



*Facteurs de réussite  
d'une prothèse*

...

*en vue de l'histoire*

François Prigent

# *L'Histoire*

Tout implant prothétique  
doit répondre à trois critères de réussite :

**Une bonne indication**

Un matériel adapté

Une technique opératoire reproductible

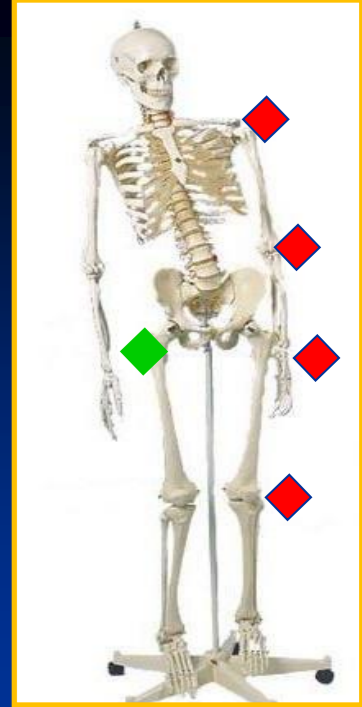


1853 - 1942

# Glück : 1890

berlin

Squelette de « Paris »  
Congrès international  
de Berlin 1890



Prothèse en ivoire : genou (3) , épaule, coude, poignet

Fixé par un « ciment » plâtre-pierre ponce

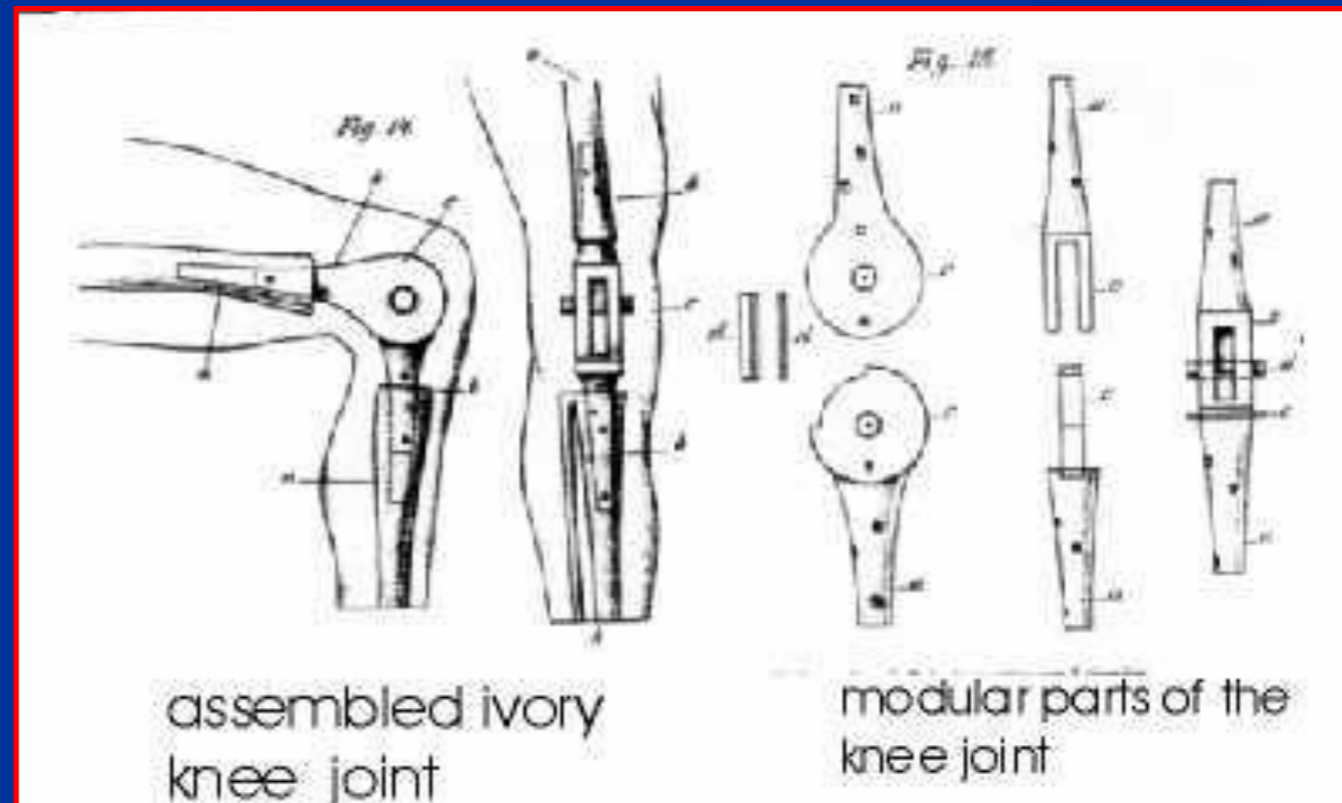
**DR. GLÜCK'S METHOD OF INSERTING  
IVORY JOINTS AS A SUBSTITUTE  
FOR EXCISED ONES.**

In no direction, perhaps, is the progress of surgery more evident than in the recent developments of plastic surgery. Nerves, tendons, muscles, intestines, etc., are all submitted to suture, and with more or less permanent success. Those who have followed the progress in this direction with minuteness will have noticed Professor Glück's name amongst many others as an advocate of these deeper plastic operations.

At the Berlin International Congress recently he read a paper<sup>1</sup> and gave several demonstrations of a method of his by which he claims that it is possible to plant not only portions of bone, but even whole joints. Whatever the ultimate possibilities of this plan may turn out to be, it at least merits a somewhat critical examination, if not an extended trial. In the Congress Museum, amongst other novelties one's attention could not fail to be attracted by a skeleton, the long bones of which appeared to be patched together by pieces of ivory, and the joints in many instances to be replaced by artificial ones also made of ivory, though differing somewhat in their construction from the ordinary ones to which one is accustomed. This skeleton was intended to show how bones that had been broken, and had even lost considerable portions of the shaft, might be supplied artificially with their deficient portions, and how limbs, the joints of which had to be removed on account of disease, might have new ones made of ivory supplied in their place. It was announced that a demonstration would take place of a case in which a patient whose knee-joint had been excised by the Professor would be shown with an ivory joint which was capable of flexion and extension. To a certain extent undoubtedly this was true. The patient was shown. The wound was completely healed, and, seated on a chair, he was able

<sup>1</sup> Those who desire further information on this point will find it in two papers by Glück, *et ibid.*, Autoplastik Transplantation, U. S. W., Berlin. *Klin. Woch.*, 1890, No. 18. Die Invagination Methode der Osteo-und Arthroplastik. *Berlin Klin. Woch.*, 1890, No. 22.

Sept.13, 1890



assembled ivory  
knee joint

modular parts of the  
knee joint

COUPE

The British medical journal.

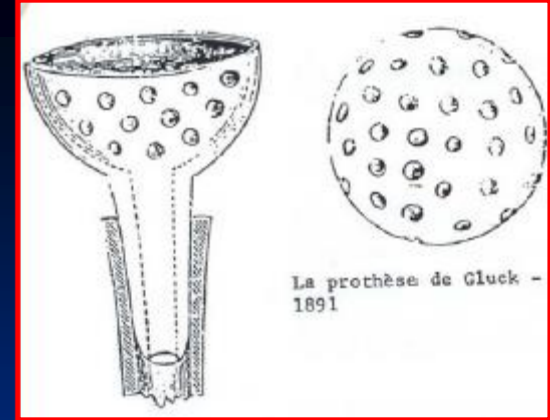
Thémistocle Glück



1853 - 1942

# Glück : 1890

berlin



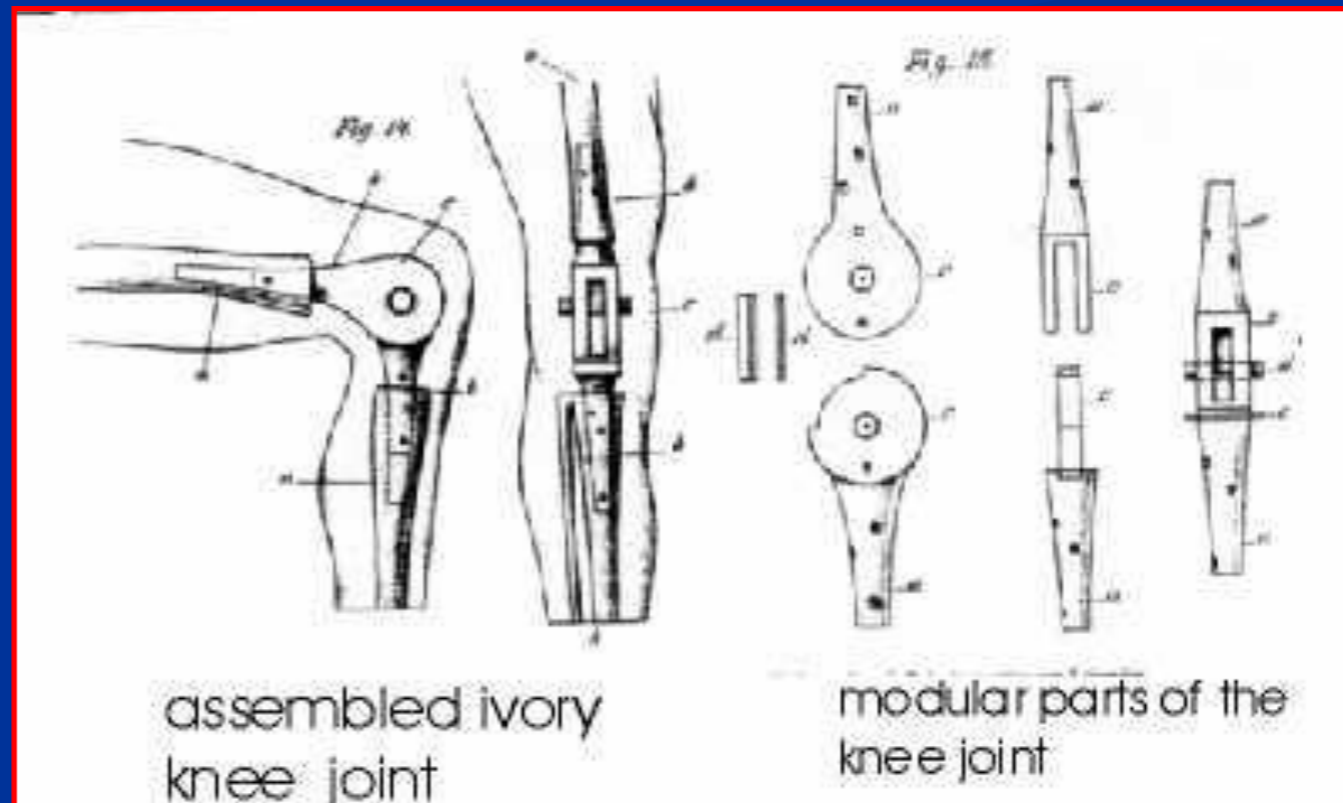
Tous les cas opérés sont des tumeurs blanches tuberculeuses  
A court terme l'échec est inéluctable par poursuite de l'infection

**DR. GLÜCK'S METHOD OF INSERTING  
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The British medical journal.

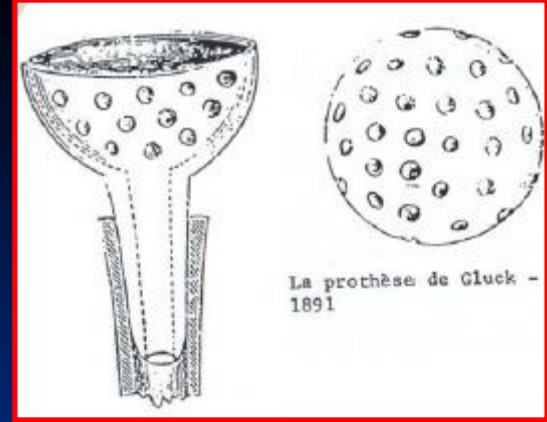
Thémistocle Glück



1853 - 1942

# Glück : 1890

berlin



« En temps que leader de la chirurgie Allemande, je ne peux accepter que **vous discréditez** l'Allemagne face à une plateforme de chirurgiens internationaux »

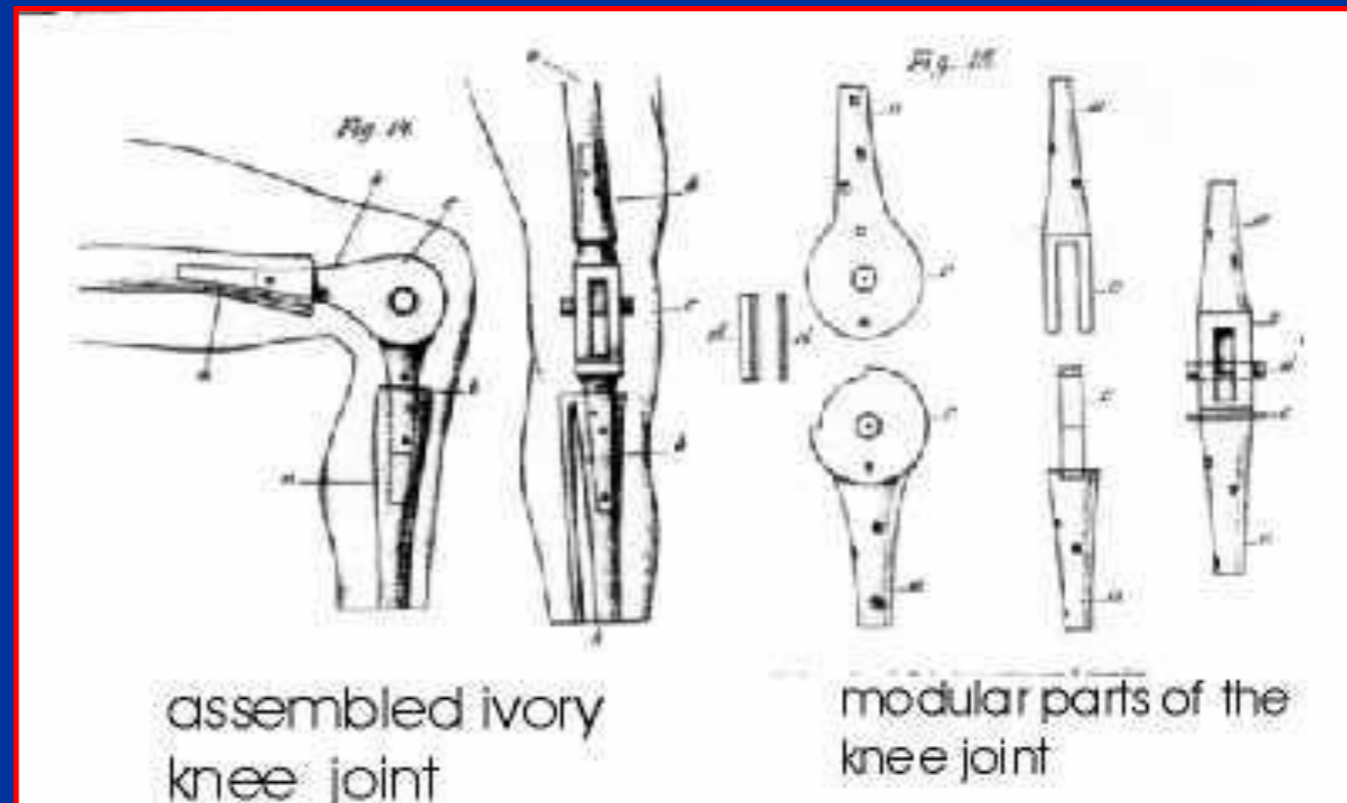
Professeur Von Bergmann

**DR. GLÜCK'S METHOD OF INSERTING IVORY JOINTS AS A SUBSTITUTE FOR EXCISED ONES.**

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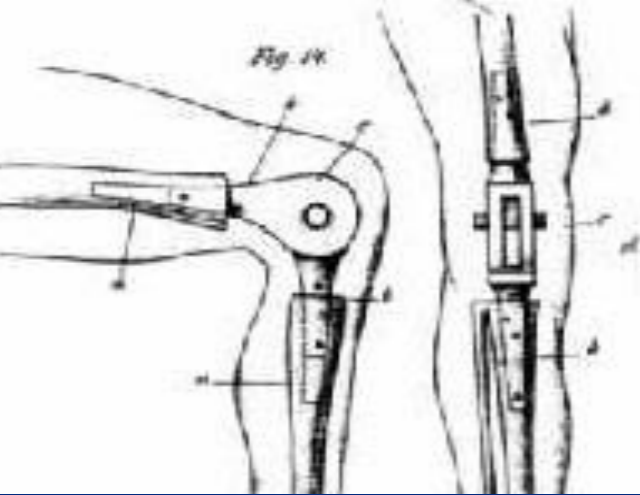
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The British medical journal.

Thémistocle Glück



1890 : indication  
tumeur blanche tuberculeuse



2010 : indication  
résection tumorale

Thémistocle Glück était un génial précurseur

Mais il s'était trompé sur ***l'indication***

...

Plus d'implant prothétique pendant 50 ans

Plus de fixation par « ciment » pendant 70 ans

# *l'Histoire*

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**Un matériel adapté**

Une technique opératoire reproductible

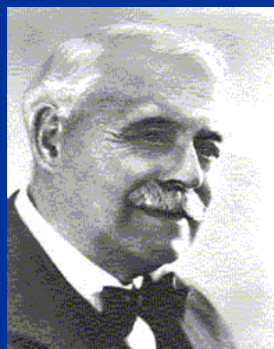


Qui dit MATERIEL, dit MATERIAU



A partir de 1900 les chirurgiens INTERPOSENT

Feuille  
d'OR  
1902



Robert Jones

vessie de porc

Foedre et Baer

lambeau

musculaire

plaques  
d'os décalcifiés  
ou d'ivoire  
Chlumsky

fascia lata

Murphy et Ilie de Colona

couche  
de collodion  
de celluloid

CIRE

Feuille  
de ZINC  
de caoutchouc

CIRE

plaques  
de  
magnesium







Aucun matériau ne marche



Trop fragile

Trop toxique

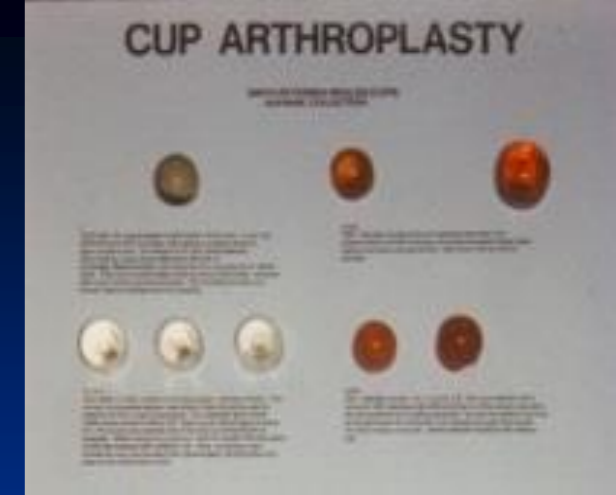
Trop mou



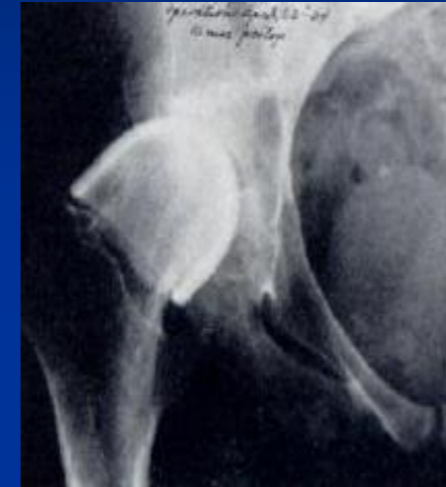


# Smith – Petersen

Resurfaçage



Verre



Celluloïd : 1931



Pyrex : 1933



Bakelite : 1937



Smith-Petersen

# Smith – Petersen

Resurfaçage



1937 : Venable expérimente les effets de différents alliages sur l'os .

Ingénieur

Il propose l' alliage Cobalt-Chrome-Molybdène : **Vitallium** (protasul)



(Co-Cr-Mo)

« John W. Cooke, son dentiste, parle à Smith-Petersen du Vitallium »



Smith-Petersen

# Smith – Petersen

Resurfaçage

*Matériau : Vitallium*



8000 cupules métalliques seront posées jusqu'en 1970



*Smith Petersen est un précurseur*

*Il a trouvé un **MATERIAU** adapté à la pose d'implant*

*: le Cobalt-Chrome-Molybdène*

*...*

*Le **MATERIAU** est une première étape*

*Reste à trouver le **MATERIEL** idéal*



Smith-Petersen

## Cupule fémorale en vitallium : 1941

Resurfaçage



*Tentative soldée par un **échec** à cause*

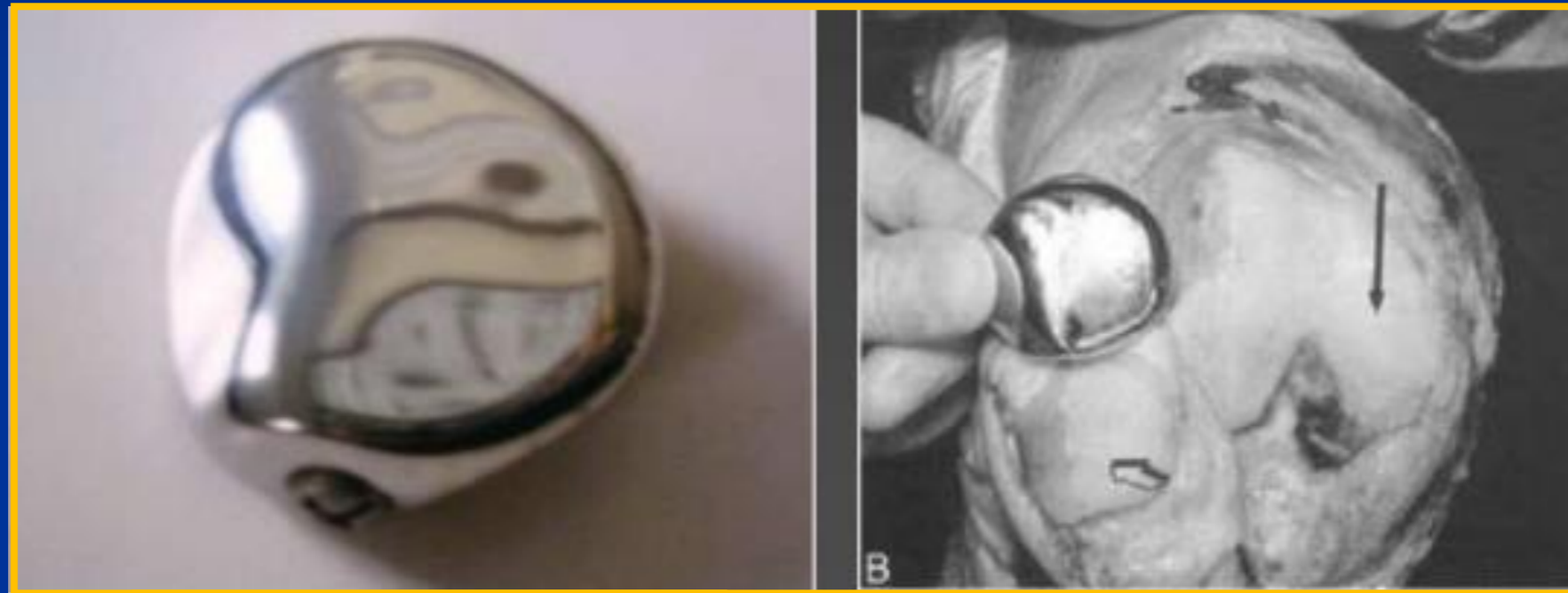
- du couple de friction Vitallium-cartilage*
- de la forme de l'implant*



Mc KEEVER

## Bouton rotulien en vitallium : 1955

Resurfaçage



*Tentative soldée par un **échec** à cause*  
*- du couple de friction Vitallium-cartilage*  
*- de la forme de l'implant*

# Les premières prothèses totales : 1953

## Vitalium - Vitalium



Mac Kee: 1953



Waldius : 1953

Shiers : 1954

Premières prothèses totales métall-métal : résultats *incertains*

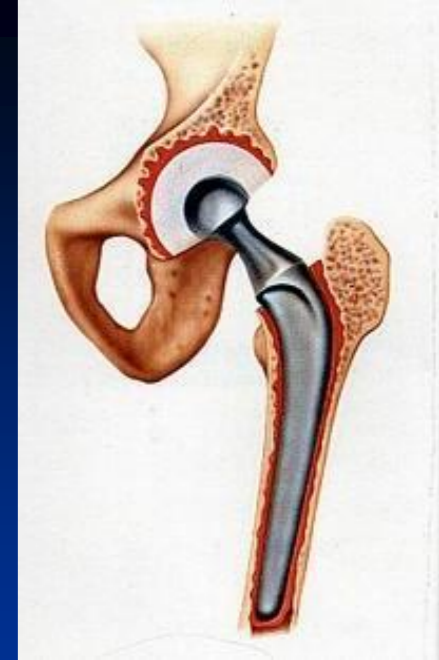




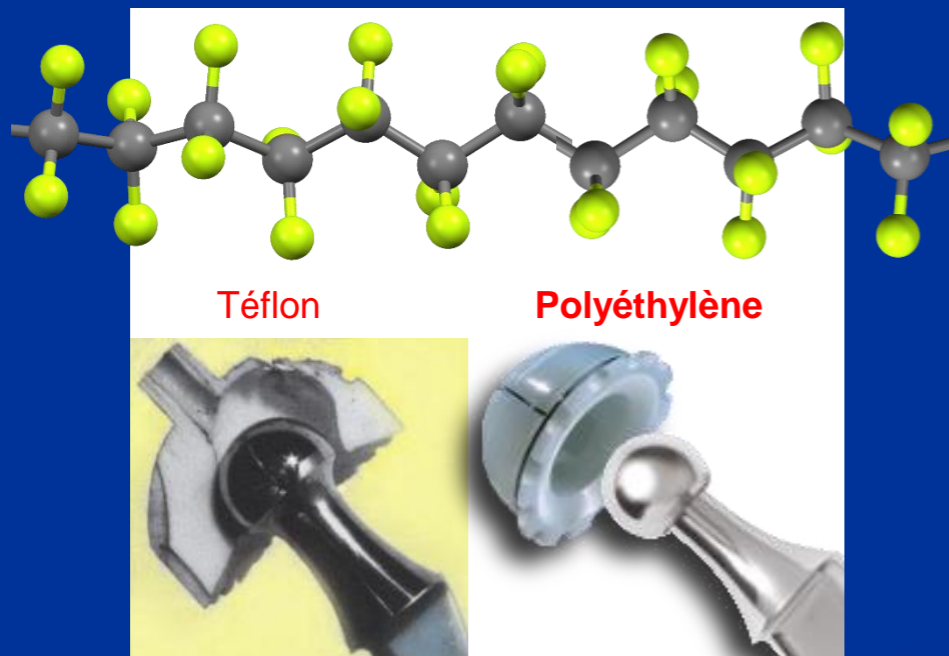
# Charnley : 1962

Manchester , Angleterre

propose une double solution mécanique  
pour les PTH



- ▶ Une tête métallique de petit diamètre dans un cotyle polyethylene (low friction)
- ▶ Fixation des composants par un ciment acrylique (déjà utilisé par les dentistes)



Tavaux de Wiltse : 1957

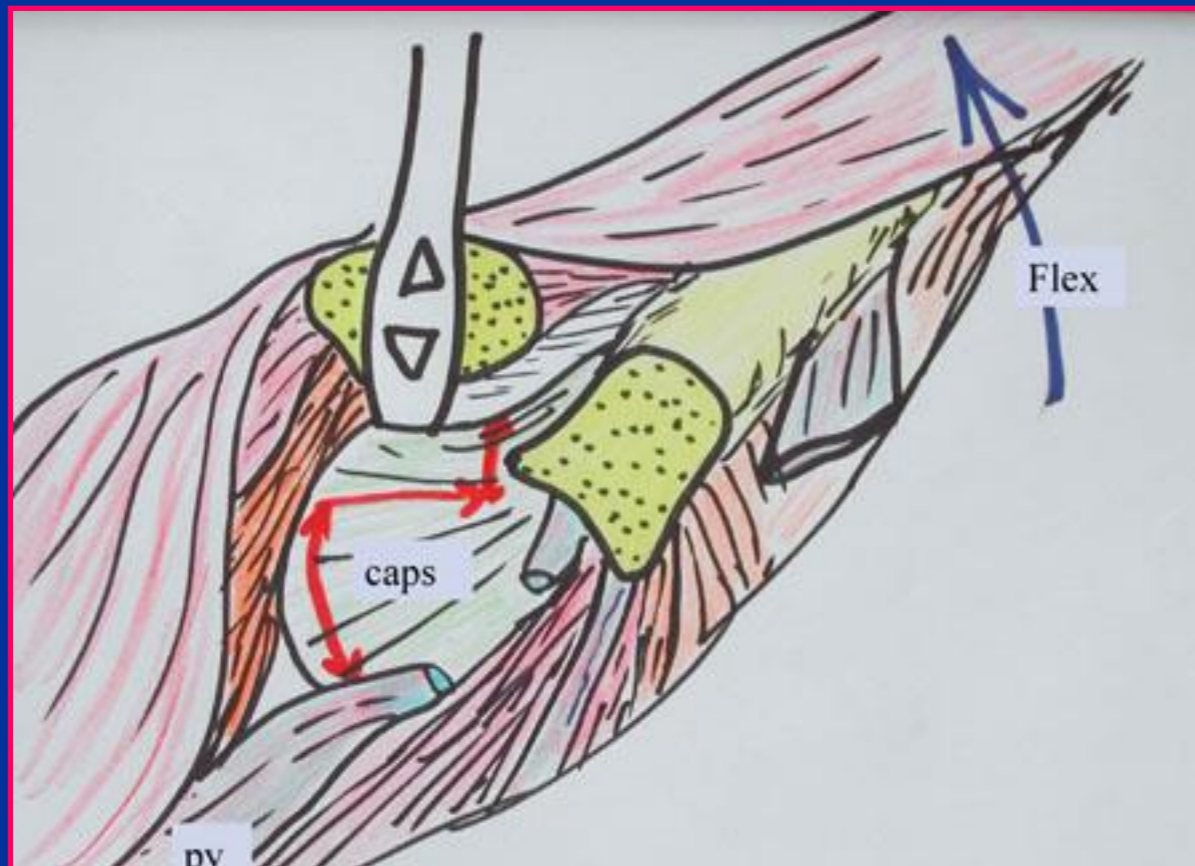
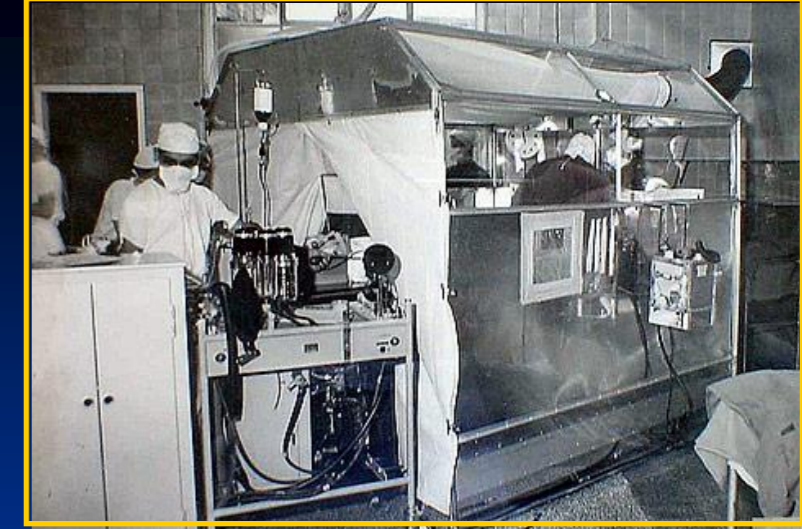


# Charnley : 1962

Manchester , Angleterre

a comme technique de pose

la TROCHANTEROTOMIE





Charnley

# Prothèse totale de hanche

Low friction

Charnley, en 1962, réuni les 3 critères d'une bonne implantation de PTH :

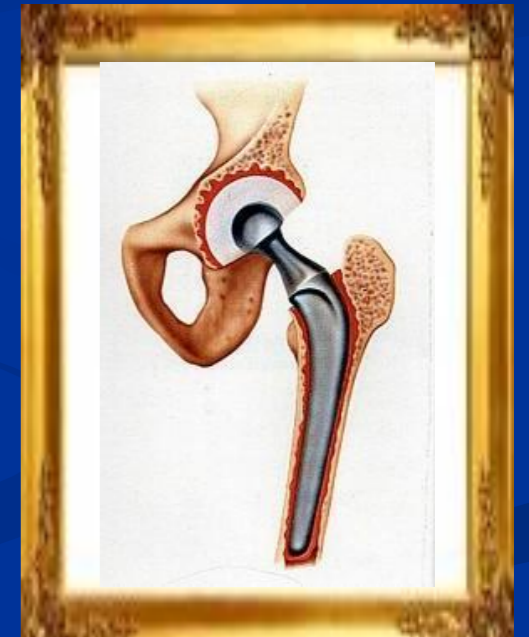
- La bonne indication : l'arthrose
- Le bon matériel : polyéthylène-métal, cimenté, avec Low friction
- Une technique reproductible

Sa prothèse sera un **Gold** standard pour 40 ans

Indication

Matériaux-Matériel

Technique

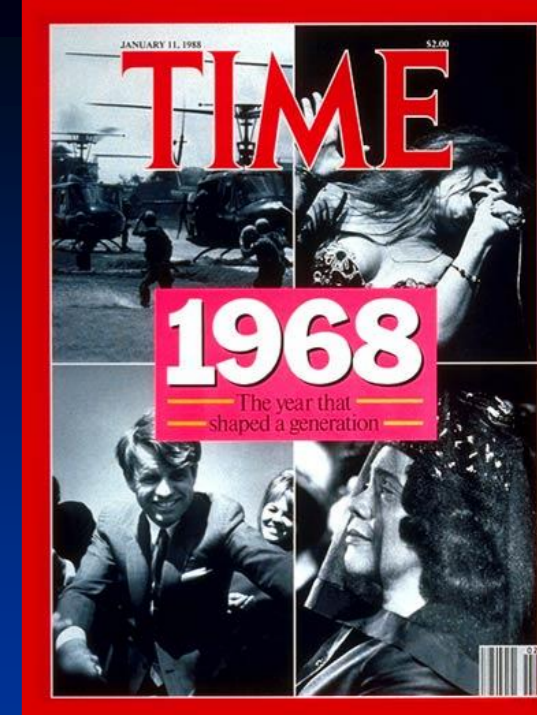




Charnley

# Prothèse totale de hanche

Low friction



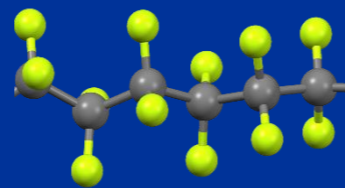
90% à 5 ans

Charnley publie en 1968 :

ses prothèses de hanche donnent de bons résultats à 90% à 5 ans

C'est une révolution !

Un million de ces prothèses seront posées dans les vingt années suivantes.



Le monde de l'orthopédie adopte le couple Polyéthylène-métal (Co-Cr-Mo)  
et la fixation au ciment

# *L'Histoire*

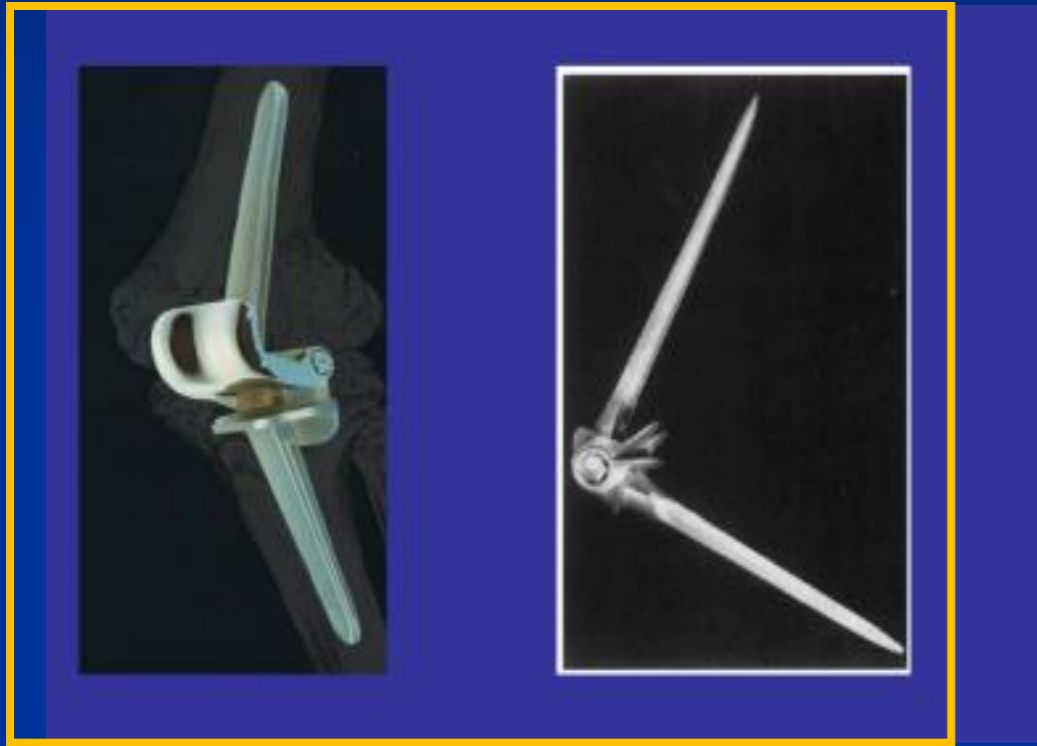
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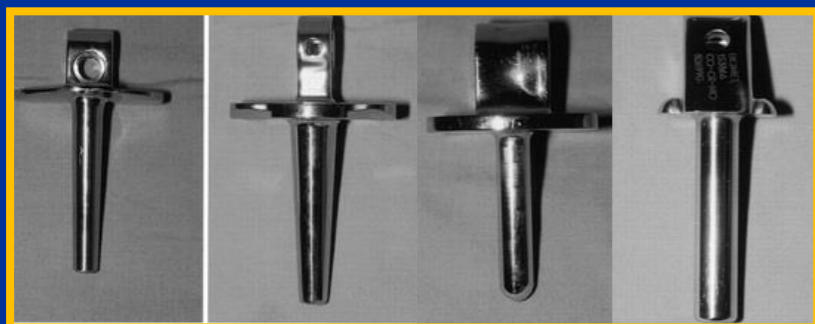
**Une technique opératoire reproductible**

## Prothèse totale à charnière : 1963



Young : 1963

Groupe Guepar : 1967



Les prothèses de genou à charnière sont *imparfaites* mécaniquement sur plusieurs points :

- Un seul axe de mobilité
- Un couple de frottement perfectible
- Une fixation dans l'os en force

Les mauvais résultats sont dus, en premier lieu, à un

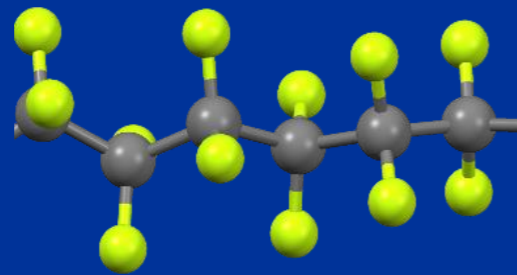
***matériau inadapté***

# Prothèse totale à glissement : 1970

*Approche anatomique*



A partir de 1970 les prothèses de genoux reprennent les matériaux expérimentés avec succès par Charnley



Polyéthylène-métal (Co-Cr-Mo)

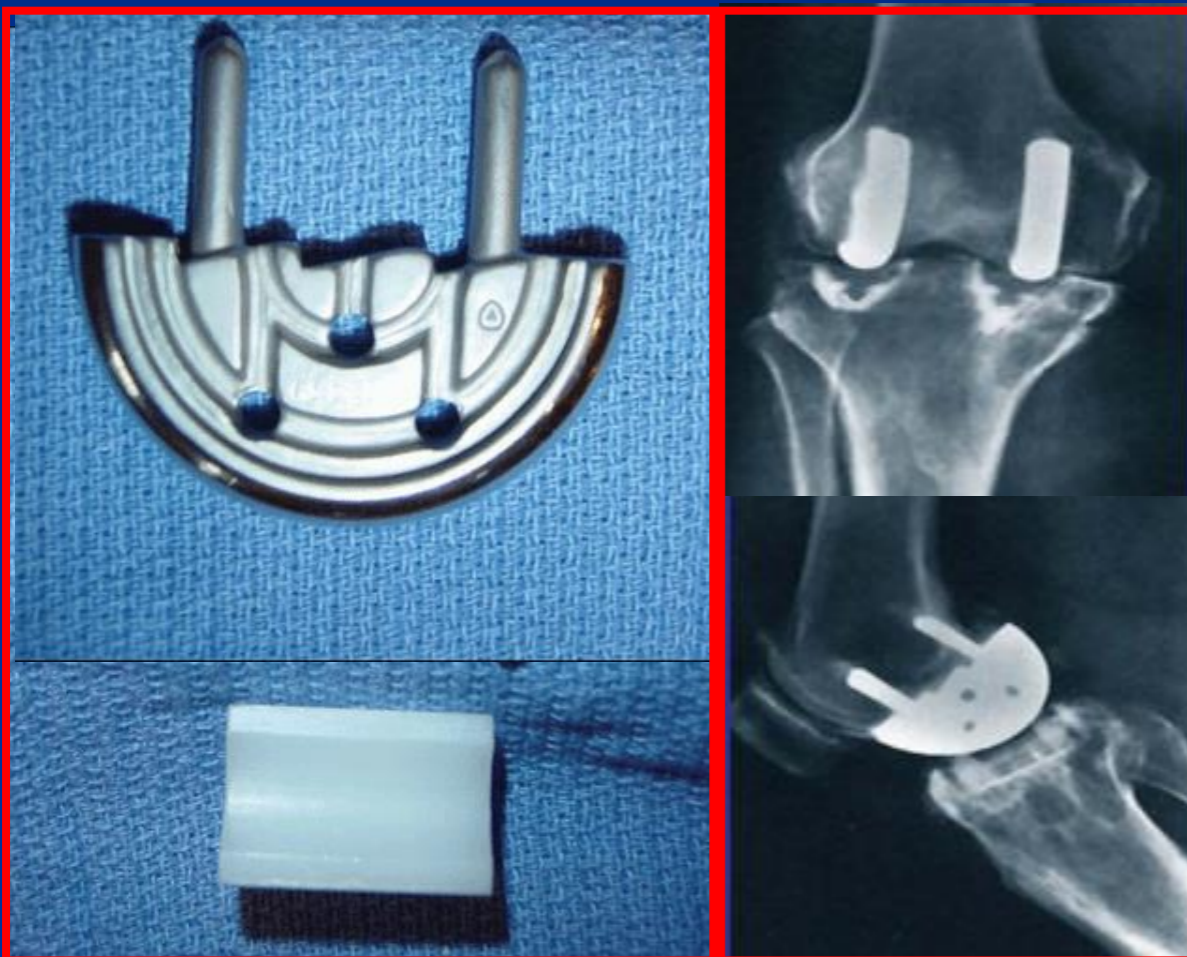


fixation au ciment

Reste à définir : le matériel idéal  
la technique de pose

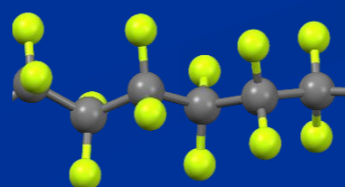
# Prothèse totale à glissement : 1970

*Approche anatomique*



**Prothèse polycentrique : Gunston**

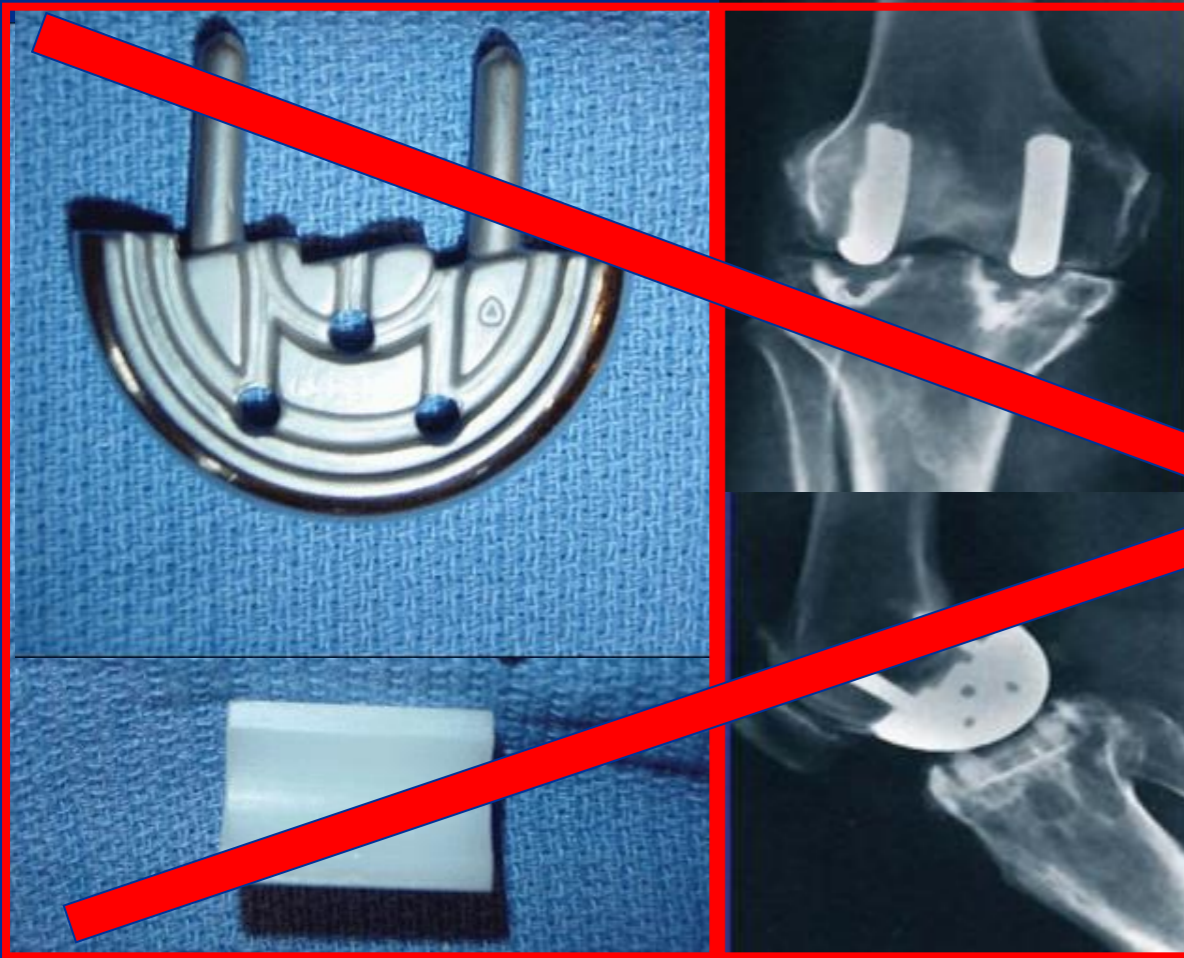
**Duocodylar Knee : Walker, Insall**





# Prothèse totale à glissement : 1970

*Approche anatomique*



C'est un échec du fait d'un

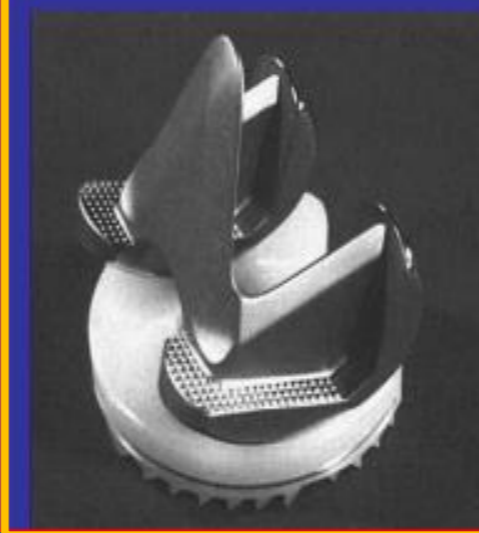
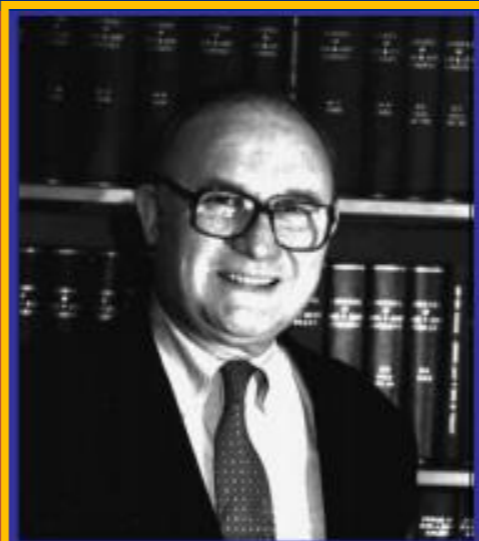
***matériel inadapté***

# Prothèse totale à glissement : 1970

*Approche anatomique*



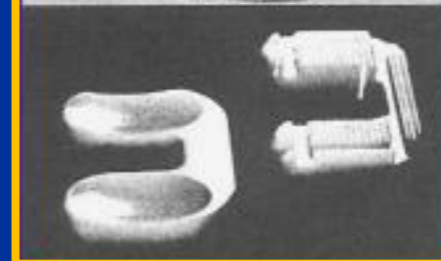
Kodama-Yamamoto knee  
1970



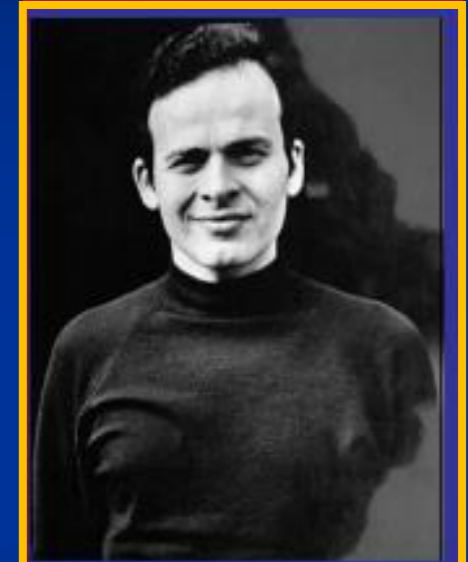
UCI knee  
Waugh and Smith



1971



The Anatomical knee  
Townley  
1971



Leeds knee  
Seedhom  
1972

# Prothèse totale à glissement : 1970

*Approche anatomique : sans section des ligaments croisés.*



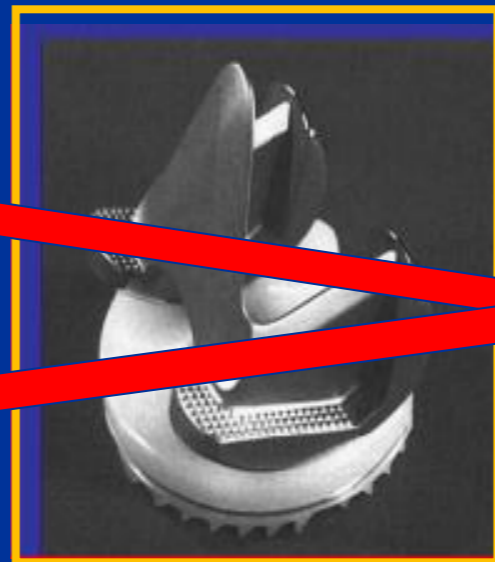
C'est un échec du fait de

***la technique chirurgicale***

Celle-ci est peu fiable pour la pose de l'implant et non reproductible



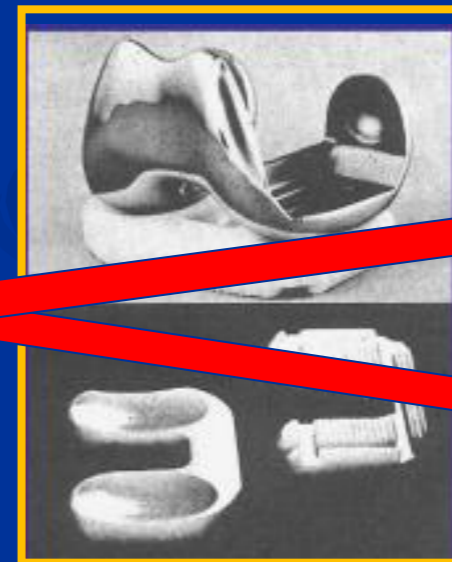
Kodama-Yamamoto knee  
1970



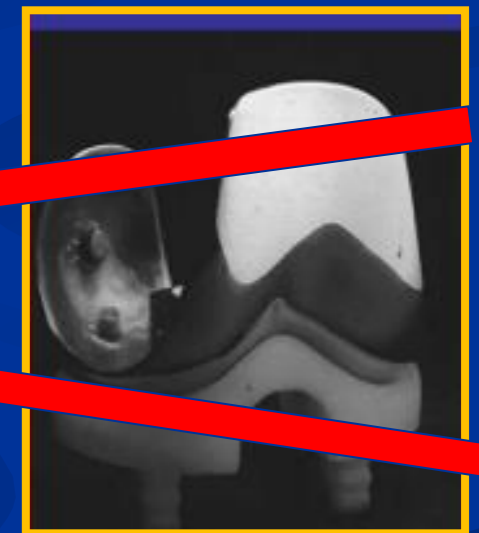
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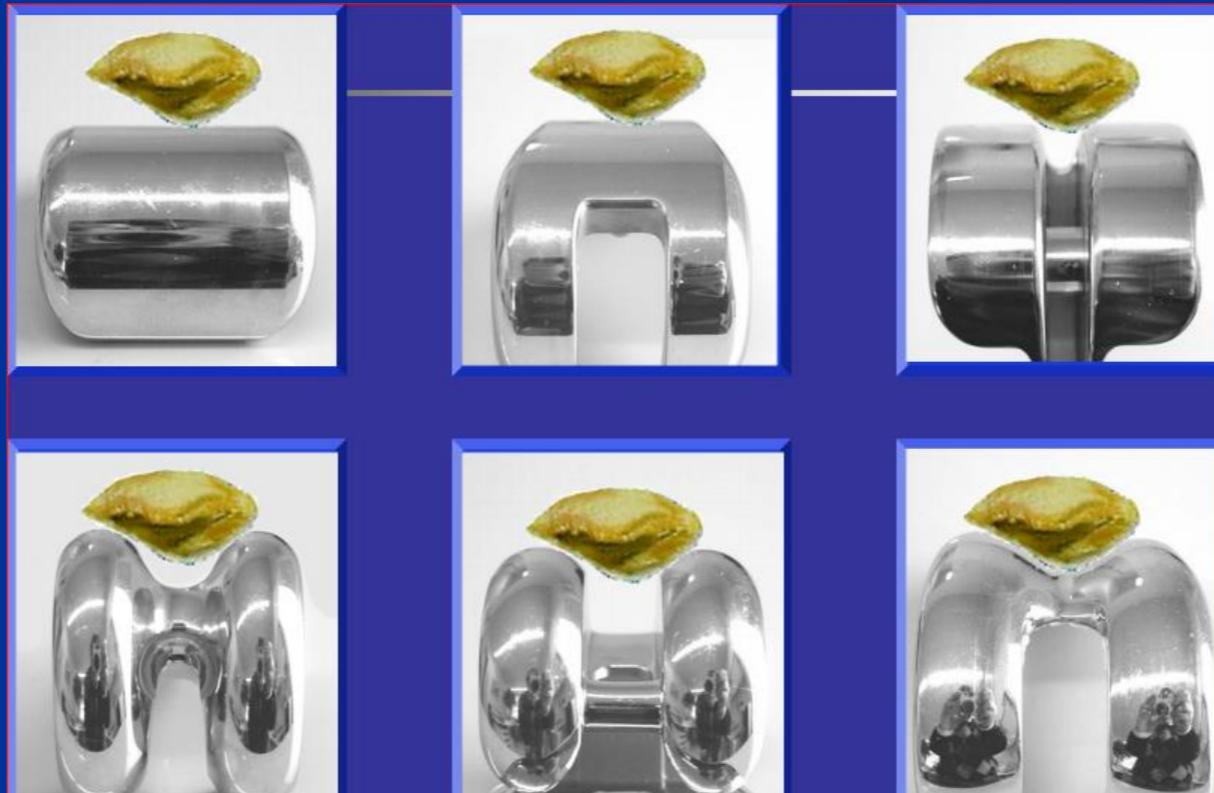
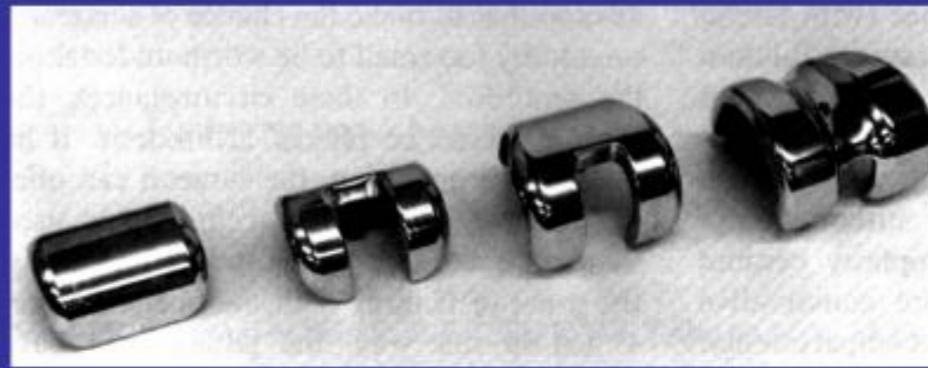
Freeman  
1971

# Prothèse totale à glissement

Freeman propose une approche fonctionnelle et reproductible grâce à la section des croisés



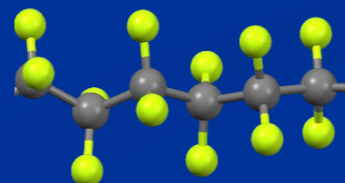
Les ligaments croisés sont sectionnés

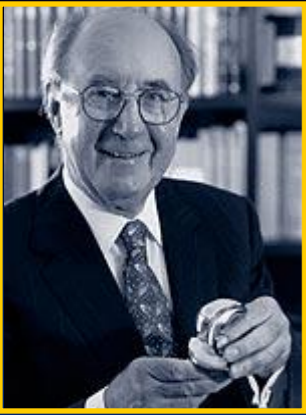


**La rotule n'est pas prise en compte**

# Bouton rotulien sur le bouclier trochléen : 1975

*M. Groeneveld*





Insall

# Prothèse totale à glissement

*Approche fonctionnelle*



Section des deux ligaments croisés

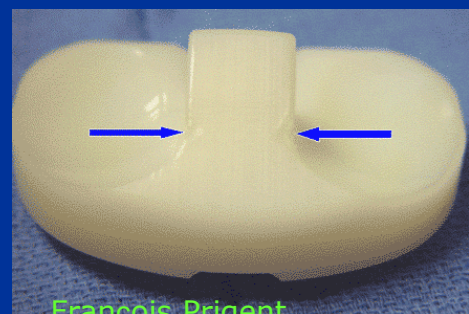
Insall, en 1980, réuni les trois critères d'une bonne implantation de PTG :

- La bonne indication : l'arthrose
- Le bon matériel : polyéthylène-métal, cimenté, avec un plot central
- La technique fiable : section des croisés

Sa prothèse sera un **Gold standard** pour 20 ans



Prothèse Postéro stabilisée  
Insall - Burstein



François Prigent

Indication

Matériaux-Matériel

Technique

*Une prothèse articulaire doit répondre aux trois impératifs  
Indispensables à la réussite de tous les implants :*

- *Une bonne indication* : comme pour Thémistocle Glück une mauvaise indication mène à l'échec.
- *Un bon matériel fait du bon matériau* : un matériel inadapté comme pour les prothèses de genou métal-métal à charnière donne un résultat incertain.
- *Une bonne technique opératoire* : fiable et reproductible à l'opposé de la technique utilisée pour les PTG anatomiques.

# MERCI



François Prigent

prigent.com