Effect of Clamping on Tensile Strength and Microscopic Changes in Various Suture Types: A Comparison between Needle Holders and Kelly Forceps

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INTRODUCTION:

Sutures are a fundamental part of any surgery. The use varies from bleeding control, closure of structures, definitive treatment in muscle-tendon repairs. When the surfaces are under tension to maintain the knot without loosening, multiple techniques have been described: locking the knot, clamping it with the Kelly clamp or needle holder.

The aim of this study is to evaluate the microscopic differences when clamping sutures with Kelly and needle holders, as well as the final tensile strength at suture rupture, comparing the sutures.

METHODS: 18 different types of sutures were analyzed in 3 groups: control group, Kelly clamp, and needle clamp. They were observed under microscope and subsequently tested with dynamometer, to evaluate the final tensile strength. RESULTS:

Microscopically, a more evident structural lesion was observed in the case of sutures clamped with needle holders. The sutures showed greater damage at lower thickness. Likewise, plastic and monofilament sutures presented greater structural deterioration.

The mean final tensile strength did not represent a significant p in 17 of the sutures, there was no difference between the groups, except for the Polysorb 1 in which the mean final tensile strength of the control group was 14.5357(7.050), the Kelly clamped group 11.9514(2.6200) and the needle holder group 10.6414(4.4400), significant difference between them p=0.044, representing an early suture breakage.

DISCUSSION AND CONCLUSION:

Significant microscopic injury when manipulating the sutures and clamping them. There was no loss of tensile strength of the sutures during suture clamping.

