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Movement of the mandibular condyle and activity of the masseter and lateral pterygoid muscles during masticatory-like jaw movements induced by electrical stimulation of the cortical masticatory area of rabbits

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ABSTRACT The functional role of the lateral pterygoid muscle (LP) as well as the masseter muscle (MS) in the movement of the mandibular condyle was examined in masticatory-like jaw movement induced by electrical stimulation of the cortical masticatory area of urethane-anesthetized rabbits. The EMGs of the LP and the MS were recorded along with video images of the mandibular condyle movement recorded with a high-speed CCD camera at a time resolution of 8 ms. The time required for the contractile force of the MS and LP to emerge as bite force or jaw movement was determined by direct electrical stimulation to respective muscles. It was found that the latency from electrical stimulation of the LP to the point when the lower incisor point reached the maximum lateral deviation was 34.3 ± 2.9 ms and the time lag for the MS between the stimulation and the peak of bite force was 32.8 ± 1.5 ms. We calculate the time point when the MS or LP exerted its maximum influence on jaw movement or bite force on the basis of these latencies. It may be concluded that the transient activity of the LP on the working side in the occlusal phase is deeply involved in the movement of the incisal point toward the balancing side across the midline (the anterior movement of the mandibular condyle on the working side in this instance) which appears in the late occlusal phase of grinding movements.