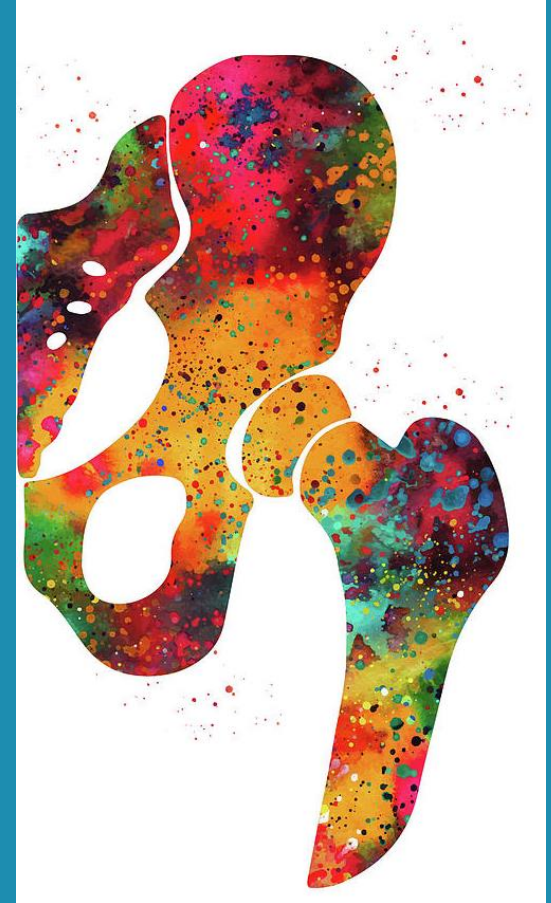


Wondproblemen en Periprosthetische infecties na THP

en hoe ze te vermijden



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- Primaire totale heupprothese via spiersparende benadering
- Revisie chirurgie
- Revisie chirurgie bij infecties
- Young adult hip problematiek
- Traumatologie van de heup
- Periprothetische fracturen

Oncologie

Pediatrische orthopedie

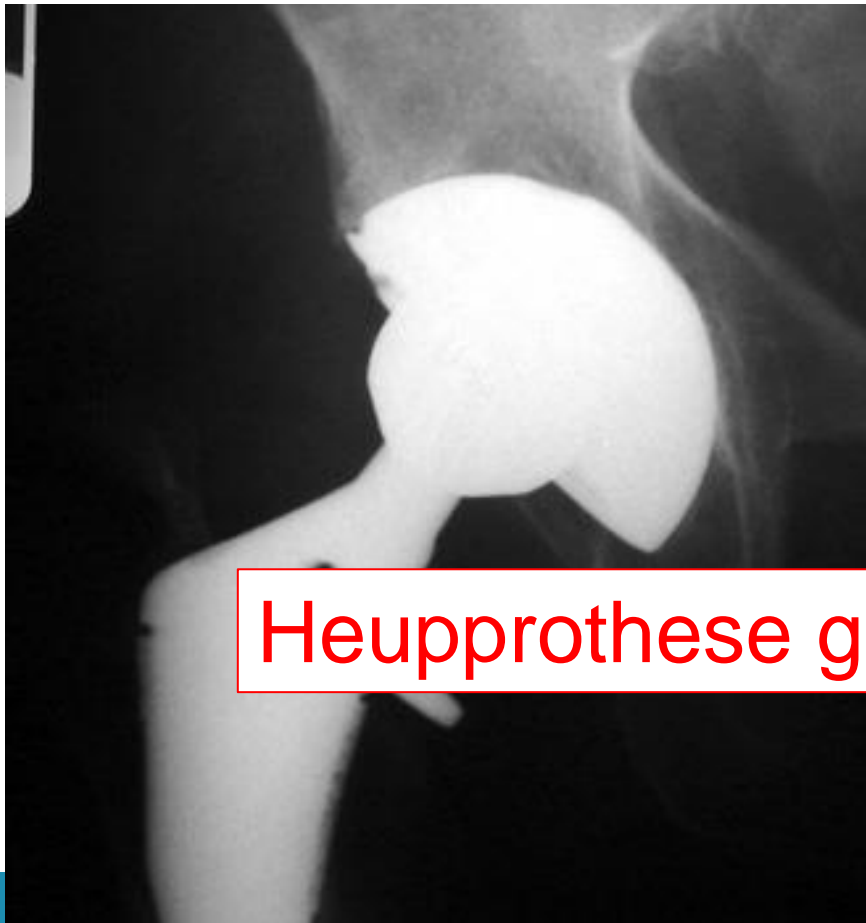
A photograph of three elderly women jogging on a paved path in a park. The woman on the left is wearing a white jacket over a blue and white striped shirt and a pink headband. The woman in the middle is wearing a light green t-shirt. The woman on the right is wearing a blue tank top and dark blue leggings. They are all smiling and appear to be in good health. The background shows lush green trees and a clear sky.

**“The Operation of the Century:
Total Hip Replacement”**

The Lancet, October 2007

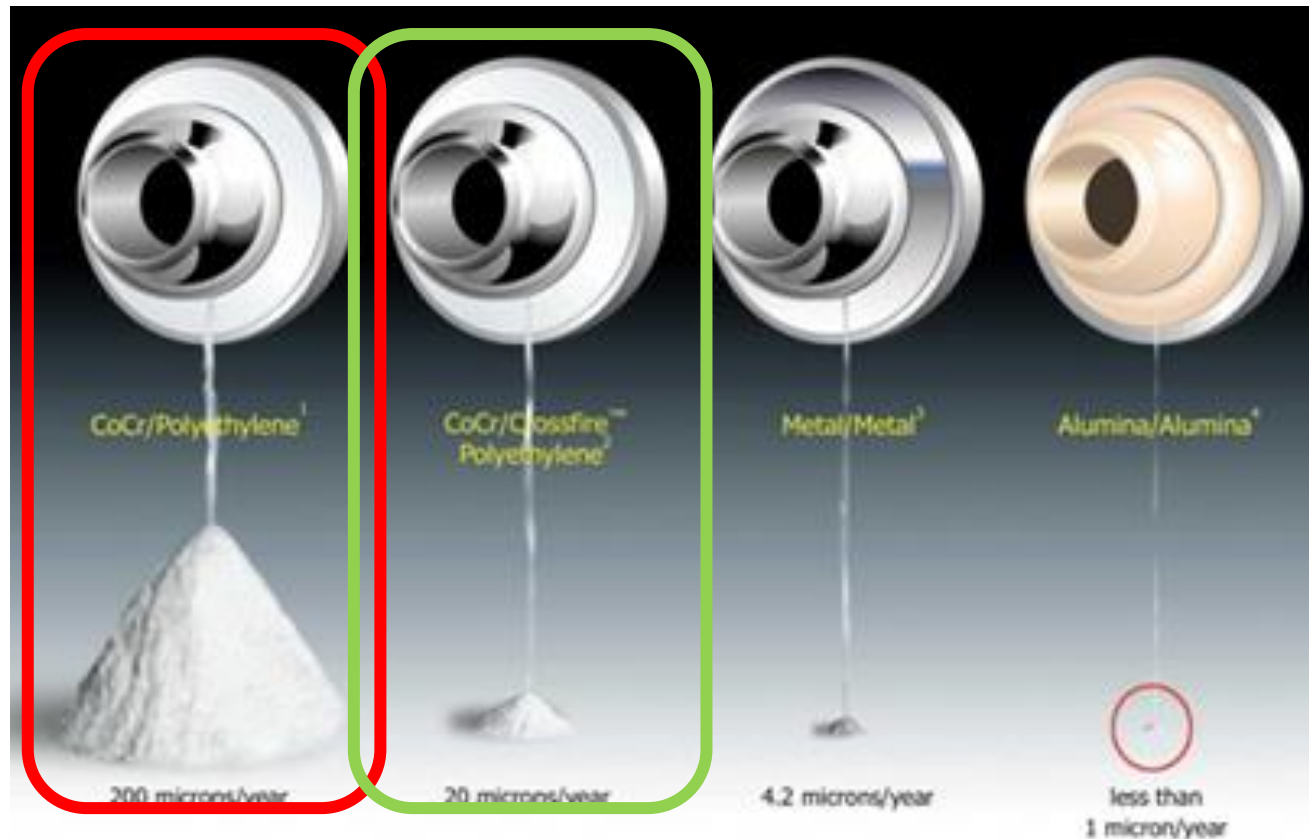
Evoluties

“Conventionele” polyethyleen = weakest link!



Heupprothese gaat 10 – 15 jaar mee !?

Evolutie 1 – Crosslinked polyethyleen



Slijtage 20 x lager !

Evolutie – bearings

Keramiek op keramiek



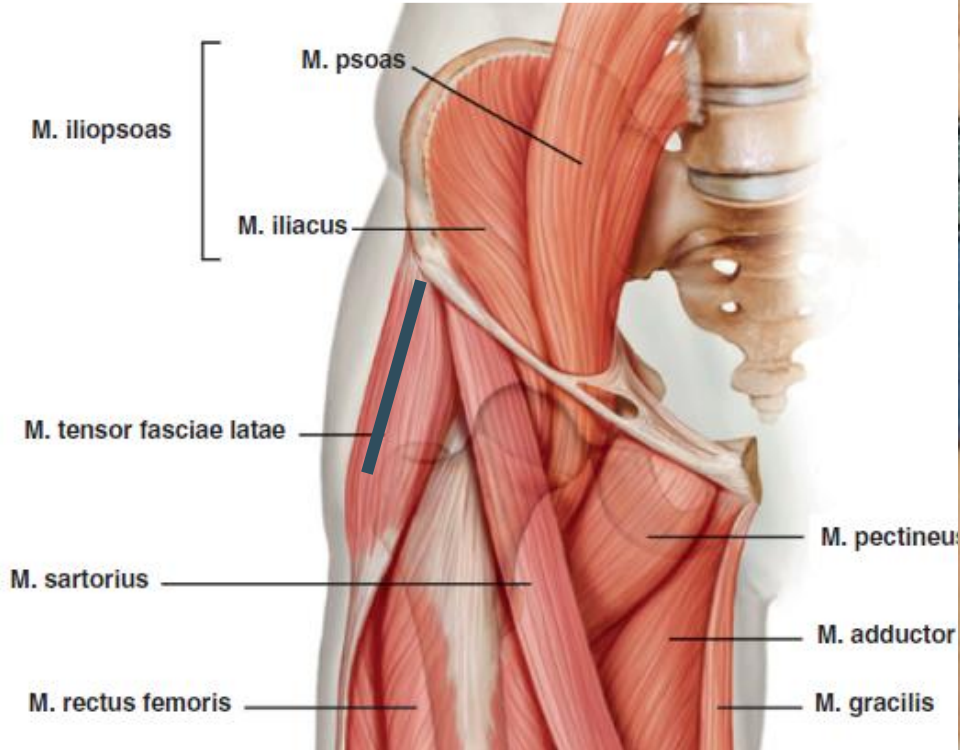
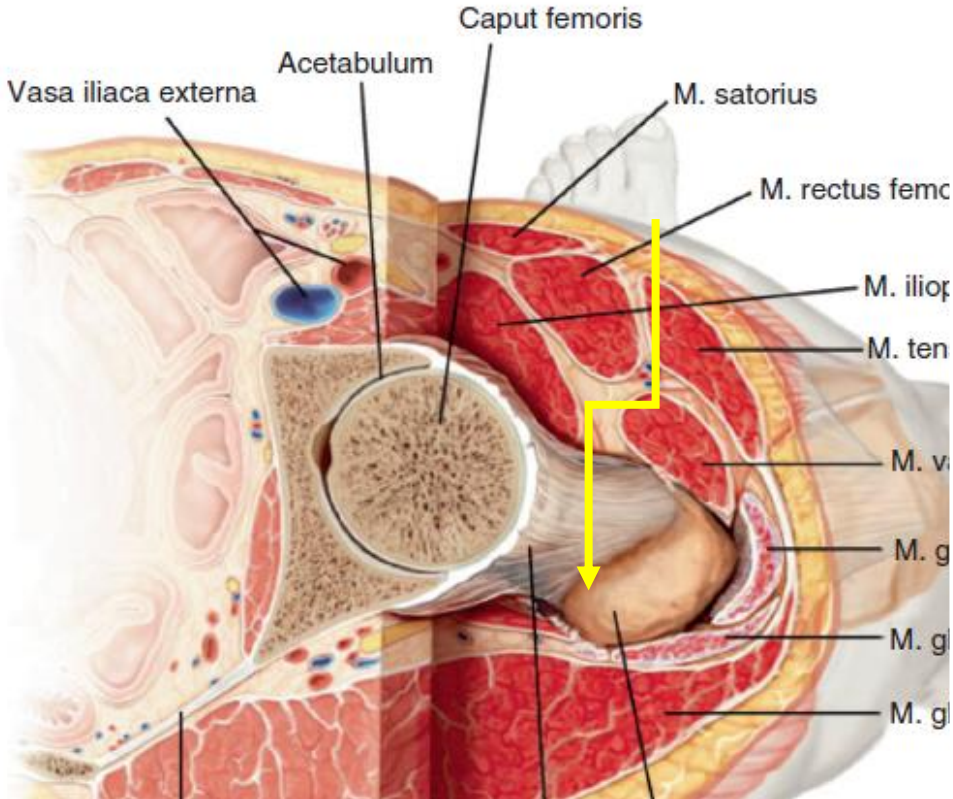
- Nagenoeg geen slijtage
- Minimaal risico op fractuur
- Technisch moeilijker
- Voor “jonge patiënten”

Keramiek op Polyethyleen



- Nieuwe generatie : nagenoeg geen slijtage
- Vit D = antioxidant
- Gouden standaard voor “ouderen”

Evolutie 2: Spiersparende anterieure approach



spiersparende anterieure approach



- Minimaal invasieve toegang tot de heup
- Intermusculair en internerveus



Potentiële voordelen

- Snellere revalidatie
- **Verminderd luxatierisico**
- Ruglig (stabiele positie bekken/Bilaterale cases)
- Mogelijkheid tot scopie

Evolutie 3: Wearable Technology



Digitale revalidatie platforms

Een simpele service voor een snel herstel

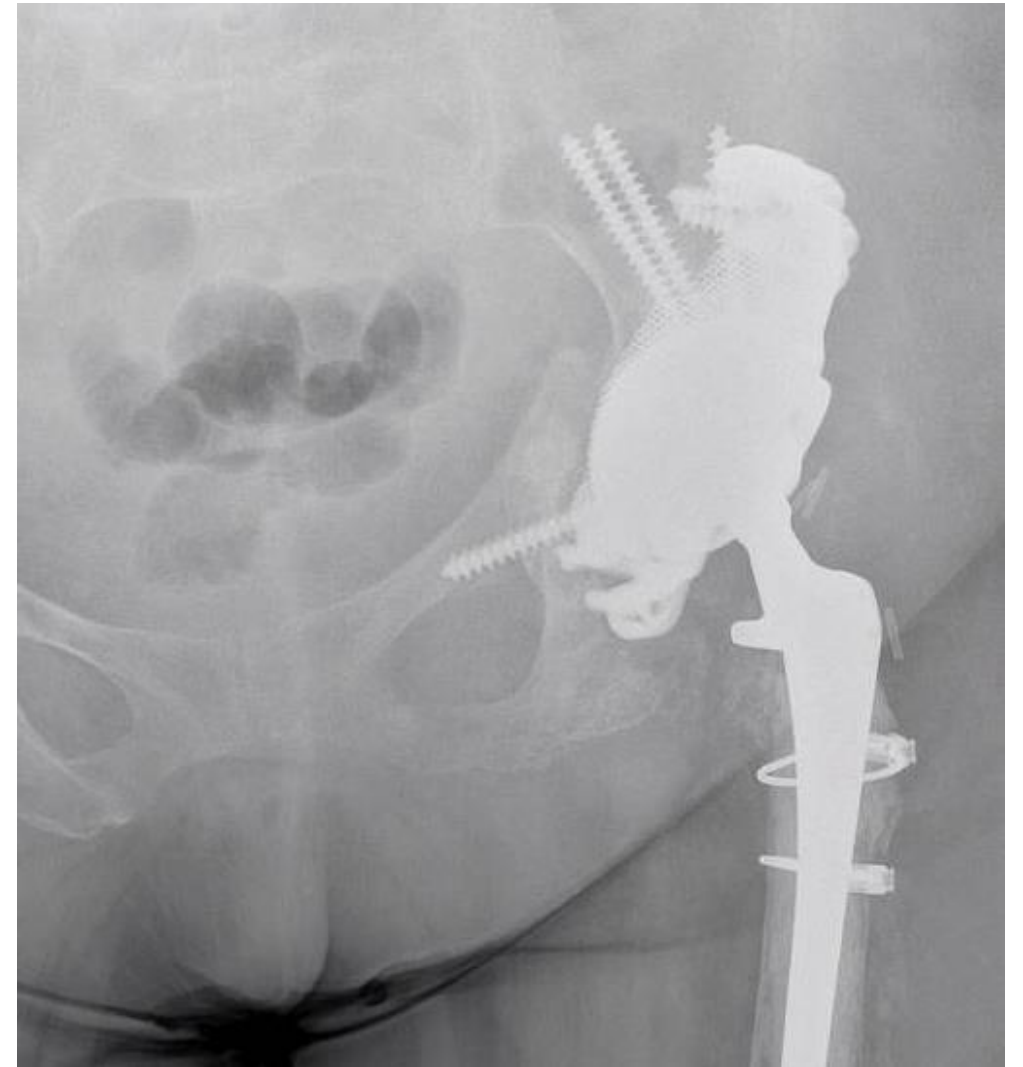
Geen nood om te investeren in dure toestellen.
Huur inbegrepen tijdens je revalidatie.

Tablet + Slimme armband + Programma

Evolutie 4: 3D printing



3D printing



Uitdagingen?

- Slijtage ↓
- Luxaties ↓
- Periprothetische fracturen ↑
- **Infecties** ↑

Preop
phase

Hospital-
surgery
phase

Postop
phase

Infecties - casus



- 66y, BMI 49.2
- Primaire THP
- Infectie < 2w => washout + Vanco IV



Toxische epidermolysis, acuut nierfalen,
dialysis



Transfer UZL

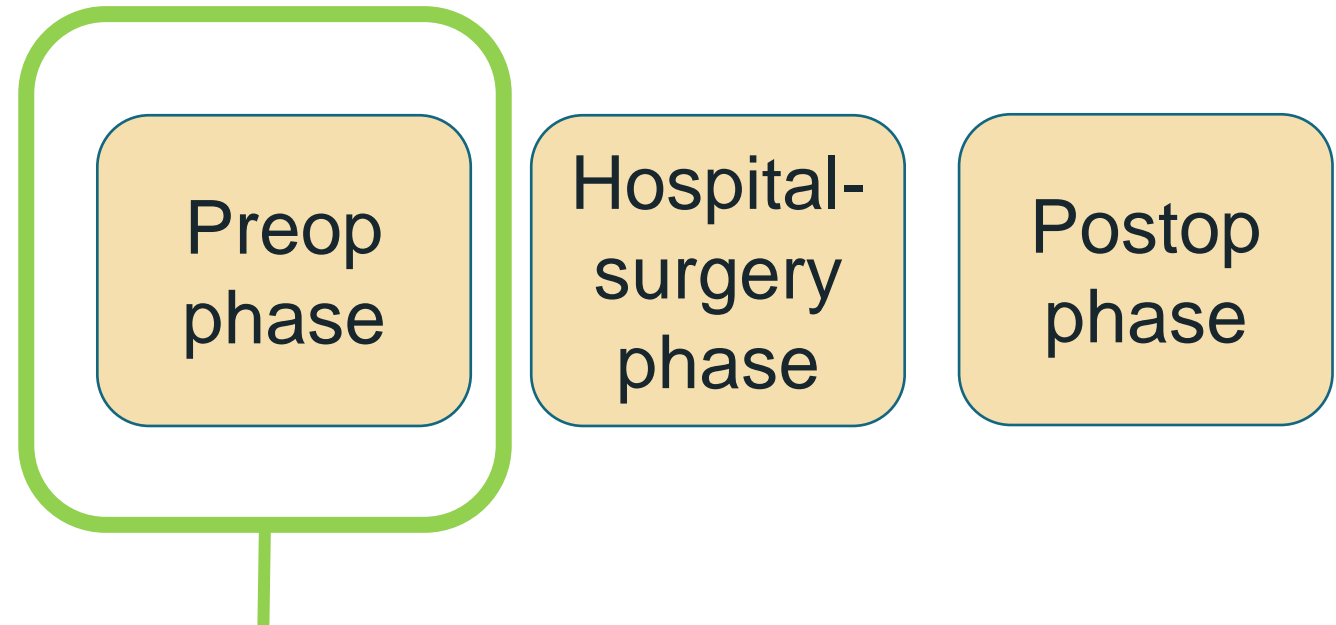
Infecties - casus



28 (!) debridementen =>
Falen => amputatie

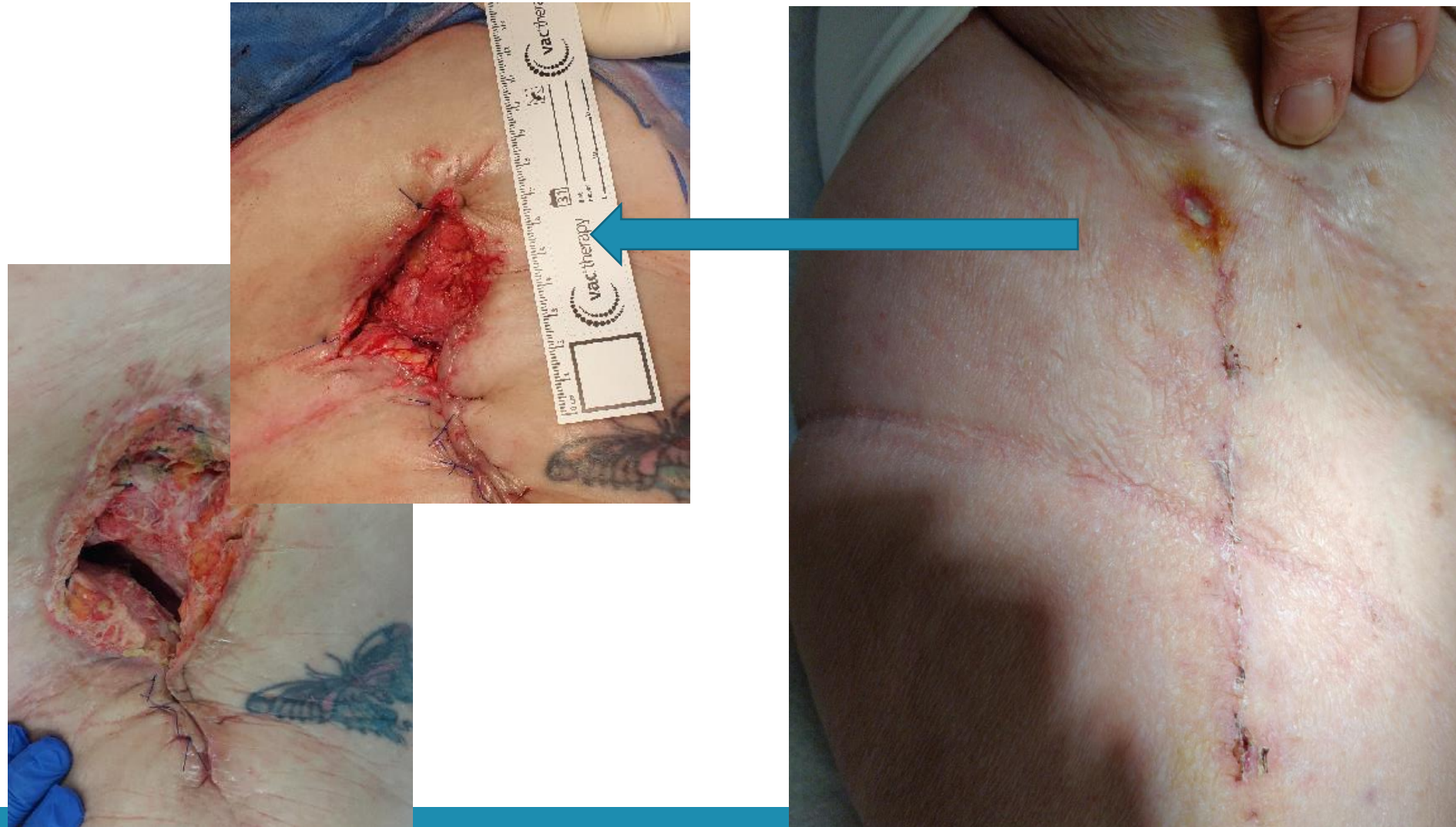
Flapbedekking door plastische heelkunde
Bijna 1 jaar in het ziekenhuis!

Opportunititeiten - Infecties



Patient optimization
Modifiable risk factors

Opportunities - Infections



Postop
phase

Early detection

Periprosthetische infecties



- Incidence = rising !
- Risk factors
 - Obesity
 - Smoking
 - Diabetes
 - Comorbidities

Modifiable!

Projected Economic Burden of Periprosthetic Joint Infection of the Hip and Knee in the United States

> 100.000\$ / patient

USA 753 million \$ for THR

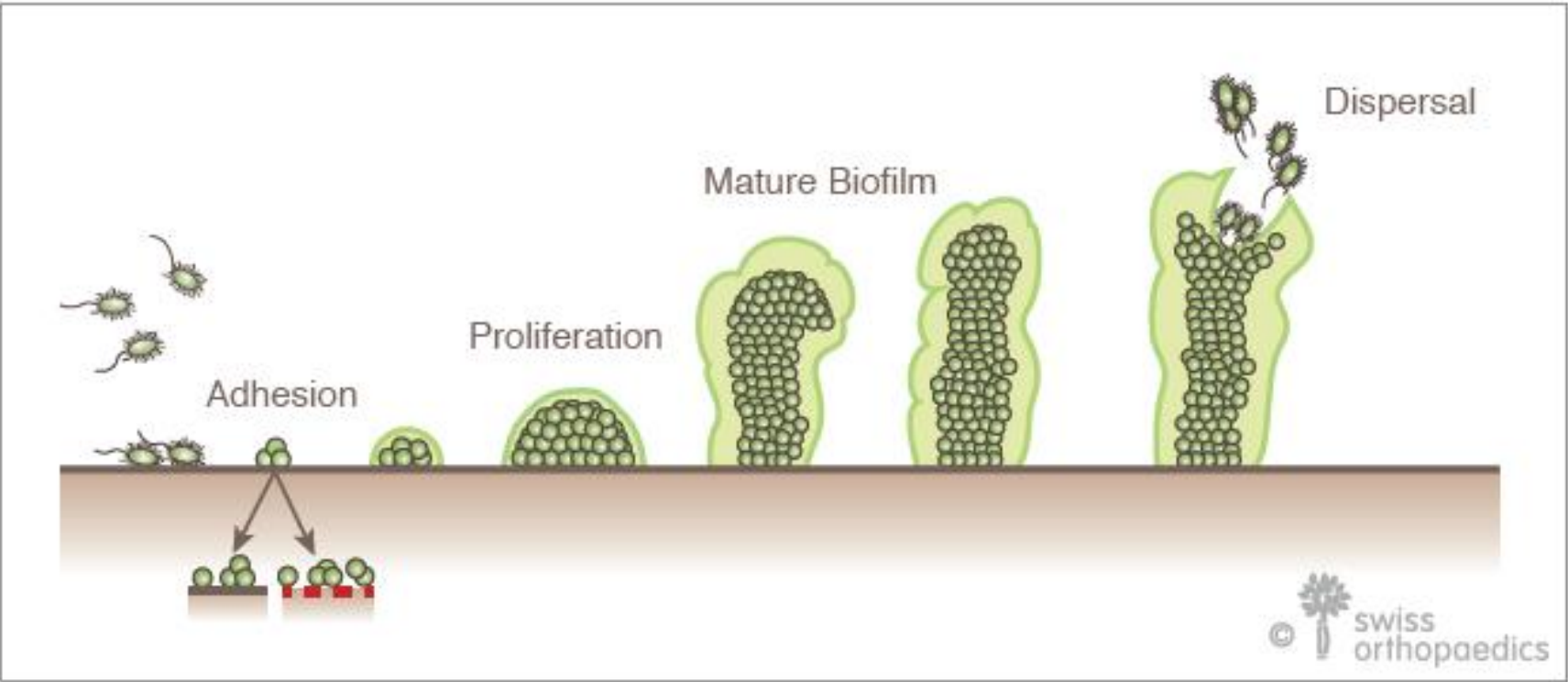
PJI algemeen

- Infectie in de aanwezigheid van een lichaamsvreemd implantaat

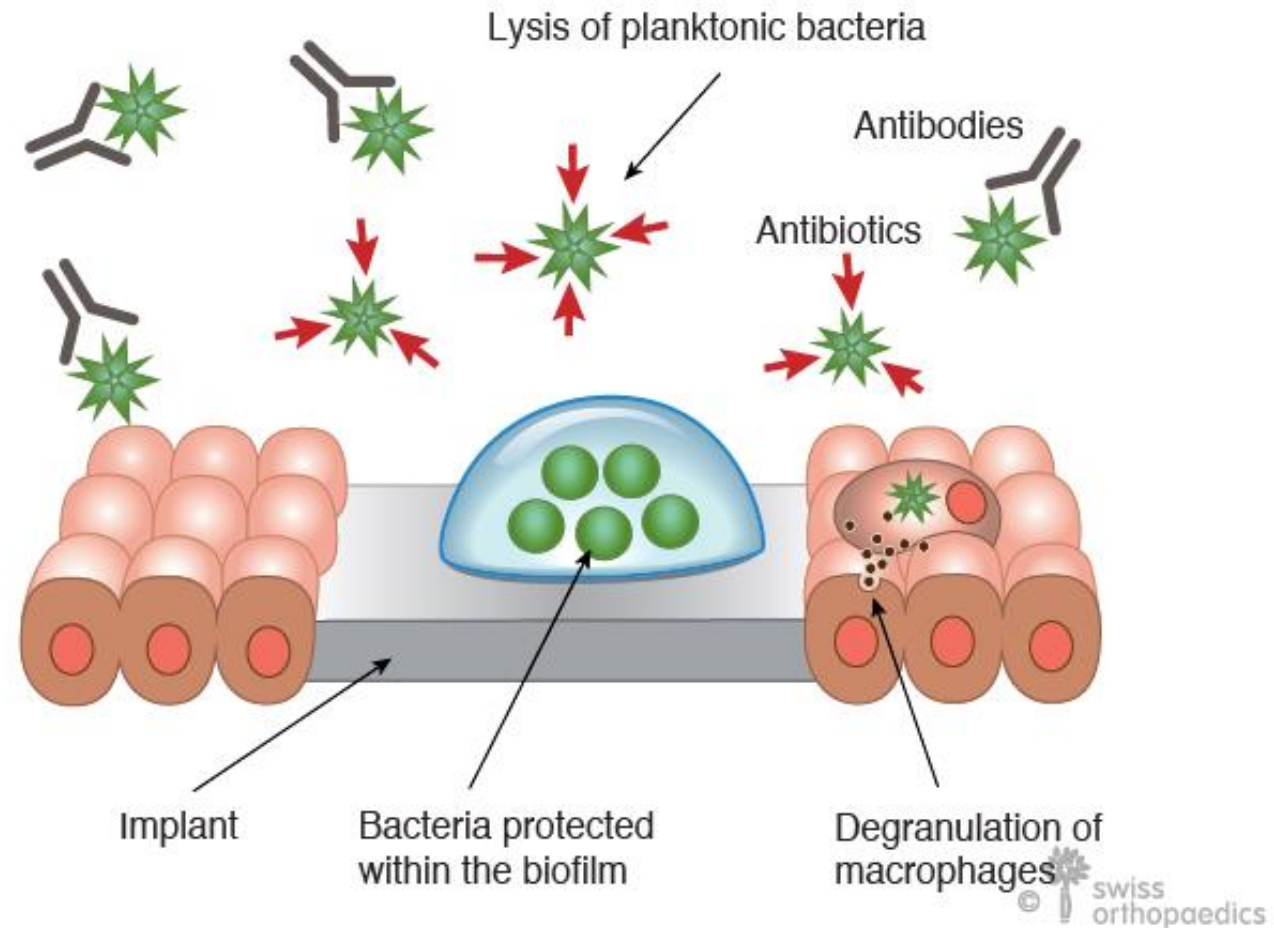
- BIOFILM



Biofilm



Sterkere bacteriën en zwakkere wittebloedcellen



Soms is de diagnose duidelijk



Vaak is het zoeken

EBJIS PJI definition (2021)

	Infection Unlikely (all findings negative)	Infection Likely (two positive findings) ^a	Infection Confirmed (any positive finding)
Clinical and blood workup			
Clinical features	Clear alternative reason for implant dysfunction (e.g. fracture, implant breakage, malposition, tumour)	1) Radiological signs of loosening within the first five years after implantation 2) Previous wound healing problems 3) History of recent fever or bacteraemia 4) Purulence around the prosthesis ^b	Sinus tract with evidence of communication to the joint or visualization of the prosthesis
C-reactive protein		> 10 mg/l (1 mg/dl) ^c	
Synovial fluid cytological analysis ^d			
Leukocyte count ^c (cells/ μ l)	\leq 1,500	> 1,500	>3,000
PMN (%) ^c	\leq 65%	> 65%	> 80%
Synovial fluid biomarkers			
Alpha-defensin ^e			Positive immunoassay or lateral-flow assay ^e
Microbiology ^f			
Aspiration fluid		Positive culture	
Intraoperative (fluid and tissue)	All cultures negative	Single positive culture ^g	\geq two positive samples with the same microorganism
Sonication ^h (CFU/ml)	No growth	> 1 CFU/ml of any organism ^g	> 50 CFU/ml of any organism
Histology ^{c,i}			
High-power field (400x magnification)	Negative	Presence of \geq five neutrophils in a single HPF	Presence of \geq five neutrophils in \geq five HPF
			Presence of visible microorganisms
Others			
Nuclear imaging	Negative three-phase isotope bone scan ^c	Positive WBC scintigraphy ^j	

Celtelling

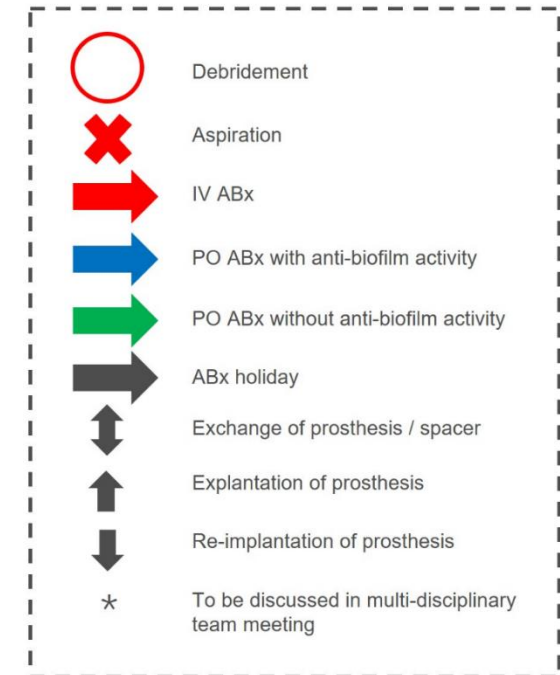
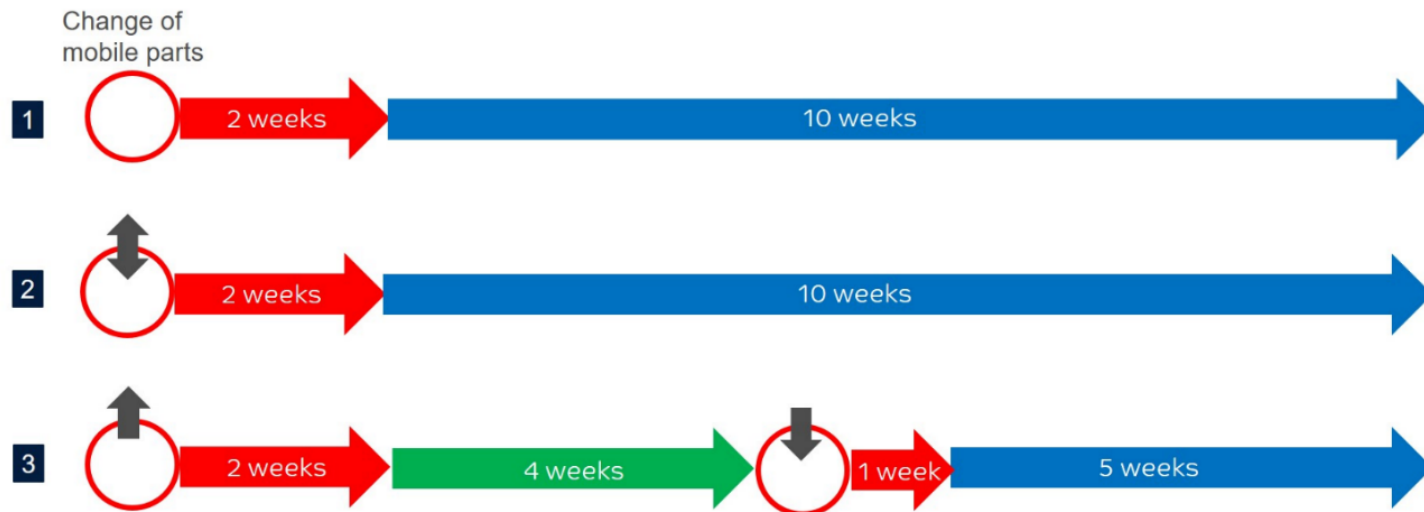
Alpha defensine / synovasure

Open biopten

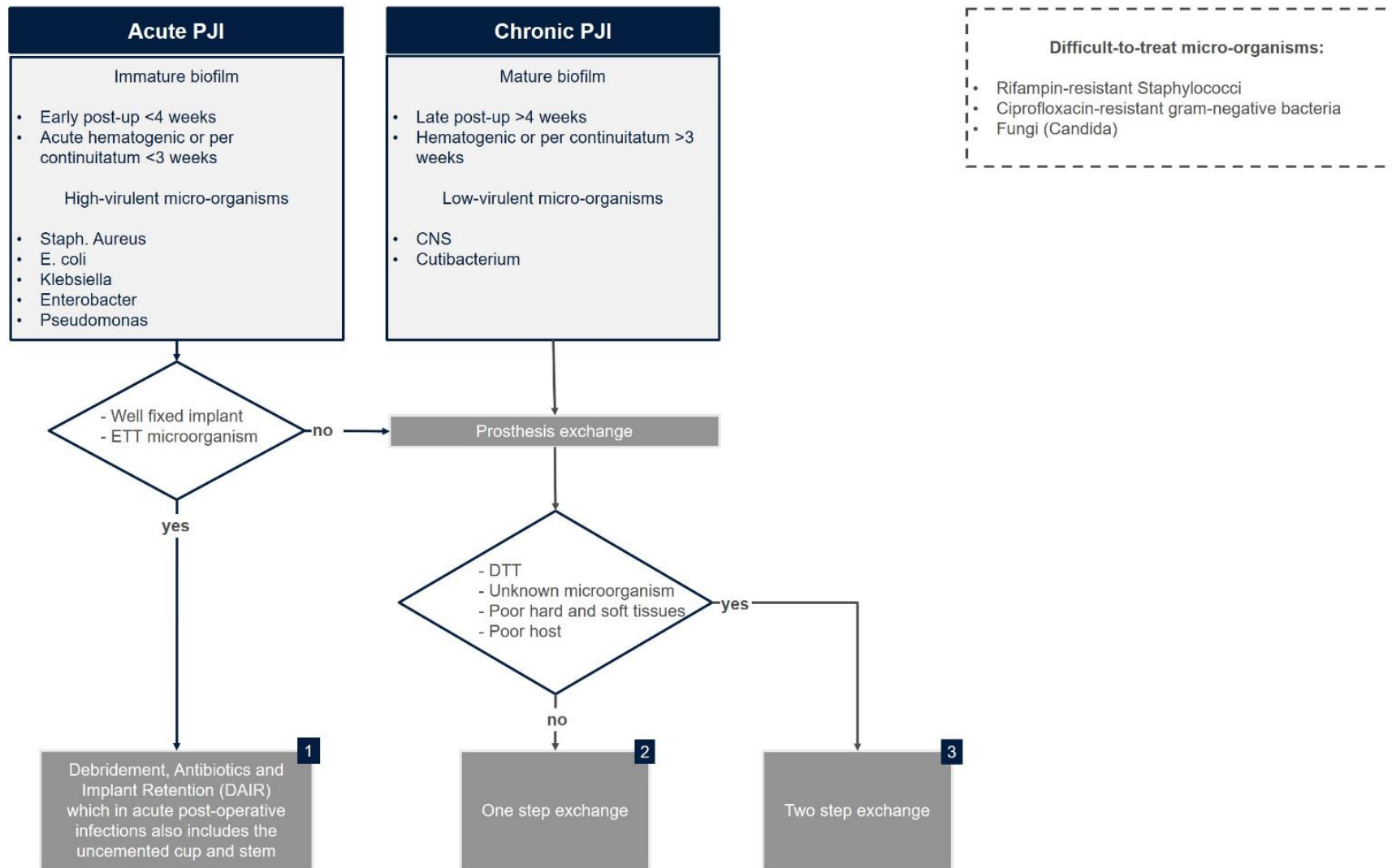
APO

Behandelplannen

Workhorses

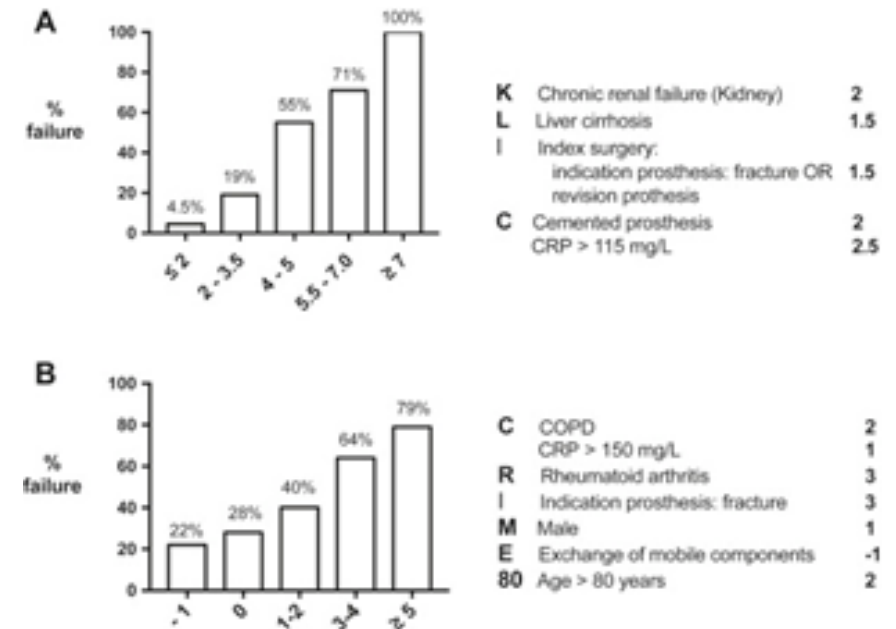


Therapeutic Algorithm PJI HIP



DAIR

- Debriement, Antibiotics and Impant Retention
- Idealiter binnen 3-4 weken na het ontstaan van de infectie
- Wisselen van alle mobiele componenten



One stage exchange

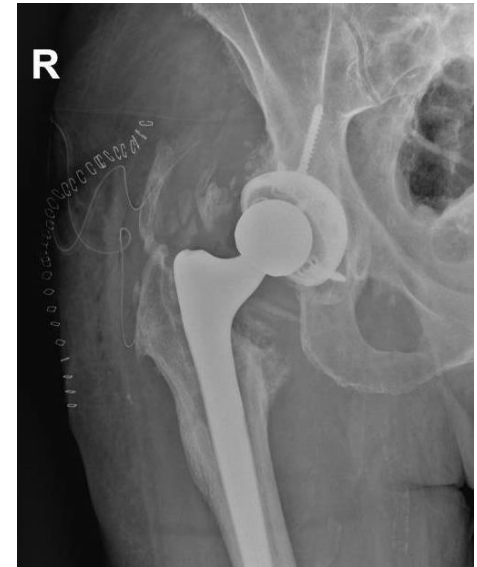
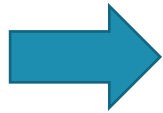
- Verwijderen en direct terugplaatsen van een THP in 1 operatie
- Voordelen
 - Lagere morbiditeit, opnameduur, kosten, etc
 - Elke patiënt komt toe aan re-implantatie
 - Geen spacer-gerelateerde complicaties
- Nadelen
 - Geen tweede kans op debridement
 - Geen bewijs dat behandeling aanslaat
- Winnaars
 - Kiem is bekend en goed te behandelen
 - Goede weke delen
 - Gecementeerde implantaten bij re-implantatie
 - Goede host



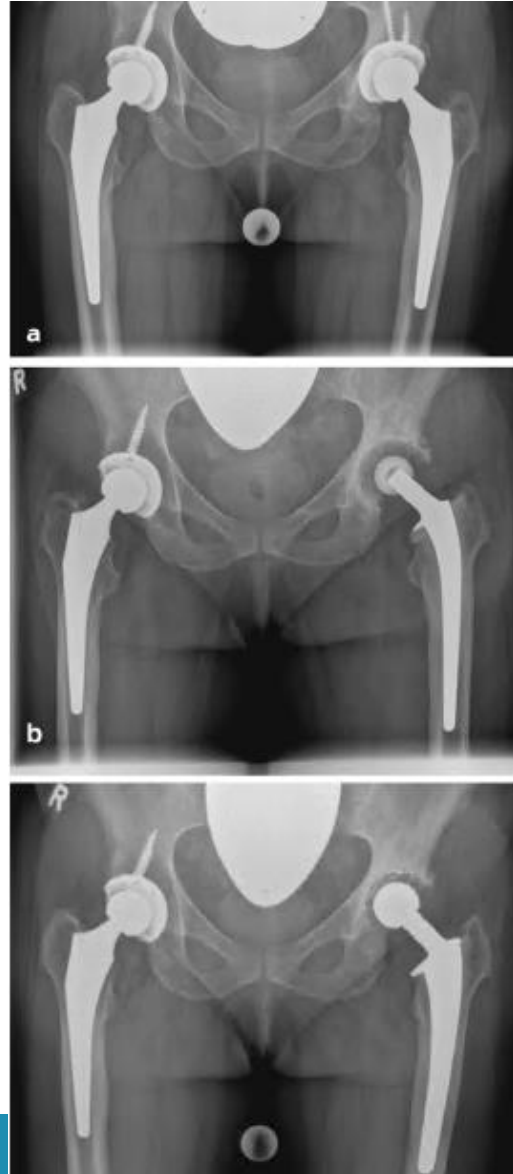
2



Two stage exchange



Spacers



Keys to success

- Vroege verwijzingen
- Expectation management
- MDT
- Strategie selectie
- Aantallen
- Ervaring met infectie EN revisie chirurgie
- Prospectief bijhouden wat je doet

MDT = standard of care

■ EDITORIAL

The role of multidisciplinary teams in musculoskeletal infection

Nike Walter, Markus Rupp, Susanne Baertl, Volker Alt

Managing uncertainty - a qualitative study of surgeons' decision-making for one-stage and two-stage revision surgery for prosthetic hip joint infection

Andrew J. Moore*, Ashley W. Blom, Michael R. Whitehouse and Rachael Gooberman-Hill



- Knowledge sharing
- Decision making
- Antibiotic stewardship



- Reduced hospital stays
- Lower reoperation rates
- Improved survival
- Lower amputation rates
- Lower overall healthcare use

Expectation management

	For FJI: Joint (prosthetic)	For Osteomyelitis: Bone involvement	Antimicrobial options	Coverage of ST	Host status
Uncomplicated	J1 Prosthetic joint infection with all of the following: • Primary type implant in situ • Minimal or no bone loss* • No evidence of loosening • No history of periprosthetic fracture	B1 Cavity infection without joint involvement (including cortical, medullary and non-segmental cortico-medullary)	Ax Unknown / culture negative A1 All isolates sensitive to ≥80% of susceptibility tests and resistant to <3 susceptibility tests	C1 Direct closure possible – plastic surgery expertise not required	H1 Well-controlled disease or patient fit and well
Complex	J2 Prosthetic joint infection with either: • associated periprosthetic fracture • Moderate bone loss** • Prosthetic loosening • Non-primary type implant in situ	B2 Segmental infection without joint involvement Or Any bone infection with associated joint involvement	A2 Any isolate either: • Sensitive to <80% of all susceptibility tests performed • Resistant to >4 susceptibility tests • Resistant to anti-biofilm antibiotics in the presence of an implant	C2 Direct closure not possible – plastic surgery expertise required	H2 Patients with poorly controlled co-morbidity or severe co-morbidity (evidence of end organ damage) Or Recurrent bone infection after previous debridement
Limited options	J3 Prosthetic joint infection with either: • Custom or tumour type implant in situ • Custom or total bone replacement required for reconstruction • Major bone loss***	B3 Whole bone involvement	A3 Any isolate sensitive to 0 or 1 susceptibility test		H3 Unfit for definitive surgery despite specialist intervention Or Patient declines surgery

Recurrence Failure at 5Y FU

2%

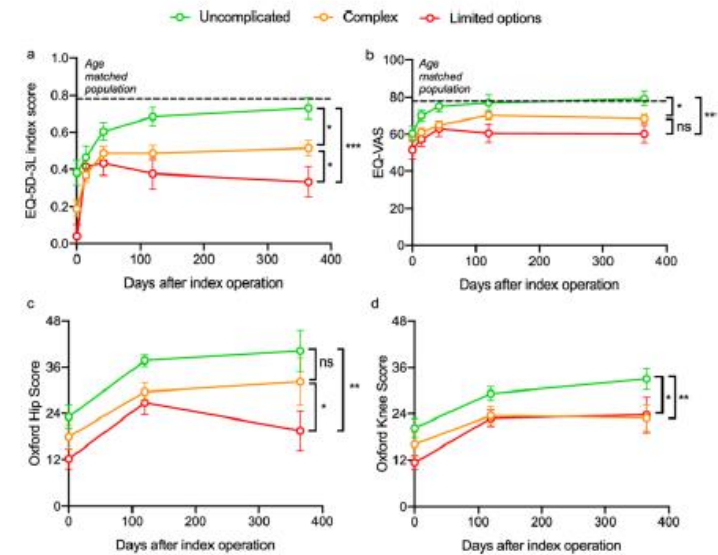
0%

35%

21%

68%

66%





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Complications - Infection

Inferior Outcomes for Patients Transferred Between Surgical Stages for Knee Periprosthetic Joint Infection



Jonathon Florance, MD^{*}, Jerry Chang, BS, Patrick J. Kelly, MD, Denise Smith, MD, Michael Bolognesi, MD, Thorsten Seyler, MD, Sean P. Ryan, MD

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ABSTRACT

Background: Periprosthetic joint infection (PJI) in total knee arthroplasty may result in 2-stage revision surgery. There are limited data describing outcomes when the first stage is completed at an outside hospital and the patient is referred to a tertiary center. We hypothesized that patients have greater success when both surgeries occur at a single center.

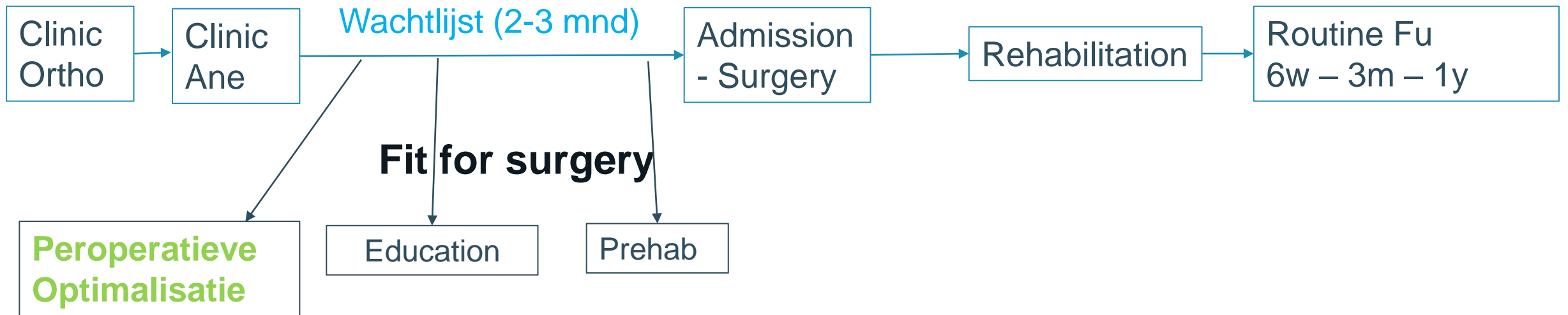
Methods: There were 25 knee PJI patients who presented with an antibiotic spacer and had a minimum 2-year follow-up who were retrospectively identified at a single tertiary referral center from 2014 to 2021. A cohort matched for age, sex, body mass index, Elixhauser comorbidity measure, spacer type, infectious organism, and year of surgery was established with patients who had both stages completed at the investigating institution. Modified Delphi success criteria of no subsequent surgery or reinfection with any species were compared.

Results: The transferred group demonstrated a treatment success of 40% compared to 84% in the continuous group ($P < .01$). The transferred group was more likely to have an additional procedure between stages (44 versus 8%, $P < .01$), with a higher number of surgeries after primary total knee arthroplasty (4.8 versus 3.0, $P < .01$), between stages (1.4 versus 0.2, $P < .01$), and after second stage (0.8 versus 0.2, $P = .03$). The transferred group had longer durations between stages (20.1 versus 7.0 weeks, $P < .01$).

Conclusion: Patients who have PJIs transferred between stages demonstrated higher treatment failure. Surgeons should consider transfer early with a goal of continuous management by a single institution.

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Preventie van PJI



Preventie PJI algemeen

- Rookstop
- Obesitas
- Mondhygiëne
- Diabetes controle

Rookstop

- wondproblemen **x 2**
- diepe infectie van de prothese **x 2,5**
- Longembolie, DVT,...

Idealiter: stop 2 maand voor ingreep

Vanaf 4 weken ervoor reeds effect merkbaar



Obesitas

MOEILIJK!

Obesitas is een risicofactor voor:

- Infectie (**BMI >40: x 4**)
- Wondproblemen

- Fractuur tijdens operatie
- Foute positie van de prothese
- Longembolen / thromboses
- Longontsteking



Obesitas - literatuur

- ... **Geen daling in BMI** postop bij obese patiënten
- ... sterk verhoogd risico op infectie bij BMI > 35 en > 40
- ... obese patiënten rapporteren forse verbetering functie & pijn
- ... geen duidelijke daling infectie risico bij vermageren / bariatric

Geen operatie bij BMI > 40

...of na grondige bespreking risico's

Mondhygiëne



- Evidentie beperkt
- Preop nazicht door CSM – verwijzing zo nodig
- Postoperatief antibiotica bij tandartsbezoek? **Geen evidentie**

Diabetes controle

Slecht geregelde glycemie is risicofactor voor PJI

Geen ingreep indien HbA1C > 7,7

Wondproblemen postoperatief (prothese)

Wondlekkage is majeure risico factor voor ontwikkelen wondinfectie

Oppervlakkige wondinfectie is majeure risico factor voor PJI

PJI heeft significante mortaliteit...

Wondproblemen postoperatief (prothese)

- Start geen antibiotica
- Geen peilsondes
- Geen wicken
- Labo
- Snelle doorverwijzing



Behandeling wondproblemen (prothese)

- Aspiratie onder steriele omstandigheden
- Start antibiotica
- Heelkundige behandeling
 - Lokale excisie & secundair sluiten
 - DAIR procedure



Conclusie

- Incidentie van PJI neemt toe
- Ernstige complicatie na THP
- Behandeling = chirurgisch
- Realistische verwachtingen
- Preop corrigeren van risicofactoren
- Postop snelle actie bij wondproblemen

Samenwerking met en feedback van de eerstelijns

Vragen?

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**SAMEN
GR[N]NZEN
VERLEGGEN**