

# Diagnosis

SPECT/CT

Hirschmann MT; Friederich NF

MRI with special software

Knee Surg Sports Traumatol Arthrosc. 2010 Jul;18(7):939-44. doi: 10.1007/s00167-010-1070-z. Epub 2010 Feb 11.

**A novel standardized algorithm for evaluating patients with painful total knee arthroplasty using combined single photon emission tomography and conventional computerized tomography.**

Hirschmann MT, Iranpour F, Konala P, Kerner A, Rasch H, Cobb JP, Friederich NF.

Department of Orthopaedic Surgery and Traumatology, Kantonsspital Bruderholz, 4101 Bruderholz, Switzerland. michael.hirschmann@ksbh.ch

BMC Musculoskelet Disord. 2011 Feb 4;12:36. doi: 10.1186/1471-2474-12-36.

**Clinical value of SPECT/CT for evaluation of patients with painful knees after total knee arthroplasty--a new dimension of diagnostics?**

Hirschmann MT, Konala P, Iranpour F, Kerner A, Rasch H, Friederich NF.

Department of Orthopaedic Surgery and Traumatology, Kantonsspital Bruderholz, CH-4101 Bruderholz, Switzerland. michael.hirschmann@ksbh.ch

# Joint Aspiration

Sepsis ?

LC < 1100 cells  
/  $10^{-3}\text{cm}^3$

+

PL < 64%

No infection (98.2 %)

Leucocytes count (LC)

Poucentage of polymorph leucocytes (PP)

### Leucocyte Scan

- **Indium-111 leukocyte scan**
  - Se 88 - 100 %
  - Spe 73 – 89.5%
- **Leukocyte-Marrow imaging**
  - Se 86 - 96 %
  - Spe 87 - 100 %
  - PPV 100 %
  - PNPV 92 %

# Diagnosis

Sepsis ?

PET CT scan

Arthroscopy

- **Rare indications**
  - **Diagnostic**
  - **Therapeutic**
    - Tightened PCL
    - Patellar Clunk
    - Arthrofibrosis



# Diagnosis

1. Clinical Exam
2. Radiographs (+stress)
3. Blood Tests

4.

CT Scan

Bone Scan (Tc)

Aseptic

Septic

5. Test infiltration ?

# Test infiltration

S Hofmann

EKA Vienna 2011

- Intra-articular
  - Together with aspiration
  - Loosening ( placebo)
- Extraarticular
  - Tender points
  - Tendinitis and bursitis
  - Neuroma
- Guanethin and sympathicus
  - CRPS

# Diagnosis

1. Mal positioning
2. Instability
3. Loosening
4. PF Complications
5. Stiffness
6. Fractures, Osteoporosis
7. Wear
8. Tendinitis, Allergy

Infection ??

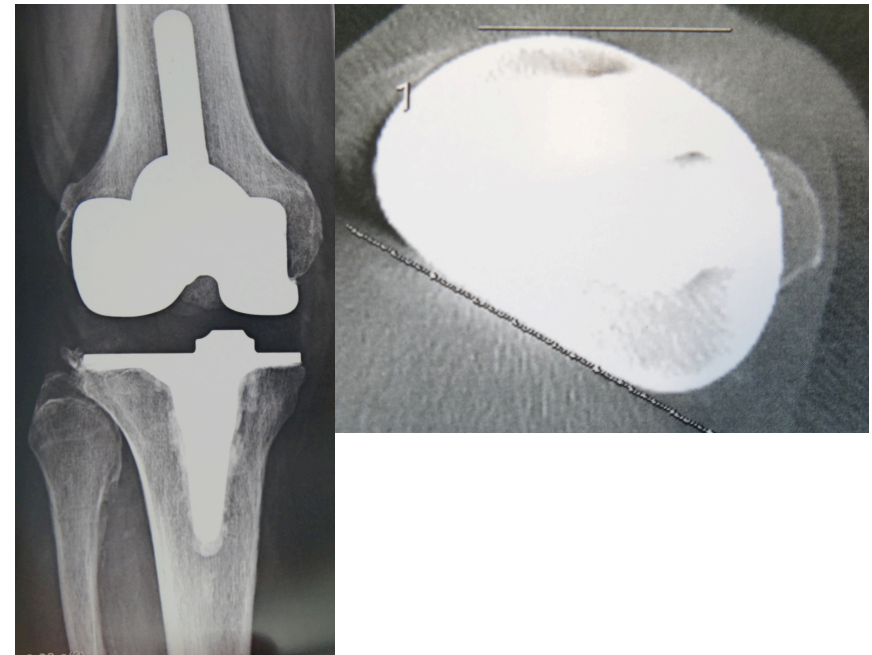
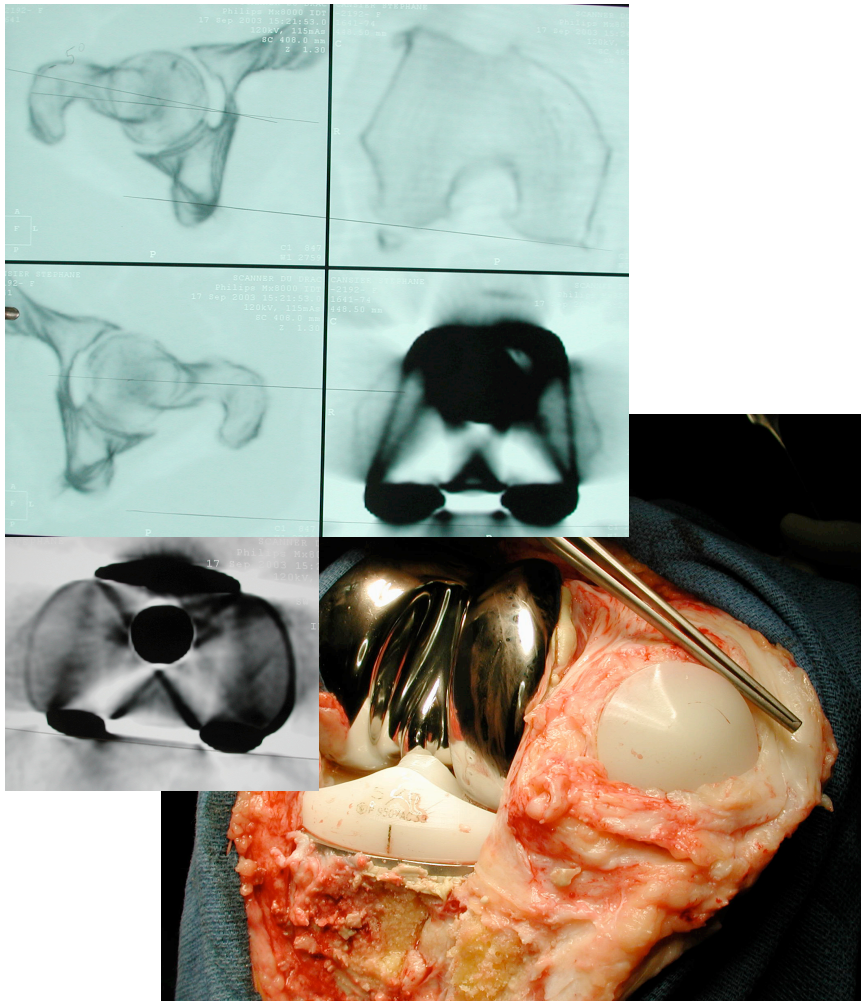
Unexplained pain

# Malpositionning Sizing

# Painful TKA

## 1. Mal positioning

### ■ Mal rotation (torsion)

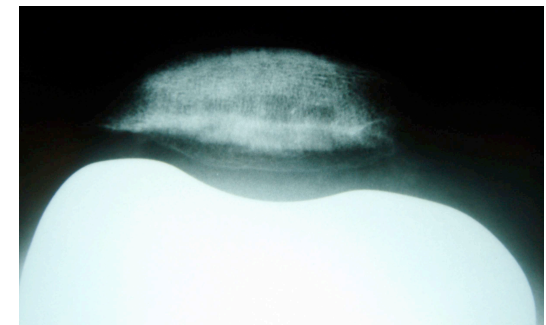
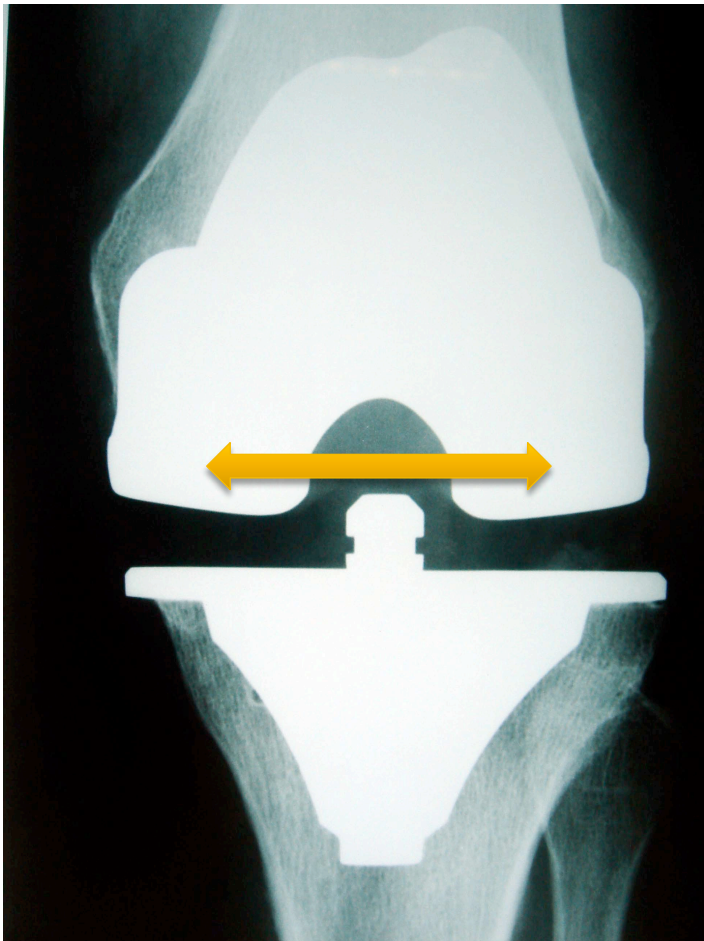


External tibial torsion  $45^{\circ}$  vs  $28^{\circ}$

# Painful TKA

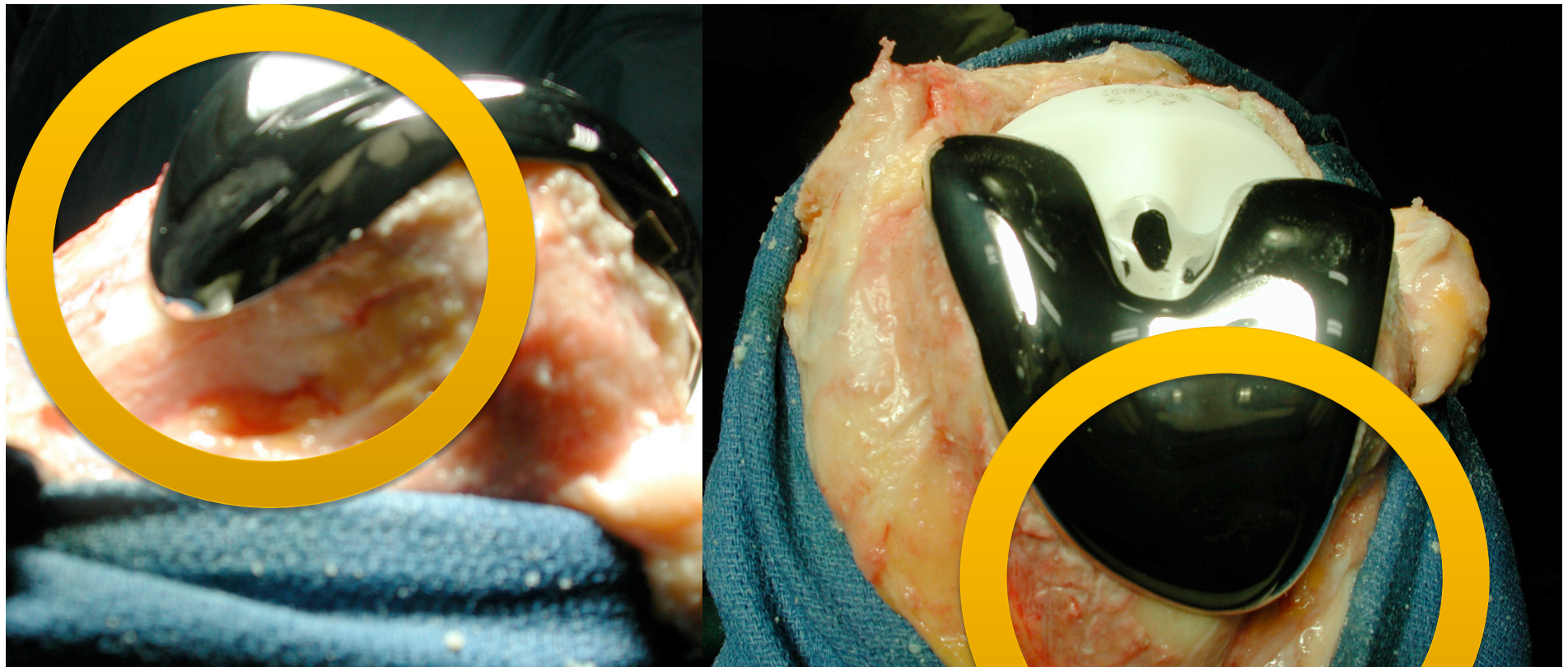
oversizing

- Miss Da F.. Yvette born in 1935



# Painful TKA

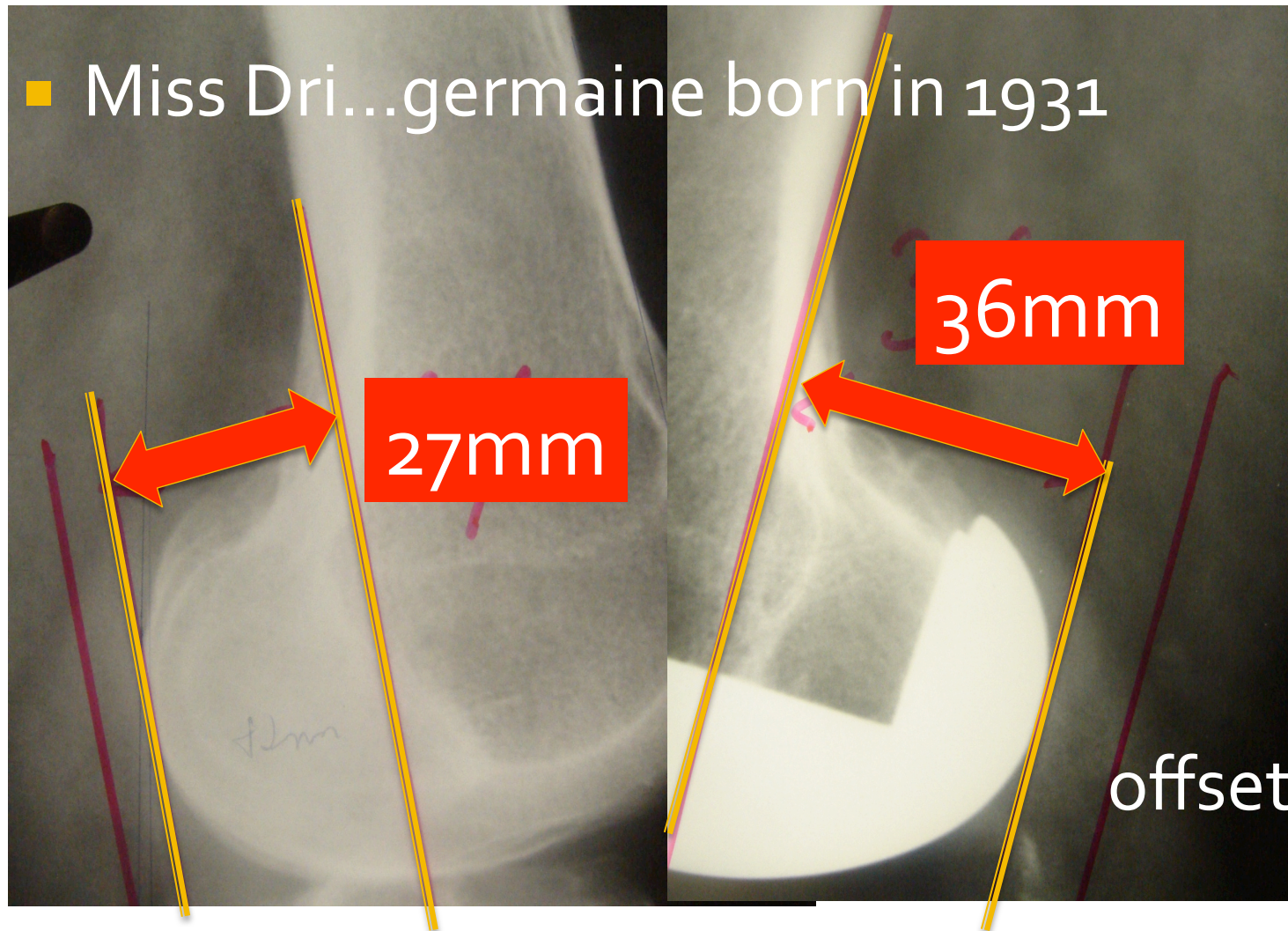
oversizing



# Painful TKA

oversizing

- Miss Dri...germaine born in 1931





# 2. Instability

# Physical examination 2. Instability

- Knee in flexion  
pending legs
- Special stress X-Rays

# 3. Loosening

# Diagnosis

## 3. Loosening

- M Ben...mohamed born in 1946
- RTKA H Dejour 1987

2006

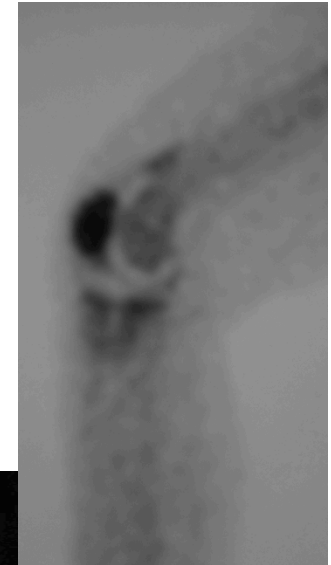
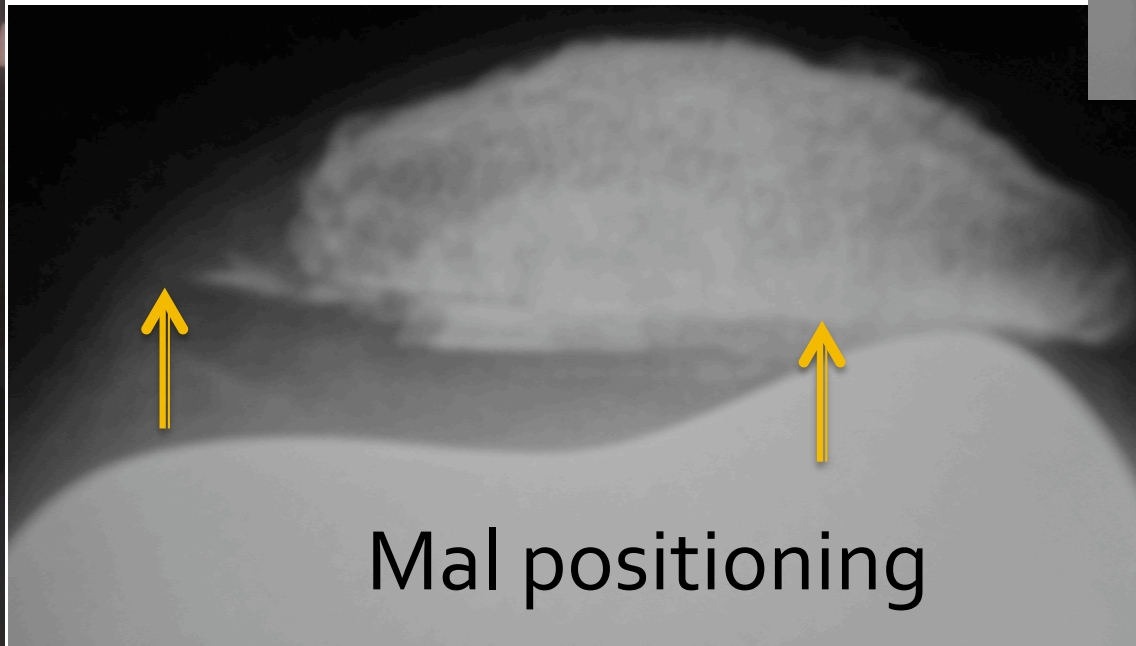


4. Patello-F...

# Painful TKA

## 4. Patello-femoral

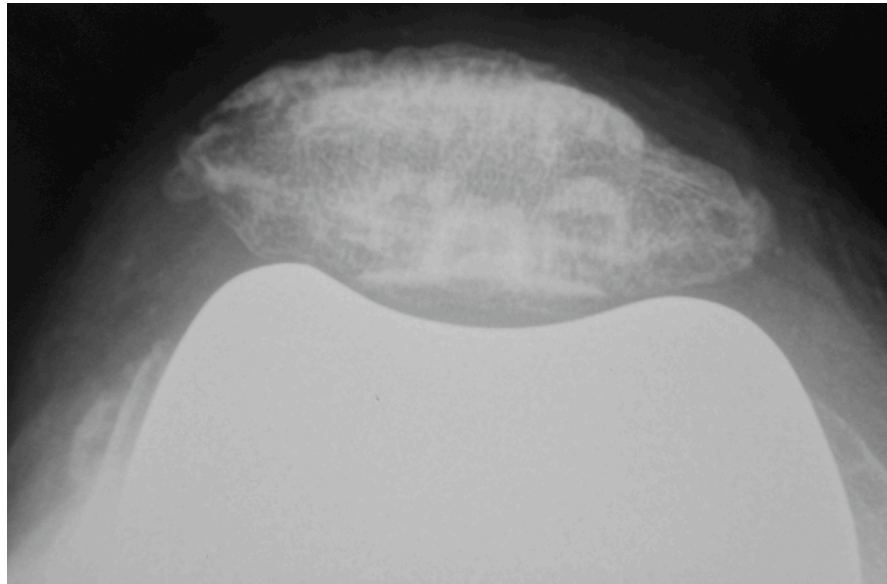
- Miss bou ... claire
- TKA in 2003 since pain
- Referred in 2012 !



# Painful TKA

## 4. Patello-femoral

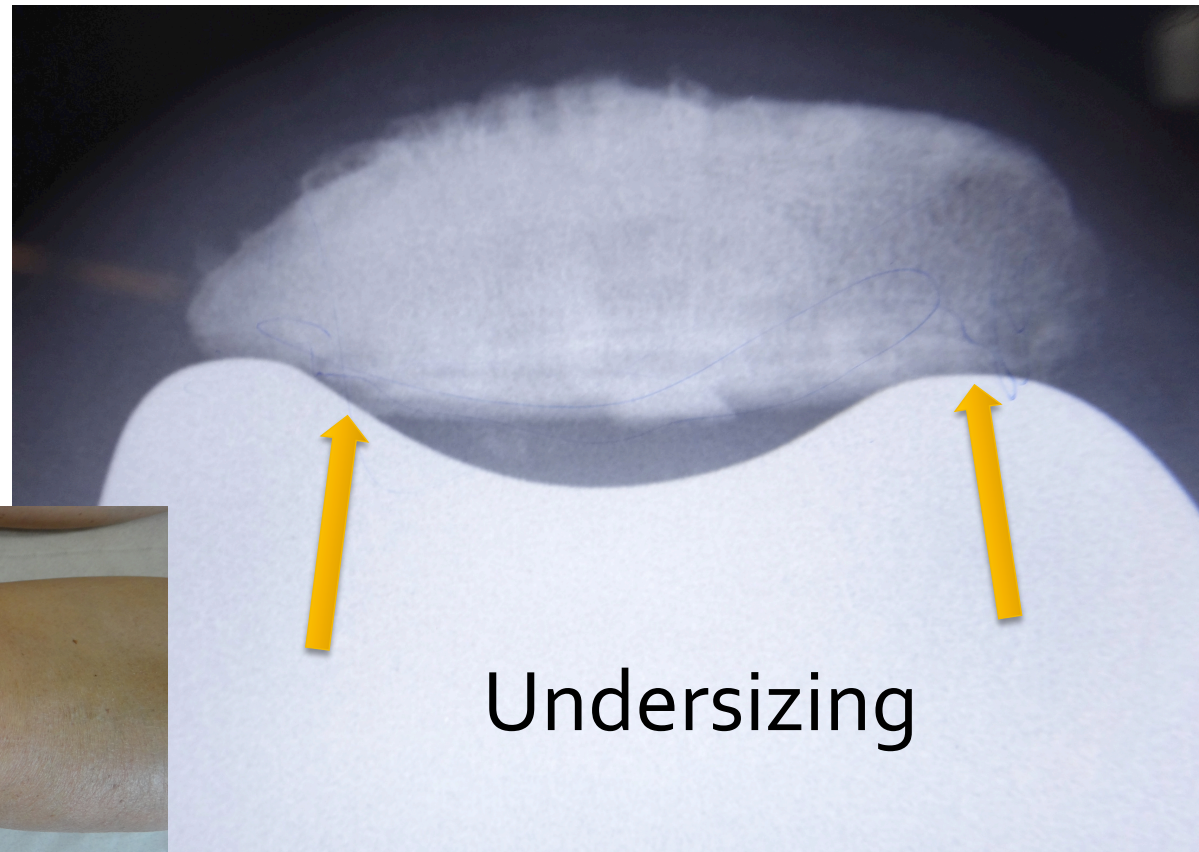
- Mr Bro ... jean born in 1938
- Pain after TKA



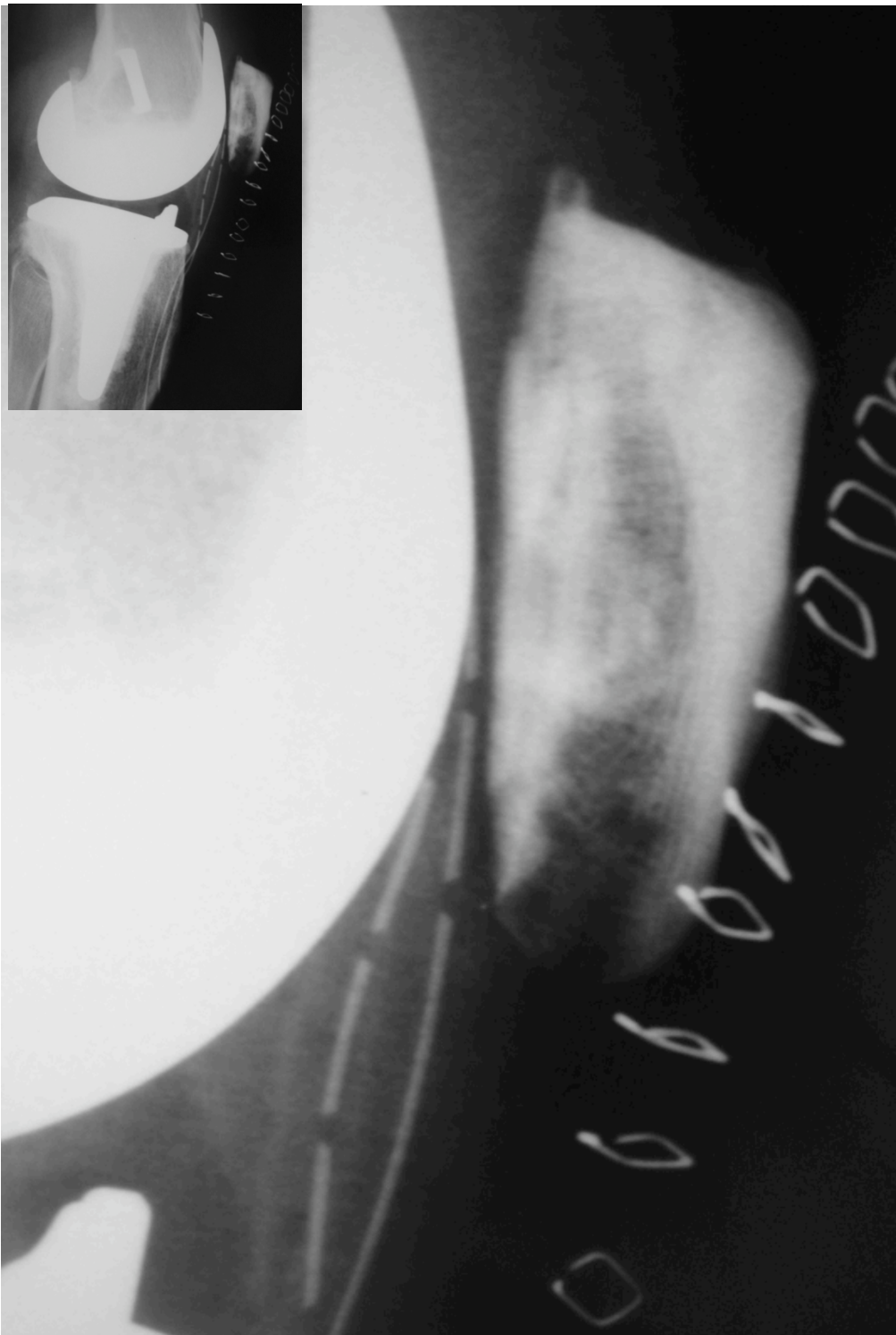
# Painful TKA

## 4. Patello-femoral

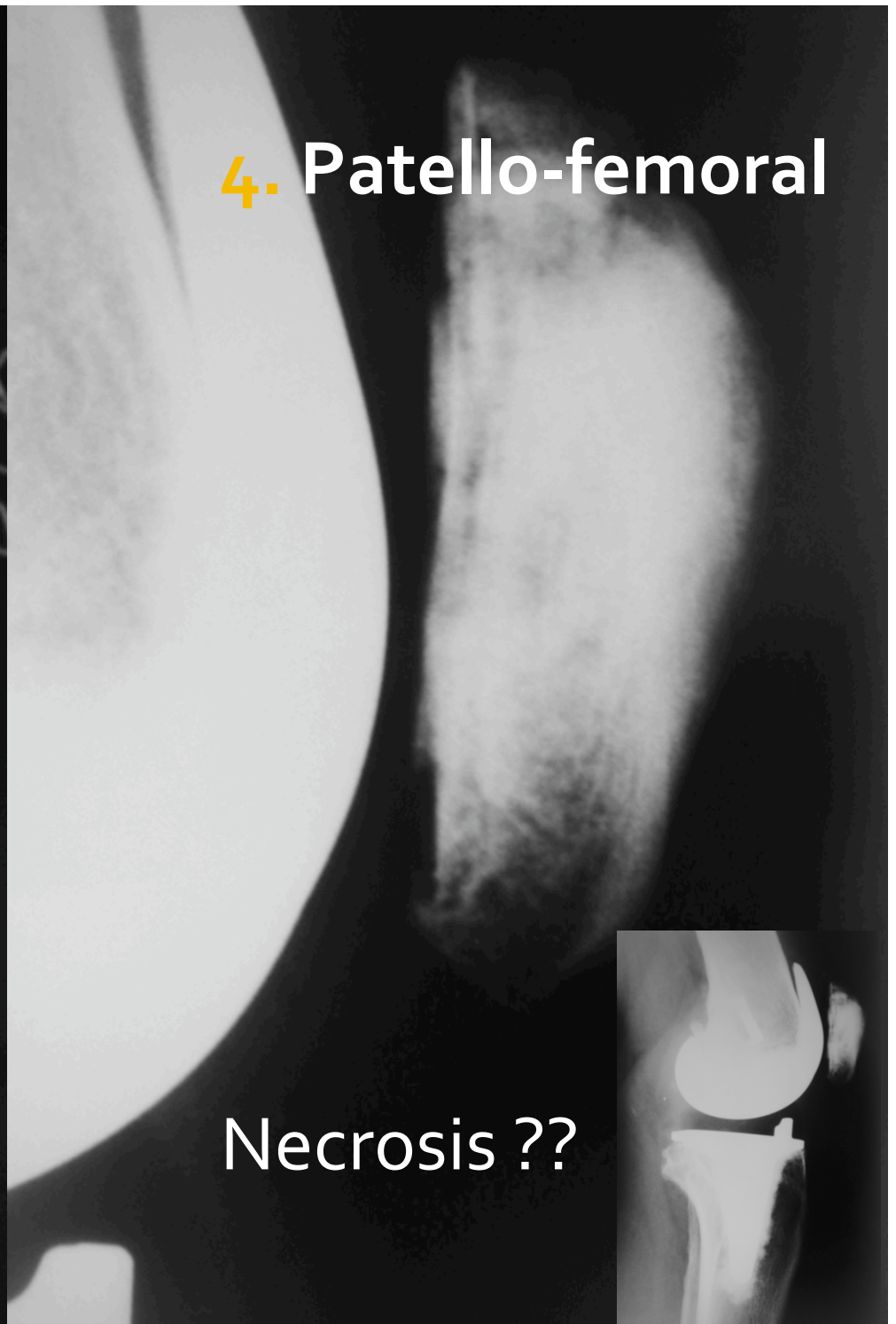
- Mr Fie...marcel







## 4. Patello-femoral



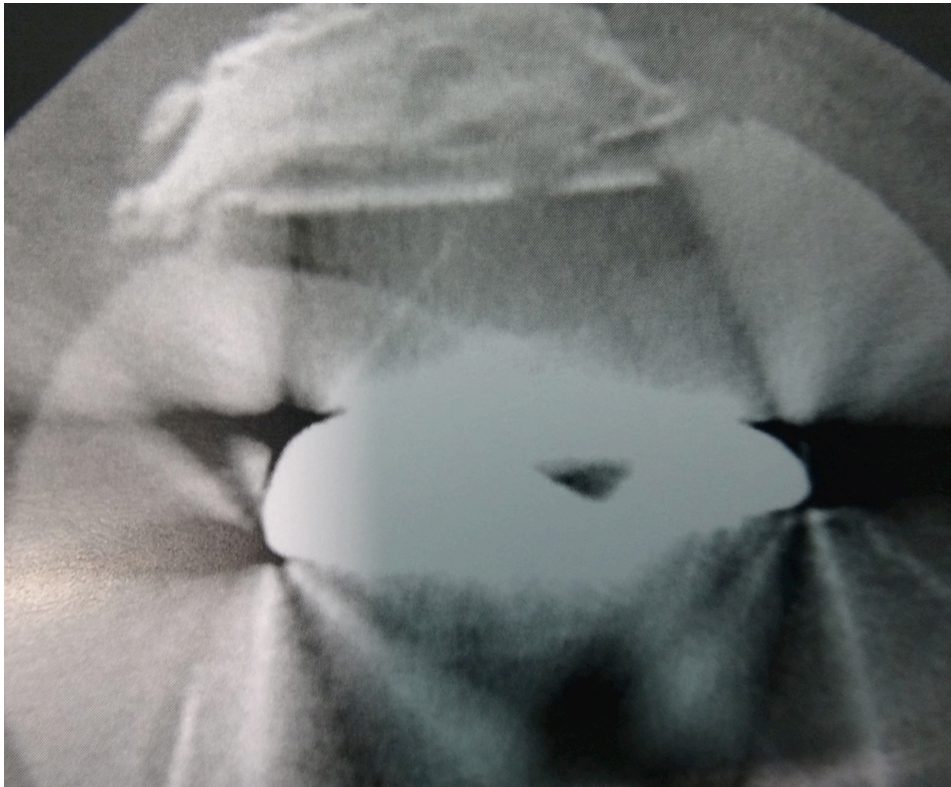
Necrosis ??



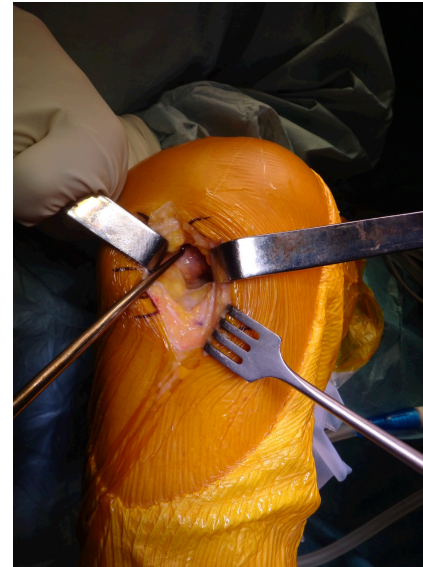
# Painful TKA

## 4. Patello-femoral

- Mic...raoul born in 1935



Loosening

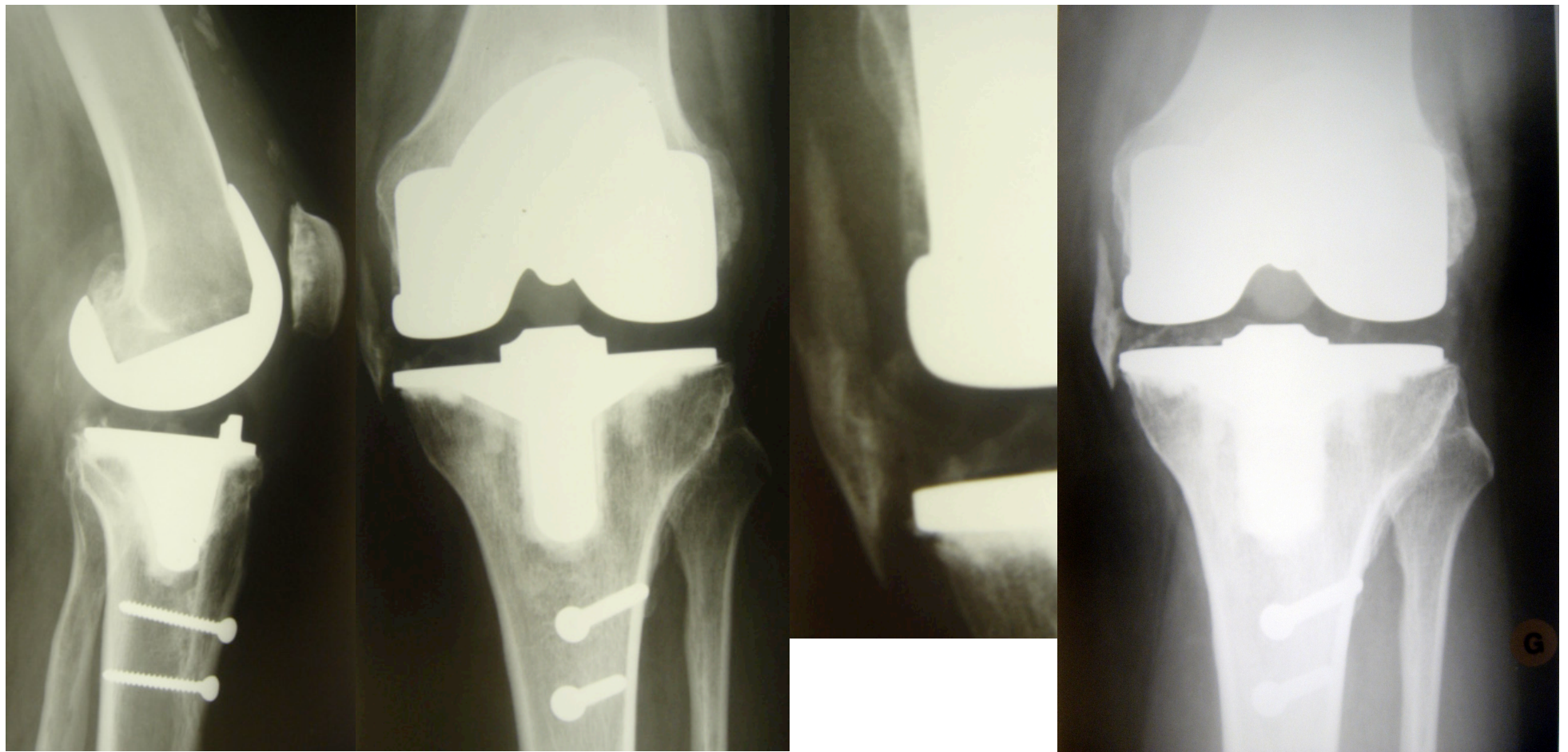


# 5. Ossifications

# Painful TKA

## 5. Ossifications

- Miss Jas ... madeleine born in 1938



# 6. Osteoporosis Osteolysis

Calcif Tissue Int. 2002 Dec;71(6):472-7.

Effect of alendronate on periprosthetic bone loss after total knee arthroplasty: a one-year, randomized, controlled trial of 19 patients.

[Soininvaara TA, Jurvelin JS, Miettinen HJ, Suomalainen OT, Alhava EM,](#)

[Kröger PJ.](#) Savonlinna, Finland.

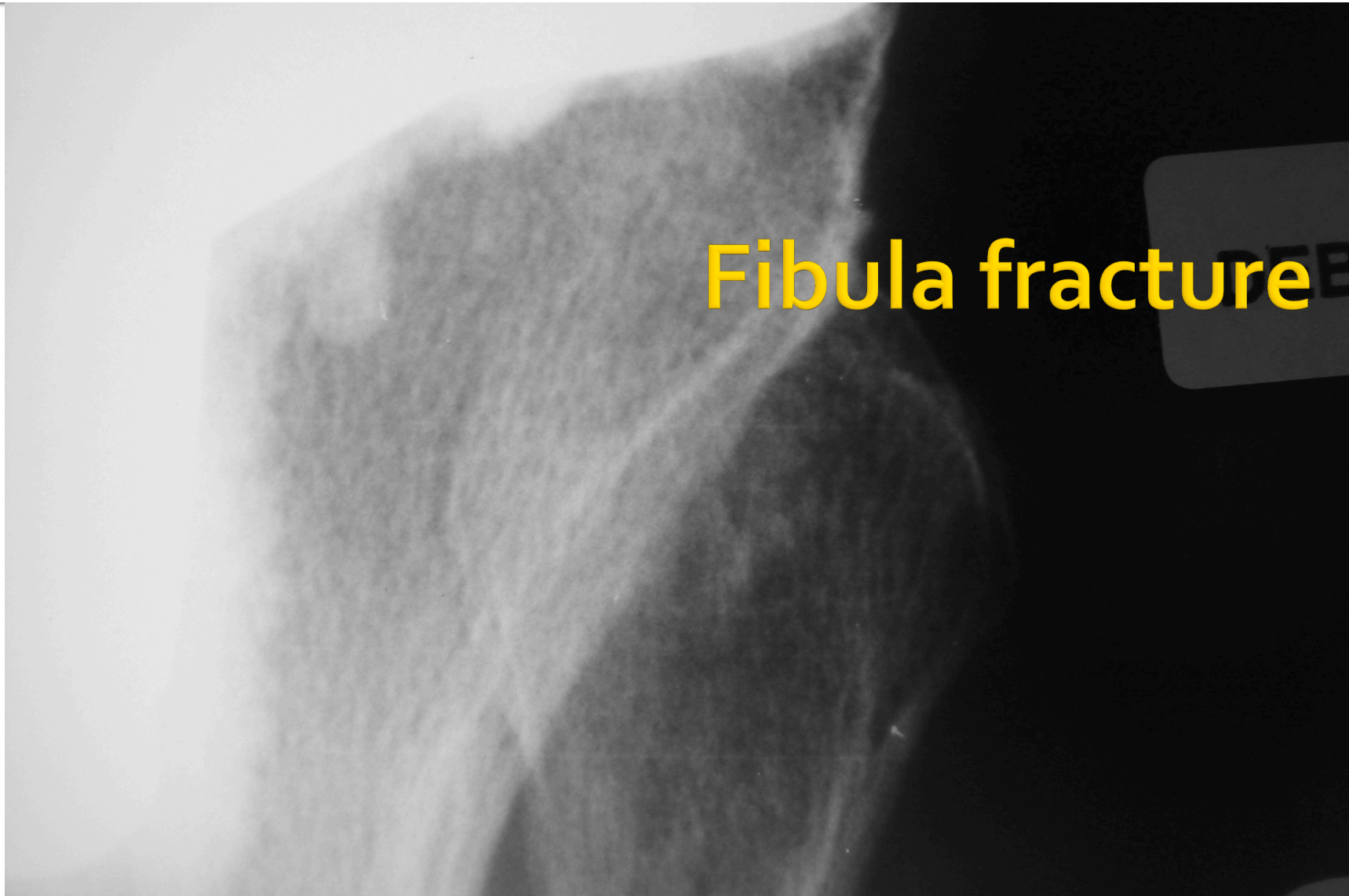
### **Abstract**

Undesired bone loss around implants is considered to occur mainly because of a stress-shielding phenomenon. Bone surrounding the total knee arthroplasty (TKA) adjusts its mineral density and structure to meet new mechanical demands.....

Our results indicate that oral alendronate reduces early postoperative periprosthetic bone loss significantly. This therapeutic strategy may improve the results and longevity of primary total knee arthroplasties.

# Painful TKA

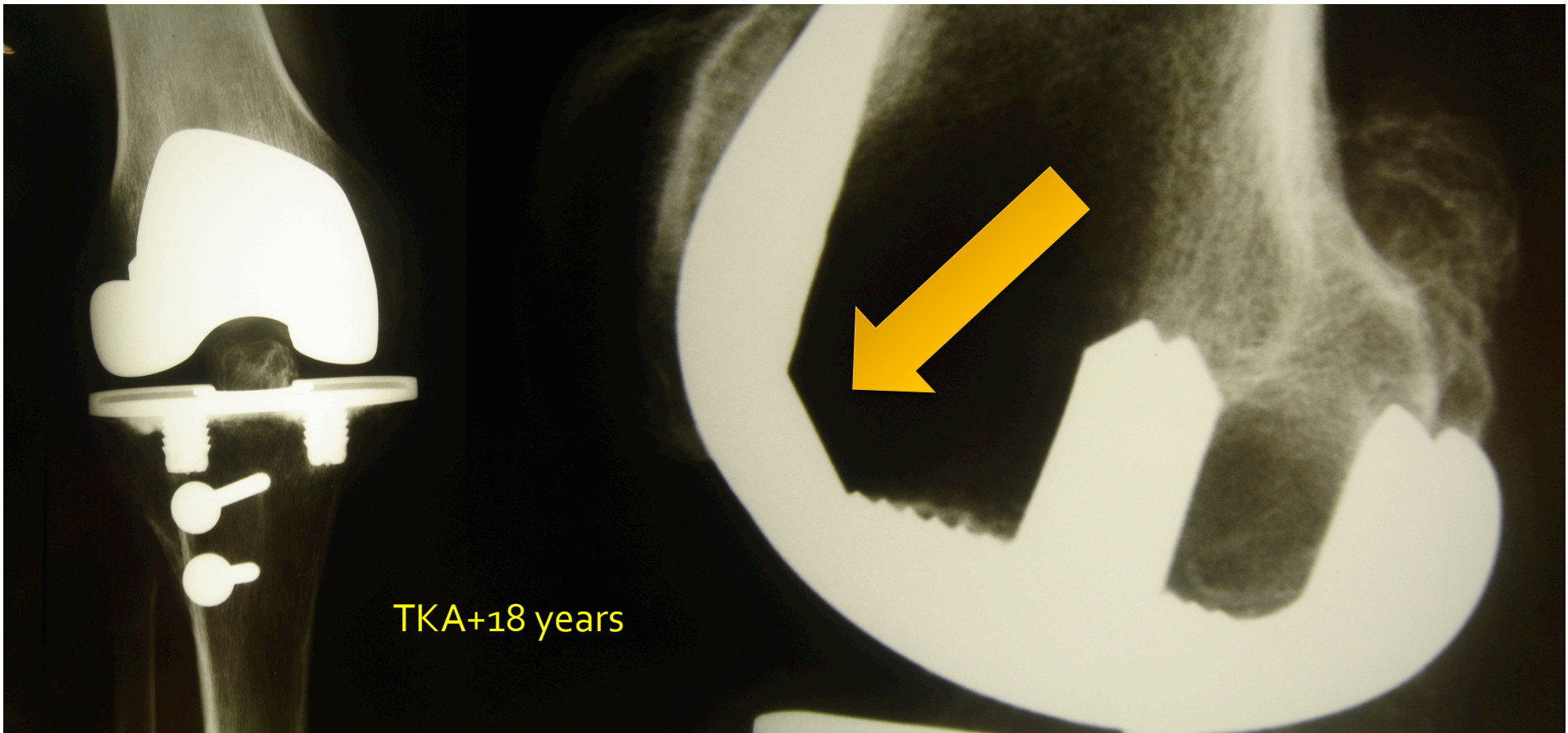
## 6. Osteoporosis



# Painful TKA

## 6. Osteolysis

- Miss Cur...mina born in 1928

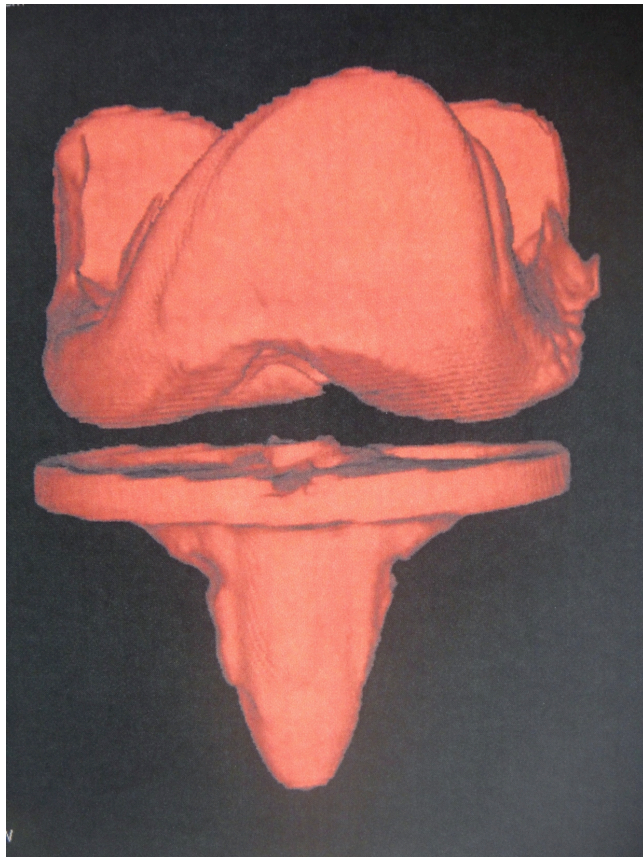




# Painful TKA

## 6. Osteolysis

- Mr Mor ... manuel



TKA 3D



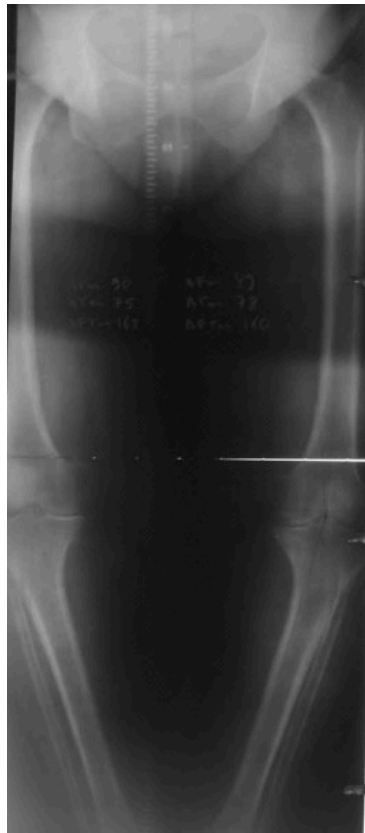
# 7.Wear

MRI

# Painful TKA

## 7. Wear

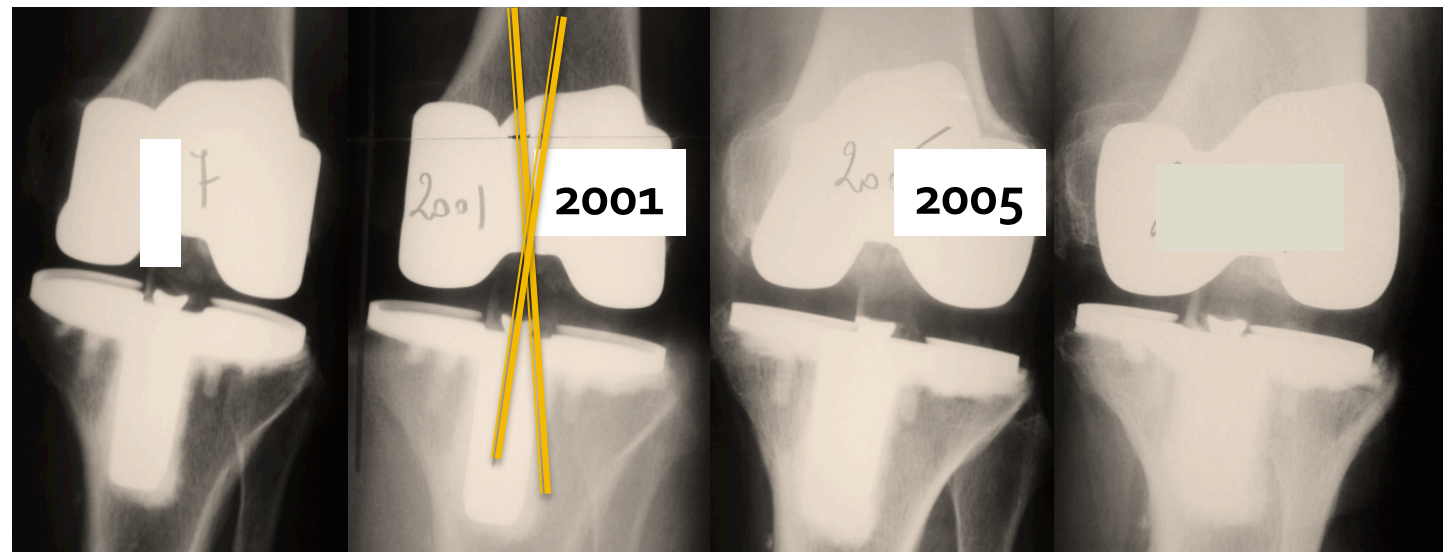
- Mrs Hoc ...  
+10y



1997

13°

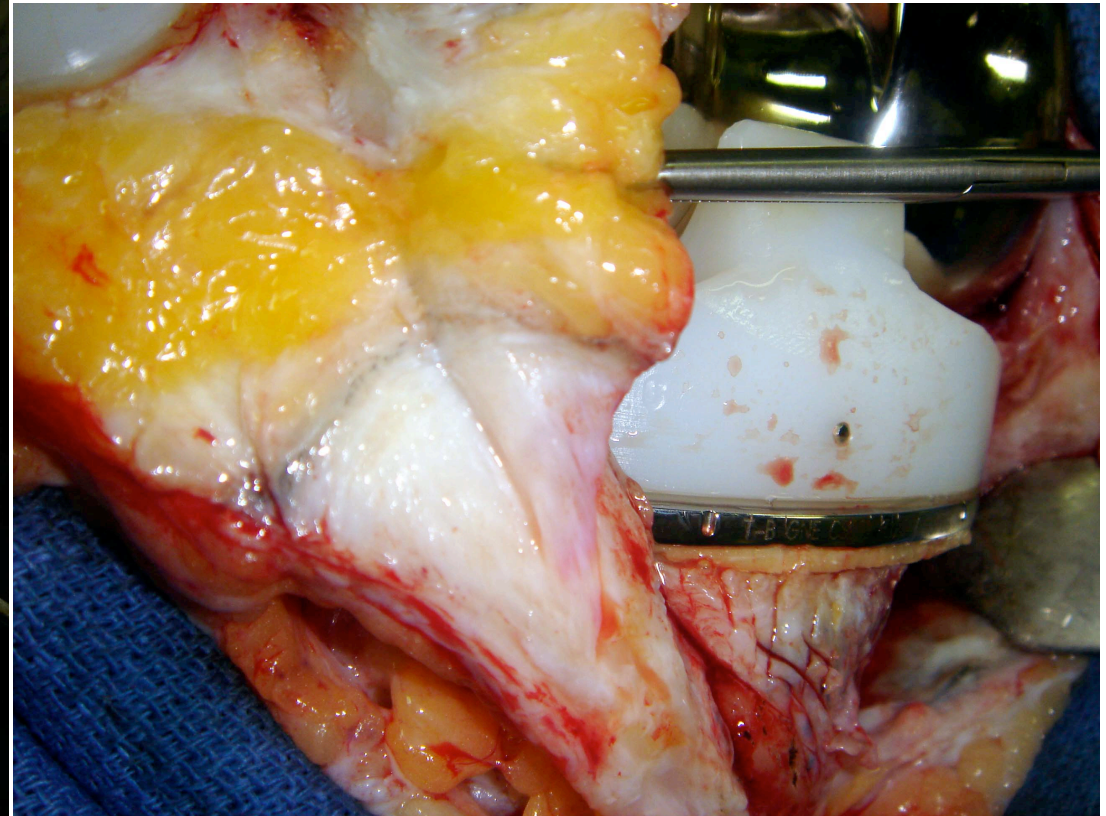
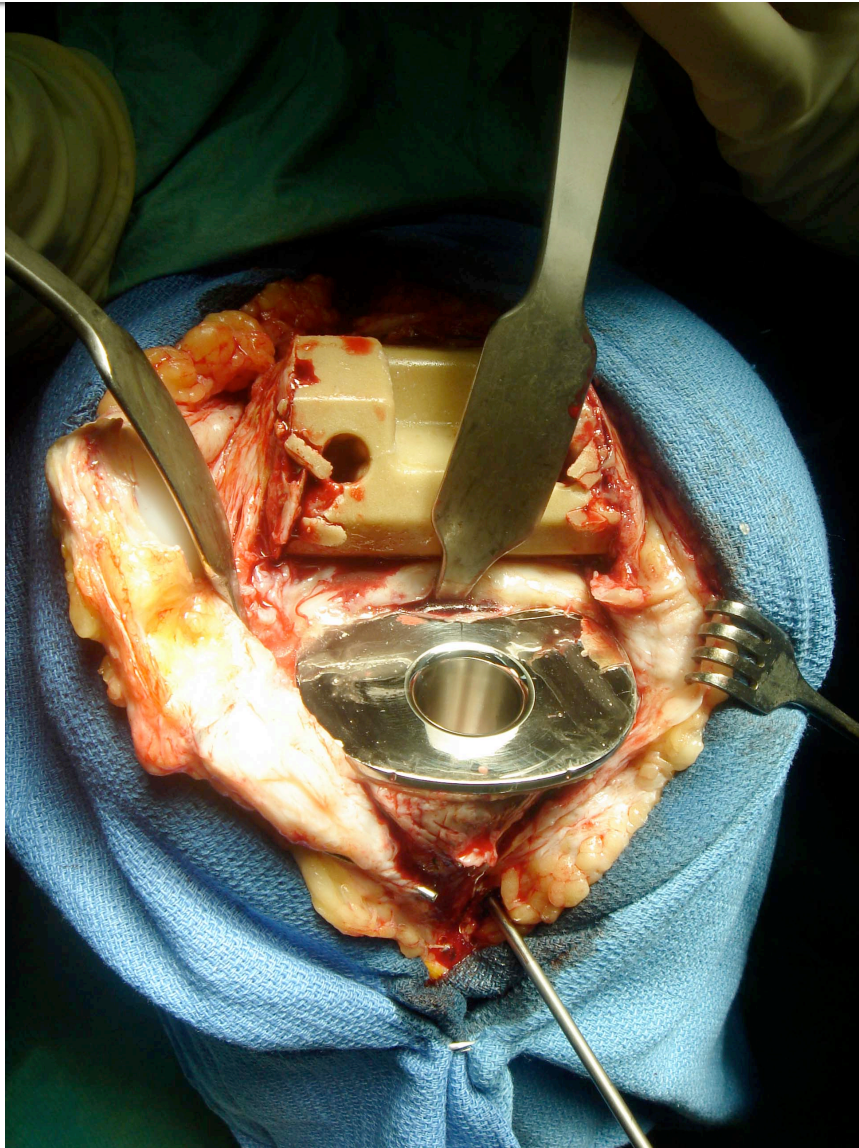
2007



# 8.Tendinitis Allergy

# Painful RTKA

## 8. Tendinitis, Allergy



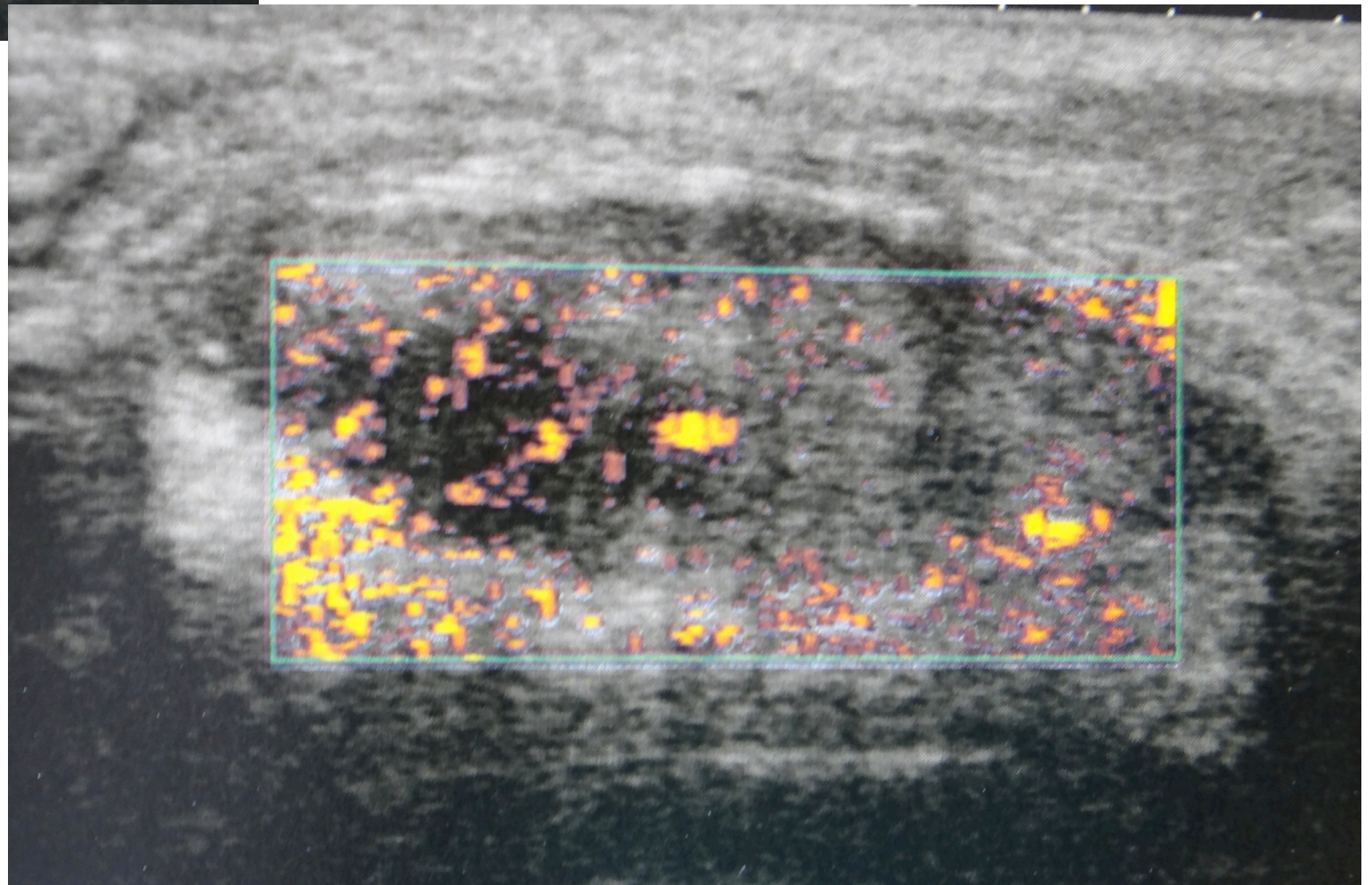
oversizing

# Painful RTKA

## 8. Tendinitis, Allergy



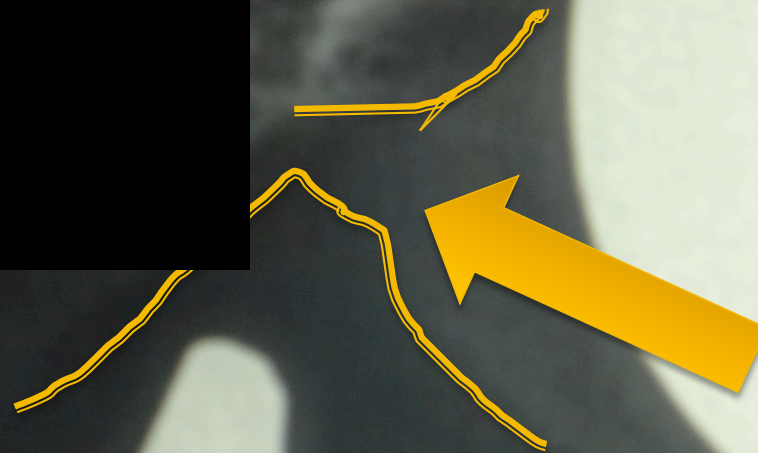
## 8. Tendinitis, Allergy



# Painful TKA

## 8. Tendinitis, Allergy

Hyperflexion





# Painful TKA

## 8. Tendinitis, Allergy

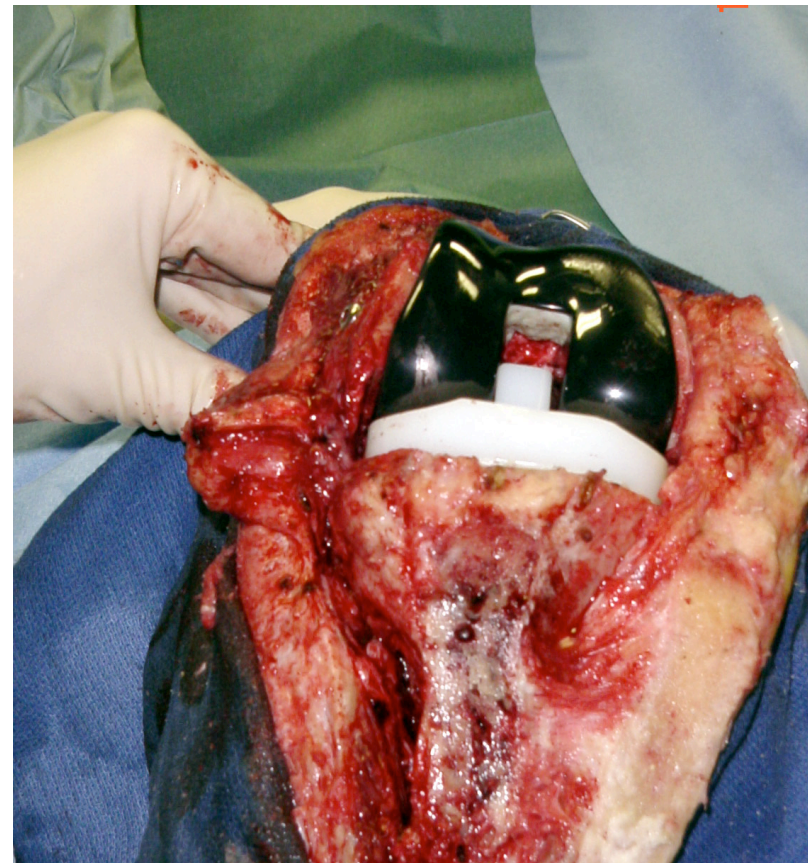
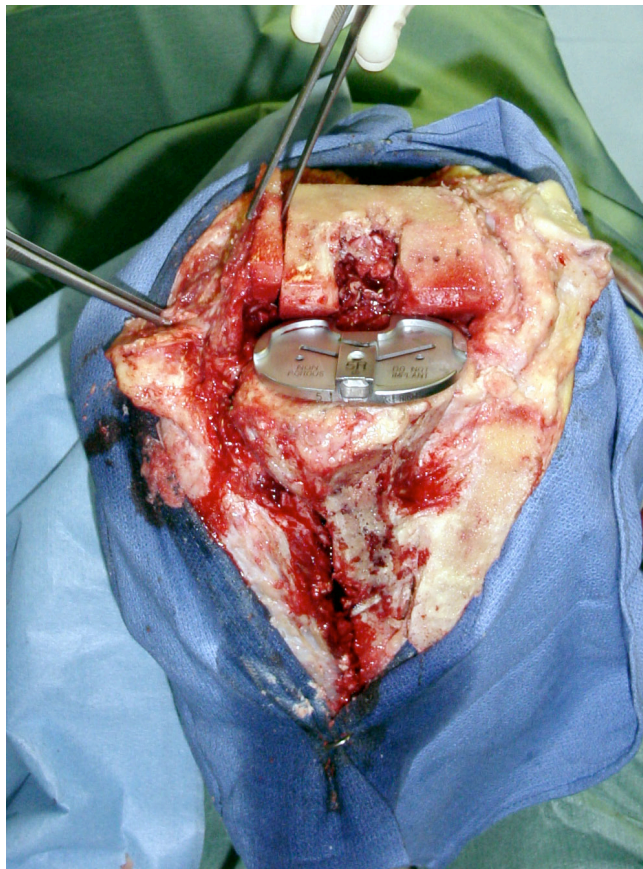
- Miss Woj...christiane born in 1936



# Painful TKA

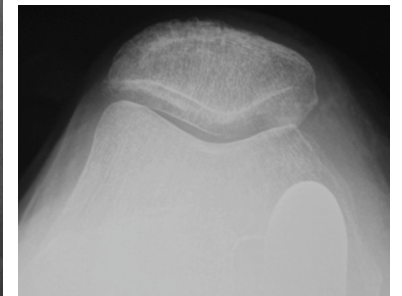
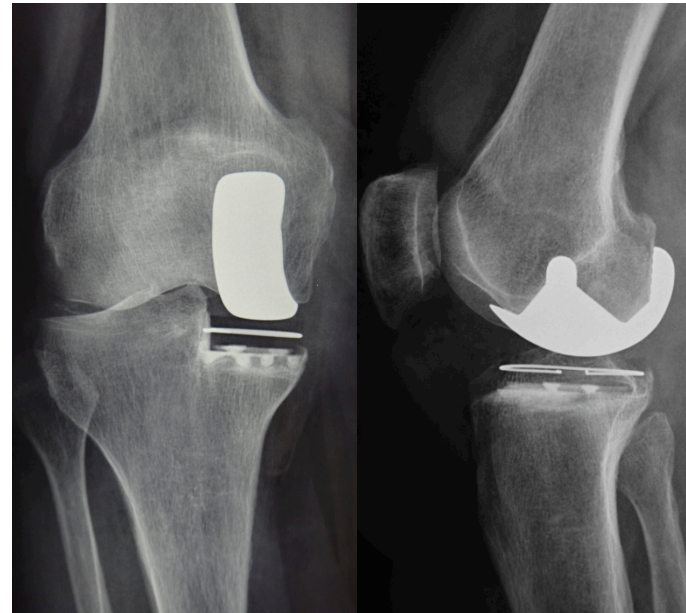
## 8. Tendinitis, Allergy

- M. Gay ...j born in 1952



Diffuse pain...

# Koe...jacqueline born in 1934



# Diagnosis

1. Mal positioning
2. Instability
3. Loosening
4. PF Complications ++
5. Stiffness
6. Fractures, Osteoporosis
7. Wear
8. Tendinitis, Allergy

Infection ??

Unexplained pain

# Diagnosis

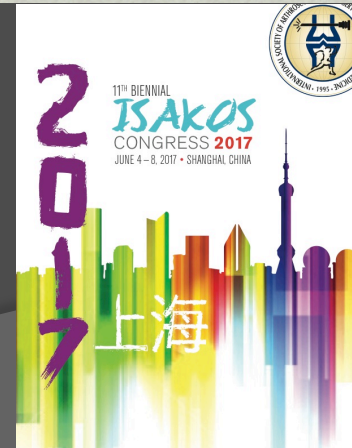
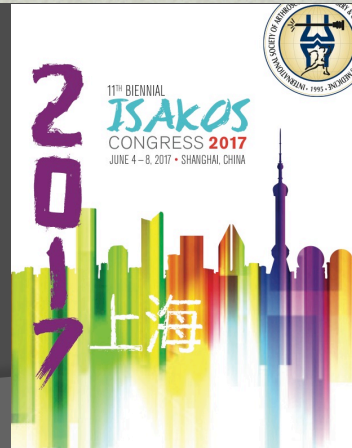
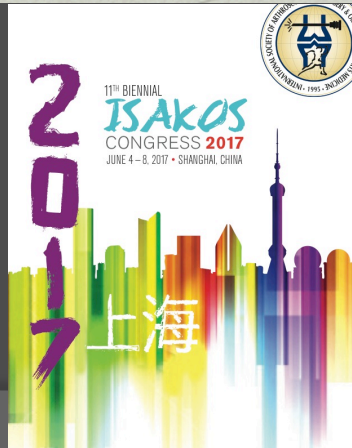
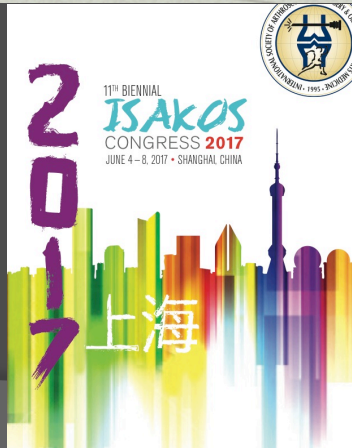
## 9. Unexplained pain

- Re-operations due to unexplained pain

23 / 2585



No pain	50.0%
Occasional pain	30.0%
Pain when climbing stairs	13%
<b>Moderate pain</b>	<b>3.5%</b>
<b>Severe pain</b>	<b>2.5%</b>



# Thank you



11<sup>TH</sup> BIENNIAL  
**ISAKOS**  
CONGRESS **2017**  
JUNE 4 – 8, 2017 • SHANGHAI, CHINA

2017 上海

A stylized graphic of a city skyline composed of vertical bars in various colors (green, yellow, orange, red, purple, blue). The Chinese characters '上海' (Shanghai) are overlaid in white on the right side of the skyline.