

Comparison Between Suprapatellar and Parapatellar Approach for Proximal Tibia Fractures: A Cadaveric Study

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Background/Purpose: Fractures of the tibia with a short proximal fragment are more difficult to nail than midshaft fractures. One solution to this problem is tibial nailing with the knee in a semi-extended position, with a suprapatellar or parapatellar approach to help achieve correction of the malalignment. Parapatellar approach for tibia nailing is a safer approach and less injurious to intra-articular structures of the knee than the suprapatellar approach; however, the parapatellar approach in the majority of the cases is an intra-articular procedure.

Methods: Paired legs from 10 fresh-frozen cadavers were used. There were no previous injuries or surgeries on the knees of the cadavers. An arthroscopy was performed in each knee, documenting the status of the knee prior to the insertion of the nail. In a random manner, the left or right leg was nailed with a supra- or parapatellar approach. The legs were positioned in 20° to 40° of knee flexion. Fluoroscopy was utilized in each case to localize the entry point, the tibia was reamed, and a titanium tibia nail was inserted in all cases. Once the nail was inserted, an arthrotomy was performed and the status of the following structures was assessed: patella cartilage, trochlea cartilage, tibia plateau cartilage, intermeniscal ligament, lateral and medial meniscus, and the ACL (anterior cruciate ligament). The distance was measured from the entry point to lateral and medial meniscus, to the intermeniscal ligament and to the ACL.

Results: The correct fluoroscopy entry point was achieved in 100% of the specimens for both the supra- and parapatellar approaches. Two-thirds of the legs with parapatellar approach had intra-articular disruption. In legs with a suprapatellar approach, patellar cartilage damage and trochlea cartilage damage was found in 30% and 20% of the specimens, respectively. There was no cartilage damage in the parapatellar approach. There were no meniscal injuries. Partial laceration of the intermeniscal ligament was found in 30% of the knees with suprapatellar approach and 15% of the knees with parapatellar approach. The ACL was intact in 96% of the specimens. The suprapatellar approach, on average had a closer entry point to the meniscus than the parapatellar approach.

Conclusion: A good fluoroscopic entry point can be achieved using either the parapatellar or suprapatellar approach. The parapatellar approach for tibia nailing has less cartilage damage and less soft-tissue damage than the suprapatellar approach. The majority of specimens with a parapatellar approach do enter the knee joint. The parapatellar approach is safer around the knee than the suprapatellar approach, and very meticulous technique should be used in cases when the suprapatellar approach is unavoidable.