

**Safety of MRI in Orthopaedic Trauma Patients With External Fixation: A Two-Center Case Series**

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**Purpose:** Obtaining MRI of orthopaedic trauma patients who are treated with external fixation for injuries to the appendicular skeleton or pelvis is difficult in clinical practice due to restricted manufacturer guidelines and safety concerns. The purpose of this study was to report on adverse events during MRI on patients with external fixators. We hypothesized that MRI can be safely performed with an external fixator in situ.

**Methods:** All adult patients with an external fixator applied to the pelvis or appendicular skeleton who underwent MRI with the external fixator inside or outside of the MRI bore between January 2006 to September 2023 were identified from our institutional database. Eligibility was done by scrutinizing operative, inpatient, radiological, and discharge notes, imaging history, and institutional safety reports. The primary outcome was adverse events, defined as any undesirable event associated with the external fixator being inside or outside the MRI bore, including: (subjective) heating, displacement, pullout of the external fixator, or early termination for any reason. Descriptive statistics were used to summarize the results.

**Results:** 97 patients with 110 external fixators had 111 MRI scans with an external fixator inside or outside of the MRI bore. The most common external fixator locations were the ankle (24%), knee (21%), femur (21%), and pelvis (19%). The median duration of an MRI was 40 minutes (interquartile range [IQR]: 26- 58) and 14% were performed using 3.0-T MRI. 95% of MRI scans were performed for the cervical spine/head. Two MRI scans with the external fixator outside of the bore were terminated early due to patient discomfort.

**Conclusion:** MRI of the (cervical) spine and head can be safely obtained in patients with external fixators on the appendicular skeleton or pelvis. The results from this study can enable orthopaedic surgeons, radiologists, and other stakeholders to develop local institutional guidelines on MRI scanning with external fixators in situ.