

Accuracy of Distalizing Tibial Tubercle Osteotomy: Correlation of Intended and Actual Outcomes

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INTRODUCTION: Tibial tubercle distalization (dTTO) is a widely accepted procedure to address patella alta in the setting of patellofemoral instability. However, the accuracy of translating intraoperative planned millimeters of distalization into postoperative radiographic outcomes remains uncertain. This study aimed to evaluate the relationship between intended intraoperative distalization and actual postoperative change in patellar height, as measured by the Caton–Deschamps Index (CDI). We hypothesized that there would be a strong correlation between planned and achieved CDI changes.

METHODS: A retrospective cohort of 22 knees in 19 patients (14 males, 8 females; mean age 22.2 ± 8.1 years) undergoing medial patellofemoral ligament reconstruction with dTTO was analyzed. Only patients with lateral radiographs (posterior condylar offset <5 mm) were included. CDI was calculated pre- and postoperatively using standardized digital software. Two distalization techniques were used: (1) a distal oblique osteotomy using an ACL saw blade with the autograft translated proximally; and (2) a standard anteromedialization (AMZ) osteotomy with distalization achieved by inserting adjacent autograft bone proximally. Planned CDI change based on intraoperative measurements was compared to actual CDI change using Pearson correlation, linear regression, paired t-tests, and Bland–Altman analysis.

RESULTS SECTION: Preoperative CDI averaged 1.42 ± 0.15 and postoperative CDI 1.07 ± 0.11 . The planned CDI reduction was 0.35 ± 0.11 , and the achieved change was 0.34 ± 0.13 . Pearson correlation revealed $r = 0.892$. Linear regression showed $R^2 = 0.795$ with a slope of 0.981 (Figure 1). Paired t-test showed no significant difference between planned and actual CDI change ($p = 0.60$). Bland–Altman analysis indicated a mean bias of -0.006 with 95% limits of agreement from -0.118 to $+0.105$.

DISCUSSION: Intraoperative planning for tibial tubercle distalization translates into accurate postoperative correction of patellar height with minimal bias. These findings support the reliability of intraoperative measurement in achieving radiographic goals and reinforce the use of CDI as a practical metric for surgical planning in patellofemoral instability.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): Reliable intraoperative distalization planning enables accurate correction of patellar height, supporting improved patellofemoral tracking and stability.

Group	Mean	SD
Preoperative CDI	1.42	0.15
Planned Target	1.06	0.10
Achieved CDI	1.07	0.11
Planned CDI Change	0.35	0.11
Achieved CDI Change	0.34	0.13

