


## Disaster Arthroplasty 2.0

“Megaprotheses around the knee-  
The view from down under”  
“Megaprotheses around the knee-  
The view from down under”



Richard Carey Smith FRCS FRACS  
The University of Western Australia

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## Disclosures

- # Institutional Support
  - # Smith and Nephew Orthopaedics
  - # De Puy/J&J
  - # Synthes
- # Personal Funding
  - # Genzyme
  - # Zimmer
  - # Oceania Orthopaedics
  - # Smith & Nephew
  - # Medical Director Perth Bone and Tissue Bank



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## Perth



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**WA**



- # 2.6 million people
- # 1/3 land mass of Australia
- # Sir Charles Gairdner Hospital
- # Perth Children's Hospital
- # State Cancer Centre
- # State Sarcoma Service



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### Megaprostheses of the knee

- # A's of orthopaedics
  - # Amputate, arthrodesis, arthroplasty
- # Most common reconstructive method for bone loss around the knee
  - # Versatile
  - # Off the shelf
  - # Modular
  - # Durable
  - # Simple



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### Now lots of options

- # Stryker GMRS
- # Zimmer
- # Wright Medical
- # Biomet
- # Implant Cast/MUTARS
- # Stanmore/Stryker



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## Prostheses in Aus



GMRS  
 QLD  
 NSW  
 ?SA  
 ?Vic  
  
 WA  
 GMRS→MUTARS

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## Indications

- # Failed arthroplasty
- # Trauma/Infection
- # Complex recon/bone loss
  
- # Oncology
- # Each bring challenges
  - # Prior surgery
  - # Soft tissue loss/immobility
  - # Immune deficiency
  - # Radiotherapy




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## Modes of failure

- # Registries and larger studies
- # Difficult with small numbers/complex cases
  
- # Large centers of excellence
  - # Soft Tissue-10.3%
  - # Loosening-5.7%
  - # Structural-0%
  - # Infection-11.4%
  - # Recurrence-6.3%

Henderson JB/JAa 2011  
 Pala CORR 2014




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## Soft tissue failure

- # Extensor mechanism issues
- # Tumour tube/Trevira tube
- # +/-Gastroc flap
- # Patella tracking/impingement
- # Patella resurfacing



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## Loosening

- # Loosening
  - # Pala GMRS 5.7%
- # Fixed > Mobile
  - # Henderson  $p < 0.0004$
- # Implant design improved
  - # HA collar/TM collar
  - # Improved rotational control
    - # Schwartz 2010



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## Structural

- # Pala 0%
- # Rare with modern engineering



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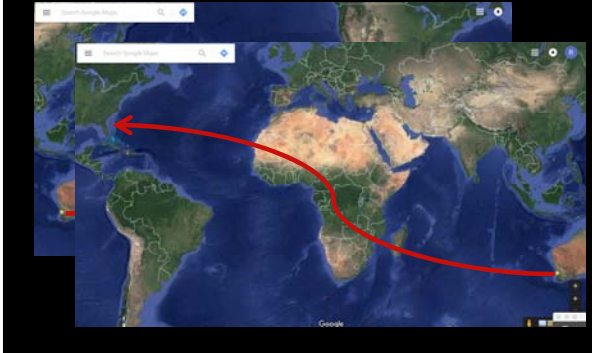
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### 12 hour time difference



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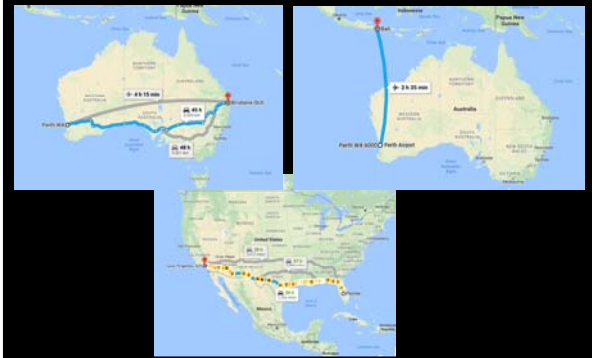
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### Perth-most isolated capital



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### Wild West



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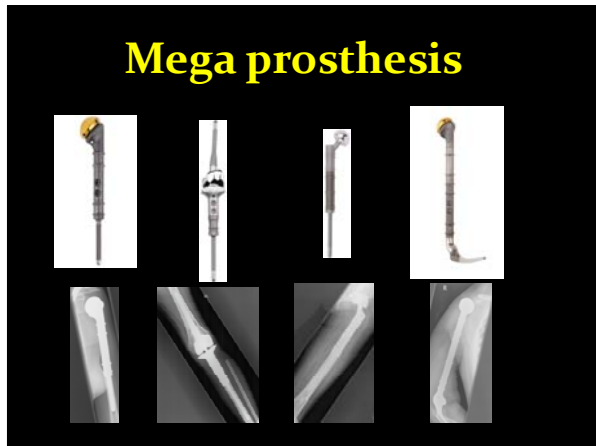
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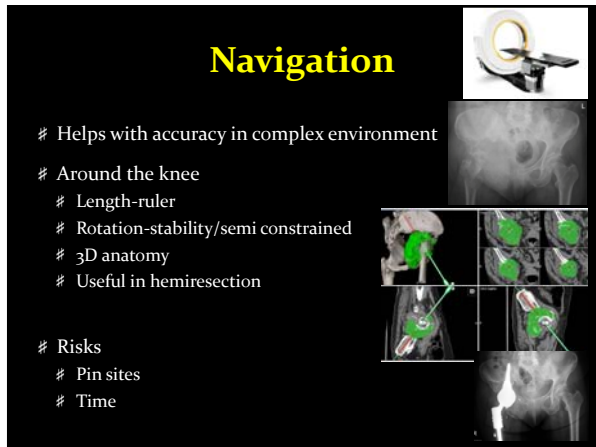
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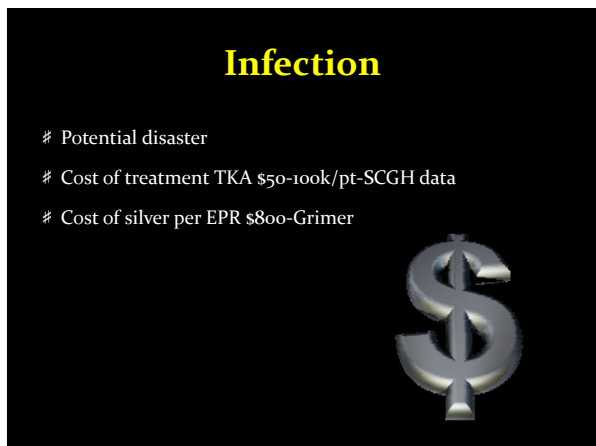
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## Risks-why (does it happen to me?)

- Long surgery
- Large incisions
- Poor immune response (chemo)
- Radiotherapy



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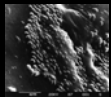
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## Periprosthetic infection

- 5-20% depending on position of prosthesis
- infection mostly within first 24 months

**Staphylococcus 69,7%**

**Biofilm causing bacteria**

Staph. aureus 69,9%  
Staph. epid. 29,1%

Soft tissue  $10^9$  CFU  
Bone  $10^5$  CFU  
Foreign body  $10^2$  CFU

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## Antibiotics

- Prophylaxis
- Short term solution
- Do not stop adhesion
- Need a blood supply



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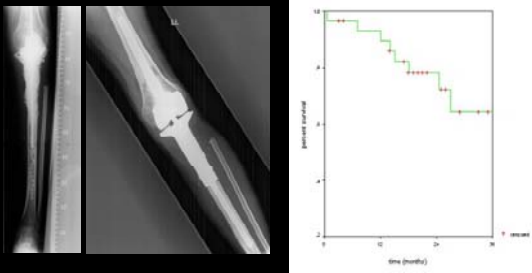
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## Options/Treatment



Late amputation > 35%

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## Solutions?

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## Toxic side effects

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

Biomaterials 28 (2007) 2869–2875 [www.elsevier.com/locate/biomaterials](http://www.elsevier.com/locate/biomaterials)

**Lack of toxicological side-effects in silver-coated megaprotheses in humans**

Jendrik Harde<sup>a,\*</sup>, Helmut Ahrens<sup>a,1</sup>, Carsten Gebert<sup>a</sup>, Arne Streitburger<sup>a</sup>, Horst Buerger<sup>b</sup>, Michael Erren<sup>c</sup>, Andreas Gunsel<sup>d</sup>, Christian Wedemeyer<sup>c</sup>, Guido Saxler<sup>c</sup>, Winfried Winkelmann<sup>a</sup>, Georg Gosheger<sup>a</sup>

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<sup>d</sup>Environmental Specimen Bank for Human Tissue, University of Muenster, Dinslagstrasse 11, 48149 Muenster, Germany  
<sup>e</sup>Department of Orthopaedic Surgery, University of Duisburg-Essen, Hufeland Street 55, 41222 Essen, Germany

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

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## Effective?

51 Pat. with silver coated prosthesis (MUTARS)

29 Proximal Tibia

22 Proximal Femur

Follow-up 19 months

74 Pat. with uncoated titanium prosthesis (MUTARS)

41 Proximal Tibia

33 Proximal Femur

Follow-up 54 months

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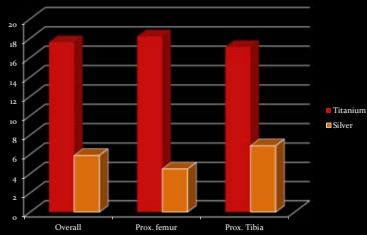
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## Results-Munster



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## Results-Perth



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## 2 infections

- # 40's female-"knee pain"
- # Morbid obesity (BMI >50)
- # Distal femur replacement-GCT
- # Multiorganism



- # Single stage revision success (so far 12 months)
- # Normal CRP, no pain, working



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## High risk cases

- # Small population



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## Technology here to help

- # <3% periprosthetic infection



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## In summary

- # Literature tells us what we need to do
  - # HA coating
  - # Cementless > cemented
  - # Technique/experience
  - # Modularity with stability
  - # Bearing surface



## Vorsprung durch technik



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## Just a knee replacement

- # Lenna, 61, 5ft tall, bright red hair
- # Rheumatoid, diabetic
- # Lawyer



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## Left knee pain

- # Then it got worse



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### 3 months Abx



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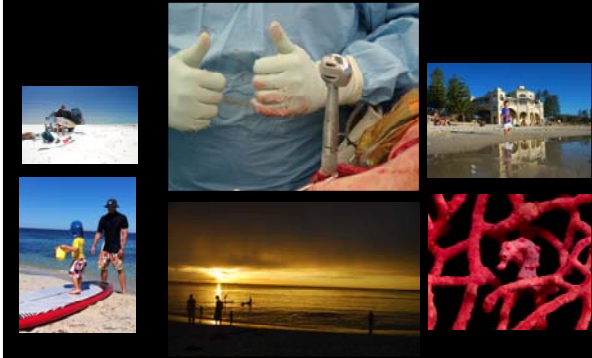
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### Thank You



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### Perth



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**Aus**

WA 33% Aus  
WA 4x Texas  
WA 12x UK  
WA 20x England



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