



BIO-MECHANICAL CONTROL OF HUMAN MASTICATION

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Mastication has two fundamental control mechanisms: the **central pattern generator** (CPG) that sets the pattern of mastication by alternately sending action potentials to jaw opening and closing muscles; and the **peripheral controller** that modulates the output of the CPG and jaw muscle motoneurons so that optimum bite forces are developed between the jaws (1, 2). The peripheral control mechanism includes the cutaneous and mucosal receptors that innervate the lips and the oral mucosa, periodontal mechanoreceptors that innervate the support tissues of the tooth root, and muscle spindles in the jaw muscles (3, 4). These receptors monitor chewing forces and modify the activity of muscles in the jaw, tongue and cheeks in order to facilitate mastication and prevent damage to oral tissues. To investigate peripheral control of jaw muscles, we stimulate these receptors electrically and/or mechanically in consenting adult volunteers during simulated mastication (5). The responses of the jaw muscles to the stimuli are recorded using intramuscular fine wire and surface electromyography (EMG) electrodes. These studies contribute to a better understanding of the neuronal circuitry of the masticatory system and provide a scientific baseline from where the neurophysiological consequences of interventions that change the physical relationship of the masticatory elements can be investigated.

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