VERILAST Technology demonstrates lower wear rates than other XLPE formulations using very similar test conditions.

VERILAST Technology vs Conventional, XLPE and Anti-oxidant Technologies

Mean volumetric wear rates of CoCr against conventional polyethylene (CPE), CoCr against crosslinked polyethylene (XLPE) and OXINIUM® against XLPE as published by the respective companies with their respective implants.

6. Biomet publication, FDA Cleared Claims for E1 Antioxidant Infused Technology
7. Ref: DePuy Attune 510 K Document K101433 Dec 10, 2010
9. Ref: Smith & Nephew OR-07-176
10. Ref: Smith & Nephew OR-08-329

*ISO 14243-1 testing protocol used. Other results obtained using ISO 14243-3 protocol.

Wear Performance

From a wear perspective, all implants with conventional material technology perform about the same. XLPE material technologies significantly improve the wear, but the wear rates across implants are still essentially the same. However, VERILAST Technology addresses the entire bearing couple and has the lowest published wear rate with testing of 45 million cycles.
VERILAST™
Oxidized Zirconium with XLPE

OxINIUM™ Oxidized Zirconium is an advanced bearing material that combines the strength of metal with the wear resistance of ceramics.

OXINIUM Technology is more than twice as hard as CoCr and will better resist abrasion compared to CoCr.

OXINIUM Technology has a coefficient of friction that is up to half that of CoCr and will help reduce polyethylene wear.


Acknowledgements
Clark and Kirby Foundations, and The Trump Institute for Implant Analysis. This work made use of the Cornell Center for Materials Research Shared Facilities which are supported through the NSF MRSEC program (DMR-1120296).

Real-life Results

Bearing surfaces are typically damaged in vivo. The extent of damage is variable between patients and rougher surfaces are associated with more wear. However, as the surface of OXINIUM alloy is twice as hard as CoCr alloy, it has been shown to be more resistant to the micro-abrasion which commonly takes place in joint replacements and has been shown demonstrate better wear performance over time vs CoCr.
Performing a joint replacement is difficult enough already. This difficulty is compounded when a patient demonstrates metal hypersensitivity to the implant materials. Due to its unique combination of materials which has nearly undetectable levels of nickel or chromium, OXINIUM technology provides an excellent option for patients with metal hypersensitivity.


Biocompatibility

10% of the general population is estimated to have metal allergies. Many may not be candidates for TKA because of their metal sensitivity.

Approximately 60% of patients with a failed or failing implant exhibit metal sensitivity.

Zirconium is one of the most biocompatible elements.

The Nickel and Chromium content are nearly non-existent in OXINIUM™ alloy

Surgeons now have a solution for patients who are nickel sensitive.
VERILAST™
Oxidized Zirconium with XLPE

The leading cause of long term implant failure is wear. Improved polyethylene or alternative-bearing surfaces certainly could diminish the rate of failure after total knee arthroplasty. Improved polyethylene or alternative-bearing surfaces certainly could diminish the rate of failure after total knee arthroplasty.3 VERILAST has been tested to show wear after a 30 year lab simulation that is at least 80 percent lower than conventional materials after only three years.‡

Wear Performance

VERILAST Technology in the LEGION™ Primary Knee System demonstrates superior wear performance in 45 million cycle testing.

Comparison of the mean volumetric wear of CoCr/CPE after simulating 5 Mc of use and VERILAST after simulating 45 Mc respectively.¹

VERILAST Technology for Hips demonstrates superior wear performance in 45 million cycle testing.

Comparison of the mean volumetric wear of CoCr/CPE and CoCr/XLPE at 7.8Mc and 45Mc respectively.²

¹ Based on in-vitro wear simulation testing, the LEGION™ Primary Knee System with VERILAST™ Technology is expected to provide wear performance sufficient for 30 years of actual use under typical conditions. 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 an improved clinical outcome 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.


81% Reduction in Volumetric Wear

80% Reduction in Volumetric Wear

81% Reduction in Volumetric Wear

80% Reduction in Volumetric Wear

Smith & Nephew GmbH
Advanced Surgical Devices
Mainstraße 2, 45768 Marl
www.smith-nephew.com
VERILAST™
Oxidized Zirconium with XLPE

With nearly one million OXINIUM® implants used globally, this innovative Technology is getting patients back to their lives.

Throughout the ongoing nearly 40 years of presentations, Smith & Nephew is the only orthopedic company to earn the prestigious ASM International Engineering Materials Achievement Award for its OXINIUM technology joining other recognized material innovations such as Kevlar® fiber, synthetic diamonds and fiber optics.

Innovation and Clinical Success

Real-life Results

Smith & Nephew is the only orthopaedic company to ever win the prestigious ASM International Engineering Materials Achievement Award for OXINIUM Technology. Choose the technology that has proven itself to researchers and patients worldwide.
Number of metals for which metal sensitive patients demonstrated reactivity (n=700)¹

<table>
<thead>
<tr>
<th>Number of Metals</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>25%</td>
</tr>
<tr>
<td>Two</td>
<td>39%</td>
</tr>
<tr>
<td>Three</td>
<td>18%</td>
</tr>
<tr>
<td>Four</td>
<td>8%</td>
</tr>
<tr>
<td>Five</td>
<td>5%</td>
</tr>
<tr>
<td>Six or more</td>
<td>5%</td>
</tr>
</tbody>
</table>


Biocompatibility

Similar to many allergies, most patients with metal sensitivity demonstrate reactions to more than one metal. OXINIUM™ may be an effective solution for patients suffering from metal sensitivities due to its unique composition.

Addressing Metal Sensitivity

Metal sensitivity after TKA should be considered when a traditional workup of a patient with painful TKA symptoms, including arthrofibrosis and dermatitis, is negative. The authors found excellent results with the use of the OXINIUM™ component and propose its use for other patients with allergic-type symptoms associated with TKA.¹

CoCr TKA March 2008¹
- Three years post TKA
  - Pain and stiffness
  - Persistent rash/hair loss
  - ROM 5°-70°

Revised to OXINIUM TKA June 2011
- One year post revision
  - Pain free
  - No rash
  - Hair returned
  - ROM 0-105°

¹ Post, Z et al, Metal Sensitivity After TKA Presenting With Systemic Dermatitis and Hair Loss, Orthopedics, April 2013, Vol. 36, No. 4, p.525-528

Biocompatibility

Metal sensitivity affects an estimated 10% of the general population.² Among patients needing revision, incidence has been reported to be approximately 60%. OXINIUM may be an effective solution for patients suffering from metal sensitivity.