OXINIUM Technology in Hips

THE MOMENT OF CHANGE

Smith+Nephew

OXINIUM®
Oxidized Zirconium

Changing times, changing needs

It's time to change everything

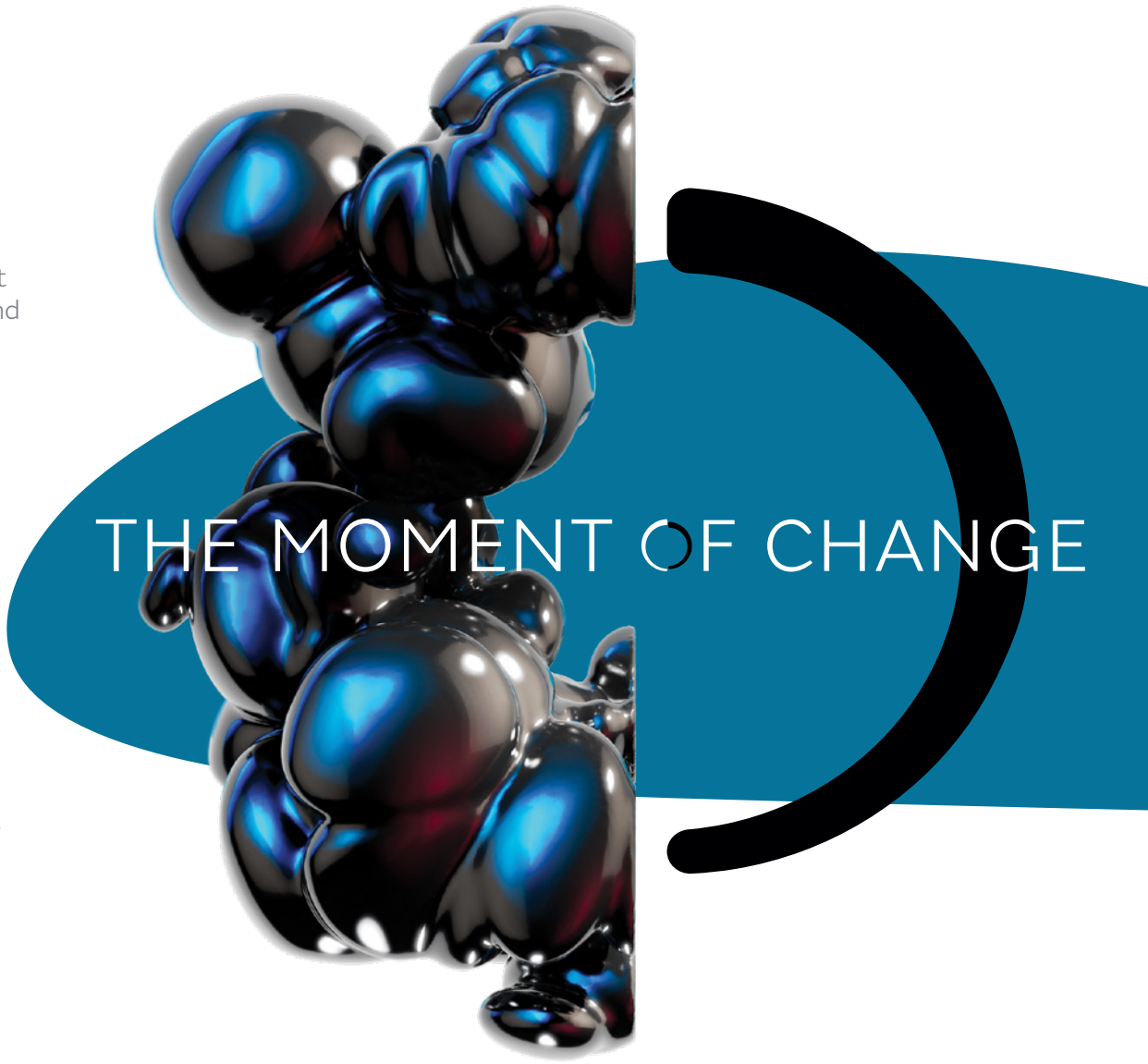
As the number of cases and the age of patients broadens,[1-3] orthopaedic applications demand a high performance implant material that can deliver proven clinical performance in hip and knee arthroplasty.[4-8]

But what does real change look like?

At Smith+Nephew, we know you want the best possible clinical outcomes for your hip replacement patients. In order to do that, you need to have confidence that the implant material you use provides both **performance and value.**

The problem is there are a range of implant materials available that may create uncertainty regarding which is the most suitable to meet the expectations of your patients.

We understand that corrosion, strength, wear and metal composition can all impact implant survivorship and quality of life for the patient.[9,10] You need an implant material that can address these concerns through material science.[4-8,11-19]



OXINIUM◊ Technology
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Exclusive to Smith+Nephew, OXINIUM◊ Technology is an award-winning,[18] advanced implant material available for hip and knee arthroplasty.

With more than 20 years of clinical experience across 120 countries, OXINIUM Technology brings **unrivalled material properties** to a portfolio which contains **best-in-class implant designs.**[11,14,15,19,20]

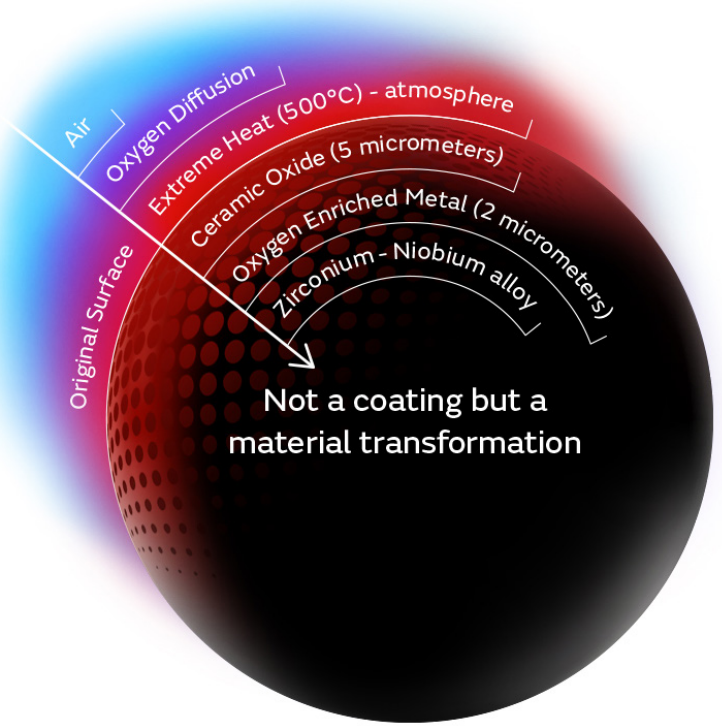
OXINIUM Technology has shown **strong clinical and health economic outcomes,** delivering value for patients, payers and providers.[4,8,21,22]

Minimize wear, corrosion and nickel/cobalt/chromium with OXINIUM Technology[14,16,17,24]

What is OXINIUM◊ Oxidized Zirconium?

- An OXINIUM implant is composed of an award-winning[18] oxidized zirconium (OxZr) alloy. The original metal is transformed through heating in air at over 500°C to create a 5 µm thick ceramicised oxide.[11]
- The unique manufacturing process means that, in contrast to other materials used in TJA, the ceramicised metal is not an externally applied coating. The result is a truly uniform surface transformation that provides the implant with the durability of metal, the wear of a ceramic bearing, and fretting/corrosion resistance that is better than both.[11-13]
- Combined with Smith+Nephew's implant designs, OXINIUM Technology provides unique material properties to support excellent clinical and economic outcomes for patients.[4-7,22,23]

Oxidation process



Dig deeper into the value that OXINIUM can provide

- Unrivalled material science[11-14,16,17,19]
- Established economic benefits[22,23]
- Proven clinical performance[4-7]
- Ideal for revisions[24]

Unrivalled material science

45 million is the number of simulated wear cycles tested in hip simulators without any measurable loss in oxide thickness – 9 times the industry standard.*[14]

0 recorded instances of brittle fracture in total joint arthroplasty[25]

2x the surface hardness of Cobalt Chrome[12]

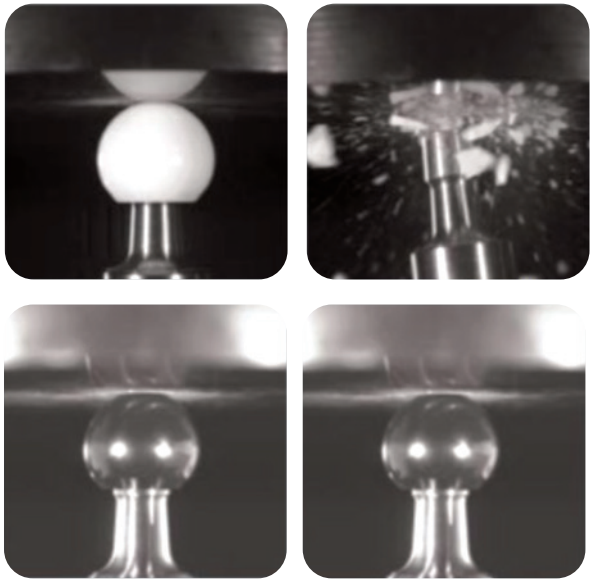
4900x more abrasion resistant than cobalt chrome after 10M cycles of pin-on-disc lab testing using bone cement[26]

< lower observed mechanically assisted crevice corrosion than both cobalt chrome and zirconia-toughened alumina ceramic[16,17]

Virtually zero levels of nickel, cobalt and chrome,[24,27] common metal sensitizers detected in 10-15% of the population[33]

OXINIUM◊ may also have a reduced impact on the inflammatory response as demonstrated by lower pro-inflammatory cytokine expression in cells exposed to OXINIUM versus CoCrMo and Ti alloy†[19]

Before loading | After loading



Top-load comparison of monolithic alumina ceramic (top) and OXINIUM femoral head (bottom).[28]

Unrivalled material science addresses your concerns regarding wear, strength and and virtually undetectable nickel, cobalt and chrome - **Why wouldn't you have OXINIUM?**

*The results of *in vitro* wear simulation testing have not been proven to quantitatively predict clinical wear performance.
†The results of *in vitro* cytokine expression analyses have not been proven to quantitatively predict clinical cytokine expression.

Proven clinical performance

Understanding OXINIUM◊ Technology reinforces what it can do in addressing clinical considerations and outcomes

>1.5M is the number of OXINIUM Hip procedures since 1995

4 the number of national joint registries showing OXINIUM as contributing to the lowest risk of revision in Total Hip Arthroplasty (POLAR3◊)[4-7]

>60% the impact on survivorship that bearing choice can have versus the class average based upon data from the National Joint Registry of England, Wales, Northern Ireland and the Isle of Man (1.96% vs 4.79% class average revision risk at 10 years)[4]

12% the difference in 10 year survivorship between OXINIUM and the next best bearing surface (Ceramic-on-XLPE) in National Joint Registry of England, Wales, Northern Ireland and the Isle of Man[4]

3 the number of Patient Reported Outcomes Measures (PROMs) that demonstrated significant improvement for POLAR3+OXINIUM+XLPE over ceramic-on-polyethylene, ceramic-on-ceramic and metal-on-polyethylene (Oxford hip score, EQ-5D, EQ-VAS)‡[29-31]

OXINIUM Technology delivers proven clinical performance in patients across a range of age and activity expectations emphasizing the importance of having **OXINIUM.**

Established economic benefit

Length of stay (LOS)

OXINIUM® cases had significantly lower LOS in Anchor STACH (p<0.001), SNF (p=0.014) and IRF (p=0.031) vs non-OXINIUM cases[22]

Significantly shorter LOS versus ceramic-on-polyethylene cases(p<0.0001)[23]

Shorter LOS for hip fracture patients treated with OXINIUM THA[32]

Discharge to home

Significantly more OXINIUM patients discharged to home health care (p=0.025)[22]

36% more likely to be discharged to home/home health care versus ceramic-on-polyethylene patients (p=0.0112)[23]

Discharge to SNF

Skilled nursing facilities are less likely to be used in OXINIUM primary THA cases (p=ns)[23]

22.4% lower discharge to SNFs in hip fracture cases using OXINIUM THA[32]

Readmission

8.6% lower rate of 30-day all-cause readmission versus non-OXINIUM cases (p=ns)[22]

5.5% lower all-cause readmission versus non-OXINIUM cases (p=ns)[22]

44% less likely to be readmitted within 30 days versus CoP patients (p=0.0041)[23]

In hip fracture cases, the use of OXINIUM THA resulted in a 51% lower 30-day readmission and a 44% lower 90-day readmission versus non-OXINIUM THA[32]

$393

The average post-acute 90-day episode cost savings comparing OXINIUM to non-OXINIUM total hip arthroplasty across 610 hospitals using US CMS/Medicare data, a significant saving including the cost of implant (p=0.005),[22] helping optimize costs in bundled payment systems

OXINIUM powered implant designs allows the patient to potentially get home faster, return to life with a lower chance of complications and save money across the episode of care – **Can you afford to not have OXINIUM?**

Ideal for revisions

60% The proportion of patients with poorly performing joint replacements who show reaction to nickel, cobalt and/or chromium[33]

Virtually zero levels of nickel, cobalt and chromium[24,27] within OXINIUM Oxidized Zirconium

1 The number of dual mobility implant systems that can avoid the use of cobalt chrome across the femoral head and acetabular liner – OR3O

OR3O is not approved for use in all markets. Please contact your local representative for further information.

OXINIUM◊ Technology is a key component of the hip revision portfolio:

REDAPT◊
The REDAPT system was designed to provide stability, adaptability and reproducibility in order to reduce the risk of future revision – OXINIUM provides additional confidence based upon material and clinical benefits

OR3O◊
The only fully advanced bearing dual mobility implant available in the market, powered by OXINIUM DH Technology

The same unrivalled material science that makes OXINIUM Technology great for primary procedures can provide benefit to revisions as well – **Why wouldn't you have OXINIUM?**

‡ *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 Smith+Nephew and do not necessarily reflect those of the National Joint Registry Steering Committee or the Health Quality Improvement Partnership (HQIP) who do not vouch for how the information is presented.*

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