

# **Medial Patellofemoral Ligament Reconstruction in Adolescent Patellofemoral Instability With High Tibial Tubercle-Trochlear Groove Intervals: A Comparison of With or Without Tibial Tubercle Osteotomy**

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## **INTRODUCTION:**

Patellofemoral instability is common in adolescent patients and is often associated with increased tibial tuberosity-trochlear groove (TT-TG) distances. While medial patellofemoral ligament (MPFL) reconstruction has become a standard surgical approach, the necessity of tibial tubercle osteotomy (TTO) remains debated. We hypothesize that the addition of TTO to MPFL reconstruction in adolescent patients with elevated TT-TG distances ( $\geq 20$ mm) will not significantly affect complications or patient-reported outcomes (PROs) compared to MPFL reconstruction alone.

## **METHODS:**

A chart review of patients with TT-TG distances  $\geq 20$ mm who underwent MPFL reconstruction (2012-2022) was performed in those with a minimum of 2-years follow-up, dividing them into two cohorts: with TTO or without TTO (No-TTO). Demographic, surgical, and clinical data were collected. Surgical metrics such as TT-TG distance, Insall-Salvati ratio, trochlear dysplasia index (TDI), and tibial tubercle – posterior cruciate ligament (TT-PCL) distances were recorded. Outcomes included complications, recurrent instability, and patient reported outcomes (PROs) (Single Assessment Numeric Evaluation (SANE), Kujala, pain, satisfaction).

## **RESULTS:**

Twenty-nine patients (30 knees), including 15 TTO and 15 No-TTO were analyzed, with a mean age of  $15.3 \pm 1.6$  years (TTO) and  $15.3 \pm 1.8$  years (No-TTO),  $p=0.916$ ; and mean follow-up of  $5.8 \pm 2.8$  years (TTO) and  $4.6 \pm 2.2$  years (No-TTO),  $p=0.218$ . The TTO cohort had higher TT-TG distances ( $22.3 \pm 2.2$  mm vs.  $20.8 \pm 0.8$  mm;  $p=0.037$ ), elevated Insall-Salvati ratios ( $1.7 \pm 0.2$  vs.  $1.5 \pm 0.3$ ;  $p=0.015$ ), and longer tourniquet times ( $83.46 \pm 29.0$  minutes vs.  $58.8 \pm 21.7$  minutes;  $p=0.023$ ). TDI and TT-PCL demonstrated no significant differences. SANE scores were  $84.0 \pm 9.0$  (TTO) and  $87.5 \pm 7.0$  (No-TTO) ( $p=0.247$ ), Kujala scores were  $90.6 \pm 8.4$  and  $89.9 \pm 10.9$  ( $p=1.000$ ), pain scores were  $1.4 \pm 1.7$  and  $1.3 \pm 2.0$  ( $p=0.653$ ), and satisfaction scores were  $9.1 \pm 1.1$  and  $9.3 \pm 0.8$  ( $p=0.847$ ), respectively. There were 5/15 complications in the No-TTO group and 8/15 in the TTO ( $p=0.462$ ). Three redislocations were observed in the No-TTO group and none were observed in the TTO group ( $p = 0.224$ ). Two subjects demonstrated instability symptoms in the No-TTO group compared to 3 in the TTO group ( $p = 1.000$ ). Return to sport was also similar among the two groups with all of the No-TTO subjects and all but one of the TTO subjects returning to sport ( $p=1.000$ ). There were 3 revisions in the No-TTO group and 2 in the TTO group ( $p=1.000$ ).

## **DISCUSSION AND CONCLUSION:**

The addition of TTO to MPFL reconstruction in adolescents with elevated TT-TG distances did not translate into significant differences in complications, PROs, or postoperative management. These findings suggest that TTO may not be necessary in all cases and should be reserved for select patients based on individual anatomical and clinical factors.