

Pediatric tibial spine fractures: Surgical treatment and MRI utilization

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INTRODUCTION: Optimal management and imaging workup of pediatric tibial spine fractures is poorly defined. As evidence evolves, trends and drivers of magnetic resonance imaging (MRI) with workup and surgical intervention are poorly quantified but of clinical interest.

METHODS: Patients aged 6-17 presenting with first diagnosis of closed tibial spine fractures with or without displacement were identified from the 2016-2020 PearlDiver M157 database. Demographic factors, MRI, and arthroscopic or open reduction internal fixation (ARIF or ORIF) were extracted. Factors independently associated with MRI utilization, surgical management, and ARIF were assessed with multivariable regression.

RESULTS SECTION: Pediatric tibial spine fractures were identified for 2,210 patients. MRI was obtained for 406 (18.4%), independently predicted by increased age (OR=1.11 per year, $p<0.0001$), fracture displacement (OR= 2.55, $p<0.0001$), and geographic region (OR 1.76, $p=0.0029$ for Midwest relative to West) (Figure 1).

Surgical management was elected for 503 (22.8%), independently predicted by fracture displacement (OR 18.54, $p<0.0001$) and MRI (OR 7.76, $p<0.0001$). ARIF was utilized for 330 (76.6% relative to ORIF), independently predicted by preoperative MRI (OR 2.87, $p=0.0001$) and South region (relative to Midwest, OR 2.38, $p=0.0037$).

Over the years of the study, the utilization of MRI and surgical management did not significantly change, but the proportion of arthroscopic surgeries increased significantly (from 67.5% in 2016 to 82.5% in 2020, $p=0.0196$) (Figure 2).

DISCUSSION: The current study presents the largest cohort of tibial spine fractures reported to date. MRI was only obtained for 18.4% of patients, despite recent literature suggesting its utility in identifying associated injuries. As expected, fracture displacement was a strong predictor of surgery, and more fractures were treated arthroscopically than open. Geographic variations in MRI and ARIF utilization suggest nonclinical factors impact management.

SIGNIFICANCE/CLINICAL RELEVANCE: The management of pediatric tibial spine fractures is evolving and influenced by clinical and non-clinical factors.

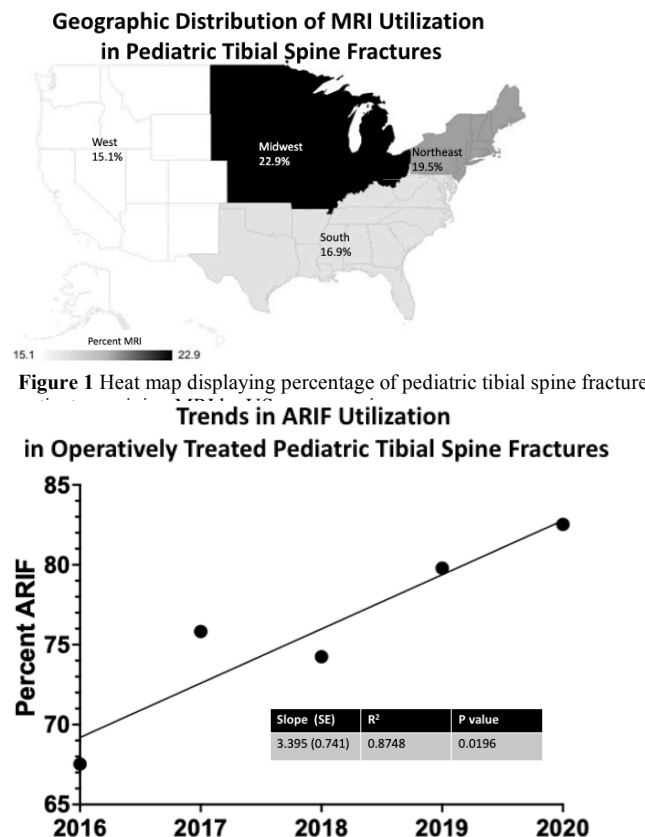


Figure 2 Trends in surgical approach for operatively treated pediatric tibial spine fractures.