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Effect of antagonist weakening on developed tension in cat extraocular muscle.

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Abstract

PURPOSE: In a previous study, the authors found that recession of an extraocular muscle resulted in atrophy of both the recessed muscle and its antagonist. To determine if atrophy, caused by weakening of an extraocular muscle, results in changes in developed tension in the antagonist, the authors studied force development of the cat lateral rectus muscle after adductor weakening. **METHODS:** Tenotomy of the left inferior, medial, and superior rectus muscles was performed in 18 cats. At 3, 6, and 12 weeks after surgery, the right (control) and left lateral rectus muscles were exposed through a lateral orbitotomy and were attached to isometric force transducers. Length-tension curves were obtained by direct muscle stimulation using bipolar contact electrodes at 0.1 Hz and 50% suprathereshold stimulus intensity. In addition, peak tetanic tension was measured at the optimal resting tension using a 5-second stimulus train at 200 Hz. Pooled data from the operative and control muscles at each postoperative interval were compared. **RESULTS:** Three weeks after adductor weakening, a 28% decrease in maximal single-twitch tension was seen in the left lateral rectus muscle when compared with controls. This difference disappeared at 6 weeks. No statistically significant changes in peak tetanic tension occurred at any time interval after surgery. **CONCLUSIONS:** Adductor weakening results in a transient decrease in single-twitch tension in the antagonist lateral rectus muscle in the cat.

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