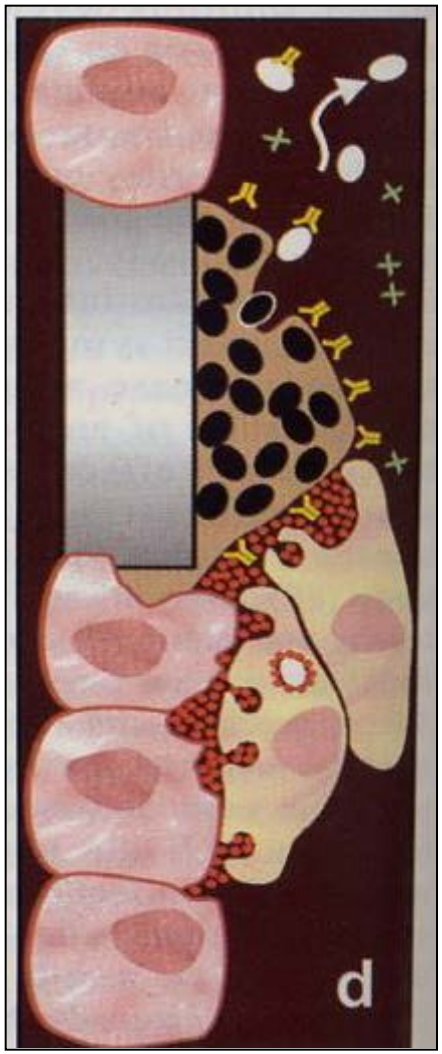
Intérêt des nouveaux traitement de surface pour le changement de prothèse pour infection complexe

S Lustig* – G Vaz**

* CHU Lyon Croix Rousse

** CHU Lyon HEH

BioFilm

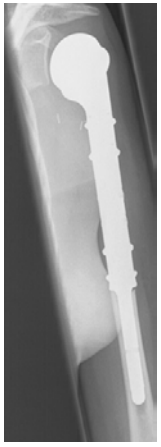


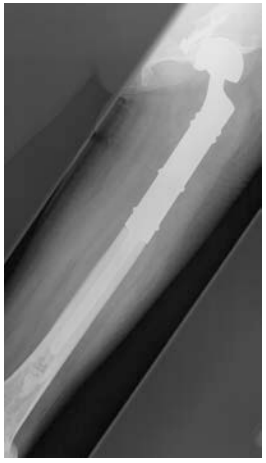
3e reprise de prothèse

Mega prothèse...







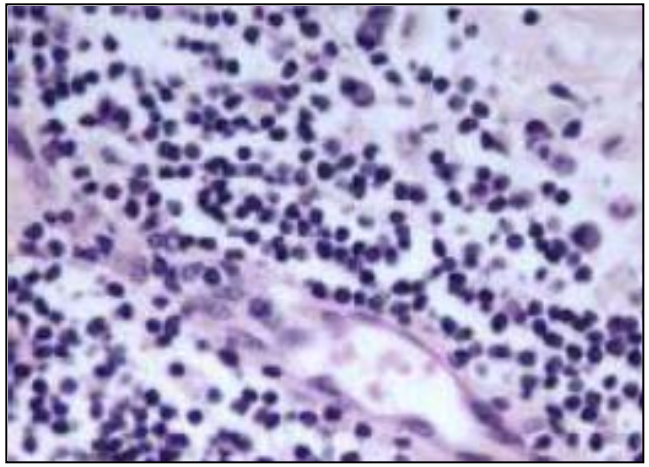




Solutions?

Traitement de surface

Traitement de surface à visée « antiallergique »

Allergie chrome / cobalt



Clinical Infectious Diseases - 1999

STATE-OF-THE-ART CLINICAL ARTICLE

Anti-Infective Efficacy of Silver-Coated Medical Prostheses

Rabih O. Darouiche

From the Center for Prostheses Infection, Department of Physical Medicine and Rehabilitation, and Infectious Disease Section, Department of Medicine, Baylor College of Medicine and Veterans Affairs Medical Center, Houston, Texas

Maki, DG, Cobb L, Garman JK, Shapiro JM, Ringer M, Helgerson RB. An attachable silver-impregnated cuff for prevention of infection with central venous catheters: a prospective randomized multicenter trial. Am J Med **1988**;85:307–14.

Lundeberg T. Prevention of catheter-associated urinary-tract infections by use of silver-impregnated catheters [letter]. Lancet **1986**;2:1031.

« … les ions argent (Ag+) ont dans l'eau potable une action microbicide (germicide). Ils peuvent donc permettre de la désinfecter et de la conserver. D'après les règlements nationaux et internationaux, les valeurs indicatives et limites pour une utilisation dans l'eau potable correspondent à une concentration de 100 µg Ag/L. … »

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Type of prosthesis	Efficacy in animals	Efficacy in humans
Bladder catheters		
Coated with silver alone	Unknown	Controversial
Coated with silver hydrogel	Unknown	Moderately effective
Central venous catheters		
Affixed with silver-chelated cuff	Unknown	Effective with short-term but not long-term cuffed catheters
Coated with silver alone	Unknown	Ineffective
Silver iontophoretic catheter	Effective	Unknown
Coated with silver sulfadiazine–chlorhexidine	Effective	Moderately effective for short-term but not long-term access
Coated with silver sulfadiazine	Not effective	Unknown
Coated with silver–benzalkonium chloride	Unknown	Unknown
Peritoneal catheters		
Coated with silver alone	Effective	Unknown
Equipped with a silver ring	Unknown	Not effective
Vascular grafts coated with silver-antibiotic	Effective	Unknown
Silver-coated prosthetic heart valve sewing rings	Not effective	Unknown
Silver-coated external fixation pins	Not effective	Unknown
Silver-coated sutures	Unknown	Unknown

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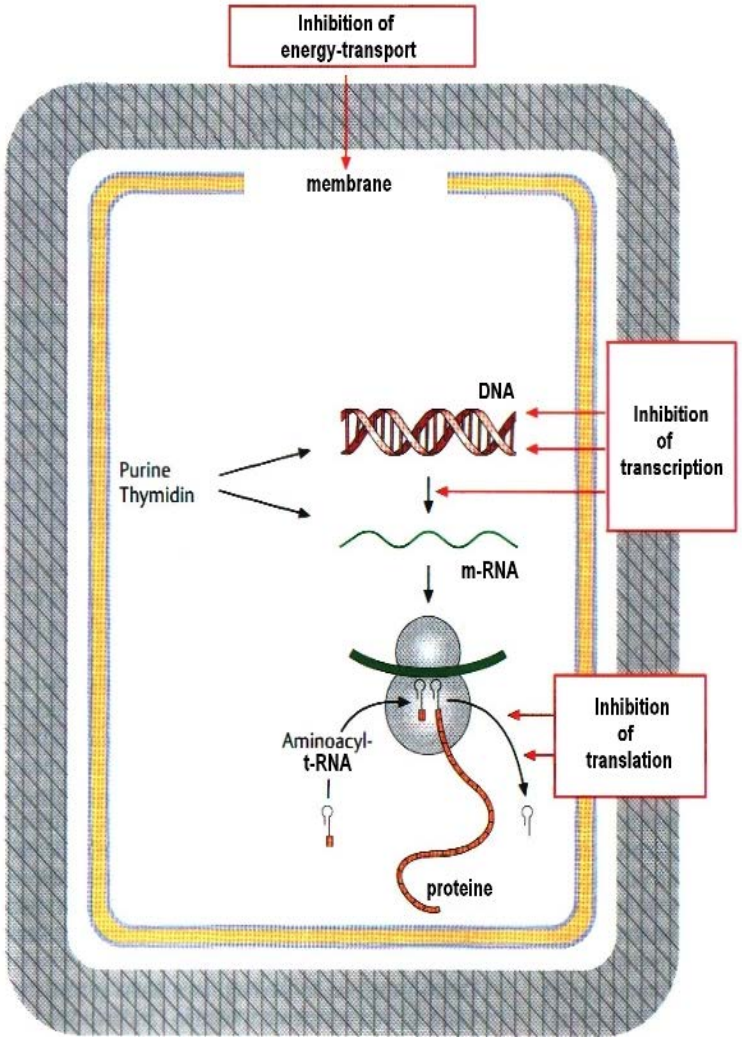
Effet Oligodynamique de l‘Argent



Ueber

oligodynamische Erscheinungen

in

lebenden Zellen

von

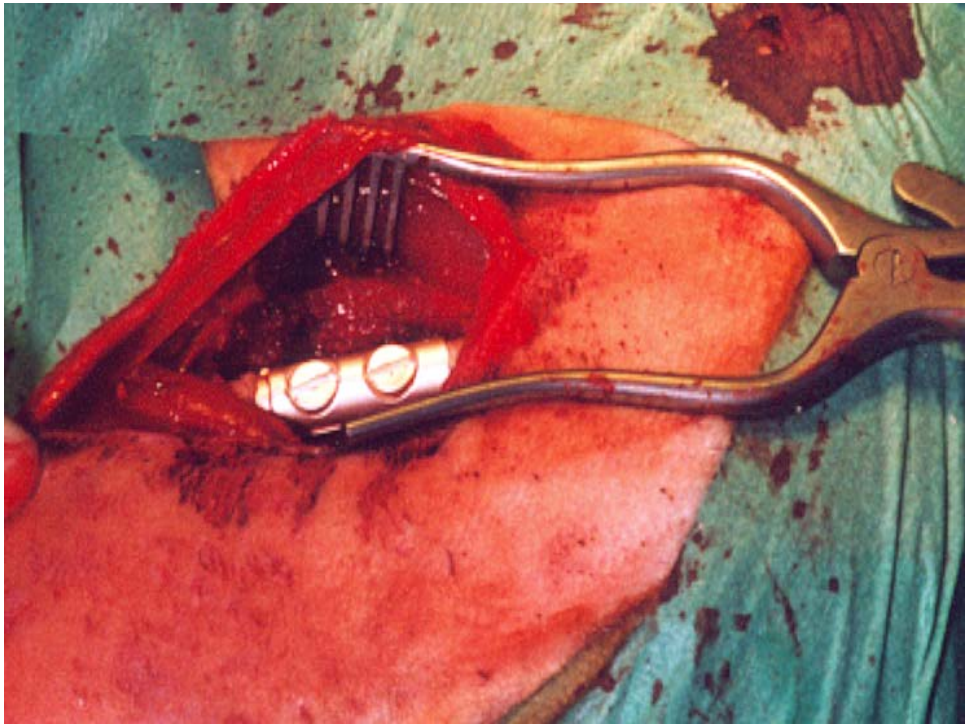
Carl von Nägeli

Traitement de surface à l'argent

« … the energy transport of the cell, the translation and the transcription within the cell are inhibited, the metabolism is shut down and an adequate contact of bacteria to silver will consequentially lead to cell death …

Another special chemical property of silver ions is the fact that they dissolve in an oligodynamic way and can release by dropped pH value like in case of inflammation. There are always sufficient silver ions on the surfaces for even late infections … »

Preuves de son efficacité
Modèle animal



Implantation chez le chien

Prof. Fehr
Dr. Hauschild

	POS	NEG	probes
pTa	8 Ti	0 Ti	8 Ti
pT1	4 Ag	5 Ag	9 Ag
total	12	5	17

$x^2=5,92$ $p<0,05$

Gruen et al. 1979

n=17

Chez l'homme ?

Hardes J. et al.
« Reduction of periprosthetic infection with siver-coated megaprosthesis in patients with bone sarcoma. »
J Surg Oncol 2010

51 Pat. with silver coated prosthesis

29 Proximal Tibia

22 Proximal Femur

Follow-up 19 mois

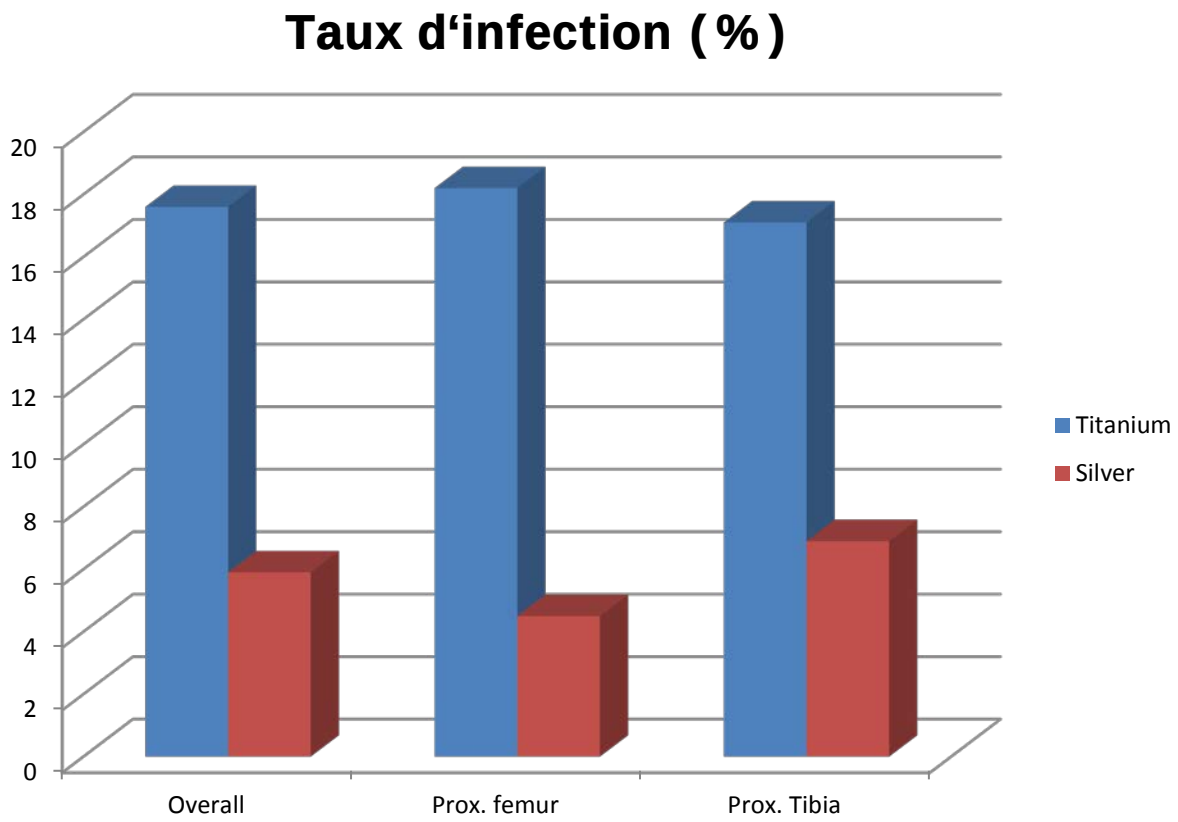
74 Pat. with uncoated titanium prosthesis

41 Proximal Tibia

33 Proximal Femur

Follow-up 54 mois

Résultats



Date de l‘infection:

en moyenne 11 mois après l‘intervention

81% dans les 24 mois après l‘intervention

Toxicité ?

ELSEVIER

Available online at www.sciencecirect.com

ScienceDirect

Biomaterials 28 (2007) 2869–2875

Biomaterials

www.elsevier.com/locate/biomaterials

Lack of toxicological side-effects in silver-coated megaprostheses in humans

Jendrik Hardes[a,*,1], Helmut Ahrens[a,1], Carsten Gebert[a], Arne Streitbuerger[a], Horst Buerger[b], Michael Erren[c], Andreas Gunsel[d], Christian Wedemeyer[e], Guido Saxler[e], Winfried Winkelmann[a], Georg Gosheger[a]

[a]*Department of Orthopaedics, University of Muenster, Albert-Schweitzer-Street 33, 48149 Muenster, Germany*
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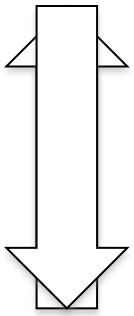
[e]*Department of Orthopaedic Surgery, University of Duisburg-Essen, Hufeland Street 55, 45122 Essen, Germany*

Received 26 January 2007; accepted 19 February 2007
Available online 3 March 2007

Infection sur prothèse



Chirurgie « tumorale »

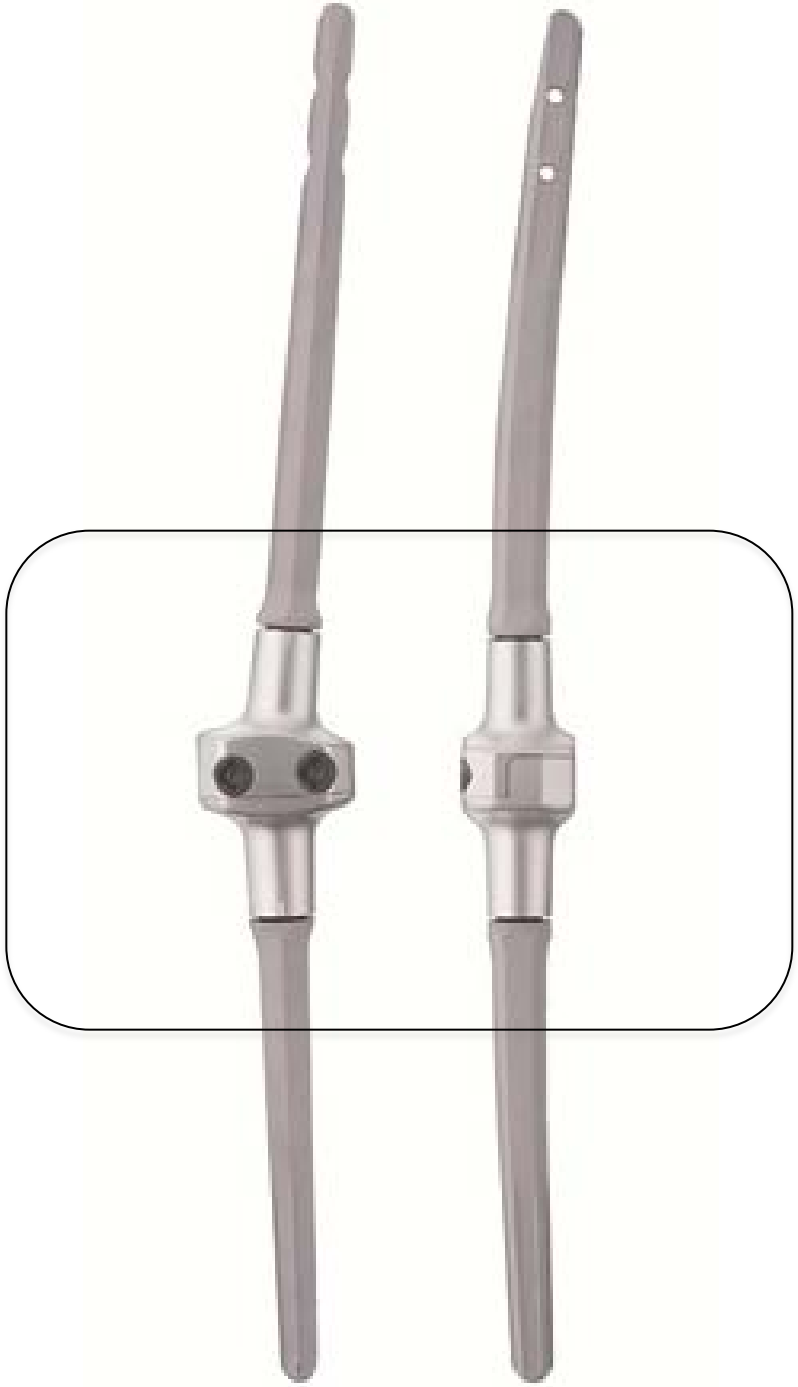
8e intervention


D

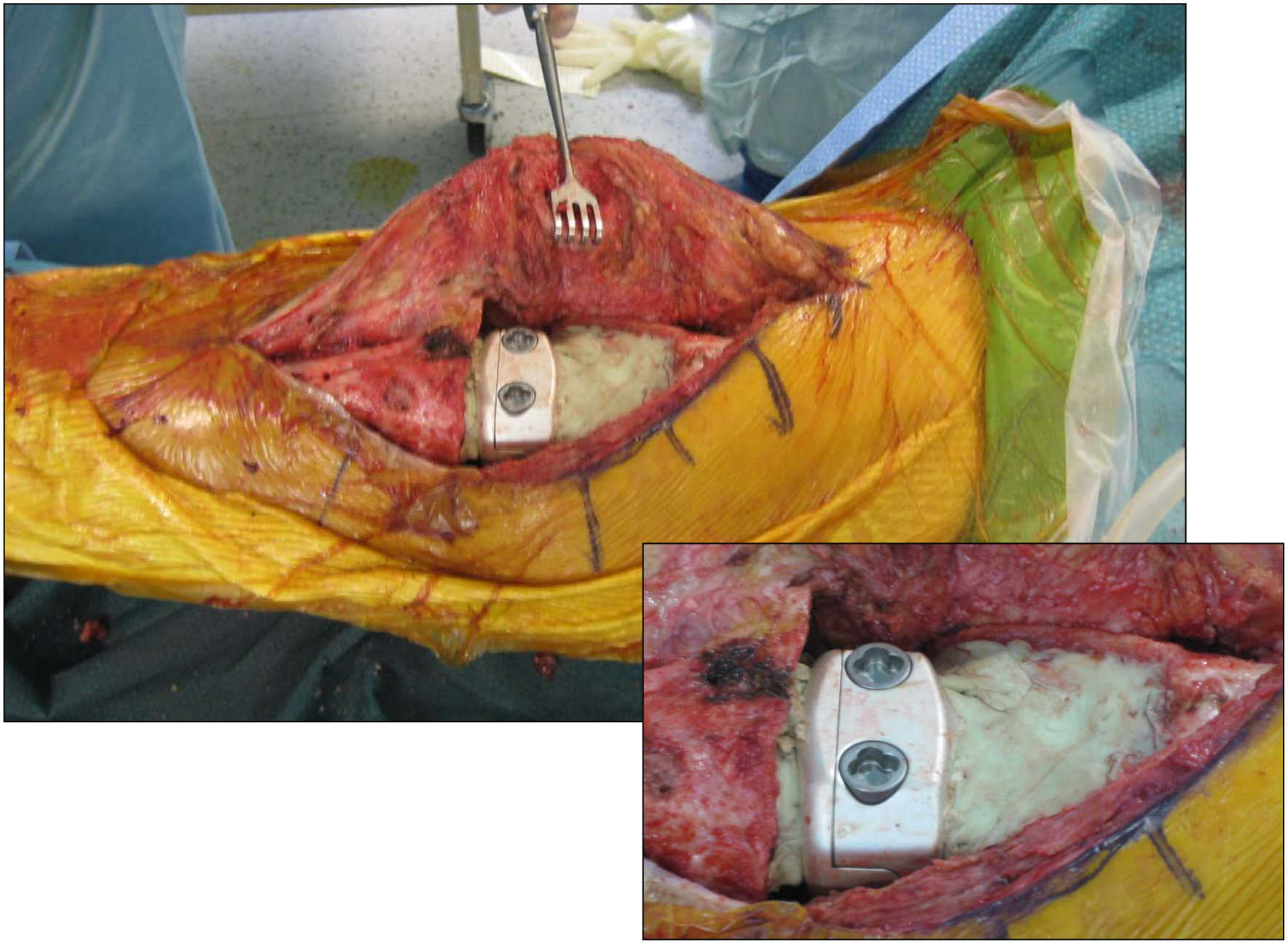

AMP
G
GA

« Chirurgie tumorale »

Uniquement les surfaces non articulaires et les surfaces sans contact direct avec l'os sont couvertes d'argent




D



Pourquoi pas une utilisation plus étendue ?

- Pas autorisé pour les surfaces articulaires
- Pas autorisé pour les surfaces en contact direct avec l'os

  → impossible pour les prothèses de 1ère intension … prévention ??

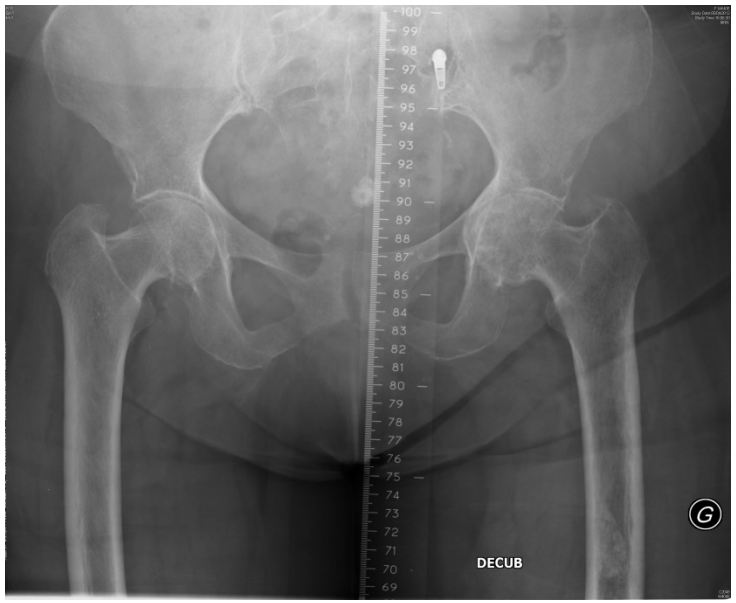
- (Sur)Coût …

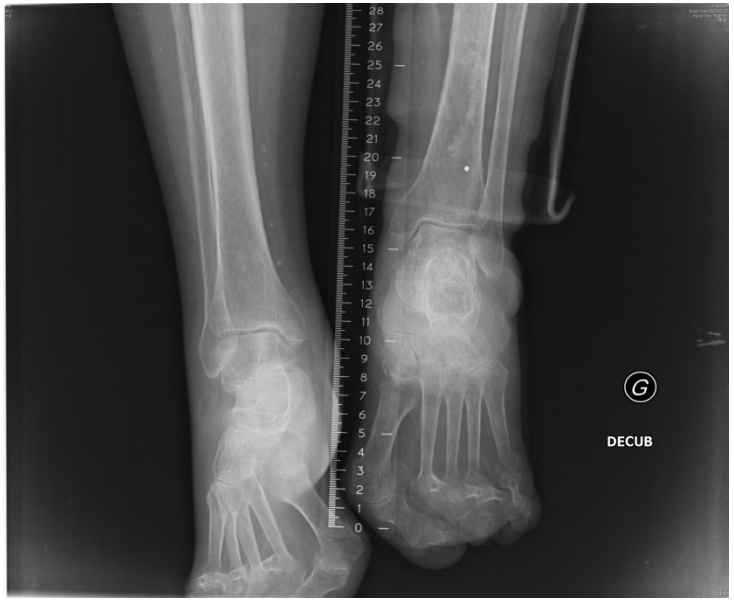
Indications actuelles (à Lyon)

- Prothèses tumorales
- Prothèses-arthrodèses

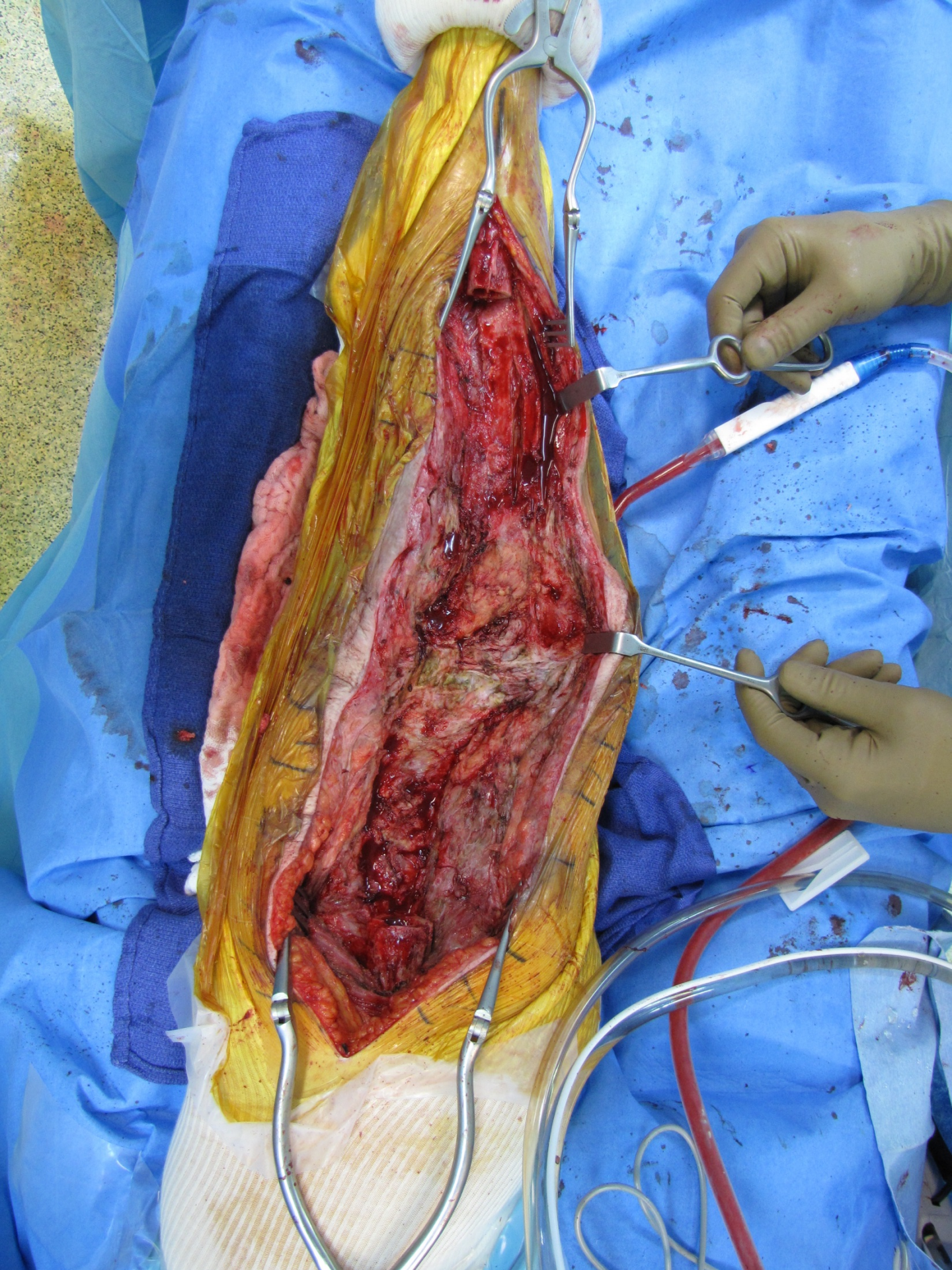
ET

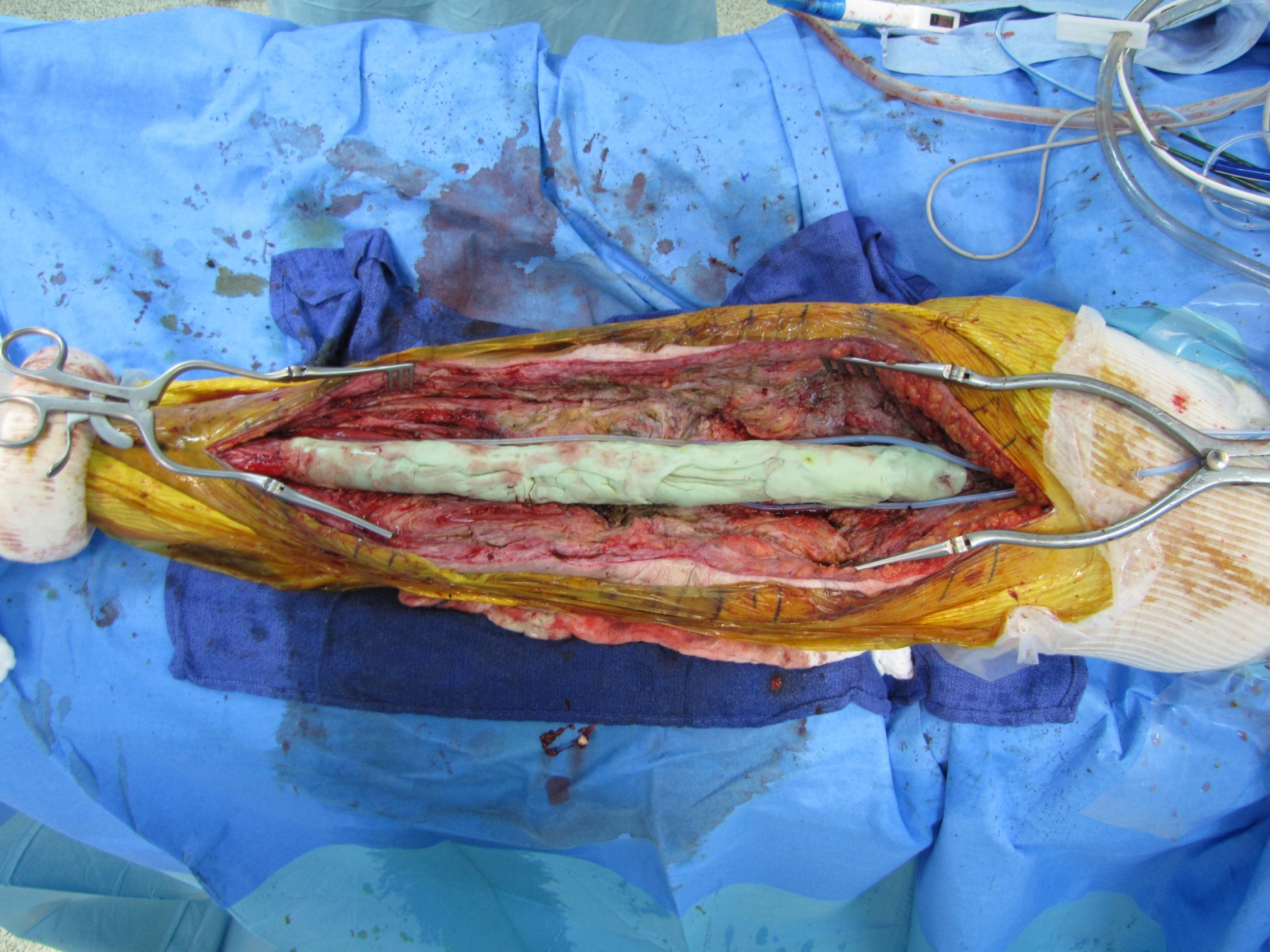
- Contexte de risque infectieux +++ ou révision « de la dernière chance » pour infection complexe sur prothèse


DECUB


DECUB


DECUB
DECUB

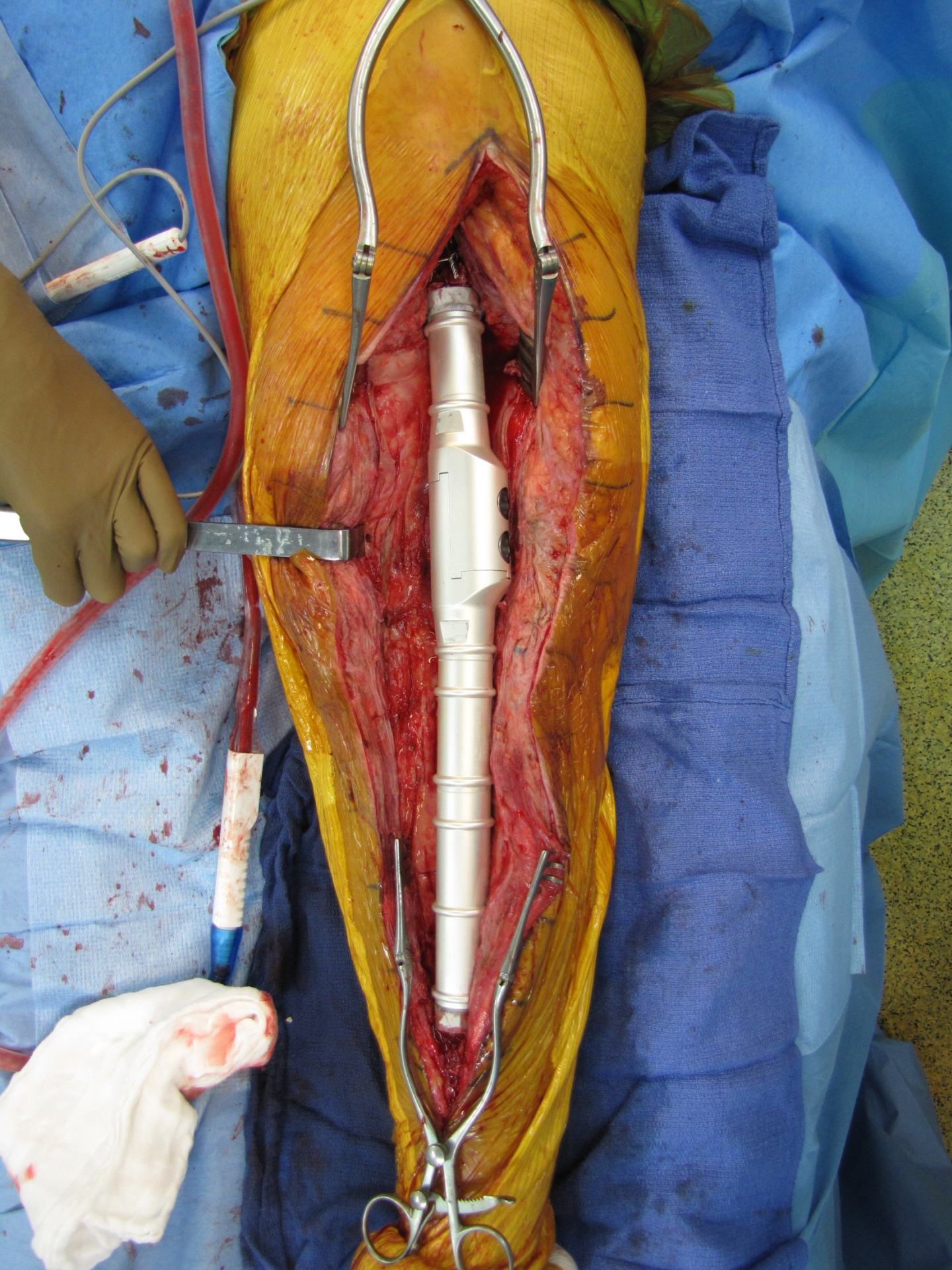


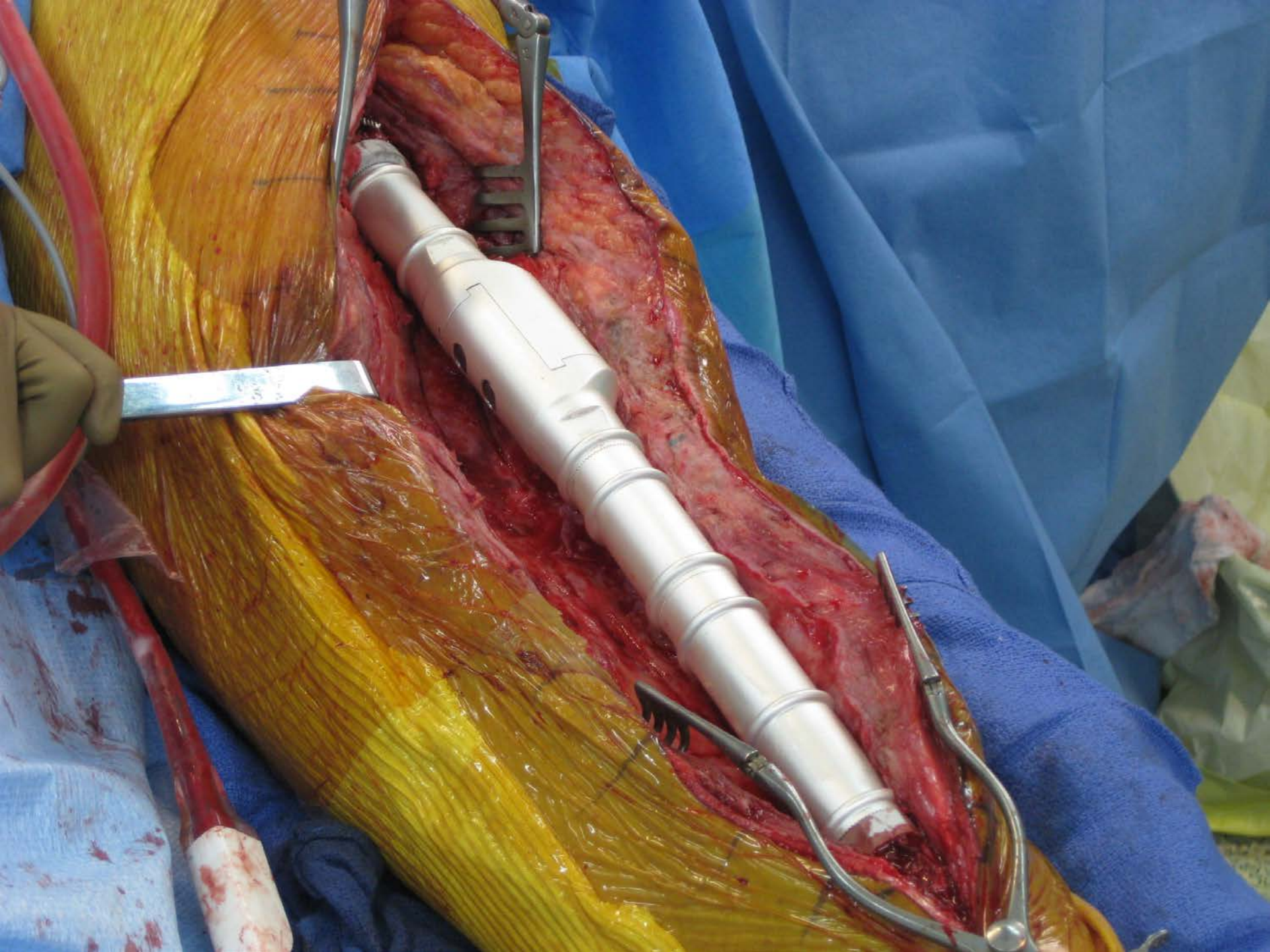


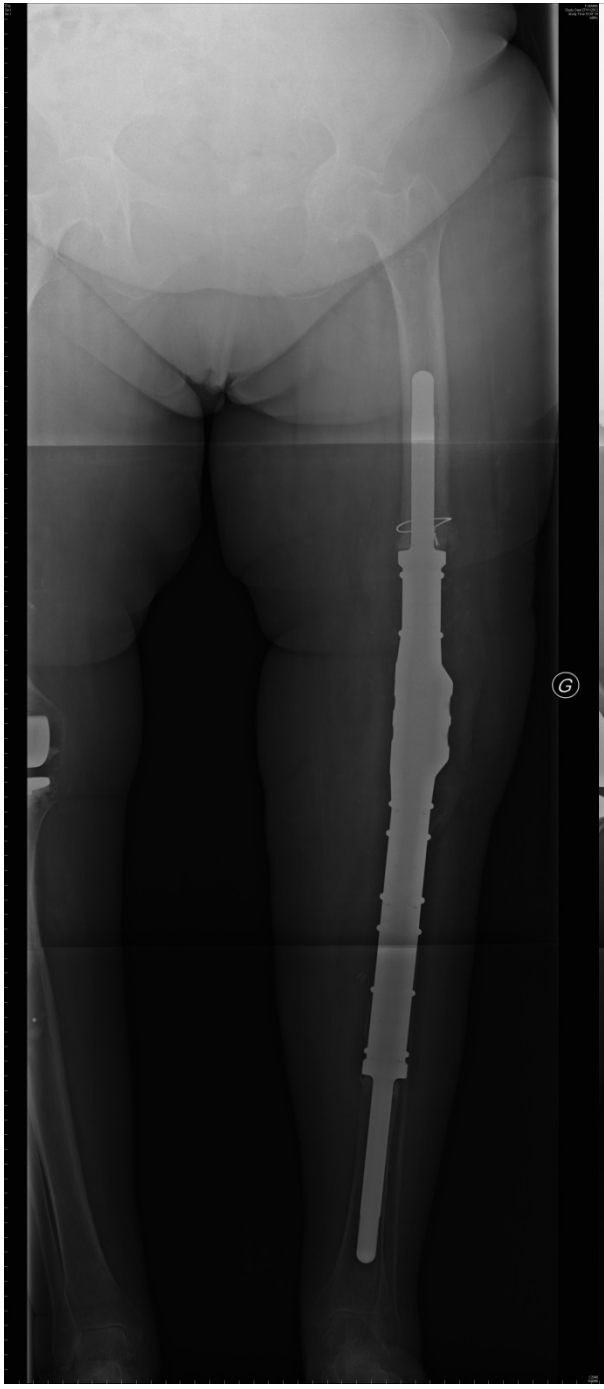
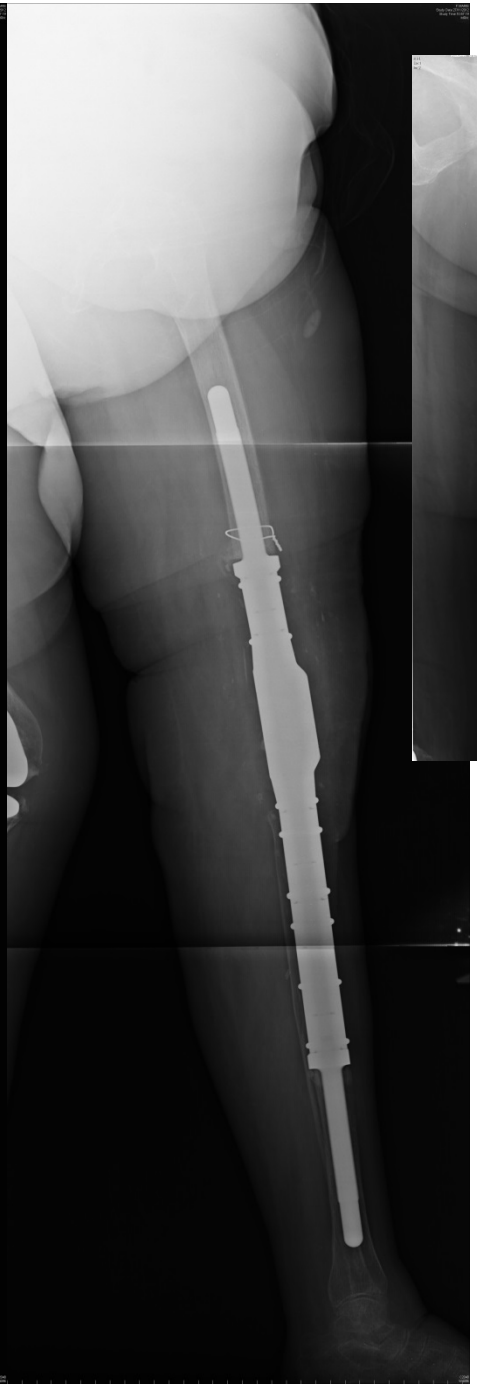

METRIC
INCHES
SKIN MARKER


G
Post Op


G
Post Op





DECUB

DECUB

Conclusion

Traitement de surface à l'argent

- Indications :
  - Contexte de risque infectieux +++ ou révision « de la dernière chance » pour infection complexe sur prothèse
  - chirurgie tumorale +++
- Coût ++
- Besoin d'études complémentaires avant d'élargir les indications


Merci pour votre attention