



SICOT Meeting – Roma September 2016



*Risk factors of periprosthetic infection
and my experience of how to prevent an infection*

Sébastien LUSTIG MD, PhD, Prof * , **

Tristan Ferry **

Frederic Laurent **

**Albert Trillat Center- Lyon, **CRIOA Lyon*





«Postoperative infection is the saddest of all complications... »

Sir John Charnley

Risk Factors Associated with Deep Surgical Site Infections After Primary Total Knee Arthroplasty

An Analysis of 56,216 Knees

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Risk Factors for Infection After Knee Arthroplasty

A Register-Based Analysis of 43,149 Cases

By Esa Jämsen, BM, Heini Huhtala, MSc, Timo Puolakka, MD, PhD, and Teemu Moilanen, MD, PhD

Investigation performed at Coxa, Hospital for Joint Replacement, Tampere, Finland

Preventing Infection in Total Joint Arthroplasty

Wadih Y. Matar, S. Mehdi Jafari, Camilo Restrepo, Matthew Austin, James J. Purtill and Javad Parvizi
J Bone Joint Surg Am. 2010;92:36-46. doi:10.2106/JBJS.J.01046

Review article: Risk factors of infection following total knee arthroplasty

**Non
modifiable**

Patient-specific

The "systemic" risk factors:

- Diabetes
- Male gender
- Rheumatoid arthritis
- ASA score 3 or greater
- Recent weight loss
- advanced age
- debilitation
- oral steroids
- Disseminated cancer
- Admission from a healthcare facility



Simmons TD, Stern SH. Diagnosis and management of the infected total knee arthroplasty. Am J Knee Surg. 1996

Patient Optimization

Modifiable Risk Factors

- 1. Diabetes
- 2. Obesity
- 3. Malnutrition
- 4. Smoking
- 5. Mental health
- 6. MRSA Screening



Modifiable

Obesity

Clin Orthop Relat Res (2012) 470:490–496
DOI 10.1007/s11999-011-1967-y

SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE HIP SOCIETY

Age and Obesity Are Risk Factors for Adverse Events After Total Hip Arthroplasty

James I. Huddleston MD, Yun Wang PhD,
Carlos Ugualas BS, James H. Berdon MD, MBA,
William J. Mahoney MD

Orthopaedics & Traumatology: Surgery & Research 100 (2014) 591–597

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

Review article
Obesity in orthopedics and trauma surgery

S. Parratte^{1,2}, S. Pesenti³, J.-N. Argenson¹

¹ Institut du Mouvement et de l'Appareil Locomoteur, Hôpital Sainte-Marguerite, UMR 6273, Aix-Marseille University, 270, boulevard Sainte-Marguerite, 13009 Marseille, France
² Service de Chirurgie Pédiatrique Orthopédique, Hôpital d'Enfants de la Timone, 13009 Marseille, France



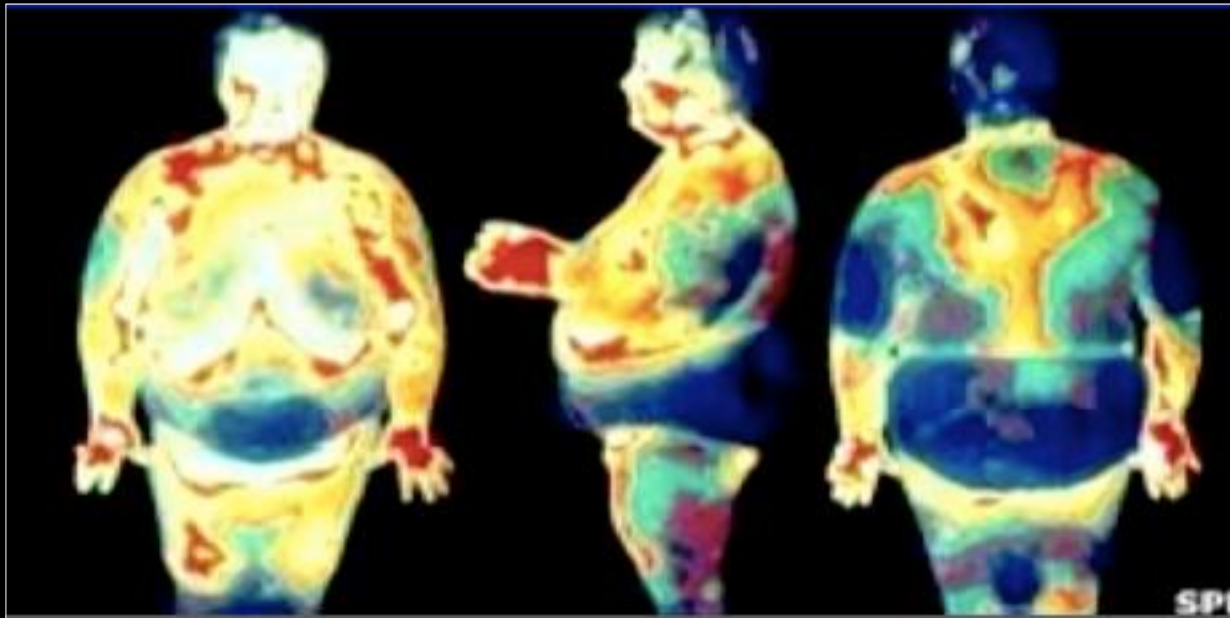
AAHKS 2014

« It is our concensus opinion that consideration should be given to delaying total joint arthroplasty in a patient with a **BMI > 40**, especially when associated with other co-morbid conditions, such as poorly controlled diabetes or malnutrition.

Mechanical / Biological

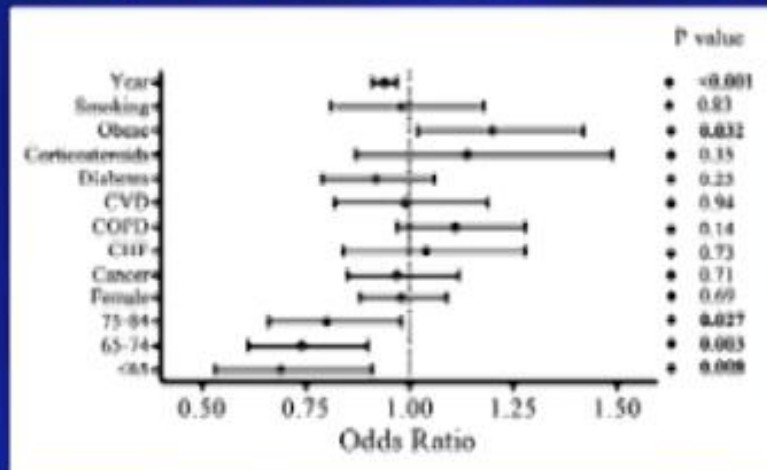
Real problem is biology : Fat degradation products (Leptine Adiponectine)

→ low grad inflammation status



Superficial wound infection

- **Friedman et al, CORR, 2013**
 - **Obese patients → increased infections (surgical and extra-surgical sites)**
- **Huddleston et al, CORR, 2012**
 - **Obesity increases adverse events (OR = 1.20)**



Deep periprosthetic Joint Infection

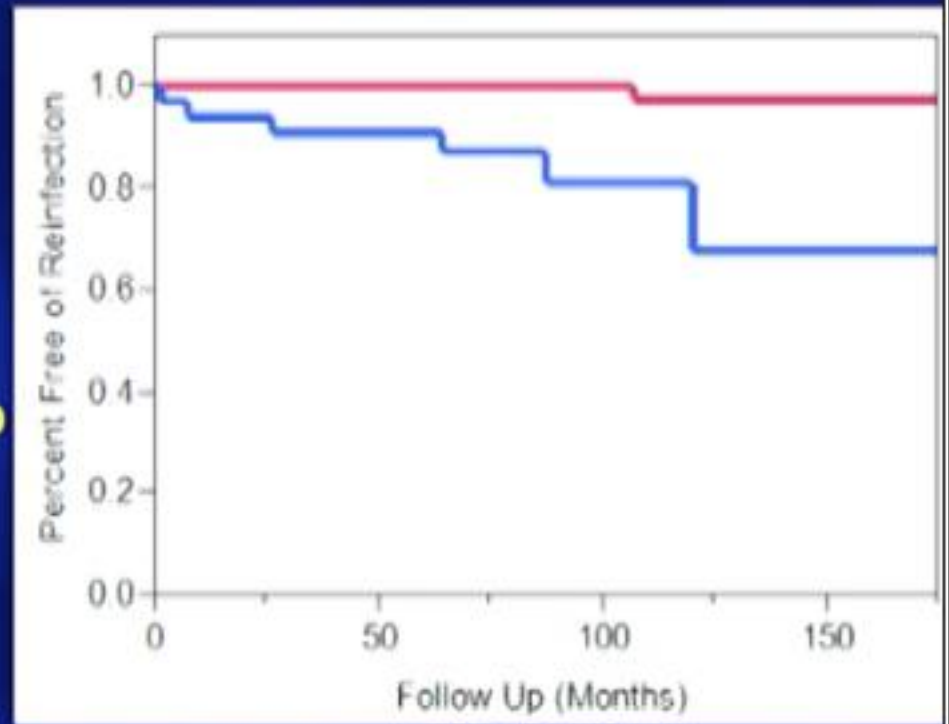
- **Dowsey et al, CORR, 2009**
 - **Morbid Obesity ($> 40 \text{ kg/m}^2$) \rightarrow Increase PJI by **9X!****
- **Malinzak et al, JOA, 2012**
 - **Super Obese ($> 50 \text{ kg/m}^2$) \rightarrow Increase PJI by **21X!****



REINFECTION

- Matt Abdel – HIP Meeting (Toulouse) 2014

- **Non-obese: 3%**
- **Morbidly Obese: 32%**
 - **$p < 0.001$**
 - **HR 18**



Modifiable

Current smoking

Systemic effects of smoking and Nicotine

Local Tissue Hypoxia :

- micro-vascular constriction
- Increase carboxyhemoglobin

Decreased collagen production

- Wound healing

Decreased T cell function

- Infection



**Smoking cessation 4-8 weeks prior surgery
Decrease complications but not normalize**

Modifiable

Nasal carriage of staphylococcus Aureus

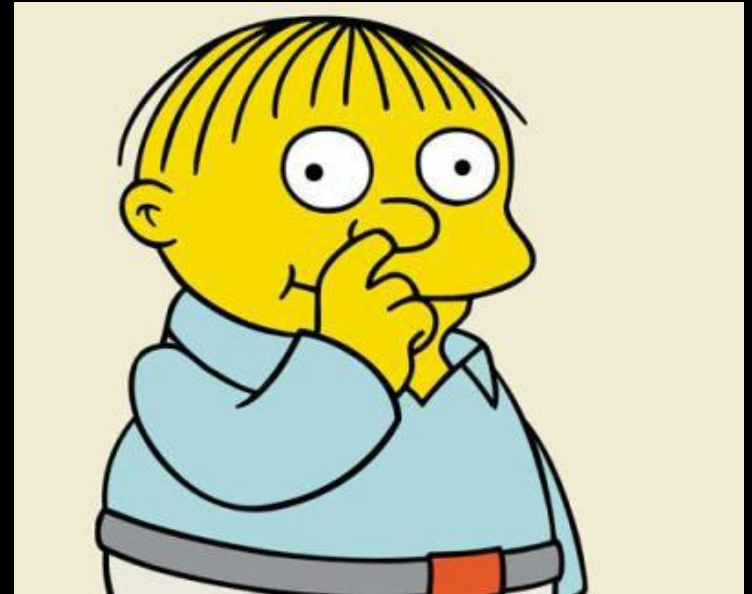
Preop screening MRSA and MSSA

30% population MSSA carriers

4% MRSA carriers

Goal :

Decrease the incidence of postoperative S aureus SS by eliminating S aureus nasal carriage from the patient prior to surgery



Springer 2014 – Metanalysis 16 studies / 56711 patients

Nasal decolonization resulted in 54,6% decrease in the risk of SSI compared to controls

Modifiable

Hematocrit < 36

British Journal of Anaesthesia Page 1 of 14
doi:10.1093/bja/aes139

Patient blood management in Europe

A. Shander^{1*}, H. Van Aken², M. J. Colomina³, H. Gombotz⁴, A. Hofmann⁵, R. Krauspe⁶,
T. Richards⁸, R. Slappendel⁹ and D. R. Spahn¹⁰

Allogenic blood transfusion
Blood Loss > 1L

Pulido et al. CORR 2008



Previous knee surgery



How to prevent an infection ?

Rule n°1

Patient selection



Procedure-specific



Suboptimal prophylactic antibiotic

- *Timing*
- *Dose*
- *Antibiotic*

Individuals for Whom Vancomycin Should Be Used

Patients colonized with MRSA* (detected during screening)
Patients with history of infection with MRSA*
Institutionalized patients (nursing home, dialysis, etc.)
Health-care professionals
Patients with proven β -lactam allergy

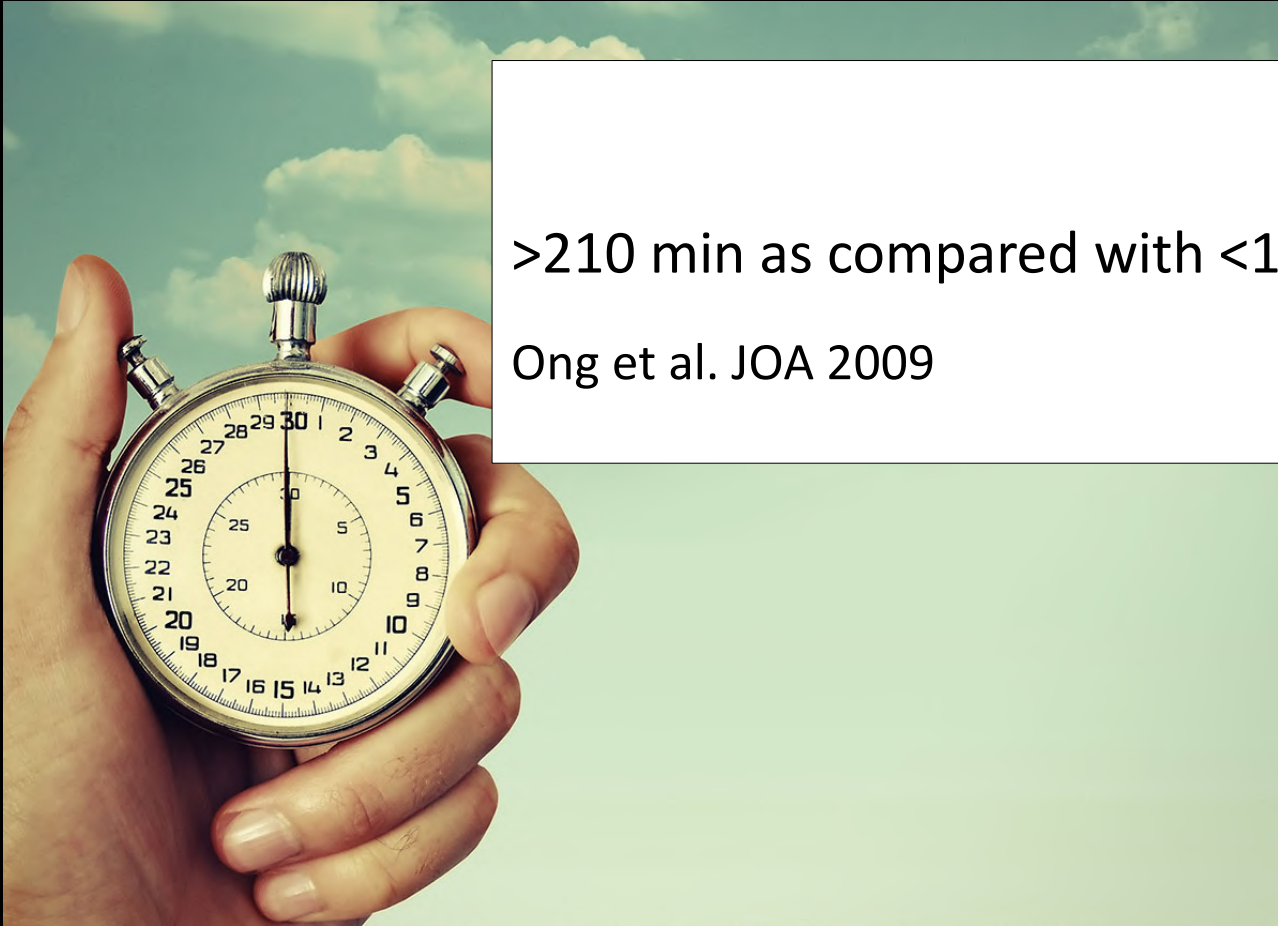
**It is not a good
idea for humans
to develop
resistance to
antibiotics.**

Nb of surgeons participating in procedure





Longer procedure time



>210 min as compared with <120 min

Ong et al. JOA 2009

Prolonged wound drainage



< 24h

Kurtz SM, Ong KL, Lau E, Bozic KJ, Berry D, Parvizi J. Prosthetic joint infection risk after TKA in the Medicare population. Clin Orthop Relat Res. 2010;468:

Mihalko WM, Manaswi A, Brown TE, Parvizi J, Schmalzried TP, Saleh KJ. Infection in primary total knee arthroplasty: contributing factors. Instr

Course Lect. 2008; 57:317-25

ATB loaded cement ?

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The Use of Erythromycin and Colistin-Loaded Cement in Total Knee Arthroplasty Does Not Reduce the Incidence of Infection

A Prospective Randomized Study in 3000 Knees

TABLE IV Multivariate Model of Risk Factors for Deep Infection*

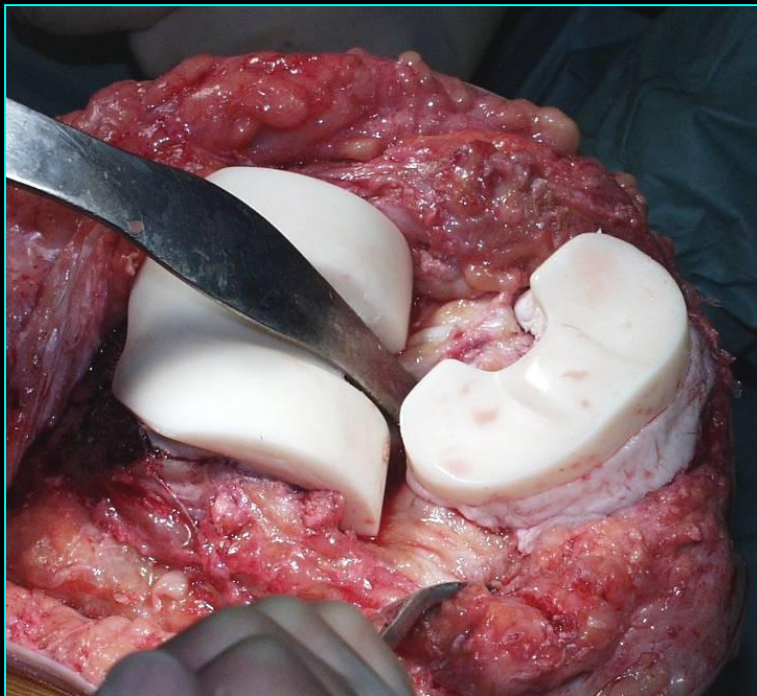
Variable	Odds Ratio (95% CI)	P Value
Sex (M)	2.11 (1.10-4.04)	0.023
Operating time of >125 min	2.67 (1.28-5.57)	0.009

*Calibration (Hosmer-Lemeshow test) ($p = 0.177$). Discrimination power area under the curve was 0.624 (95% CI, 0.532-0.716). CI = confidence interval.

Rev Chir Orthop Reparatrice Appar Mot. 2007 Oct;93(6):582-7.

Surgical site infection after total knee arthroplasty: a monocenter analysis of 923 first-intention implantations.

Debarge R1, Nicolle MC, Pinaroli A, Ait Si Selmi T, Neyret P.



- Rheumatoid arthritis
- Diabetes
- Previous surgery

My experience ?



1995 – 2015

Perioperative infection Database

n = 25,000

Lyon metropolis
2,000,000 inhabitants

Rhône-Alpes Auvergne region
7,500,000 inhabitants

