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Magnetic Resonance Imaging (MRI) — Medacta Hip Prosthesis compatibility

The MRI is a medical imaging technique, based on a powerful magnetic field, widely used in orthopaedics. Nevertheless the presence of metallic implants may create a risk due to excessive magnetic field interactions, which may result in movement (translational attraction and torque), heating of the metallic component and artifacts^{1,2}.

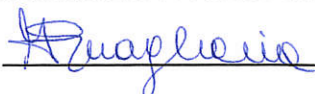
Medacta hip prostheses are manufactured from different metals: titanium and cobalt (and their alloys) and from stainless steel. Several studies investigated the behavior of different implants in high magnetic field (up to 1.5 Tesla) of MRI units, and showed that there was no appreciable movements of devices fabricated from titanium, cobalt and stainless steel alloys³.

However, as the MRI Units are increasing the power of the magnetic field to improve imaging capabilities, additional studies have been conducted on higher magnetic field (3 Tesla), demonstrating no significant or no movements for that devices^{4,5}.

A risk of excessive heating has been demonstrated to be typically associated with implants that have an elongated configuration or that are electronically activated and conducting.

Different studies indicate that the MRI procedure has unimportant or no effect on hip prostheses; however, as there are different manufacturers and generations of MRI machines on the market, Medacta cannot make any statement concerning the compatibility of their implants and a specific MRI unit; it is, therefore, recommended to contact the surgeon or the MRI manufacturer to discuss the compatibility.

International Product Manager



R&D Manager



References:

1. "MR Imaging in Patients with metallic implants" R.W. Laakman et al. — Radiology 1985; 157: 711-4.
2. "MR Imaging of Metallic Implants and Material: a Compilation of the Literature" F.G. Shellock - American Journal of Radiology 151: 811-814, 1988.
3. "Safety of Orthopedic Implants in Magnetic Resonance Imaging: an Experimental Verification" R. Kumar et al. - Journal of Orthopedic Research 2006 Sep;24(9):1799-802.
4. "MR Procedures and Biomedical Implants, Materials, and Devices: 1993 Update" F.G. Shellock et al. - Radiology 1993; 189: 587-599.
5. "Biomedical Implants and Devices: Assessment of Magnetic Field Interactions with a 3.0 Tesla MR system" F.G.Shellock—Journal of Magnetic Resonance Imaging 16:721-732 (2002).

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