

## A Biomechanical Comparison of Transosseous Versus Anchor Technique for Patellar Tendon Repair

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**Background/Purpose:** Minimizing gap formation and maximizing the strength of patellar tendon repairs are two critical factors for the successful healing of these injuries. The purpose of this study was to compare transosseous and screw-in anchor repair techniques to determine if there were differences in gap formation and failure load of the constructs. Our primary research hypotheses were that the anchor construct would have significantly less gap formation and significantly greater load to failure.

**Methods:** 24 porcine specimens were randomly assigned into transosseous and 4.75-mm PEEK (polyetheretherketone) screw-in anchor repair groups. A tendon rupture was simulated by transecting the tendon at the insertion on the inferior pole of the patella. Repairs were conducted using two, No. 2 braided, nonabsorbable polyethylene-based sutures and were performed with a Krackow suture method that included 4 locking loops placed at 5-mm intervals with four strands crossing the repair site in both groups. The transosseous repairs were performed by drilling three tunnels from inferior pole to superior pole. For the anchor group, pilot holes were created to allow placement of two anchors. All tendons were mounted on a custom-made soft-tissue grip and pretensioned at a load of 175 N for 5 minutes. The repairs were then completed and each specimen was mounted on the materials testing device (MTS Insight 150kN Universal Test System with a 1-kN load cell) and was loaded for a total of 1000 cycles between 20 N and 200 N. Gap formation was measured after 1, 10, 250, 500, and 1000 cycles. Load to failure was recorded for each specimen after 1000 cycles. Independent *t*-tests were conducted to analyze the data using STATA version 10.1.

**Results:** 12 specimens in each group were tested to completion. Average gap formation in the transosseous group was significantly greater ( $5.7 \text{ mm} \pm 1.6$ ) when compared to the anchor group ( $2.2 \text{ mm} \pm 1.8$ ),  $P = 0.0001$ . Ultimate load to failure testing demonstrated that the average load to failure was significantly higher in the anchor group ( $669.9 \text{ N} \pm 91.8$ ) when compared to the transosseous repair group ( $582.8 \text{ N} \pm 92.6$ ),  $P = 0.03$ . The average yield point observed between the anchor ( $480.6 \text{ N} \pm 123.16$ ) and transosseous ( $410.99 \text{ N} \pm 50.98$ ) repair groups failed to reach significance,  $P = 0.091$ .

**Conclusion:** The results support our primary research hypotheses. Statistically significant gap formation and load to failure differences were found between the two repair techniques. Those repairs performed with 4.75-mm PEEK screw-in anchors compared to those performed with transosseous sutures demonstrated a greater failure load as well as less gap formation at the repair site. These findings suggest that the 4.75-mm screw-in anchor construct may be superior to the transosseous technique for minimizing gap formation and improving load to failure strength following surgical repair of the patellar tendon.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.