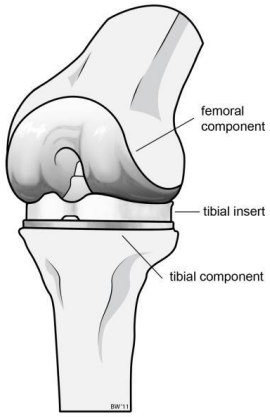
Method and Material to Extend the Life of Total Joint Replacements through Wear Particle Activation

Description:



More than 500,000 joint replacements occur in the US each year and demand for joint replacements will grow an estimated 175 percent for total hip replacements and six-fold for total knee replacements by 2030 (CDC report "Health United States 2009"). These replacements typically last about 10 years or more, but as the patients live longer and are more active, demand for longer lasting, more durable implants is greatly desired. A leading cause for joint replacement failure and subsequent need for revision surgery is osteolysis around the prosthetic implant. This condition is often caused by wear particles from the ultra high molecular weight polyethylene (UHMWPE) immaterial commonly used as a replacement bearing surface. This is a very well known problem and although great strides to minimize wear particle generation have long been achieved, the elimination of sub-micron wear particles entirely is not likely and the problem remains. As a means to minimize this osteolysis, it is known that bisphosphonates (BP) can be administered orally to prevent wear-debris induced bone loss, however this systemic delivery is highly inefficient in that most of the drug never reaches the target and is excreted via the kidney.

What is described here is a novel technology including the method of utilizing the inevitable sub-micron wear particles as a means to locally administer bisphosphonates (BP) at the targeted site, over a long period of time. This approach turns a disadvantage into a positive and aims directly at extending the life of a total joint replacement. On-going studies at Clemson University indicate that the modified UHMWPE material shows significant potential for an alternative bearing material to indirectly increase TJR longevity.

Applications:

- Biomaterial for total joint replacement
- Orthopedic implant bearing material

Benefits:

- Increased longevity of joint replacement: reducing revision rates and increasing patient satisfaction
- Compatible with the most common orthopedic bearing material (process and performance)

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Licensing Status: Available for licensing
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