0137 Tri-axial Accelerometric Analysis of Dynamic Patterns of Mandibular Movements

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Objectives: The dynamics of mandibular movements is determined by neuromuscular physiology as well as pathophysiology of all parts of masticatory system. The objective of this pilot study was to examine if dynamic features of mandibular movements in healthy subject can be described and extracted through mandible acceleration measurements. Accelerometric analysis represents a simple and unique method for acquiring specific dynamic data of mandibular movement which can be used for determining physiological as well as pathological dynamics' patterns. Methods: This pilot study included a healthy subject without any signs or symptoms of temporomandibular disorders which was determined using RDC/TMD and AAOP examination protocols and computerized analysis of dental occlusion (T-Scan®II, Tekscan, USA). Accelerations were measured by tri-axial MEMS wireless acceleration sensor (G-LinkTM, Microstrain, USA) with range of +/-10g and freely selected sweep rate of 1 kHz. Sensor was mounted on custom-made holder firmly fixed to subject's mandibular teeth to avoid soft tissues' movement artefacts. Acquisition of acceleration data was performed during mouth opening-closing cycles, protrusive and laterotrusive movements with predetermined pace and amplitude. By means of accelerometric data mean vertical and horizontal velocities of the mandible during movements were calculated. Results: Acceleration and calculated respective velocities in the frontal plane of ten opening and closing cycles demonstrate smooth, repetitive and distinctive patterns of mandibular movements. Patterns are recognized and sequenced according to open-close cycle's phases. Analysis of acceleration and calculated velocity data during ten protrusive and laterotrusive movements in horizontal plane also reveal regular, repetitive and recognizable patterns. Conclusion: Acceleration and velocity during mouth opening-closing cycles demonstrate repetitive and distinctive dynamics patterns. They significantly differ ($P<0.05$) from patterns of protrusive and laterotrusive movements which also demonstrate repetitive and regular form. Those data could be used as the basis for time and spectral domain attribute description of regular and pathological mandibular movements.

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