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# **STRETCH REFLEXES IN HUMAN MASSETER**

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# ABSTRACT

The stretch reflex has been intensively studied in a number of spinal systems because of its importance as a manifestation of a major mechanism in the control of movements, posture, and locomotion, and because of its importance in clinical medicine. The aim of the present study was to investigate the pattern of reflexes evoked by stretch in a human jaw-closing muscle (masseter) at the level of the whole muscle and individual motor units. This matter is of particular interest because of earlier reports that the pattern of stretch-evoked responses in masseter differs from that of spinal muscles.

In order to study the reflex, a special-purpose stimulator was designed and built in this laboratory. This incorporated a number of unique features to match its performance to the special properties of the masticatory system. During my preliminary analysis of the surface electromyographic data, I developed a new analytical method with general application to signals of this type. This provides a quantitative index of muscle activity evaluation and is also free from the artefacts that conventional methods are known to produce in certain circumstances.

In contrast to earlier reports, the reflex response of the masseter to stretch was found to consist not only of a short-latency excitation, corresponding to monosynaptic projections of Ia afferents onto the homonymous motoneurons, but also of a long-latency phase which represents the output of a polysynaptic pathway. The later phase is more important physiologically, as it is this phase of excitation that produces active force in a reflex paradigm.

The study of the responses of individual motor units revealed further details of the organisation of this reflex. Among other things, some motoneurons were found to lack any physiologically significant projections from Ia afferents. Finally, I have developed a new method for estimating the shape of a compound post-synaptic potential evoked in a motoneuron by a sensory input.