✚ Evidence in focus

POLAR3◊ clinical evidence summary

POLAR3

Total Hip Solution

July 2025

Smith+Nephew

Product summary: POLAR3◊

5 studies reporting on POLAR3

Access the POLAR3 clinical evidence summary by clicking or scanning the QR code:

POLAR3 delivers excellent short- to mid-term survivorship

One of the highest survivorship rates of any cementless hip combination[1]

NJR (annual report)[1]
98.1%
POLARSTEM◊/R3◊

Compared to the NICE benchmark (5%), the revision rate of 1.9% equates to a 62% lower risk of revision at 10 years[1,2]

0 years | 6 years | 10 years | 12 years

Alva A, et al*[3]
99.5% (stem)
99.8% (cup)
POLAR3

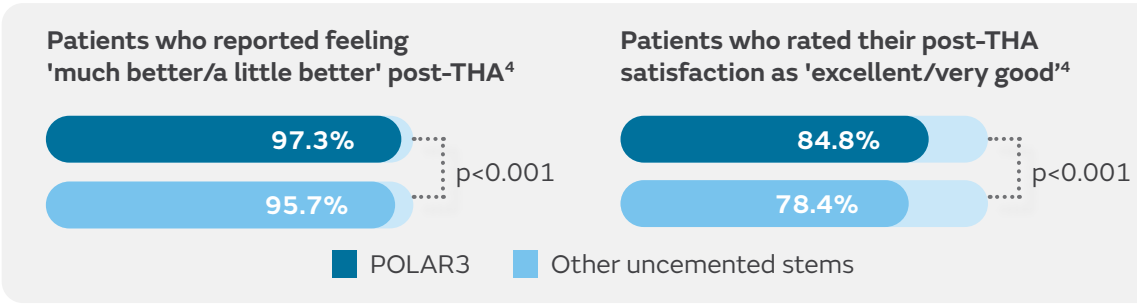
NJR (implant summary report)[4]
97.8%
POLAR3

POLAR3 is associated with strong clinical, functional and radiological outcomes

- Lower revision risk due to aseptic loosening of either stem or cup[4]
- Low postoperative complication rate when used in bikini incision DAA THA[3]
- Strong medium-term functional and radiographic outcomes in younger patients[5]

POLAR3 results in excellent PROMs and better than class average patient satisfaction

POLAR3 results in significantly improved average 6-month OHS, EQ-5D and EQ-VAS scores compared with other uncemented stems (p<0.001),[4] and improvements from pre- to post-operative HHS[3]



*This study included 865 cases of bikini incision DAA THA using POLARSTEM/CPCS◊ stem with R3 and OXINIUM◊.

Abbreviations: CPCS = collarless polished cemented stem; DAA = direct anterior approach; EQ-5D = EuroQol-5 Dimensions; EQ-VAS = EuroQol Visual Analogue Scale; HHS = Harris Hip Score; NICE = National Institute for Health and Care Excellence; NJR = National Joint Registry; OHS = Oxford Hip Score; PROMs = patient reported outcome measures; THA = total hip arthroplasty.

Product summary: **POLARSTEM**◊

9 studies reporting on POLARSTEM

Access the POLARSTEM clinical evidence summary by clicking or scanning the QR code:

POLARSTEM delivers excellent short- to mid-term survivorship

Willburger RE, et al[6]
99.6%
POLARSTEM

Assaf A, et al[7]
97.69%
POLARSTEM/R3◊

Cypres A, et al[8]
99.1%
POLARSTEM/ POLARCUP◊

0 years // 5 years | 7 years | 10 years | 14 years

NJR (annual report)[1]
98.1%
POLARSTEM/R3

NJR (implant summary report)[9]
97.1%
POLARSTEM

ODEP 10A*
POLARSTEM
Uncemented Stem[10]

29% lower cumulative 14-year revision rate compared with all other uncemented stems[9]

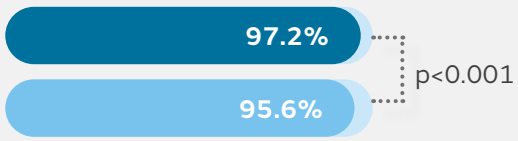
POLARSTEM demonstrates excellent clinical outcomes

- Low rates of intraoperative complications[6,8,11]
- Strong radiographic outcomes[8]
- Low blood transfusion rates[11]

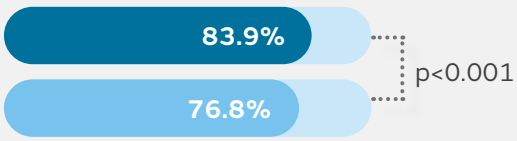
POLARSTEM results in improved PROMs and patient satisfaction

POLARSTEM results in significantly improved average 6-month OHS, EQ-5D and EQ-VAS scores compared with other uncemented stems (p<0.001),[9] and improvements from pre- to post-operative HHS and WOMAC scores[6,8]

Patients who reported feeling 'much better/a little better' post-THA[9]



Patients who rated their post-THA satisfaction as 'excellent/very good'[9]



POLARSTEM | Other uncemented stems

*A pre-entry benchmark introduced for implants being introduced through beyond compliance.

Abbreviations: EQ-5D = EuroQol-5 Dimensions; EQ-VAS = EuroQol Visual Analogue Scale; HHS = Harris Hip Score; NJR = National Joint Registry; OHS = Oxford Hip Score; PROMs = patient reported outcome measures; THA = total hip arthroplasty; WOMAC = Western Ontario and McMaster Universities Osteoarthritis Index.

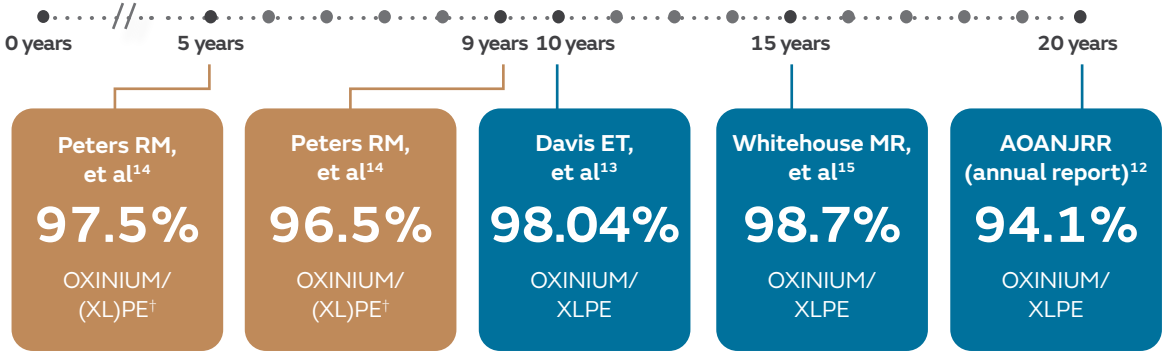
Product summary: OXINIUM®/XLPE

6 studies reporting on OXINIUM/XPLE

Access the OXINIUM clinical evidence summary by clicking or scanning the QR code:

OXINIUM/XLPE demonstrates superior mid- to long-term survivorship compared with other bearing combinations

Highest survivorship of all bearing combinations analysed across multiple registries (AOANJRR, NJR, LROI)*[12–15]



OXINIUM/XLPE results in superior clinical and health economic outcomes compared with non-OXINIUM bearings

- Lower mean hospital LoS[16,17]
- Lower 30–day readmission rate[16,17]
- Greater number of patients discharged to home health care[16,17]
- Lower likelihood of blood transfusion[16]

OXINIUM/XLPE is associated with:

- A **38%** lower revision risk from 1 year compared with Metal/XLPE[12]
- A **19%** lower revision risk compared with Metal/PE[14]
- A **60%** lower risk of revision relative to the NICE benchmark at 10 years[2,13]

OXINIUM/XLPE is associated with a significant **$602** reduction in 90–day episode of care costs when compared with non-OXINIUM bearings (p=0.003)[17]

*Period of registry analysis for AOANJRR: 1999–2022; NJR: 2004–2016; LROI: 2007–2016. †OXINIUM/(XL)PE includes grouped data for OXINIUM bearings on XLPE or PE.

Abbreviations: AOANJRR = Australian Orthopaedic Association National Joint Replacement Registry; Metal/PE = metal on polyethylene; Metal/XLPE = metal on crosslinked polyethylene; NICE = National Institute for Health and Care Excellence; NJR = National Joint Registry; OXINIUM/XLPE = ceramicised metal on XLPE; LROI = Landelijke Registratie Orthopedische Implantaten (Dutch Arthroplasty Register).

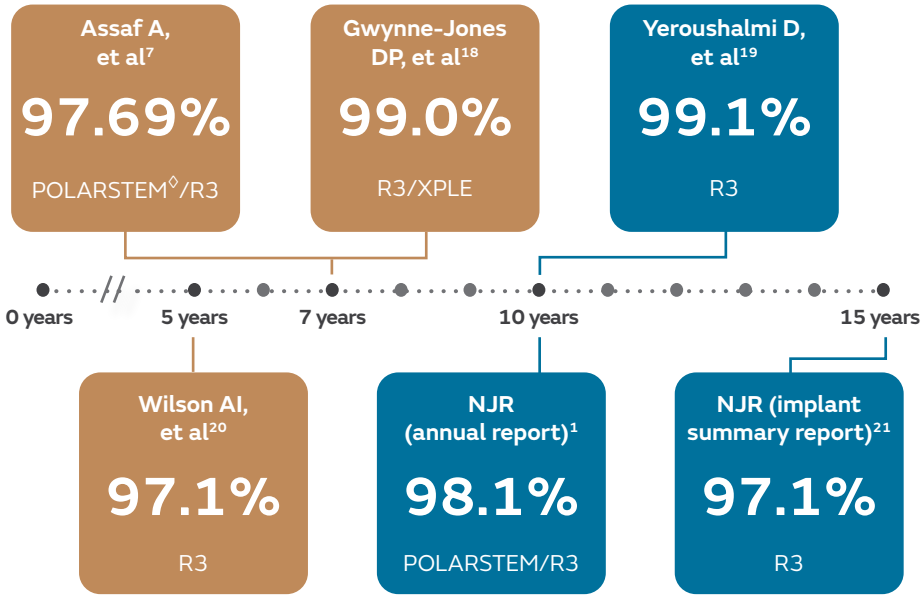
Smith+Nephew

Product summary: R3◊

8 studies reporting on R3

Access the R3 clinical evidence summary by clicking or scanning the QR code:

R3 delivers excellent short- to mid-term survivorship



ODEP 15A*
R3 HA Cementless Cup

ODEP 10A
R3 non-HA Cementless Cup

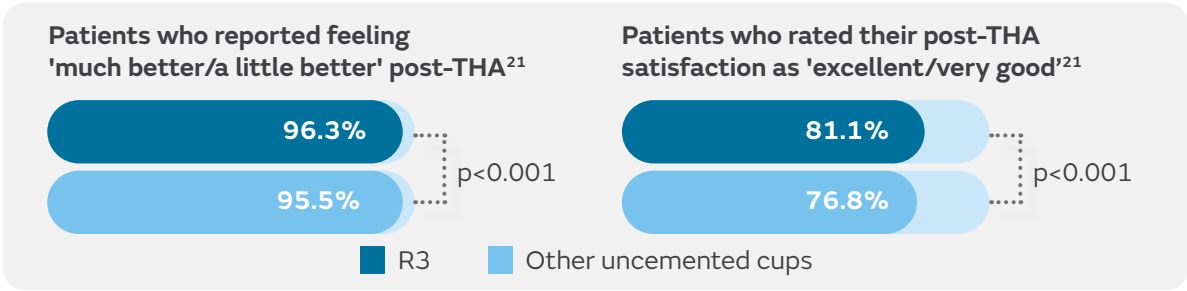
40% lower cumulative 15-year revision rate compared with all other uncemented cups[21]

R3 demonstrates excellent clinical outcomes

- Low rates of intraoperative complications[11]
- Low rate of postoperative complications[19]
- Strong radiographic outcomes[22]
- Low liner dissociation rate when compared with Pinnacle[18]

R3 results in improved PROMs and patient satisfaction

R3 results in significantly improved average 6-month OHS, EQ-5D and EQ-VAS scores compared with other uncemented cups (p<0.001),[21] and improvements from pre- to postoperative HHS and WOMAC scores[5,20]



Abbreviations: EQ-5D = EuroQol-5 Dimensions; EQ-VAS = EuroQol Visual Analogue Scale; HHS = Harris Hip Score; NJR = National Joint Registry; n.s. = not significant; OHS = Oxford Hip Score; PROMs = patient reported outcome measures; THA = total hip arthroplasty; WOMAC = Western Ontario and McMaster Universities Osteoarthritis Index.

✚ Evidence in focus

Arthroplasty registry analysis (2024)

Smith+Nephew

POLAR3◊ Total Hip Solution delivers high survivorship at 12 years, greater than class average patient satisfaction and improvements in patient-reported outcome measures (PROMs)[4]

Overview

- Bespoke implant report produced by the UK National Joint Registry (NJR) summarising usage and outcomes associated with POLAR3, which is the combination of POLARSTEM◊ Hip Reconstruction System, OXINIUM◊ Technology femoral head, highly cross-linked polyethylene (XLPE) bearing and R3◊ cup
- The analysis is based on data collected by the NJR and on PROMs data collected by NHS Digital*
- Reported POLAR3 usage between July 2007 – October 2024 for:
  - 32,859 total hip arthroplasties (THA)
  - 29,510 total patients
  - 579 implanting surgeons at 111 centres

Considerations

*The data used for this analysis was obtained from the NJR Supplier Feedback System. The Healthcare Quality Improvement Partnership (HQIP) and/or the NJR take no responsibility for the accuracy, currency, reliability and correctness of any data used or referred to in this report, nor for the accuracy, currency, reliability and correctness of links or references to other information sources and disclaims all warranties in relation to such data, links and references to the maximum extent permitted by legislation.

Results

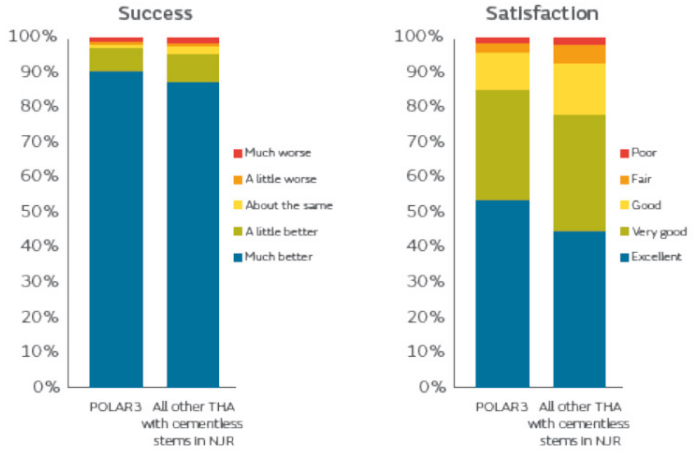
12 years — **97.7%** survivorship with POLAR3

37% ↓ Lower revision risk with POLAR3 compared to class average for all other THA with cementless stems at 12 years

ODEP[2]
10A* POLARSTEM Cementless Stem
15A* R3 HA Cementless Cup
10A R3 non-HA Cementless Cup

Patients who received POLAR3...

Were **significantly more likely to be satisfied** with their THA and to consider their procedure a success (Chi-squared; p<0.001), after 6 months, compared to those who received all other THA with cementless stems



Achieved **significantly better average 6-month PROM scores** compared to patients who received all other THA with cementless stems (p<0.001)

PROMs	POLAR3	Class average‖	p value
Oxford Hip Score	23.1 (22.9–23.3)	21.7 (21.7–21.8)	p<0.001
EQ-5D	0.473 (0.467–0.479)	0.444 (0.443–0.445)	
EQ-VAS	14.8 (14.4–15.2)	12.5 (12.4–12.6)	

‖All other THA with cementless stems.

Adjusted health gain scores (95% confidence interval) at 6 months after THA. Adjusted scores correspond to the NHS Digital version 3 case-mix-adjustment model. Using case-mix adjusted scores allows for a more accurate comparison between groups by taking into account variations in patient characteristics.

Conclusions

POLAR3 delivers 12-year survivorship of 97.7% and also delivers significantly higher patient satisfaction, success outcomes and improvements in PROMs compared to the class average for cementless stems in all other THA patients.

Abbreviations: EQ-5D = EuroQol-5 Dimensions; EQ-VAS = EuroQol Visual Analogue Scale; HQIP = Healthcare Quality Improvement Partnership; NJR = national joint registry; ODEP = Orthopaedic Data Evaluation Panel; PROMs = patient reported outcome measures; XLPE = crosslinked polyethylene.

✚ Evidence in focus

Arthroplasty registry analysis (2024)

Smith+Nephew

Comparison of survivorship of cementless constructs in primary THA[1]

Available at: NJR 21st Annual Report Hips 2024

Overview

- The NJR reported on primary THA The UK National Joint Registry (NJR) reported on primary THA between 1 April 2003 and 31 December 2023, with a follow-up at maximum of 20 years
- Cementless THA accounted for 37% of all primary THA (n=1,561,640)
- Top five most implanted cementless THA prostheses were included in this analysis

Acknowledgments

We thank the patients and staff of all the hospitals in England, Wales and Northern Ireland who have contributed data to the National Joint Registry. We are grateful to the Healthcare Quality Improvement Partnership (HQIP), the NJR Steering Committee and staff at the NJR Centre for facilitating this work. The views expressed represent those of the authors and do not necessarily reflect those of the National Joint Registry Steering Committee or the HQIP who do not vouch for how the information is presented. is presented.

Results

10 years 98.11% survivorship with POLARSTEM®/R3®

55% Lower revision risk with POLARSTEM/R3 compared to class average for cementless hip combinations at 10 years[4]

ODEP[10]
10A* POLARSTEM Cementless Stem
15A* R3 HA Cementless Cup
10A R3 non-HA Cementless Cup

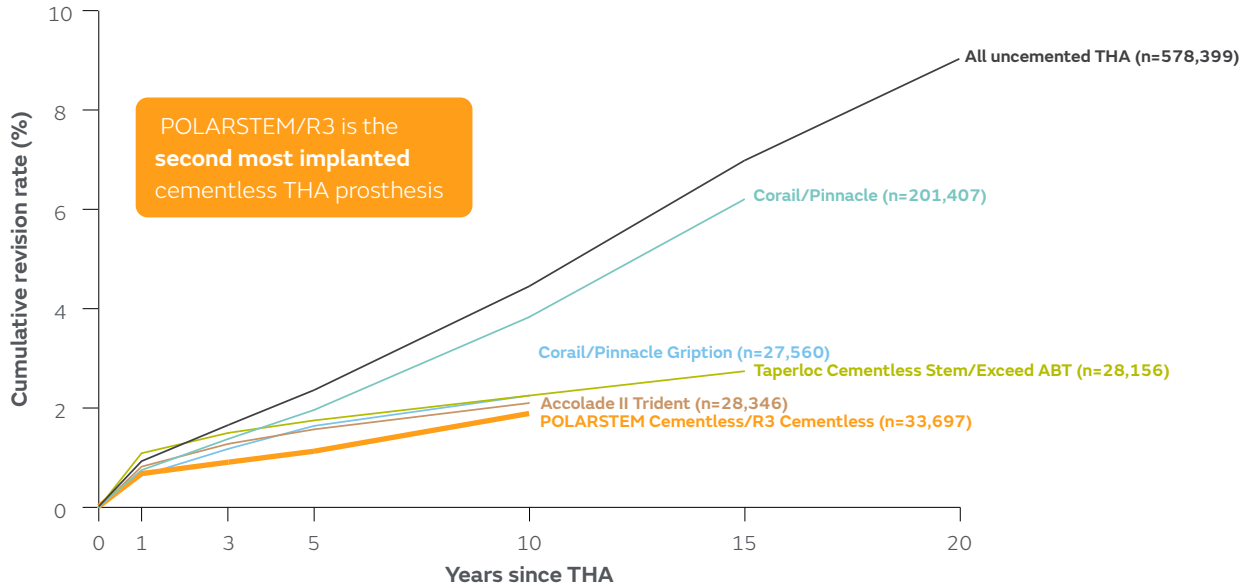


Figure. Cumulative revision of top five most implanted cementless THA prostheses

Conclusions

POLARSTEM with R3 was associated with a 1.89% revision rate at 10 years. This revision rate corresponds to a 55% lower revision risk compared with the class average revision rate for cementless constructs in the NJR.

Abbreviations: HQIP = Healthcare Quality Improvement Partnership; NJR = national joint registry; ODEP = Orthopaedic Data Evaluation Panel; THA = total hip arthroplasty.

✚ Evidence in focus

Arthroplasty registry analysis (2024)

Smith+Nephew

Comparison of survivorship of OXINIUM◊/XLPE with other bearing combinations in primary total hip arthroplasty[12]

Available at: AOANJRR Annual Report, 2024

Overview

- The AOANJRR reported on 10 bearing surfaces, 8 of which have been used in >5,000 procedures
- Bearing surfaces include three types of femoral head (metal, ceramic, and ceramicised metal [OXINIUM]) and four types of acetabular articular surface (XLPE, non XLPE, ceramic, and metal)

Considerations

Comparing the rates of revision for these bearings, Ceramicised Metal/XLPE* has the lowest rate of revision at 15 years. As in previous years, the Registry urges caution in the interpretation of this result. This bearing is a single company product, used with a small number of femoral stem and acetabular component combinations. This may have a confounding effect on the outcome, making it unclear if the lower rate of revision is an effect of the bearing surface or reflects the limited combinations of femoral and acetabular prostheses. Tables and graphs have been reproduced in exact and complete form.

Results

20 years 94.1% survivorship

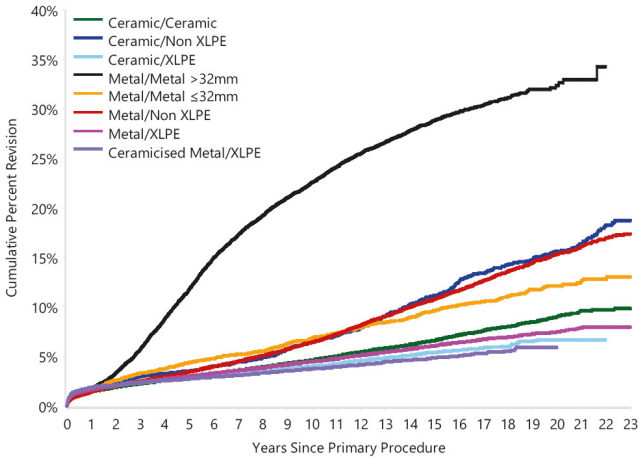


Figure HT34 Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Bearing Surface (Primary Diagnosis OA)

Number at Risk	0 Yr	1 Yr	3 Yrs	5 Yrs	10 Yrs	15 Yrs	20 Yrs
Ceramic/Ceramic	110883	105160	94772	83649	48132	17459	4241
Ceramic/Non XLPE	10753	9718	8080	6612	3712	2216	1003
Ceramic/XLPE	166184	140708	101851	69562	19319	4434	576
Metal/Metal >32mm	14424	14063	13212	11973	9295	5479	267
Metal/Metal ≤32mm	5143	5022	4841	4653	3980	2879	1071
Metal/Non XLPE	36113	34632	32153	29458	21118	12175	4263
Metal/XLPE	207814	190898	162953	134374	63972	19115	2755
Ceramicised Metal/XLPE	37758	33779	26857	20952	9518	2778	143

Note: Only bearing surfaces with >5,000 procedures have been listed

HR - adjusted for age and gender

Ceramic/Ceramic vs Metal/XLPE	Entire Period: HR=0.98 (0.95, 1.02), p=0.387
Ceramic/Non XLPE vs Metal/XLPE	0 – 2Yr: HR=1.16 (1.02, 1.32), p=0.026 2Yr – 3.5Yr: HR=1.42 (1.11, 1.83), p<0.005 3.5Yr – 5Yr: HR=0.90 (0.63, 1.29), p<0.567 5Yr – 8Yr: HR=01.49 (1.19, 1.86), p<0.001 8Yr+: HR=2.65 (2.36, 2.97), p<0.001
Ceramic/XLPE vs Metal/XLPE	0 – 2Yr: HR=1.01 (0.97, 1.06), p=0.617 2Yr+: HR=0.76 (0.72, 0.81), p<0.001
Metal/Metal >32mm vs Metal/XLPE	0 – 2Wk: HR=1.28 (0.96, 1.69), p=0.087 2Wk – 1Mth: HR=0.45 (0.31, 0.66), p<0.001 1Mth – 9Mth: HR=0.95 (0.79, 1.15), p=0.604 9Mth – 1.5Yr: HR=2.82 (2.38, 3.33), p<0.001 1.5Yr – 2Yr: HR=4.40 (3.66, 5.29), p<0.001 2Yr – 3Yr: HR=6.46 (5.73, 7.28), p<0.001 3Yr – 8Yr: HR=9.49 (8.95, 10.05), p<0.001 8Yr – 10Yr: HR=5.99 (5.35, 6.71), p<0.001 10Yr – 12Yr: HR=4.96 (4.39, 5.61), p<0.001 12Yr+: HR=3.36 (3.02, 3.74), p<0.001
Metal/Metal ≤32mm vs Metal/XLPE	Entire Period: HR=1.44 (1.32, 1.58), p<0.001
Metal/Non XLPE vs Metal/XLPE	0 – 1Mth: HR=0.73 (0.62, 0.85), p<0.001 1Mth – 6Mth: HR=0.90 (0.78, 1.04), p=0.145 6Mth – 3.5Yr: HR=1.42 (1.30, 1.54), p<0.001 3.5Yr – 5Yr: HR=1.57 (1.37, 1.81), p<0.001 5Yr – 7Yr: HR=1.74 (1.54, 1.96), p<0.001 7Yr – 10Yr: HR=2.15 (1.95, 2.38), p<0.001 10Yr+: HR=2.60 (2.42, 2.79), p<0.001
Ceramicised Metal/XLPE vs Metal/XLPE	0 – 6Mth: HR=1.17 (1.07, 1.28), p<0.001 6Mth – 1Yr: HR=1.03 (0.84, 1.25), p=0.789 1Yr: HR=0.62 (0.57, 0.68), p<0.001

38% ↓ From 1 year, OXINIUM/XLPE demonstrates significantly lower risk of revision compared to Metal/XLPE (p<0.001)

Conclusions

OXINIUM/XLPE has the highest survivorship of all bearing combinations up to 20 years.

*The term 'Ceramicised Metal/XLPE' is equivalent to 'OXINIUM/XLPE', and the term 'Non XLPE' is equivalent to 'CPE'.

Abbreviations: AOANJRR = Australian Orthopaedic Association National Joint Replacement Registry; CPE = conventional polyethylene; Metal/XLPE = metal on crosslinked polyethylene; XLPE = crosslinked polyethylene.

✚ Evidence in focus

Download your copy of the POLAR3◊ clinical evidence summary by clicking or scanning the QR code:

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Smith & Nephew Orthopaedics AG, Baar, Switzerland is the legal manufacturer for POLARSTEM◊

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