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Magnetization and demagnetization of magnetic dental attachments in a 3-T MRI system

[Norio Hayashi](#) , [Akio Ogura](#), [Toshio Tsuchihashi](#), [Daisuke Takahashi](#), [Tsuyoshi Matsuda](#), [Shinya Seino](#) & [Tsukasa Doi](#)

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Abstract

The purpose of this study was to evaluate the magnetization and demagnetization of magnetic dental attachments in a 3.0-T magnetic resonance imaging (MRI) scanner. A high-field-strength (3.0 T) MRI scanner (Achieva 3.0 T, Philips, Amsterdam, Netherlands) was used. Magnetic flux leakage was measured using a gaussmeter. To evaluate the magnetization and demagnetization of the magnetic assemblies and keepers caused by the moving in and out of the MRI scanner, the magnetic force of the attachments was measured before and after the table was moved in and out. Two settings were used wherein the magnetic assemblies and keepers were positioned on the table at angles of 0° or 90° with respect to the magnetic flux of the static magnetic field. The movement of the table was repeated 15



times. In addition, the retentive force of the magnetic dental attachments was measured after magnetic field exposure. The magnetic force of the magnetic attachments positioned at 0° decreased significantly after moving in and out of the MRI scanner ($p < 0.05$). In contrast, the magnetic force of the magnetic attachments positioned at 90° was stable after the movement of the table. The magnetic force of the keepers placed at both 0° and 90° was slightly increased after the movement of the table. At 0°, the retentive force of the magnet-keeper combinations decreased when the magnetic assembly was exposed to the strong magnetic flux of the MRI scanner. Therefore, the removal of all removable magnetic dentures is recommended before an MRI examination.

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