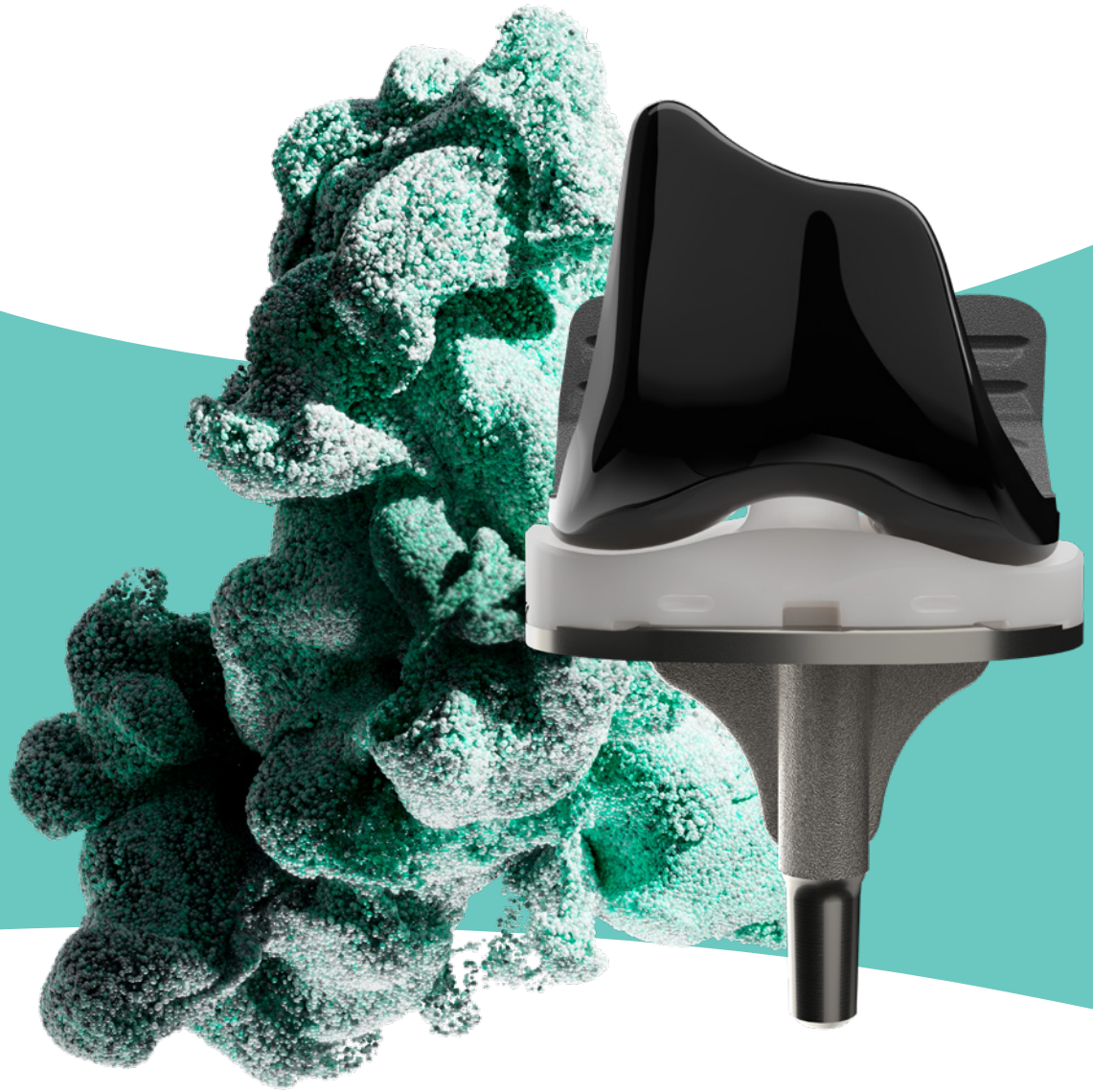
OXINIUM Technology in Knees

THE MOMENT OF CHANGE

Smith+Nephew

OXINIUM®
Oxidized Zirconium



Changing times, changing needs

It's time to change everything

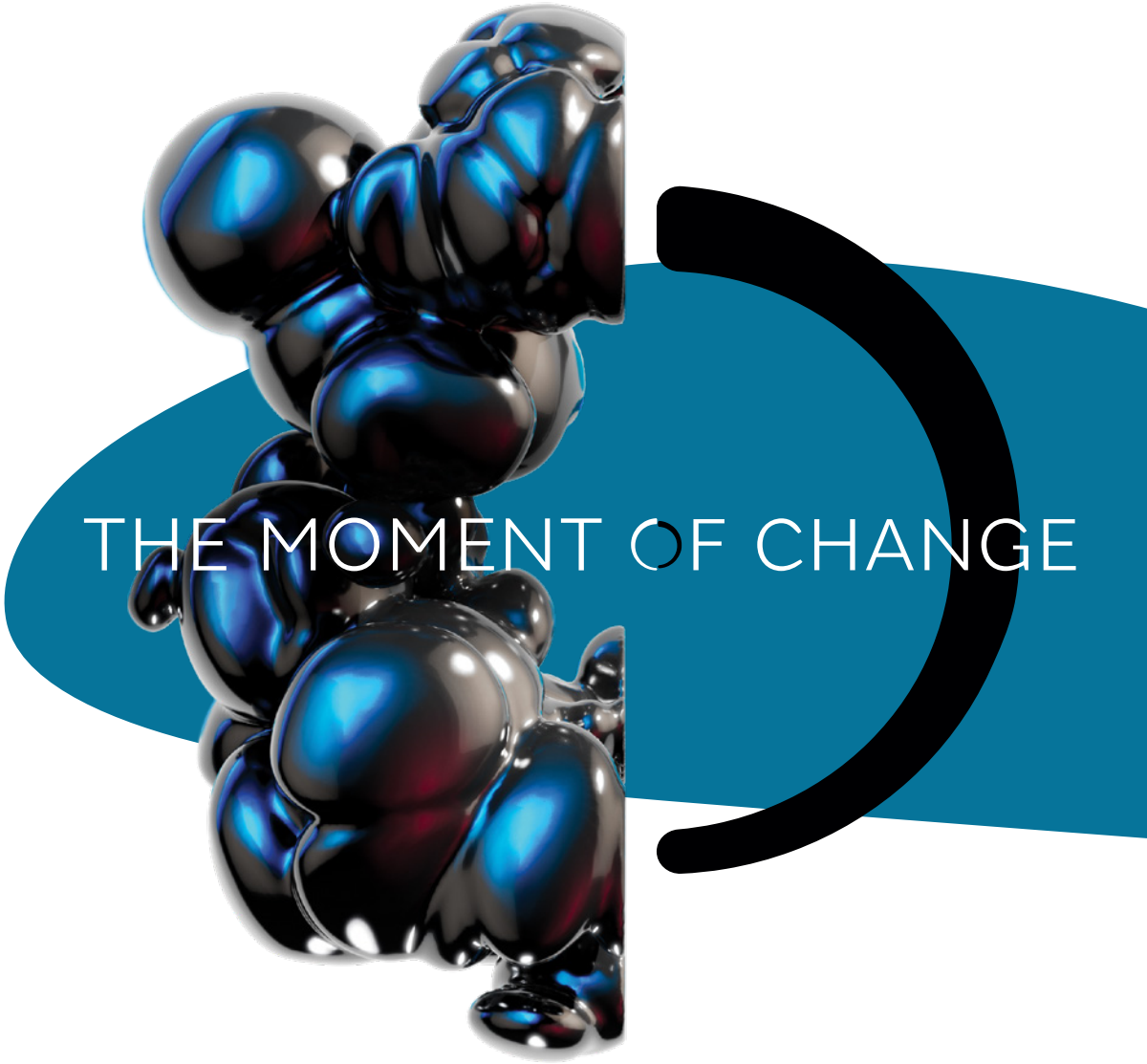
As the number of cases and the age of patients broadens,[1-3] orthopaedic applications demand a high performance implant material that can deliver proven clinical performance in hip and knee arthroplasty.[4-8]

But what does real change look like?

At Smith+Nephew, we know you want the best possible clinical outcomes for your knee 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

THE MOMENT OF CHANGE

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]

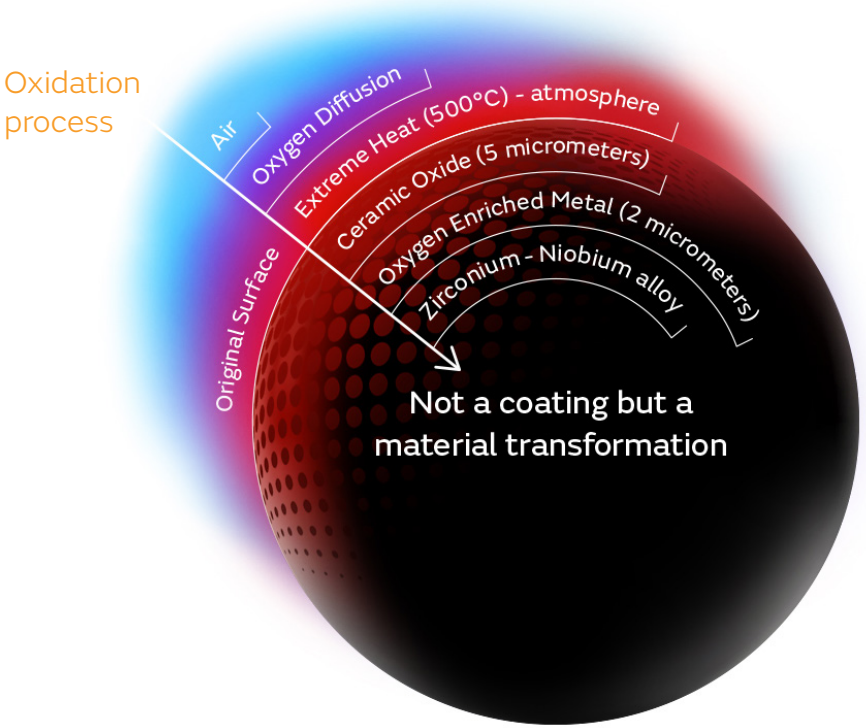
OXINIUM Technology has shown **strong clinical and health economic outcomes,** delivering value for patients, payers and providers.[4,8,21,22]

Minimize wear, corrosion and nickel/cobalt/chromium with OXINIUM Technology[15,20,26]

Does your knee implant have OXINIUM?

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.[21,23,24]



Dig deeper into the value that OXINIUM can provide

- Unrivalled material science[11-15,19]
- Established economic benefits[21,25]
- Proven clinical performance[8,24]
- Ideal for revisions[26,27,33]

Unrivalled material science

45 million is the number of simulated wear cycles tested in knee simulators without any measurable loss in oxide thickness – 9 times the industry standard which is estimated to be 30 years of use*[15]

2x the surface hardness of cobalt chrome, contributing to wear performance[12]

4900x more abrasion resistant than cobalt chrome after 10M cycles of pin-on-disc lab testing using bone cement[28]

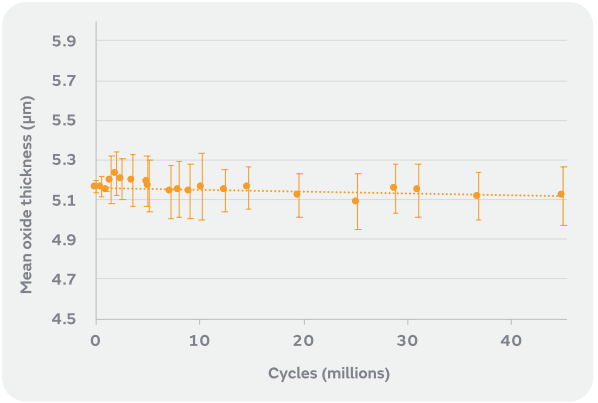
160x smoother than a cobalt chrome surface following 10M cycles of pin-on-disc testing[28]

Virtually zero levels of nickel, cobalt and chrome,[26,29] common metal sensitizers detected in 10-15% of the population[34]

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]

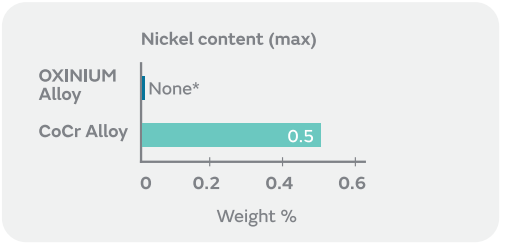
Unrivalled material science addresses your concerns regarding wear, strength and virtually undetectable nickel, cobalt and chrome – **Why wouldn't you have OXINIUM?**

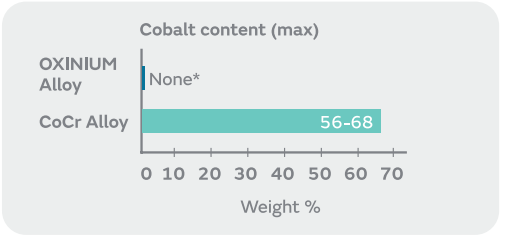
*The LEGION◊ Primary CR Knee System completed 45 million cycles of in vitro simulated wear testing, which is an estimate of 30 years of activity. Other LEGION VERILAST Primary Knee Systems underwent similar lab testing comparable to industry standards. The results of in vitro wear simulation testing have not been proven to quantitatively predict clinical wear performance. Also, a reduction in total polyethylene wear volume or wear rate alone may not result in improved clinical outcomes as wear particle size and morphology are also critical factors in the evaluation of the potential for wear mediated osteolysis and associated aseptic implant loosening. Particle size and morphology were not evaluated as part of the testing.
†The results of in vitro cytokine expression analyses have not been proven to quantitatively predict clinical cytokine expression.

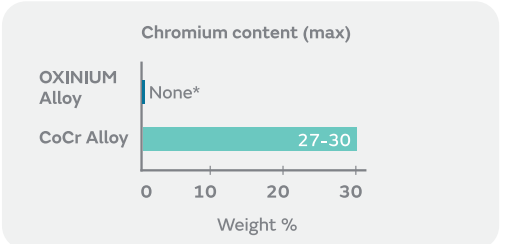


Mean (+/- Std. Dev.) oxide thickness of the OXINIUM femoral components during laboratory wear testing[15]

Comparison of metal content between OXINIUM◊ alloys and CoCr alloys[26,29]







*All metal implants contain residual levels of metal elements. May contain<0.01% wt.

Proven clinical performance

Multiple studies demonstrate excellent 10 year survivorship

- **95.4%** (n=44) in patients <50 years old[§30]
- **97.1%** (100% survivorship for aseptic loosening; n=303)[¶31]
- **97.8%** (revision aseptic loosening; n=98)[¶8]

A*/A Independent assessment by the Orthopaedic Data Evaluation Panel (ODEP) shows that OXINIUM[◊] knee implants perform at or above top levels of survivorship up to 15 years post-implantation.[32]

2X Lower In one analysis of registry data, the use of OXINIUM Technology resulted in a revision rate that was two times lower than cobalt chrome in patients younger than 65 years old,[23] typically a challenging population for implant survivorship.[7]

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

Knee ODEP ratings[32]

5A* **JOURNEY[◊] II BCS**
OXINIUM
JOURNEY II BCS
OXINIUM with JOURNEY tibia, JOURNEY II XLPE Insert and JOURNEY Resurfacing Patella.

5A* **JOURNEY UNI Knee System**
OXINIUM
JOURNEY UNI tibia, JOURNEY UNI Insert and no patella.

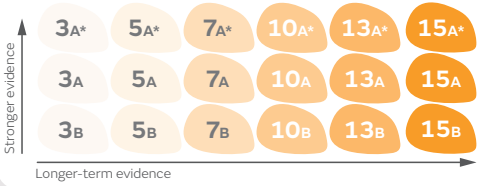
7A* **LEGION[◊] Total Knee System**
CR OXINIUM
with GENESIS II Baseplate, GENESIS II PS PE High Flex Insert & GENESIS II Round and Oval Resurfacing Patella

7A* **LEGION Total Knee System**
PS OXINIUM
GENESIS II PS High Flex PE Insert and GENESIS II Round and oval patella.

13A* **GENESIS[◊] II Total Knee System**
CR OXINIUM
Dished PE Insert and Biconvex Patella

15A **GENESIS II Total Knee System**
PS OXINIUM
with GENESIS II Baseplate, GENESIS II PS PE High Flex Insert & GENESIS II Round and Oval Resurfacing Patella

Orthopaedic Data Evaluation Panel (ODEP) Rating Chart



§ using OXINIUM PROFIX implants, ¶ using OXINIUM GENESIS II implants

Established economic benefit

Length of stay

JOURNEY® II BCS implants with OXINIUM® significantly reduced hospital stays versus other total knee systems (p<0.0001)[21]

Discharge to home

JOURNEY II BCS patients were 35% more likely to be discharged to home/home health care (p<0.0001)[21]

26% more likely versus Triathlon™ Knee System (p=0.003)[25]

Discharge to SNF

JOURNEY II BCS patients were 41% less likely to be discharged to a Skilled Nursing Facility versus other total knee systems (p<0.0001)[21]

28% less likely versus Triathlon™ Knee System (p=0.0003)[25]

Readmission

Patients receiving JOURNEY II BCS with OXINIUM were 51% less likely to be readmitted within 30 days compared to other TKA systems (p=0.0037)[21]

27% less likely to be readmitted within 1-year compared to Triathlon™ Knee System (p=0.0264)[25]

$1,690

The average total hospital cost savings comparing JOURNEY II BCS, powered by OXINIUM, compared to all other TKA systems using US CMS/ Medicare data, a significant saving including the cost of implant (p<0.0001)[21]

OXINIUM powered implant designs, like JOURNEY II BCS, allow 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 not to have OXINIUM?**

Ideal for revisions

60% The proportion of patients with poorly performing joint replacements who show reaction to nickel, cobalt and/or chromium[34]

Virtually zero levels of nickel, cobalt and chrome[26,29] and chromium in OXINIUM Oxidized Zirconium

OXINIUM◊ Technology in knee applications has been shown to minimize metallic artifacts with magnetic resonance imaging to confirm placement during follow-up compared to cobalt chrome[33]

Lower 13-year revision rate of LEGION◊ Revision, powered by OXINIUM, versus the class average for revision TKA in the National Joint Registry for England, Wales and Northern Ireland‡[27] (11.9% vs. 12.7%)

LEGION Revision, powered by OXINIUM, demonstrates significantly fewer re-revisions due to aseptic loosening of the femur compared to the class average (p=0.01)‡[27]

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.*

The data used for this analysis was obtained from the National Joint Registry ("NJR"), part of the Healthcare Quality Improvement Partnership ("HQIP"). HQIP, the NJR and/or its contractor, Northgate Public Services (UK) Limited ("NPS") take no responsibility (except as prohibited by law) 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 including any duty of care to third party readers of the data analysis.

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