

Mandibular border movements: The two envelopes of motion

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Abstract

Background The envelope of motion is a diagrammatic representation of the mandibular border movements. Classically, those movements are carried out eccentrically; starting from the position of maximal intercuspation, the mandible describes an excursion movement until reaching maximal mouth opening. Reverse movements would describe a different path, but up to now concentric development of mandibular border movements has not been considered. Literature states that beyond mandibular border movements limits, no movement is possible. Therefore, it is of great interest to compare both paths-both envelopes of motion-and define the actual limits of mandibular movement.

Objective The aim of this study was to compare the geometric characteristics of mandibular border movements carried out eccentrically and concentrically by healthy subjects.

Methods Sixteen individuals aged between 18 and 27 years, molar class I and with no temporomandibular disorders, participated in the study. Eccentric and concentric mandibular movements were recorded using a 3D electromagnetic articulograph. Data were processed with computational scripts developed in MATLAB. Maximum mouth opening, trajectories, displacement ranges, polygon areas and chewing cycle area/ mandibular border movements area ratio were analysed.

Results The frontal plane showed significant differences in all the parameters evaluated. Higher values were registered in the concentric area of the border movement envelope ($P = .008$) and in the trajectories on both sides. Statistical differences were observed in polygon areas ($P = .006$) in the sagittal plane and right ranges ($P = .046$) in the horizontal plane.

Conclusion Concentric mandibular movements revealed significant differences in three-dimensional trajectories in the frontal plane.

Palabras clave

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