

ALTRX™
ALTRA-LINKED™ POLYETHYLENE

A BETTER ALTERNATIVE




a Johnson & Johnson company

PINNACLE HIP SOLUTIONS

PINNACLE[®] ACETABULAR CUP SYSTEM

AltrX liners are designed to work with the Pinnacle Acetabular Cup System, which provides a range of acetabular cup options, biological and mechanical fixation alternatives and advanced bearing technologies to provide surgeons the power to choose the precise combination that best meets the individual needs of each patient.



The Pinnacle system was developed with a team of surgeon thought-leaders from across the country. They utilized the proven Porocoat[®] Porous Coating fixation and combined it with engineering advances such as the patented Variable Interface Prosthesis (VIP) taper technology. This allows for the support of optimum performance metal and cross-linked polyethylene liners without compromising cup/insert congruency.

- Over 400,000 implanted
- 99.9 percent survivorship at 5 years⁴



A SOLID FOUNDATION

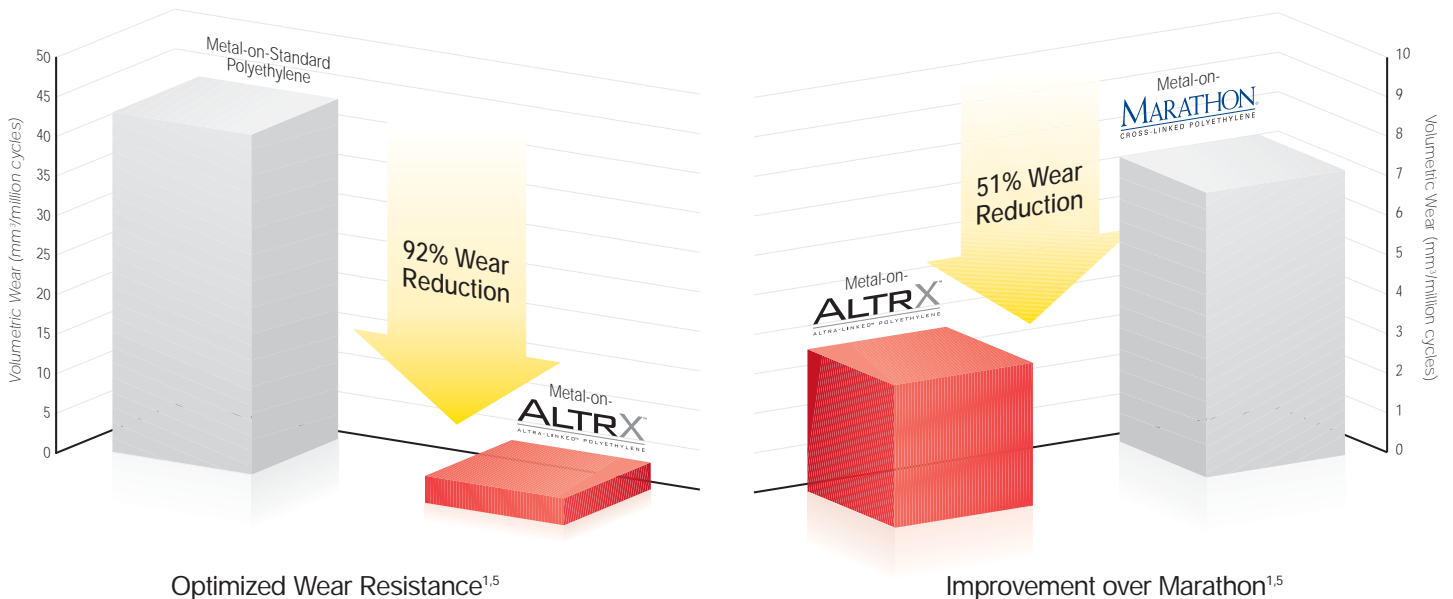


AltrX™ was built on the proven clinical heritage of Marathon® cross-linked polyethylene. Introduced in 1998, Marathon was the first FDA-cleared cross-linked polyethylene in orthopaedics.

To address a growing trend toward high demand patients, AltrX was developed to reduce wear by 92 percent versus standard polyethylene and 51 percent versus Marathon while maintaining the same mechanical integrity and oxidative stability as Marathon.^{1,5}

92% WEAR REDUCTION

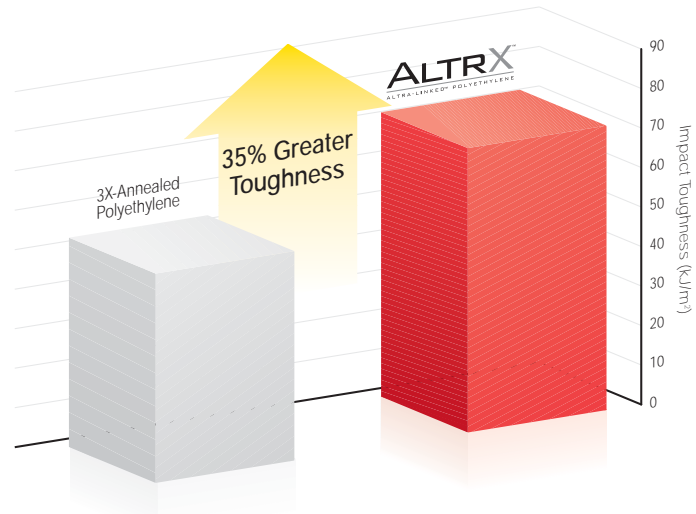
AltrX polyethylene starts with a base resin bar stock of GUR 1020 and is then moderately cross-linked at 7.5 Mrads, resulting in a material that is mechanically tough while providing 92 percent reduction in wear and resistance to oxidation.^{1,5}



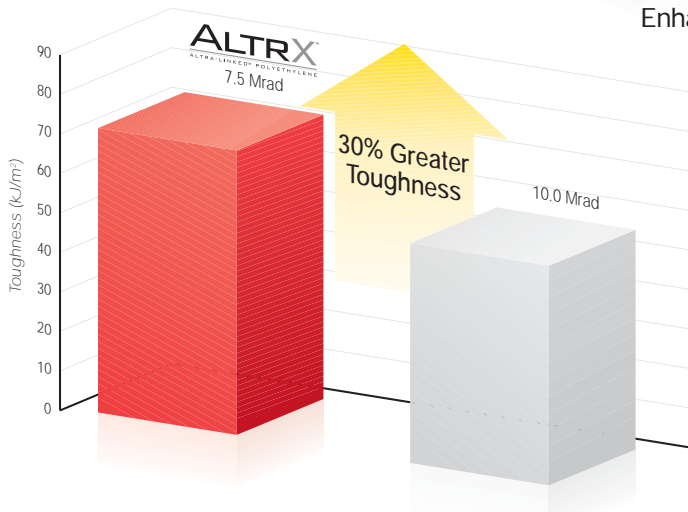
MECHANICAL INTEGRITY

AltrX polyethylene uses an exclusive Altra-Link™ material enhancement process to optimize the balance between wear reduction and mechanical integrity.^{1,5}

Compared with a 3X-annealed polyethylene, AltrX material has superior toughness, which reduces the risk of failures due to impingement or rim loading.^{2,5}



Enhanced Mechanical Toughness^{2,5}



Effect of Irradiation Dose on Toughness^{2,5}

And, because AltrX is moderately cross-linked at 7.5 Mrads, the risk of cracking or fractures is reduced compared with a highly cross-linked material.⁵

OXIDATIVE STABILITY

AltrX material is remelted in an argon convection to consistently eliminate free radicals and oxidative potential. Annealed polyethylenes do not eliminate oxidation.^{2,5,6}



Oxidative Resistance^{5,7}

HIGH STABILITY, LOW WEAR

To enhance stability, AltrX liners are available in 36mm inner-diameter (ID) and now AltrX LD 40, 44 and 48mm ID. AltrX liners are available in neutral, lateralized, face changing, and lipped designs.

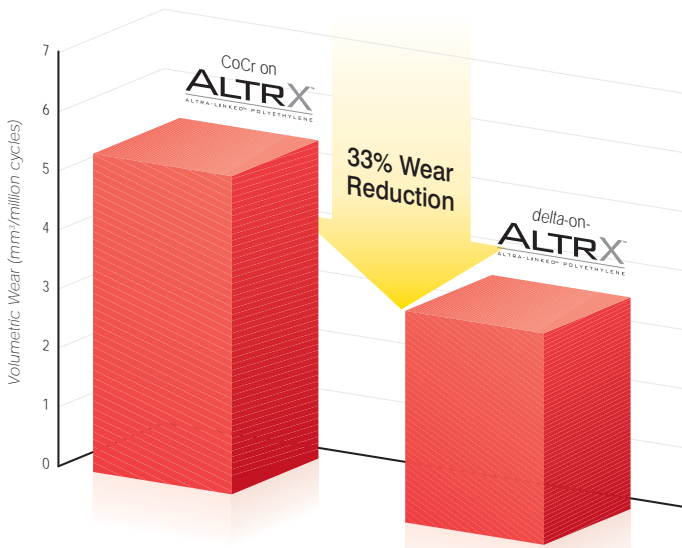
With a focus on wear reduction, AltrX liners are potentially less susceptible to higher wear as a function of head size.⁵

AN ALTERNATIVE FOR HIGH DEMAND PATIENTS

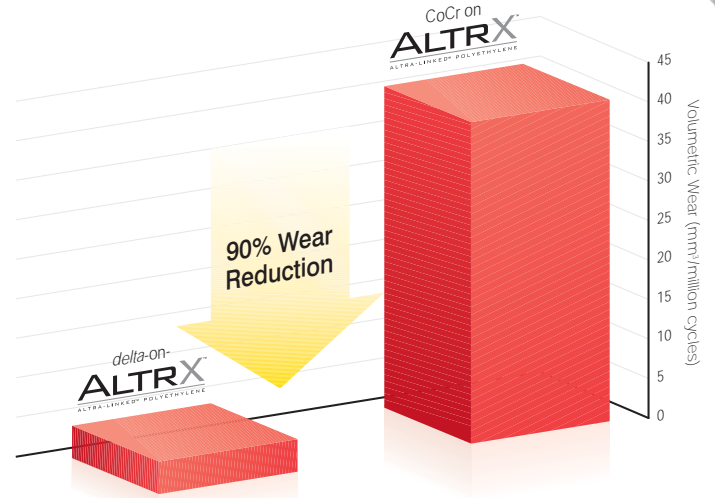
BIOLOX® *delta* heads on AltrX liners provide a low wear solution for younger, high demand patients. AltrX liners with *delta* heads produce 33 percent less volumetric wear than AltrX liners with cobalt chrome heads.⁵

This bearing combination is also less susceptible to scratching and increased wear from third body debris such as bone cement or bone fragments.^{3,5}

ALTRX™ LD
LARGE DIAMETER ALTRA-LINKED® POLYETHYLENE



High Performance Option⁵
Volumetric wear with 36mm heads



Scratch Resistance^{3,5}
Above chart compares volumetric wear after heads were roughened to emulate scratching from 3rd body debris

References:

1. Liao, Y.-S., K. Greer, et al. "Effects of Resin and Dose on Wear and Mechanical Properties of Cross-linked Thermally Stabilized UHMWPE." Society for Biomaterials, the 7th World Biomaterials Congress, Sydney, Australia, 2004.
2. Orthopaedic Research Society, 2007, P1784.
3. Y.-S. Liao, K. Greer, A. Alberts. "Effect of Head Material and Roughness on the Wear of 7.5 Mrad Crosslinked-Remelted UHMWPE Acetabular Inserts." Orthopaedic Research Society 54th Annual Meeting, San Francisco, CA, 2008.
4. Kindsfater, K., W.P. Barrett, J.E. Dowd, C.B. Southworth and M.J. Cassell. "99.9% Midterm Survival of the Pinnacle Multi-Liner Acetabular Cup in a Prospective Multi-Center Study." Poster Presentation #P077, AAOS, San Diego, CA. February 14-18, 2007.
5. Data on file, DePuy Orthopaedics, Inc.
6. Keith K. Wannomae, BS, Shayan Bhattacharyya, BS, Andrew Freiberg, MD, Daniel Estok, MD, William H. Harris, MD, and Orhun Muratoglu, PhD. "In Vivo Oxidation of Retrieved Cross-linked Ultra-High-Molecular-Weight Polyethylene Acetabular Components with Residual Free Radicals." *The Journal of Arthroplasty* Vol. 21 No. 7 2006.
7. X3 data reported by Orhun Muratoglu from Mass General Hospital during a Grand Rounds Presentation at the Dartmouth-Hitchcock Medical Center on May 16th, 2007. <http://www.dhslides.org/ortho/ortho051607/msh.htm>



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