

# You have your MoM's ions

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Hip replacement patients with metal-on-metal (MoM) implants (both the socket and hip ball are metal) pass metal ions to their infants during pregnancy, according to a new study presented today at the 2010 Annual Meeting of the American Academy of Orthopaedic Surgeons (AAOS). Data showed there is a correlation between cobalt and chromium levels in the mother and those in her infant at the time of delivery.

"Although the affects of [metal ions](#) in maternal and fetal subjects are unknown, the fact that the placenta is not a complete barrier to the transport of these metals is noteworthy," said Joshua J. Jacobs, MD, Professor and Chairman of Orthopaedic Surgery at Rush University Medical Center in Chicago. "As metal-on-metal implants increase in popularity and use, especially among young, active patients, women of child-bearing age and their doctors should be aware of these findings when considering their hip replacement implant options."

Researchers evaluated three patients who had either a unilateral (only on one hip) MoM primary total hip arthroplasty or unilateral MoM [hip resurfacing joint replacement](#) and no other metal implant in the body. The implant group's metal ion levels were compared within the group, between mothers and their infants, and to those of a Control Group comprising seven women of child-bearing age (mean age of about 32 years) who did not have any metal implants and their infants.

For all subjects, maternal and umbilical cord blood was obtained at the time of delivery and tested for blood serum concentrations of titanium, nickel, cobalt and [chromium](#) using inductively coupled plasma mass

spectrometry (ICP-MS), a highly sensitive technique that can detect trace amounts of metals in biological samples.

The data found:

- Mothers with MoM implants and their offspring had elevated Chromium and cobalt levels compared to the cohort without metal implants.
- A correlation existed between maternal and infant cobalt and chromium levels in the Implant Group, while the Control Group showed no correlation.
- Offspring of women with MoM implants had about half the levels of cobalt in their bloodstream as their mothers and approximately 15 percent of their mother's chromium levels, while there was no significant difference among ion levels between mothers and infants in the Control Group.
- There was no statistically significant differences in levels of titanium or nickel among any of the cohorts.

Dr. Jacobs noted that because the cobalt and chromium levels of the infants did not increase to those of their mothers, the data suggests the placenta does modulate the transfer of metal ions to the fetus.

"The next step is to find out what, if any affect metal ions have on fetal or infant development," he said. "The best way to do that would be through the establishment of a national joint registry by which clinicians could input and access long-term data."

He added that, in the meantime, medical device companies are

feverishly working to develop new technologies that will reduce the release of ions through improvements in wear and corrosion properties of metal implants. "Any advancements in this area will directly benefit patients," he said.

## About Joint Replacement

Joint replacement, also known as arthroplasty, is considered by many to be one of the most successful medical innovations of the 20th century. Total joint replacement is a surgical procedure in which the patient's natural joint is replaced with an artificial one, made of a combination of plastic, metal, and/or ceramic.

The most common reasons for this surgery are pain and stiffness that limits normal activities such as walking and bending and that cannot be satisfactorily treated with medications or other therapies. Therefore, joint replacement surgery often provides a significantly improved quality of life to patients who would otherwise have to live with severe pain.

In 2007, there were 251,882 primary total hip replacements performed in the United States, and that number is on the rise—particularly as the Baby Boomer population continues to age. Because of this trend, it is important to optimize patient outcomes.

Provided by American Academy of Orthopaedic Surgeons

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