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Straight Anteriorization Tibial Tubercle Osteotomy Is Safe and Effective for Patellofemoral Cartilage Lesions

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Faculty Disclosure Information

- Our disclosure(s) are:
- RJW:
- Arthrex, Inc: IP royalties; Paid consultant
  BICMD: Stock or stock Options
  Cymedica: Stock or stock Options
  Engage Surgical: Stock or stock Options
  Gramercy Extremity Orthopedics: Stock or stock Options
  Histogenics: Research support
  JRF Ortho: Paid consultant
  Lipogems: Paid consultant
  Pristine Surgical: Stock or stock Options
  RecoverX: Stock or stock Options

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Introduction

- ***Background:*** Sagittal plane malalignment is increasingly recognized as a risk factor for patellofemoral cartilage wear. While some cartilage lesions may be unloaded with anteromedializing tibial tubercle osteotomies (TTOs), other lesions may be better addressed with pure anteriorization TTOs (aTTOs).
- ***Problem:*** Traditional aTTO techniques were associated with unacceptable complication rates, however, and there is need for safer aTTO techniques.
- ***Goal:*** Assess the safety of a contemporary aTTO technique for patellofemoral overload.

Methods

- ***Patients:*** Consecutive patients undergoing a modern aTTO technique for isolated patellofemoral overload from 2016-2024 with minimum six-month follow-up
- ***Technique:*** In brief, this previously published technique consists of an anterior-posterior cut ~5-10° off the vertical line, a lateral-medial cut parallel to the posterior tibial cortex, straight anteriorization of the osteotomy shingle by 10-15 mm proximally with an anterior periosteal hinge distally, and fixation by two 4.5 mm lag screws. No proximal bone block is required
- ***Primary Outcome:*** Overall complication rate, including wound complications, nonunion, and fracture, among others.
  - Removal of hardware (ROH) was offered to all our patients and not considered a complication
- ***Secondary Outcomes:*** Range of motion (ROM) at 6- and 12-weeks and patient-reported outcome measures (PROMs) at two-years (among the 26 patients with minimum two-year follow-up)
- ***Statistics****:* Comparisons made with Student t-tests

Results

- 57 patients, mean follow-up 2.4 years (range 6.1 months-6.8 years)
- Mean (SD) age 30.5 (7.2) years, 54.4% women
- 39 (68.4%) patients underwent concomitant cartilage restoration procedures
- Mean anteriorization amount was 11.2 (2.2) mm
- Overall complication rate was 5.3% (3 patients)
  - Two (3.5%) manipulations under anesthesia for arthrofibrosis
  - One (1.8%) superficial cellulitis successfully managed with oral antibiotics alone
  - No episodes of wound dehiscence (0%), deep surgical site infection (0%), nonunion (0%), or fracture (0%)
- Mean ROM 0-122˚ at 6-weeks and 0-130˚ at 12-weeks
- 18 (31.6%) patients underwent elective ROH
- 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 / Conclusions

- Contemporary pure aTTO can be performed safely for isolated patellofemoral overload, with no instances of wound breakdown or nonunion/fracture encountered in this series.
- Furthermore, patients experienced substantial improvement in PROMs from baseline to two-year follow-up.
- Given the growing recognition of the importance of sagittal plane malalignment on patellofemoral chondral wear, these finding 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.

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