

Symmetry of mandibular movements: A 3D electromagnetic articulography technique applied on asymptomatic participants

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Statement of problem: Asymmetries in mandibular movements (MMs) can be found in patients with some temporomandibular joint disorders, condylar fracture, or after orthognathic or orthodontic surgery. Quality and symmetry of the MMs should be recorded and analyzed. However, methods for this purpose are limited. Purpose: The purpose of this clinical study was to determine the symmetry of MMs on asymptomatic participants by applying an innovative technique based on 3D electromagnetic articulography. Material and methods: The symmetry of MMs was studied in 16 fully dentate participants (8 men and 8 women). A 3D electromagnetic articulograph was used to register MM by placing a sensor on the interincisal midline of the mandible. The border movements related to the frontal (FP), sagittal (SP), and horizontal (HP) polygons of the Posselt envelope of motion were recorded, as well as masticatory movements. Digital data processing was applied to calculate the trajectory and ranges of mandible displacement, area of the right and left sectors of FP and HP, similarity index between the right and left sectors of FP and HP, and orientation of the individualized masticatory cycles. The Shapiro-Wilk statistical test was used to determine the normality of the sample. To compare the characteristics of the right and left sectors of the polygons, a paired-samples t test (normal distributions) and Wilcoxon test for paired samples (non-normal distributions) were applied ($\alpha=.05$). Results: No statistically significant differences were found between the right and left sectors of the frontal and horizontal polygons in terms of trajectory (FP, $P=.408$; HP, $P=.417$), ranges of movement (FP, $P=.736$; HP, $P=.650$), areas (FP, $P=.736$; HP, $P=.233$), or orientation of the cycles ($P=.506$). The similarity index between the morphology of the

right and left sectors of the polygons was $68 \pm 12\%$ for the FP and $67 \pm 11\%$ for the HP. The areas, trajectories, and ranges had similar values, but they had a different morphology on each side of the polygons. Regarding masticatory cycles, a balanced distribution was observed in terms of their orientation. Conclusions: The technique used allowed the assessment of symmetry of MM on asymptomatic participants. The evaluated parameters maintain similar values at both left and right sides; however, a different morphology of the trajectories and areas was observed. © 2020 Editorial Council for the Journal of Prosthetic Dentistry