Suprapatellar Versus Infrapatellar Approach to Intramedullary Nailing of Tibia Fractures: An Objective Measure of Knee Cartilage

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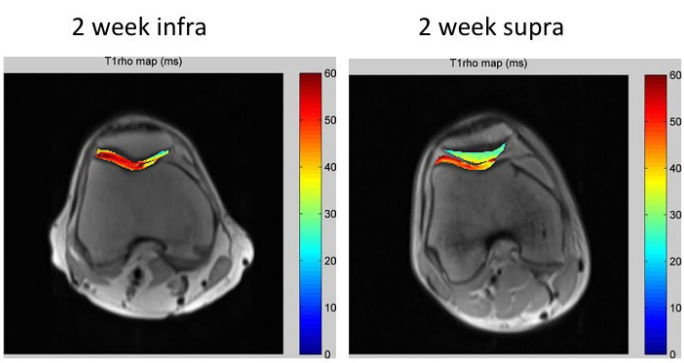
Purpose: Intramedullary nailing (IMN) is the gold standard in surgical stabilization of tibial shaft fractures. Recent literature has sought to evaluate the effect of the suprapatellar approach on the cartilage of the knee. Advances have emerged to objectively quantify the health of the articular cartilage. Utilizing T1ϱ imaging, this study seeks to determine the effects on cartilage health in fracture repair.

Method: All patients with tibia fractures that met inclusion criteria and consented underwent IMN with the approach being randomized. Subjects returned for knee MRI scans at 2 weeks and 6 months post surgery. 8 slices of T1ϱ data were acquired in both the coronal and axial planes. Data were processed using a voxel-by-voxel monoexponential fit algorithm in a custom-written script. Cartilage regions of interest (ROIs) were manually segmented based on raw T1ϱ images. Data were reported as T1ϱ values averaged by ROI and by slice, and the data were then evaluated statistically by utilizing heteroscedastic 2-tailed Student t tests.

Results: 29 tibia shaft fracture subjects with an average age of 32.5 years were recruited and consented. Of the 29, 9 subjects who were randomized to the suprapatellar approach underwent 2-week scans, 7 subjects who were randomized to the infrapatellar approach underwent 2-week scans, and 15 of these 16 subjects had contralateral knee T1ϱ MRI scans. For the 6-month T1ϱ MRI scans, there were 2 from the suprapatellar group, 2 from the infrapatellar group, and 4 with bilateral scans. At 2 weeks, data from the patellofemoral compartment indicate slightly increased average T1ϱ values in subjects having undergone the infra-patellar procedure relative to the supra-patellar procedure. These differences were not statistically significant. T1ϱ data from tibial and femoral trochlear cartilage ROIs show an insignificant degree of difference. For all ROIs evaluated at 2 weeks post surgery, the subjects' contralateral knees exhibited high T1ϱ values. At 6 months, most cartilage ROIs show a general reduction in average T1ϱ values, as expected due to subject recovery.

Conclusion: The suprapatellar and infra-patellar approaches to IMN insertion into the tibia have nearly indistinguishable effects on T1ϱ values in the patellofemoral joint. The T1ϱ values reveal little impact on the cartilage of the involved knee in suprapatellar nailing compared to infrapatellar, suggesting suprapatellar nailing is a safe alternative.



The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.