Two stage revision of periprosthetic infection after TKA

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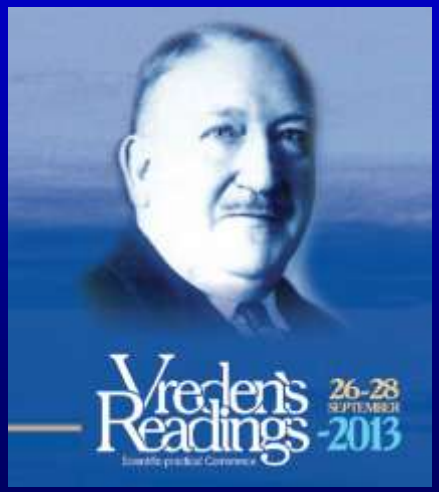


Aix*Marseille université

IML
Institut du Mouvement et de l'appareil Locomoteur

Themistocles Gluck: an unrecognised genius

20 May 1890

N J Eynon-Lewis, D Ferry, M F Pearse

BMJ VOLUME 305 19-26 DECEMBER 1992

emphasised the need for ease of application and atraumatic surgery: "The devices must be easy to insert through small wounds. Even if the device is technically complicated, ingeniously made and movable in different directions, it must not give rise to operative difficulty."

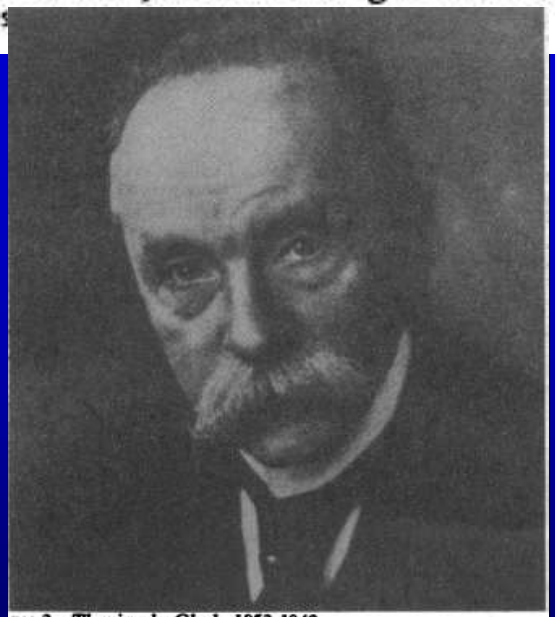


FIG 2—*Themistocles Gluck, 1853-1942*

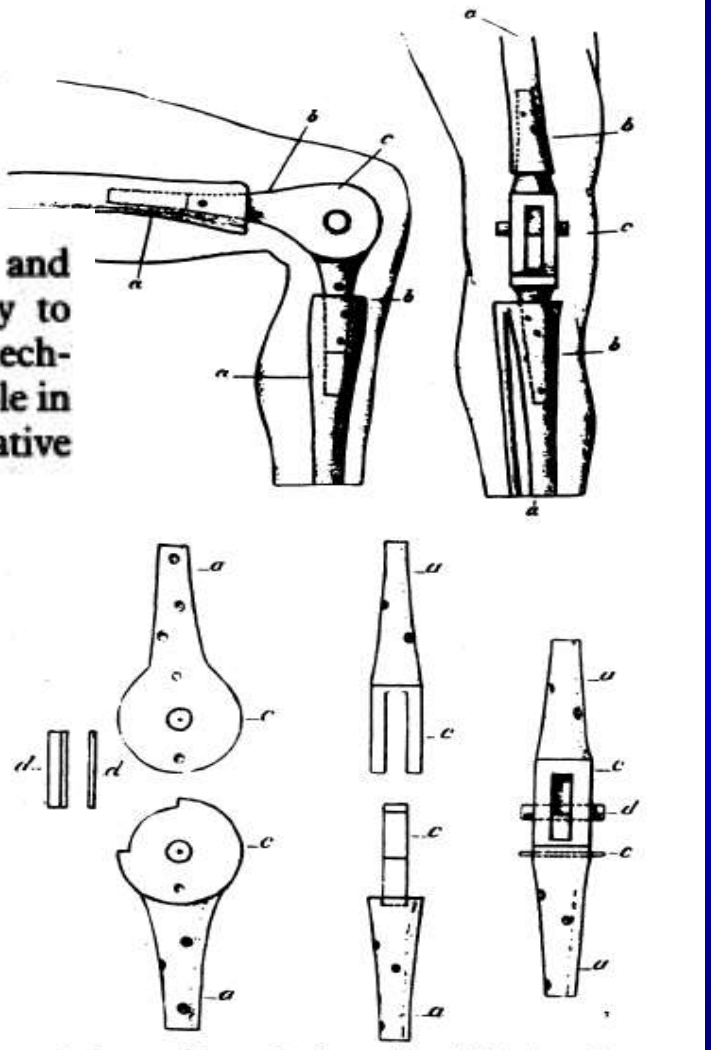


FIG 1—*Ivory total knee a… prosthesis showing slots for…*

fistula formation. Gluck, a rigid follower of asepsis, later realised that prior joint infection was a contraindication to joint replacement. Sadly, because of the

lecture. Bergmann wrote to Gluck, "As the leader of German surgery I cannot allow that you discredit German science in front of a platform of international surgical specialists. My pupils and I will fight you with

«Postoperative infection is the saddest of all complications… »

Sir John Charnley

Two-stage revision for infected TKA

When ?

Why ?

How ?

Results?

Proceedings of the International Consensus Meeting on Periprosthetic Joint Infection

Chairmen:

Thorsten Gehrke MD

Javad Parvizi MD, FRCS

International Consensus Group on Periprosthetic Joint Infection

July 31- August 1, 2013

Thomas Jefferson University, Philadelphia

When?

Irrigation & Debridement

Question 1A: When can irrigation and debridement (I&D) be considered?

Consensus: I&D may be performed for early postoperative infections that occur within 3 months of index primary arthroplasty with less than 3 weeks of symptoms.

Delegate Vote: Agree: 84%, Disagree: 13%, Abstain: 3% (Strong Consensus)

When?

Question 2: What are the indications for <u>two-stage</u> exchange arthroplasty?

Consensus: Two stage-exchange arthroplasty is a reasonable option for the treatment of periprosthetic joint infection (PJI). Specific conditions where two-stage exchange may be indicated over one-stage exchange include:

1) patients with systemic manifestations of infection (sepsis)

2) the scenario where infection appears obvious but no organism has been identified;

3) preoperative cultures identifying difficult to treat and antibiotic-resistant organisms

4) presence of a sinus tract

5) inadequate and non-viable soft tissue coverage

<u>Delegate Vote:</u> Agree: 93%, Disagree: 7%, Abstain: 0% (Strong Consensus)

Why?

2 problems

Cure the infection

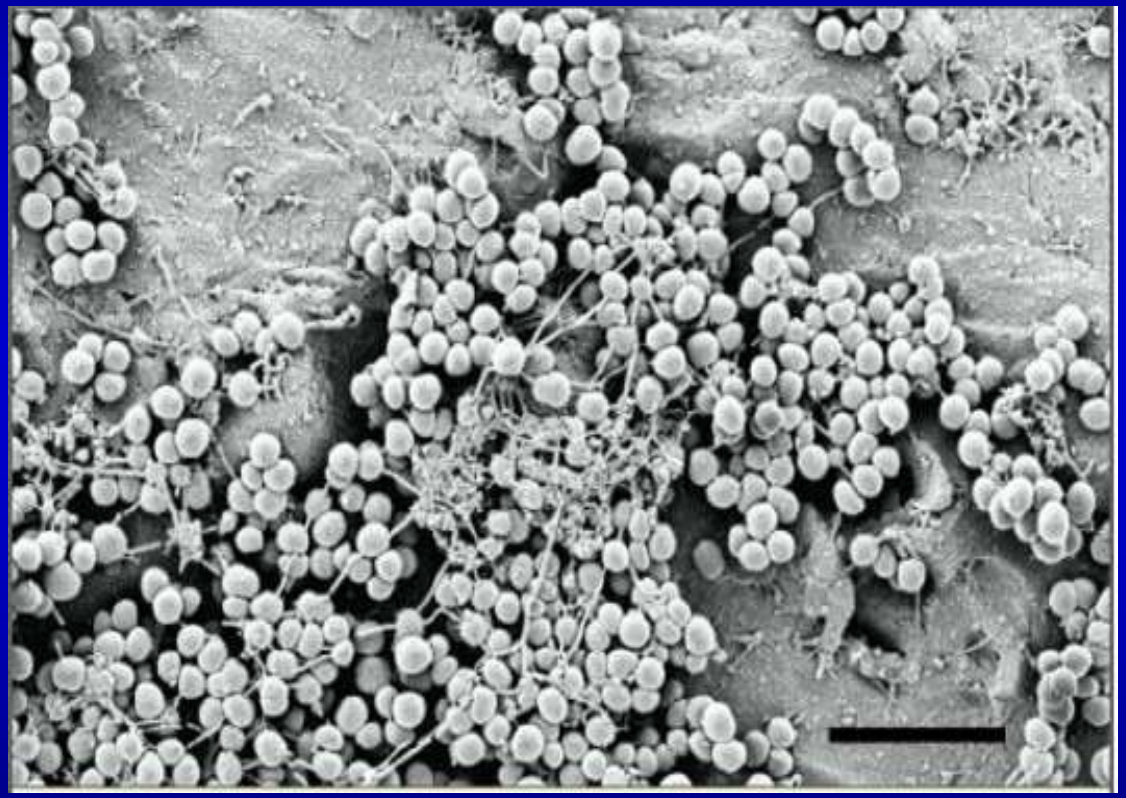
Maintain or restore Knee Function

« Environment is everything

Bacteria are nothing »

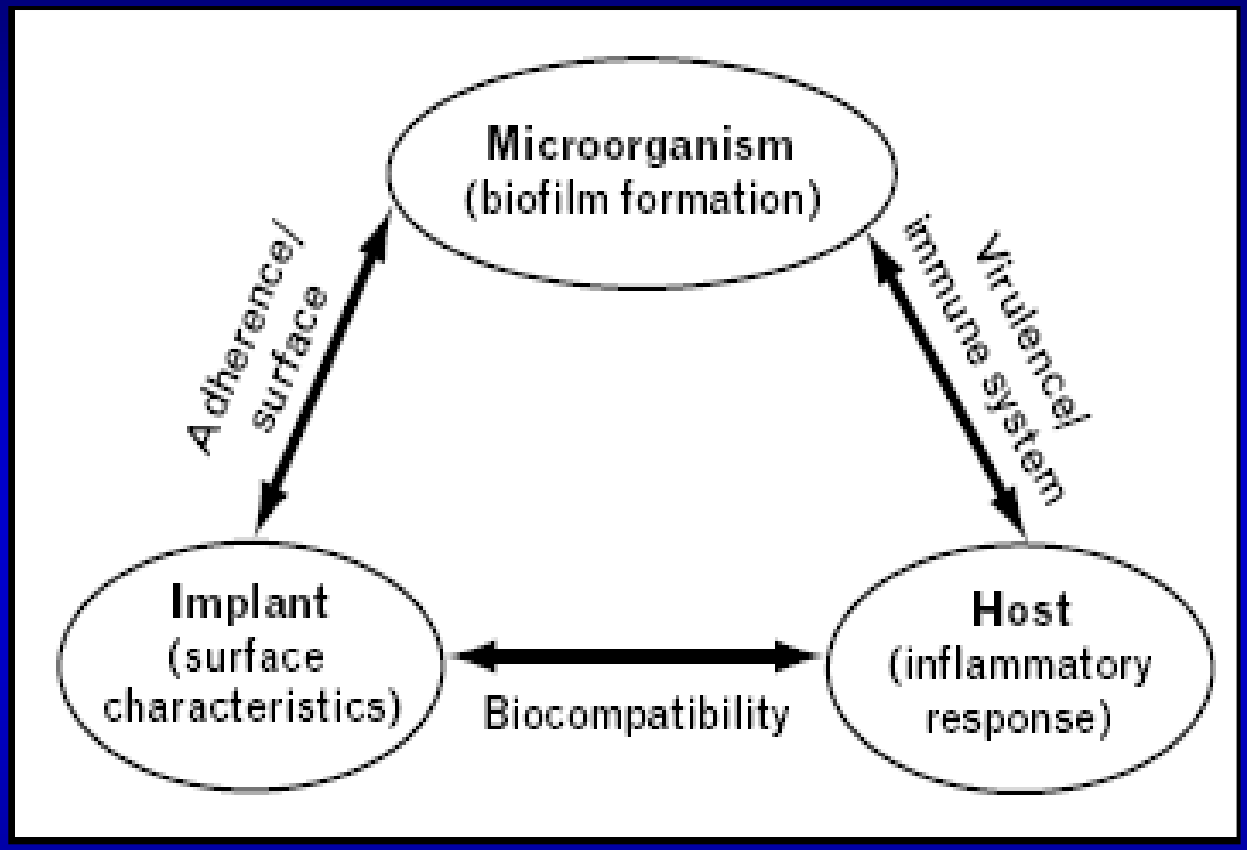
Louis Pasteur

Role of Biofilm= Basic Survival Mechanism for Microorganism



Decrease the number of bugs colonies

Basic Principle of the pathogenesis of implant-associated infections



Interaction between the microorganism, the implant and the host

Infection associated with orthopedic implant , Trampuz, Curr Opin Inf Dis, 2006

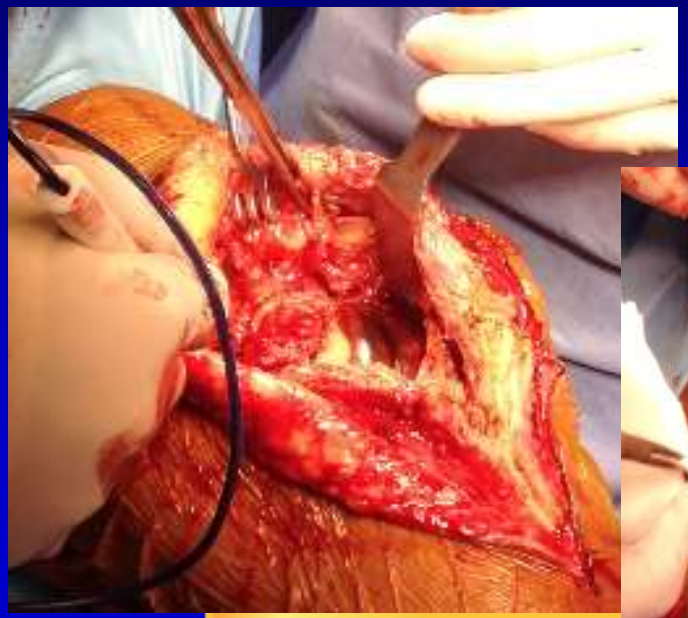
How ?

First step : remove everything and spacer

Second step: in between

Third step :reimplantation

1. Approach: always the same
Skin: lateral
Extensive subvastus approach



Remove all fibrous tissue

2. Implant removal
Not always a slam dunk!

My main problem: cement removal

Spacer? Consensus Phili

Articulating spacers provide better function and is especially preferred for patients who are likely to have spacer in place for longer than 3 months.

There is a non-significant trend in range of motion improvement with articulating compared to non-articulating spacers, but the panels believes that this is still of value to the patient

No difference in terms of infection control

Non articulated spacers when too much bone loss

Consensus 3: **reimplantation is easier with articulated spacers**

Different manufacturers

Thoracic Drain to build the quill

Antibiotic loaded

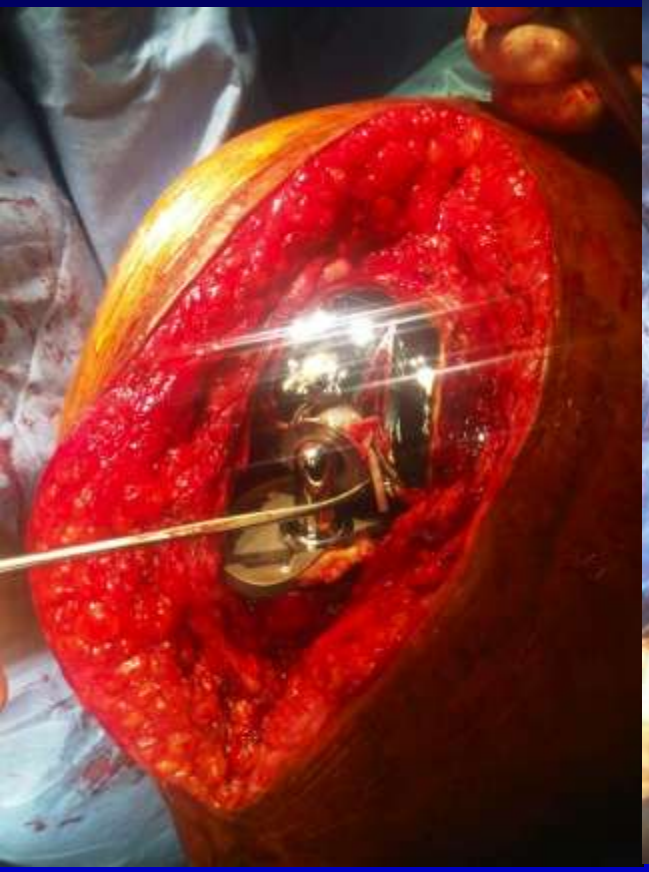
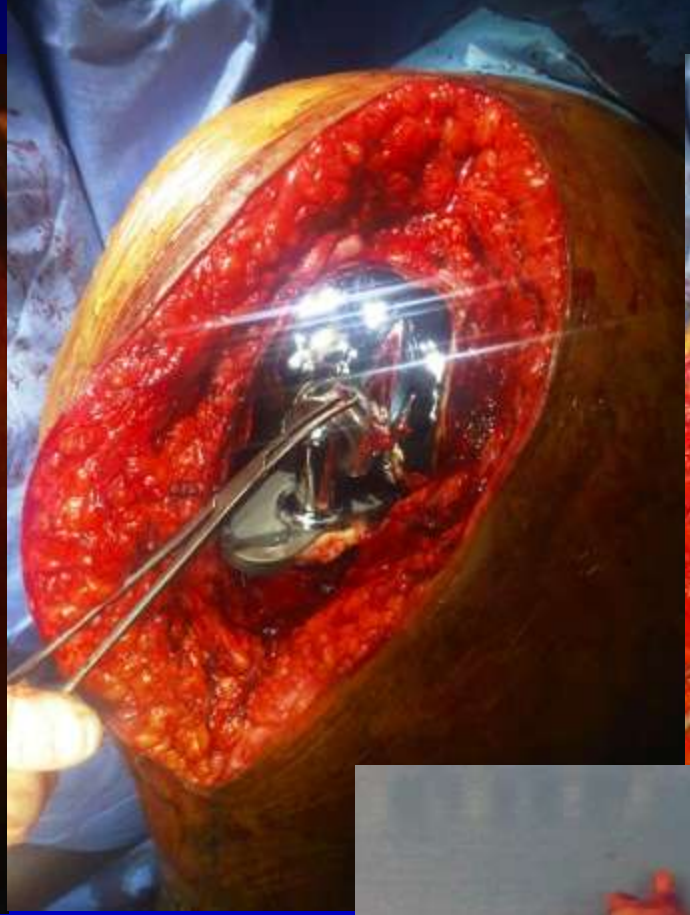
individualized for each patient based on the organism profile and antibiogram (if available) as well as the patient's renal function and allergy profile.

Vancomycin (1- 4 gm per 40 gm/ 40 gr package of cement)

Tobramycin (2.4-4.8 gms per 40 gm package of cement)

Gentamicin (1- 4 gm per 40 gm package of cement)

72 years-old lady
Loosed hinged
Suspicion of infection

Antiobiotic loaded spacer

How long should we keep the spacer?

Skin: Gastrocnemius flap

Two stage revision : first stage

« If you think about it, that means that you need it »

How long in between?

Consensus: There is no definitive evidence in the literature as to the optimal time interval between the two stages. Reports vary from 2 weeks to several months.

More than 6 months: sub-optimal functional results

Classical protocol

Adapted Antibiotic therapy lasting 4 to 6 weeks with subsequent cessation of antibiotics for 2 to 8 weeks prior to reimplantation

The need for serologic evaluation, synovial fluid analysis, and culture of joint fluid aspirate prior to reimplantation is unclear.

A change in value from those conducted at the time of resection was a helpful indicator though

Third step : reconstruction

Manage

Approach

Implant, cement or TM removal

Joint line, alignement and stability

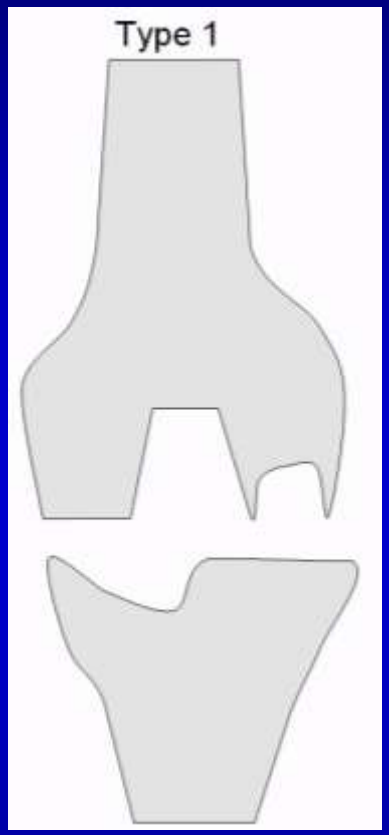
Bone loss

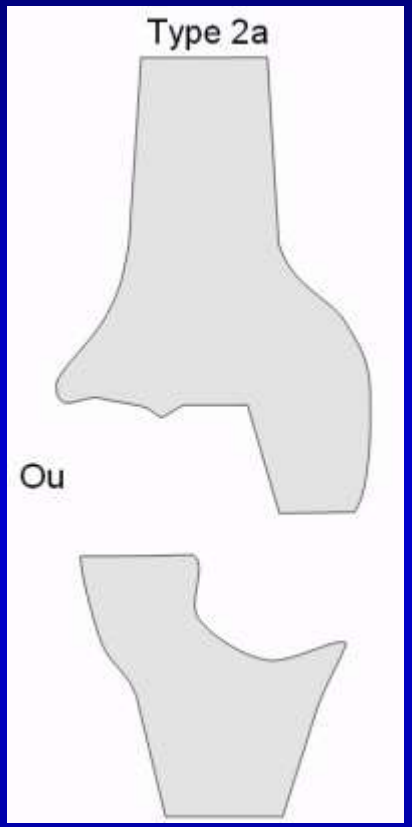
Extenseur mechanism

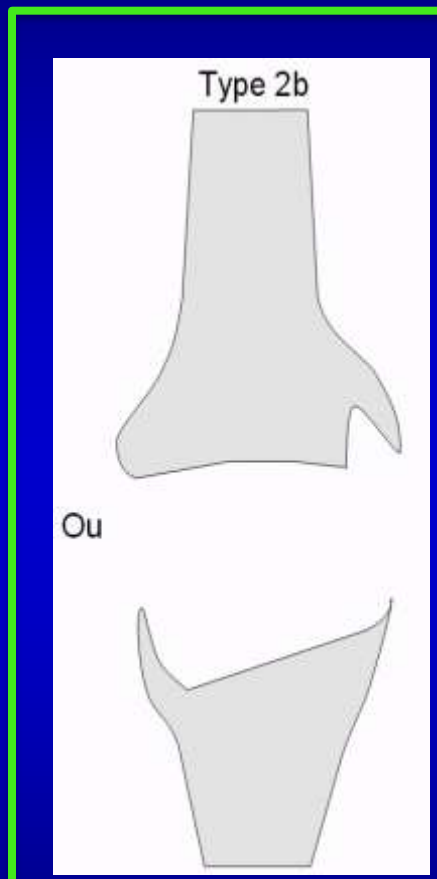
Skin

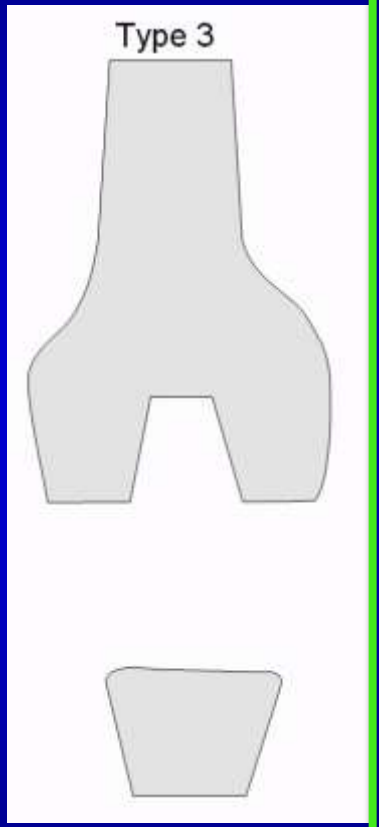
4. Bone loss: Big Hole

Type of bone loss





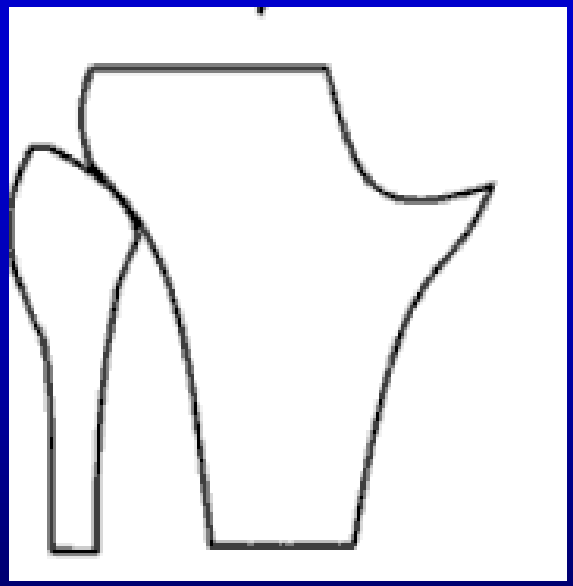




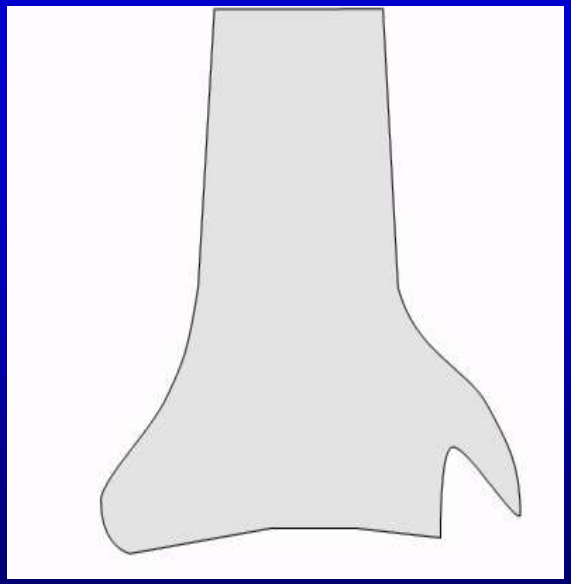
AAOS
Anderson Institute

consequence 1

1. Segmental = rebuild
2. Cavitary: fill

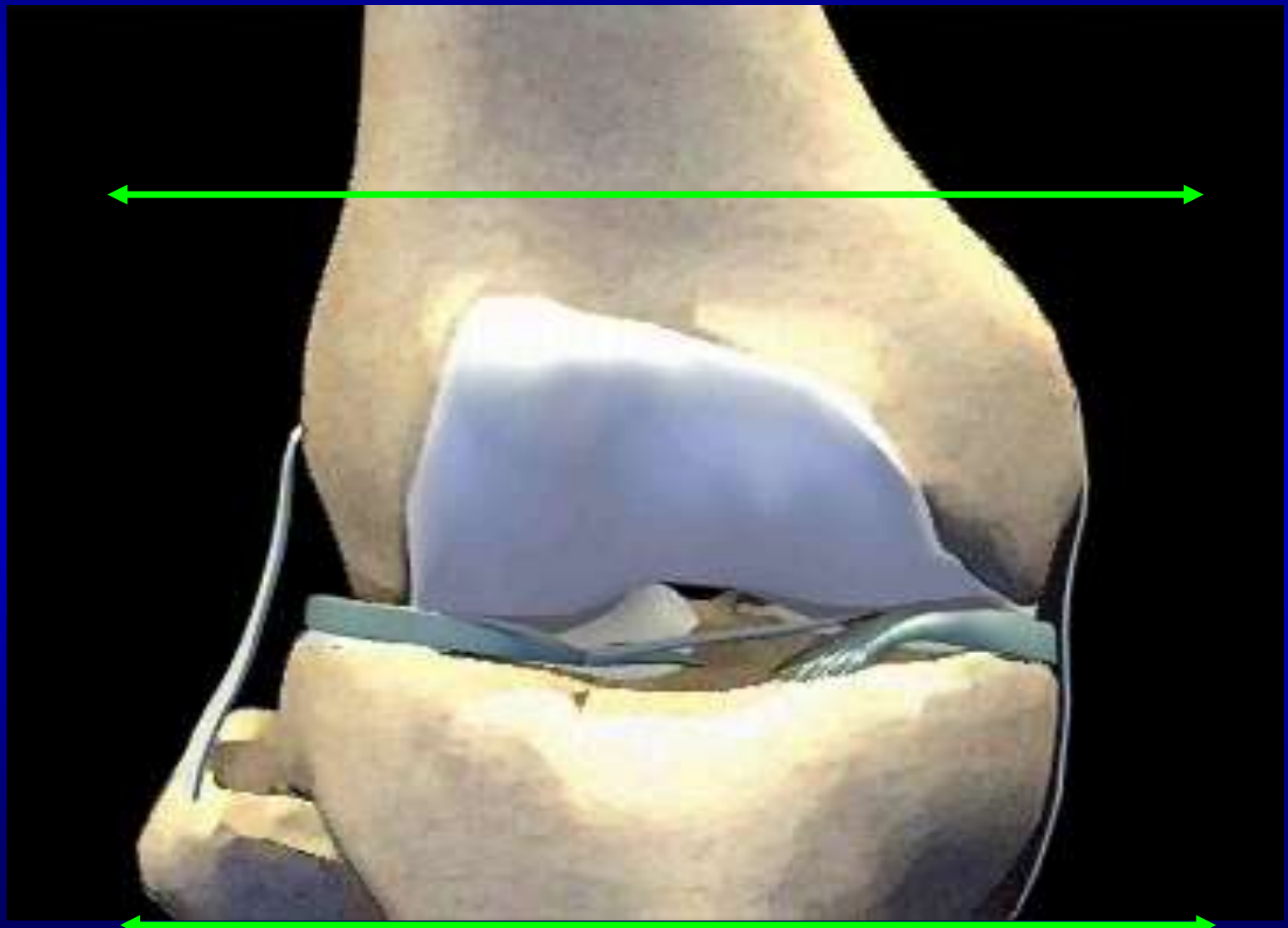


Tibia



Femur

Consequence 2
No ligament any more => RHK



LPS flex

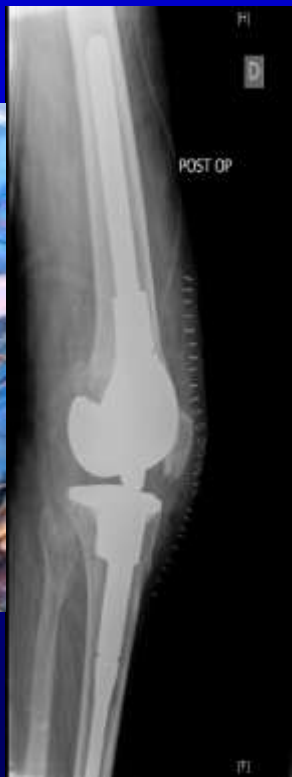
C C K

R H K

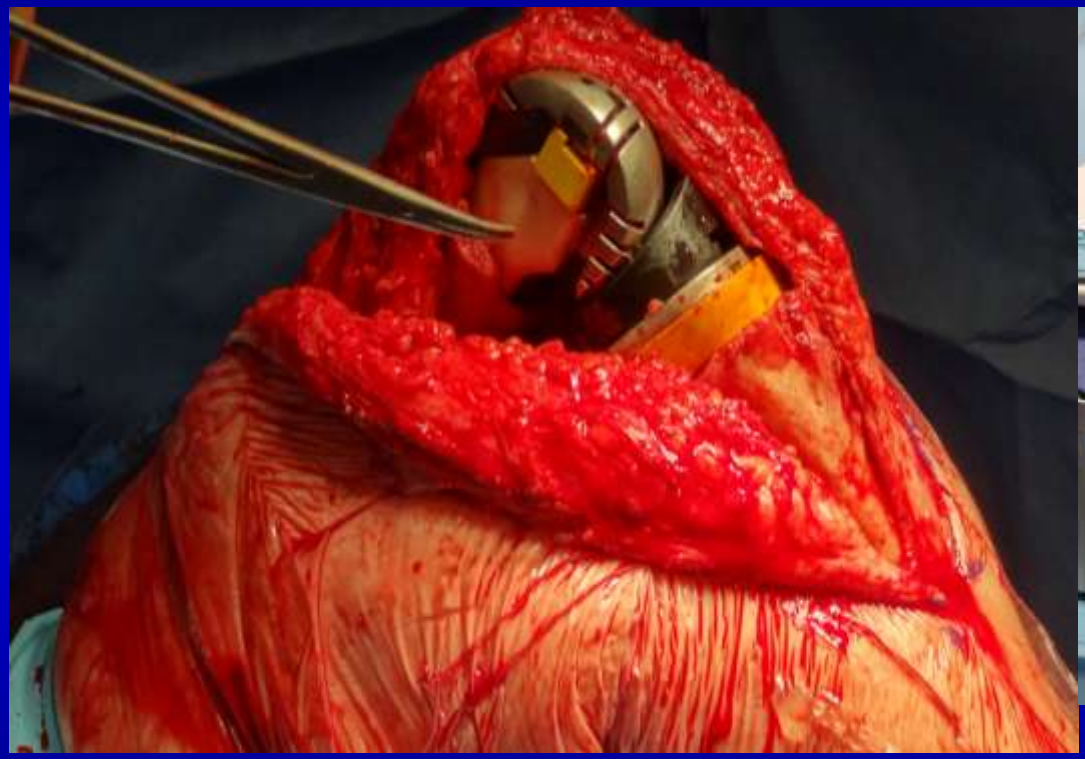
One surgical challenge

Restauration of a strong and long lasting metaphysal support

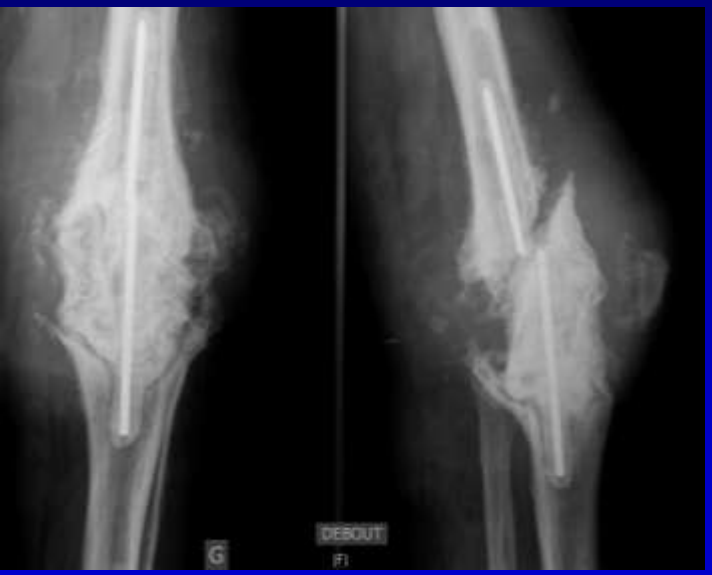
Femoral Epiphysal reconstruction

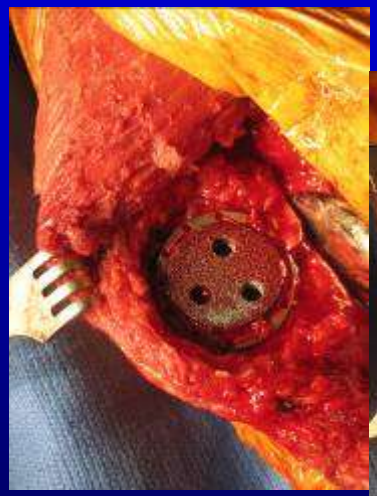


Augments



Not always easy





Results

Our results : 81 % at five years for staph A

Parratte S et al. SOFCOT 2004

85 % at five years , and 78% at 10 years

Clin Orthop Relat Res. 2012 Oct;470(10):2730-6..

Assessing the gold standard: a review of 253 two-stage revisions for infected TKA. *Mahmud T, Lyons MC, Naudie DD, Macdonald SJ, McCalden RW.*

Conclusion

Consensus Philadelphia: J Parvizi

Team work

2 surgical stages

In between: crucial