

# Dr Andreas Loeffler

[www.orthosports.com.au](http://www.orthosports.com.au)

29-31 Dora Street, Hurstville  
160 Belmore Road, Randwick



**ORTHOSPORTS**  
ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# How to choose a Total Hip Replacement Prosthesis

Andreas Loeffler

Orthosports

POW Hosp.



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# THR



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# AOA NJRR Report 2017

- 1,237,576 joint replacements
  - 545,831 hips
  - 653,480 knees
  - 38,265 shoulders
- Revision is the end point
- Surgeon and hospital variation
  - Consistency
  - Good prostheses



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Outliers

- Prostheses are identified if the RR is more than 2.5 SD above the rest



# Outliers

- Prostheses are identified if the RR is more than 2.5 SD above the rest
- Since 2008 surgeons are linked to procedures
  - 7.9% surgeon outliers with higher RR
  - Why?



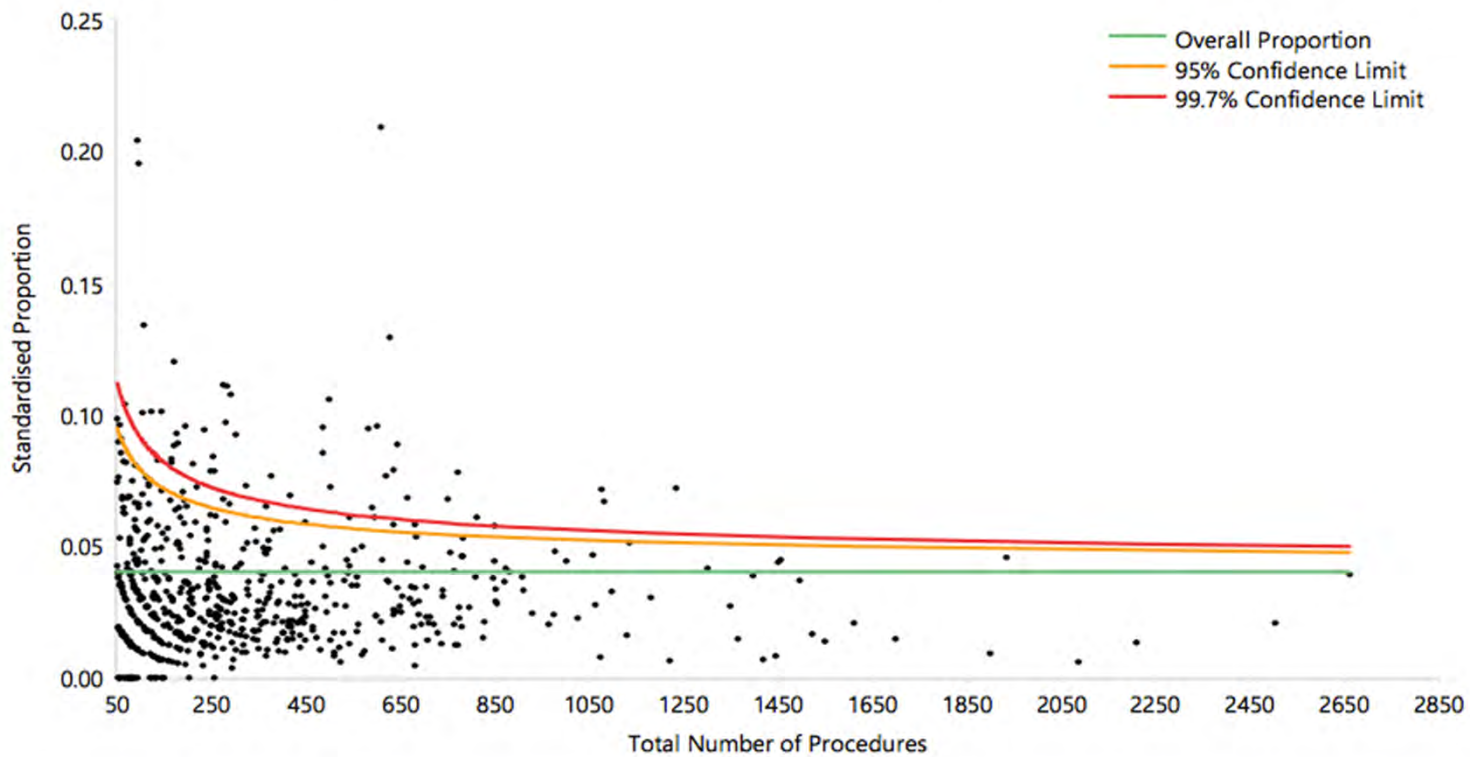
**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Outliers

Figure SV1 Funnel Plot of Primary Total Conventional Hip Replacement by Surgeon (Primary Diagnosis OA, Revision for Any Reason)



# Outliers

- Prostheses are identified if the RR is more than 2.5 SD above the rest
- Since 2008 surgeons are linked to procedures
  - 7.9% surgeon outliers with higher RR
  - Why?
  - Prosthesis choice





# THR 2016

- THR increased by 3.7%
- Revisions decreased by 8.9%
- Multiple prostheses combinations possible
- 78 femoral and acetabular combinations with 10 year outcomes, of which 42 are in use
- 651 surgeons performed 50 or more THR



# Prosthesis choice

- Effect of prosthesis choice on surgeon variation
  - Consistency of prosthesis use
  - Use of better prostheses



# Consistency

- When a surgeon uses two prostheses

G

- > 90%
- 70 – 90%
- < 70%



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Consistency

- When a surgeon uses two prostheses

G	N
– > 90%	224
– 70 – 90%	213
– < 70%	185



# Consistency

- When a surgeon uses two prostheses

G	N	RR
– > 90%	224	3.8%
– 70 – 90%	213	4.0%
– < 70%	185	4.2%



# Consistency

- When a surgeon uses two prostheses

G	N	RR
– > 90%	224	3.8%
– 70 – 90%	213	4.0%
– < 70%	185	4.2%

– G3 did 280 more revisions than G1



# Better performing prostheses

- 10 prostheses combinations with lowest RR were identified
- Consistency group usage
  - G1 30.8%
  - G2 25.3%
  - G3 17.4%



# Better performing prostheses

- 10 prostheses combinations with lowest RR were identified
- Consistency group usage
  - G1      30.8%      3.8%
  - G2      25.3%      4.0%
  - G3      17.4%      4.2%





# Better performing prostheses

- 10 prostheses combinations with lowest RR were identified
- Consistency group usage
  - G1      30.8%      3.8%
  - G2      25.3%      4.0%
  - G3      17.4%      4.2%
- Correlation between consistency and quality



# Better performing prostheses

- When comparing the usage of only 10 best prostheses in these groups of surgeons, the RR is equal.



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Better performing prostheses

- When comparing the usage of only 10 best prostheses in these groups of surgeons, the RR is equal.
- When comparing the usage of the 10 best with the usage of all other prostheses
  - 10 best 1.7%
  - All others 7.8%



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Better performing prostheses

- When comparing the usage of only 10 best prostheses in these groups of surgeons, the RR is equal.
- When comparing the usage of the 10 best with the usage of all other prostheses
  - 10 best RR 1.7%
  - All others RR 7.8%
  - **Theoretically 4,720 extra revisions**



# Prostheses variation

- The 10 year RR vary from 1.9% to 45.8%
- A commonly accepted benchmark is 5%
- 35 hip combinations have less than 5%



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Prostheses variation

- The 10 year RR vary from 1.9% to 45.8%
- A commonly accepted benchmark is 5%
- 35 hip combinations have less than 5%
  
- 15 year results
  - 13 combinations with 6.5% or less RR
  - 6 combinations with less 5% RR



# THR 2016

- 47,171 procedures
  - Primary THR, hemi-arthroplasty, revision hips
  - Increase 5.5% over 2015
- 2,844 stem and acetabular combinations
- Multiple decisions



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# THR 2016

- 47,171 procedures
  - Primary THR, hemi-arthroplasty, revision hips
  - Increase 5.5% over 2015
- 2,844 stem and acetabular combinations
- Multiple decisions
  
- Approach was not recorded





# Prosthesis choice

- Fixation
  - Cemented, hybrid, un-cemented



# Prosthesis choice

- Fixation
  - Cemented, hybrid, un-cemented
- Short or long stem



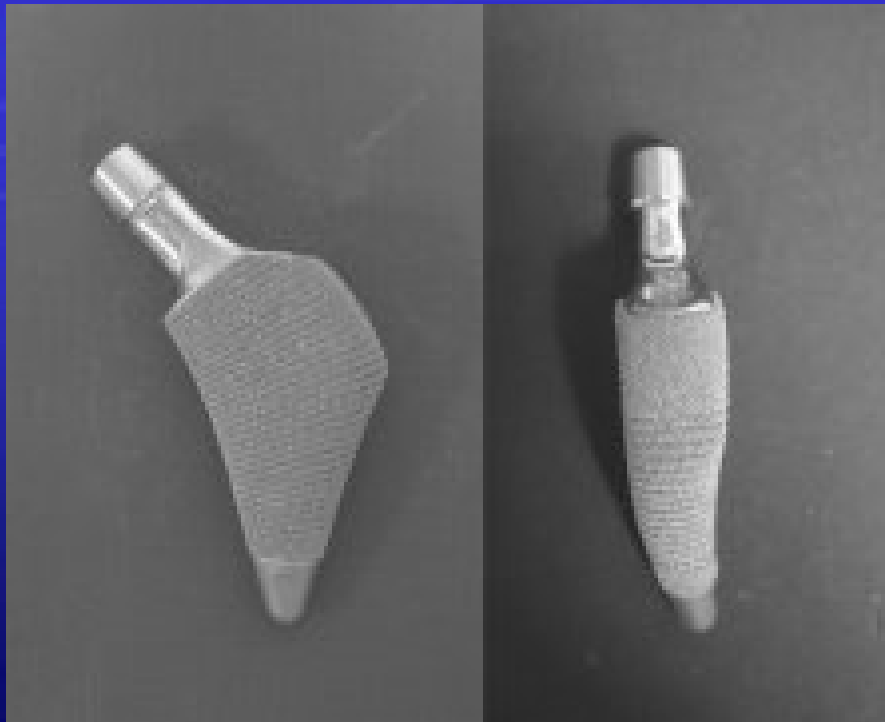
**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Prosthesis choice

- Fixation
  - Cemented, hybrid, un-cemented
- Short or long stem



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

# Prosthesis choice

- Fixation
  - Cemented, hybrid, un-cemented
- Short or long stem
- Modular neck

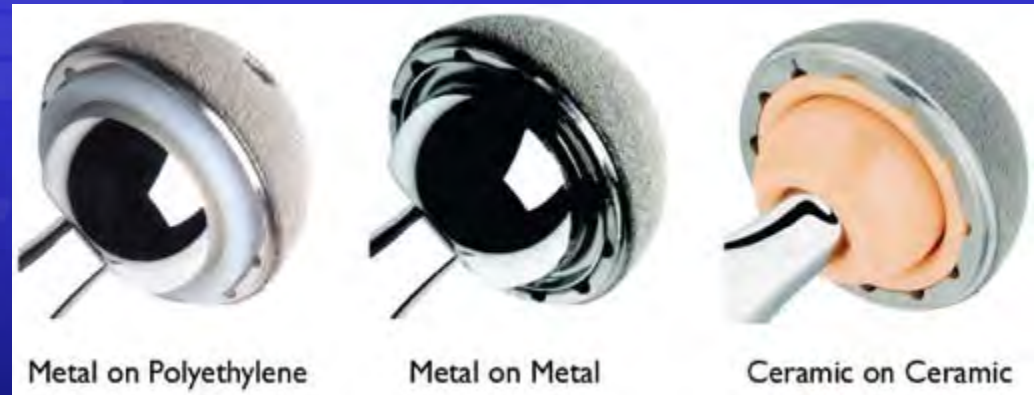


**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

# Prosthesis choice

- Fixation
  - Cemented, hybrid, un-cemented
- Short or long stem
- Modular neck
- Bearing surfaces
  - Metal on poly
  - Ceramic on poly
  - Ceramic ceramic



# Reasons for Revision

- Loosening – 25.6%
- Dislocation – 21.6%
- Fracture – 19.5%
- Infection – 17.7%



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Reasons for Revision

- Loosening – 25.6%
  - Dislocation – 21.6%
  - Fracture – 19.5%
  - Infection – 17.7%
- 
- Dislocation early
  - Loosening non-cemented early
  - Loosening cemented late



# Fixation

- <65 years no difference cemented or non-cemented
- >65 years cemented is better





# Fixation

- <65 years no difference cemented or non-cemented
- >65 years cemented is better

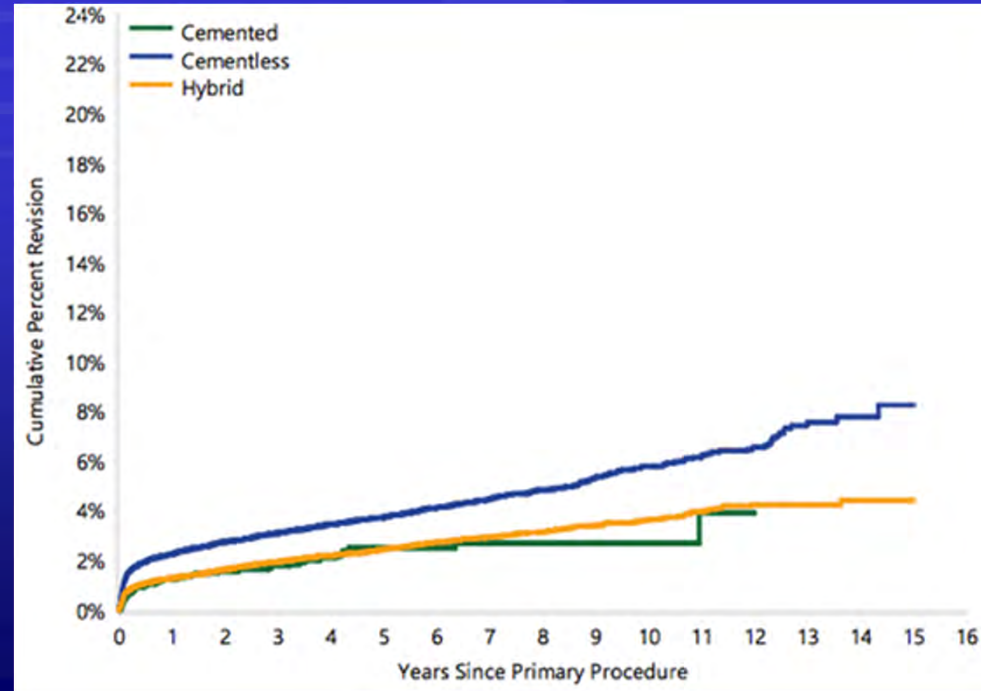
Types of Total Hip Arthroplasty



Dr Andreas Loeffler  
Knee & Spine Surgery

# Fixation

- <65 years no difference cemented or non-cemented
- >65 years cemented is better



Dr Andreas Loeffler  
cement & Spine Surgery

# Fixation

- <65 years no difference cemented or non-cemented
- >65 years cemented is better
  
- Assess bone quality
- Assess shape of femur



# Mini stems

- Short non-cemented femoral stem
- 11 different prostheses
- Less than 1% of all THR, but increasing
- 597 cases in 2016
- Overall RR same
- Femoral loosening twice that of other stems

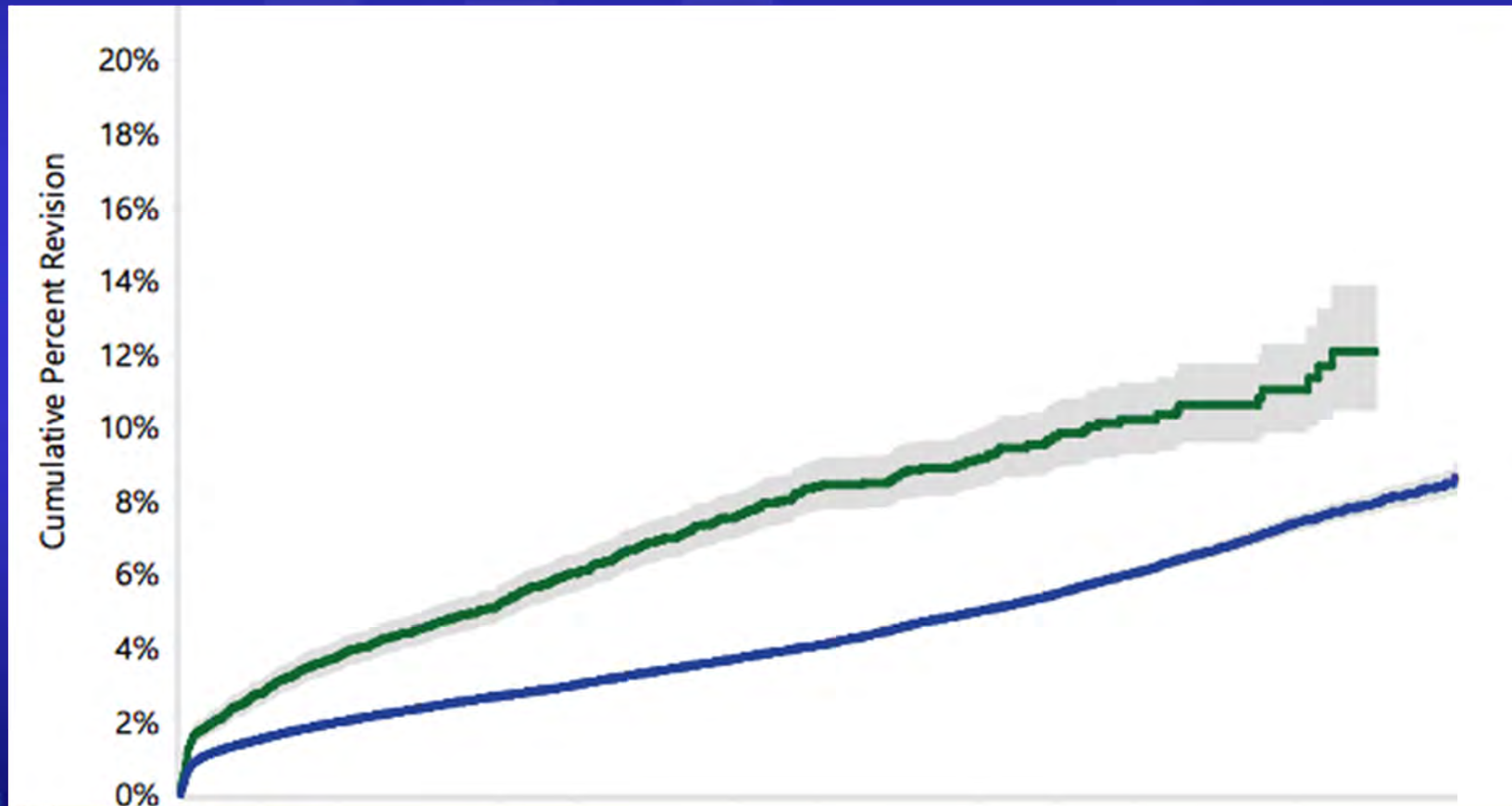


# Exchangable necks

- Allow surgeons to adjust version, offset and length
- Higher RR 12.0% vs 7.9% at 15 years
- Fretting at neck stem junction
- Fracture, loosening, dislocation
- Use is decreasing rapidly



# Exchangable necks



# Bearing surfaces

- Heads
  - Metal
  - Ceramic
  - Cermicised metal
- Cup
  - Metal
  - XLPE
  - ceramic



# Bearing surfaces

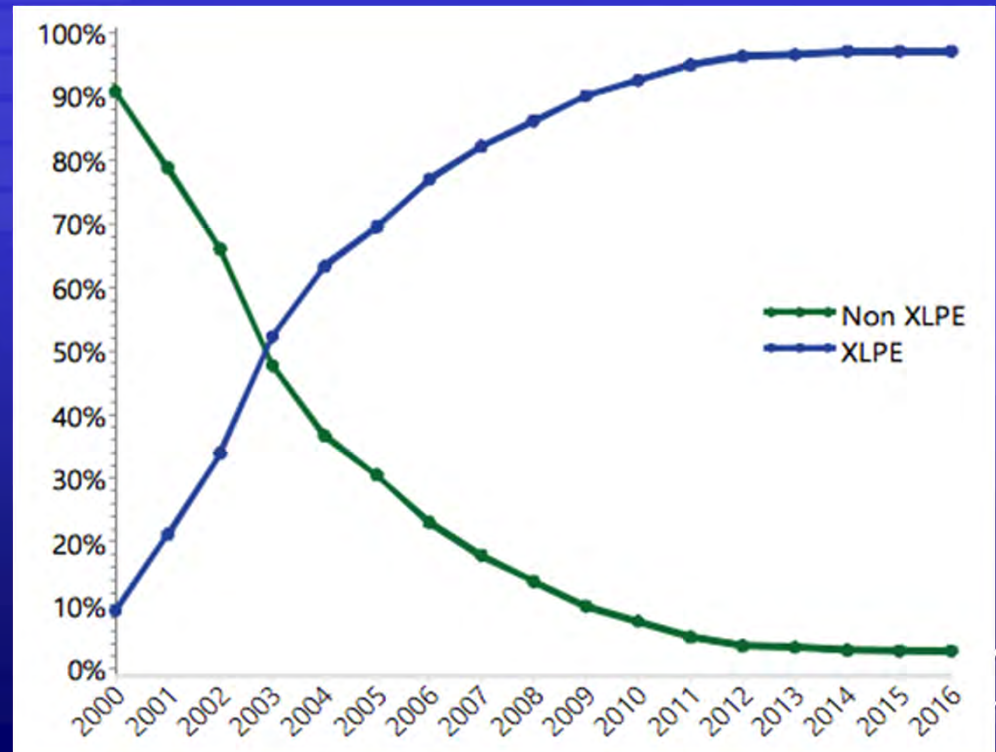
- Ceramicised metal/XLPE lowest RR, but single company product, small numbers
- Ceramic/XLPE better than Metal/XLPE
- Ceramic/XLPE better than Ceramic/Ceramic, but figures marred by batch of bad ceramic with fractures and squeaking
- Metal/Metal durable, but toxic





# Polyethylene

- Non-crosslinked higher RR, rarely used
- Crosslinked XLPE
  - Ultra high density
  - Irradiated
  - Antioxidant



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

# Head size

- Ceramic heads >36mm have lower RR
  - <28 2.0%
  - 32mm 0.4%
  - 40mm 0.1%
- Dual mobility have a higher RR
  - More complex cases



# Cost

- THR costs vary enormously
  - \$4,500 - \$12,000
  - Prostheses pricing list
  - Fierce competition
  - Hips and knees cost \$3Billion per year



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Best choice <65 years

- Prosthesis with good outcomes
- Non-cemented cup
- XLPE or ceramic liner
- Non-cemented femoral stem
- Ceramic head 36mm or greater



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

# Best choice >65 years

- Prosthesis with good outcomes
- Non-cemented cup
- XLPE liner
- Cemented femoral stem
- Ceramic head 36mm



# Special cases

- Steep acetabulum
- Abnormal neck
- Narrow femoral canal
- Small size
- Abnormal bone
- Previous surgery or trauma



# THR

- Perhaps the best operation of all
- Relieves pain and restores function
- Careful selection improves results
  - Consistency
  - Good prosthesis
  - Appropriate for age



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**

Thank you



**ORTHOSPORTS**

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

**Dr Andreas Loeffler**  
**Joint Replacement & Spine Surgery**