

RESPONSE OF MEDIAL GASTROCNEMIUS MOTOR UNITS TO PARTIAL DENERVATION.
R Orozco and T Gordon, Faculty of Medicine, University of Alberta.

When a muscle is partially denervated, the remaining motoneurons sprout and reinnervate neighbouring denervated muscle fibers. This enlargement of the motor unit (MU) by collateral sprouting is an important compensatory mechanism for partial denervation. To study the capability of different MU types to enlarge, we partially denervated the medial gastrocnemius (MG) muscle of the cat by sectioning one (S1) of its two contributing ventral roots. Because the relative contributions of the two roots to the innervation of the MG varies among animals, this procedure resulted in varying degrees of partial denervation among the cats. Two to twelve months later, the enlargement of MU's in response to partial denervation was assessed by the electrophysiological study of single MU's. Animals were divided into four groups: 1) control (no MG denervation), 2) slight, 3) moderate and 4) severe MG denervation. Almost all animals were able to re-establish their original muscle force. Tetanic force was taken as a measure of MU size. MU's from group 2 did not show any exceptionally large MU's, however, the small units did enlarge. MU's from group 3 showed an even greater enlargement of small MU's. It was not until denervation was severe (group 4) that large MU's enlarged.

Our data suggest: 1) that the enlargement of intact MU's of the cat MG muscle is an effective compensatory response for partial denervation and 2) that there may be differences in response among the MU types.