The effects of postoperative immediate active mobilization on repair site after repairing extensor Zone IV tendon with 3 various suture techniques (CADAVERIC STUDY)

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INTRODUCTION AND PURPOSE: Success of surgical treatment of extensor tendon injuries is related to the properties of the repair technique used, as well as the postoperative rehabilitation program applied. Early motion after tendon repair accelerates tendon healing and prevents adhesion formation. The purpose of this study was to investigate the effects of gap formation on repair site of postoperative immediate active mobilization after repairing extensor Zone IV tendon with 3 various suture techniques.

MATERIALS AND METHODS: The study was conducted on 9 fresh-frozen cadaveric upper extremities amputated from mid-shaft of humerus. While the extensor tendon was in place, Zone IV tendon was measured for length and for the amount of forces needed to flex and extend the finger. The same measurements were made after cutting and repairing the tendon. Three different suture techniques were used for repair: Double-Modified Kessler, Double Figure of Eight and Running Interlocking Horizontal Mattress and 3-0 PDS® suture have been applied. Each finger was flexed and extended for 200 times through the tendon axis without any sudden loading. After each cycle of 20 motions, any gap formation was checked, and the first moment of gap formation and the moment of 2 mm gap formation were recorded. The tendons with no gapping were flexed and extended 50 more times with double force and the gap in the repair zone was recorded.

RESULTS: We did not detect any failure in any of the suture techniques after applying repetitive motions on the repaired tendons. None of the tendons had measurable gap formation. Additionally, the tendons without gapping were repetitively flexed and extended for 50 times with double force. As a result, any failure or gap was not detected. The average postoperative extensor tendon shortening was 6.7 mm in Modified Kessler, 5.9 mm in Figure of Eight and 5.1 mm in Running Interlocking Horizontal Mattress method. No statistically significant difference among these values was identified.

DISCUSSION: A number of suture techniques for extensor tendon repairs have been broadly studied while no golden standard suture technique has yet been defined. In this study we compared 3 various suturing techniques used in extensor tendon repairs. We studied the changes in repair site resulting from early active mobilization and the effects of suture techniques on tendon shortening. We concluded that these suture techniques are resistant in vitro for starting postoperative early active motions. We did not identify any statistically significant difference in the impact of the applied suture techniques on the tendon shortening.

CONCLUSION: The results suggest that all 3 techniques applied are reliable for starting early active motion after extensor tendon Zone IV injuries. This is an in vitro study and in vivo and clinical studies are needed for further support.

KEY WORDS: Extensor tendon, cadaver, biomechanical, active motion, Zone IV