

Contemporary Pure Anteriorization Tibial Tubercle Osteotomy is Safe and Effective for Patellofemoral Overload

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INTRODUCTION:

Sagittal plane malalignment is increasingly recognized as a risk factor for patellofemoral cartilage wear. While lateral cartilage lesions may be unloaded with anteromedializing tibial tubercle osteotomies (TTOs), central and medial lesions may be better addressed with pure anteriorization TTOs (aTTOs), particularly when patients have normal patellar height and coronal plane alignment. Traditional aTTO techniques were associated with unacceptable complication rates, however, and there is need for safer aTTO techniques. The purpose of this study was to assess the safety and efficacy of a contemporary aTTO technique for isolated patellofemoral chondral wear.

METHODS:

Consecutive patients undergoing a contemporary aTTO technique for patellofemoral overload from 2016-2024 were evaluated. In brief, this previously-published technique consists of an anterior-posterior cut along the vertical line, a lateral-medial cut parallel to the posterior tibial cortex, straight anteriorization of the proximal osteotomy shingle by 10-15mm with an anterior periosteal hinge distally, and fixation by two 4.5mm lag screws angled obliquely from anterolateral to posteromedial. No proximal bone block is required. The primary outcome was overall complication rate, including wound complications, nonunion, and fracture, among others. Secondary outcomes included patient-reported outcome measures (PROMs) at two-years. Removal of hardware (ROH) was offered to all our patients and not considered a complication.

RESULTS:

There were 57 patients with an average follow-up of 2.4 years. The mean (standard deviation) age was 30.5 (7.2) years and 54.4% of patients were women. Thirty-nine (68.4%) patients underwent concomitant cartilage restoration. Mean operative anteriorization was 11.2 (2.2) mm. The overall complication rate was 5.3% (3 patients), including two (3.5%) manipulations under anesthesia for arthrofibrosis and one (1.8%) superficial cellulitis successfully managed with oral antibiotics alone. There were no episodes of wound dehiscence (0%), deep surgical site infection (0%), nonunion (0%), or fracture (0%). Eighteen (31.6%) patients underwent elective ROH. There were significant improvements in mean International Knee Documentation Committee (41.0 vs. 81.1, $p<0.001$) and visual analog pain (4.6 vs. 1.6, $p<0.001$) scores from baseline to two-year follow-up.

DISCUSSION AND CONCLUSION: Contemporary pure aTTO can be performed safely for isolated patellofemoral overload, with no instances of wound breakdown or nonunion/fracture encountered in this series. Given the growing recognition of the importance of sagittal plane malalignment on patellofemoral chondral wear, these findings suggest contemporary aTTO may be increasingly considered as a treatment option for patients with patellofemoral chondral wear who may not be ideal candidates for traditional TTO techniques. Moving forward, indications for and long-term follow-up following aTTO should continue to be defined.