Headless Screw Fixation Lowers Re-Operation Rate Following Tibial Tubercle Osteotomy

Authors: Ran Atzmon MD, Aimee Steen BA, Kinsley Pierre BS, Monica Sri Vel BS, Nicole Segovia Pham MPH, Kenneth Lin MD, Seth L. Sherman MD

Contact:
Seth L. Sherman MD
shermans@stanford.edu

Disclosures

Dr. Sherman's disclosures can be found at the AAOS Disclosure site: https://disclosuresearch.aaos.org/search?_ga=2.104669317.42261289.1742422389-1435715100.1728420275.

The remaining authors have nothing to disclose.

Stanford MEDICINE

Background

- Hardware removal is a common reason for reoperation after tibial tubercle osteotomy (TTO), with prior literature reporting rates up to 59%.

- Superficial hardware-related pain is the most common reason for reoperation after osteotomy union.

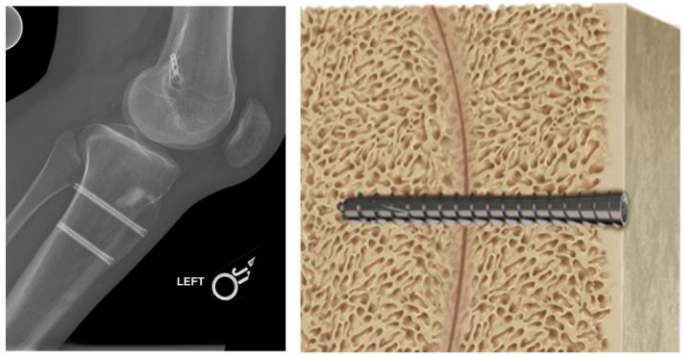
- To-date, there is no clear solution for symptomatic hardware requiring removal following TTO.

Stanford MEDICINE

Objectives

- **Purpose:** To investigate the risk of hardware removal after TTO fixation using two 5.0mm fully-threaded, headless, titanium, cannulated compression screws.

- **Hypothesis:** The use of headless compression screws would result in decreased incidence of hardware removal when compared to traditional fixation techniques.

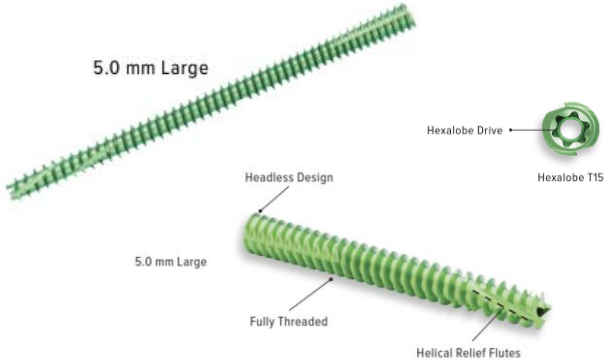


(Arthrex Inc., Naples, FL, USA)

Stanford MEDICINE

Methods

- Duration: October 2019 to August 2022.
- 42 TTO procedures
- All osteotomies were fixed with two 5.0mm fully-threaded, headless, titanium, cannulated compression screws



(Arthrex Inc., Naples, FL, USA)

Stanford MEDICINE

Methods

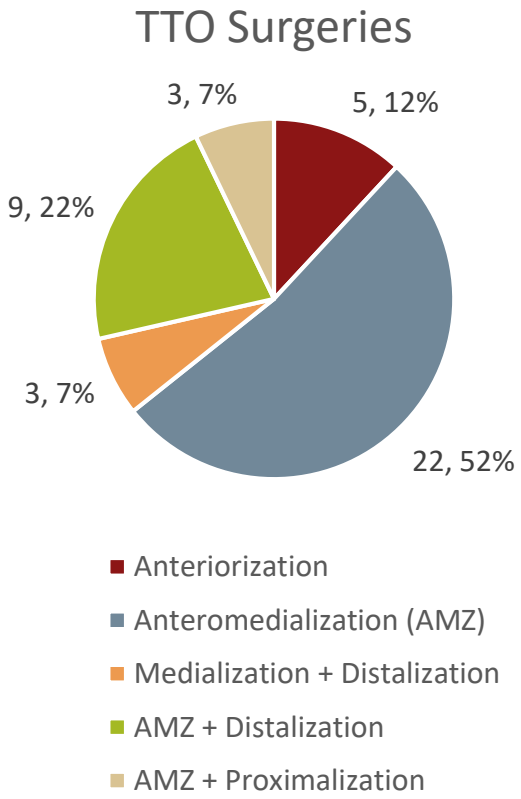
- <2 years follow-up excluded
- Osteotomy union evaluated with serial radiographs
- Rate of hardware removal compared to a representative literature value using a two-proportion Z-test
- Patient-reported outcome measures (PROMs) analyzed using Wilcoxon Signed-Rank tests and Mann-Whitney tests

Stanford MEDICINE

Results

- Demographics

Category	Value
Total Knees Examined	42
Total Patients	39
Gender Distribution	69% Female (n = 29), 31% Male (n = 13)
Average Age	29 years (Range: 16-69)
Average Follow-Up	39 months (Range: 24-58)



Stanford MEDICINE

Results

- One patient (2.8%) underwent removal of hardware

  → **Z = -4.48, p < 0.001**

- No other major complications

- Statistically significant **(p < 0.05)** improvements in:
  - → Knee SANE
  - → KOOS Symptom
  - → KOOS Sport and Recreation
  - → KOOS QOL

Stanford MEDICINE

Conclusion

- TTO fixation using two 5.0mm fully-threaded, headless compression screws led to significantly lower rates of hardware removal at two-year follow up compared to literature-reported values using classic fixation techniques

- The use of headless screws demonstrated an excellent safety profile, including radiographic union in all patients, without fracture or non-union requiring re-operation.

Stanford MEDICINE

Limitations

- Single center
- Single surgeon

Stanford MEDICINE

References

1. Cox JS. Evaluation of the Roux-Elmslie-Trillat procedure for knee extensor realignment. *Am J Sports Med*. 1982;10(5):303-310. doi:10.1177/036354658201000509

2. Fulkerson JP. Anteromedialization of the tibial tuberosity for patellofemoral malalignment. *Clin Orthop Relat Res*. 1983; (177):176-181.

3. Merchant, A. 2017. *MD3T – A new method for Safe, Secure, Accurate Tibial Tubercle Transfers.* [PowerPoint Slides] American Academy of Orthopaedic Surgeons. San Diego, CA, USA.

4. Merchant, A. MD3T Surgical Technique Guide. (2021) Kinamed Incorporated.

Stanford MEDICINE

Thank you ☺

Questions?

Stanford
MEDICINE