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"OXINIUM" THE CERAMIC METAL BROCHURE

ARTHRITIS UPDATE:

ADVANCES IN JOINT REPLACEMENT

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NEW TECHNIQUES:

"OXINIUM"

THE CERAMIC METAL FOR JOINT REPLACEMENT

OXINIUM CERAMIC METAL IN HIP REPLACEMENT (in black)

BIOMATERIALS IN JOINT REPLACEMENT

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THE ARTICULATING SURFACES HAVE UNDERGONE MANY CHANGES IN THE LAST 30 YEARS

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Hip and Knee replacements have been successful since the 1980's. As technology has advanced, researchers have looked to newer materials that might last longer.

The original materials used were metals that mimicked the mixture of strength and flexibility of healthy bone. Currently Titanium alloys are used to interdigitate with the bone of the hip because they match that similarity to bone. The interface that rubs on the joint needs different properties, because the materials that rub together have to be extremely hard but durable. Titanium is not hard enough to last if it was used at the joint interface. The materials also need to have minimal particle wear to tolerate the friction over many years of joint movement. This concept is similar to the wear a car tire gets from the road over time.

As successful as hip and knee replacements have become, this procedure was initially restricted to patients with severe arthritis at older ages because of concerns that the implants would wear out over 10 years, leading to a more complex revision surgery. As the baby boomer population aged, work continued to try to lessen the failure rate from particle wear which can happen on either the metal or plastic side of the replacement joint.

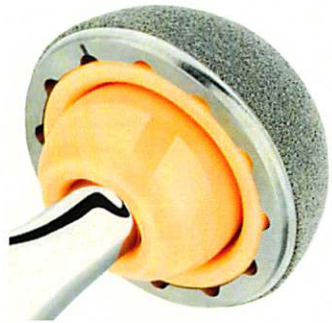
"If the components could last longer, then even younger patients could be considered for hip and knee replacement treatment options."

Most frequently, wear problems come from the ultra-high molecular weight polyethylene (UHMWPE) plastic component of the joint replacement used in both hips and knees.

The plastic wear issue was addressed in 1998 with newer modifications of the plastic. A technique was developed that cross-linked the ultra-high molecular weight polyethylene making the plastic component more resistant to oxidation which previously caused the plastic to wear out and has become the current standard, particularly in hip replacements.

The metal side of the joint replacement has traditionally been an alloy of Cobalt and Chrome, which is extremely hard (harder than Titanium or Stainless Steel) making it resistant to wear over time. Gradually, the Cobalt-Chrome can develop microscopic scratches which don't significantly affect the metal itself but leads to wear on the polyethylene plastic side of the joint over time.

In the search for materials that can last longer than our previous options, aluminum ceramic surfaces were developed. This ceramic material is also extremely hard but has almost no wear over time, making it a good consideration for younger patients with severe arthritis considering hip or knee replacement surgery.



ALUMINUM CERAMIC HIP ARTICULATION (in yellow

The Aluminum Ceramic materials have been used since the late 1980's and initial designs had problems which have been improved upon. The aluminum ceramic in addition to being extremely hard, is more brittle and can chip or break. If that happens the ceramic debris is sharp enough to severely scratch the metal that is attached to it and when this happens the components need to be removed. Leaving any residual ceramic debris behind will damage the alternative materials used on revision surgery lessening the chances of the subsequent surgery having long term success

The aluminum ceramic also is known to have "squeaking" problems associated with patients that have dry joints (less joint lubricating fluid). Although this problem doesn't affect the longevity of the components, it is obviously annoying and can lead to surgical revision to alternative materials.

One of the major orthopedic companies, Smith-Nephew developed what is a hybrid metal with the advantages that ceramics have (wear resistance) and the increased strength from breaking that true metals provide. This material is an alloy of Zirconium which is in the Titanium family. It has an enhanced ceramic surface using Zirconia (a wear resistant ceramic compound), the oxidized alloy of the metal. The net result is "Oxinium," a wear resistant, black colored "ceramic metal" (in contrast to Titanium or Cobalt-Chrome which are silver). Oxinium does not have the brittleness of aluminum ceramics (these can be identified due to their yellow or pink color) yet Oxinium has the durability of metal. It also has been shown to have lower friction and less adhesive wear against the polyethylene plastic than the Cobalt-Chrome alternative.

Oxinium is a hybrid metal that has an oxidized surface of Zirconia which is a ceramic but the core metal is Zirconium which is in the Titanium family.

Although Oxinium can scratch, it doesn't create the buildup that Cobalt-Chrome does. This build up is analogous to a snow plow going down a street and leaving piles of residual snow from the edges of the plow.

Smith-Nephew lab studies indicate this new combination of Oxinium on Polyethylene plastic may last as long as 30 years although the product has been on the market over 12 years, since the early 2000's. This ceramic Oxinium metal is an available option for both hip and knee replacements. Certainly it is worth considering in younger patients with severe arthritis in their 40's and 50's.

OXINIUM CERAMIC METAL IN KNEE REPLACEMENT (in black)