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“ANALYSIS OF THE MANDIBULAR MOTOR SYSTEM IN PATIENTS WITH MYOGENOUS FORMS OF TEMPOROMANDIBULAR DISORDERS”

Introduction. Temporomandibular disorders (TMD) constitute a heterogeneous group of conditions involving the muscular and articular structures of the masticatory system. They may lead to pain, functional impairment, and reduced quality of life. TMDs are highly prevalent, particularly among women and individuals aged 20–40 years, and their etiology is multifactorial, encompassing local, systemic, psychosocial, and genetic components. The clinical presentation is complex, often accompanied by overlapping systemic symptoms, which makes diagnosis and management challenging. Myogenous forms of TMD are of particular interest because—despite the absence of intra-articular changes—they can alter mandibular movement patterns and the quality of jaw function. Therefore, detailed assessment of the mandibular motor system, using both clinical and instrumental methods, is essential to understand these dysfunctions and their impact on mandibular–maxillary relationships.

Aim of the study. The main objective of this dissertation was to analyze the impact of muscular (pain-related) forms of temporomandibular disorders (TMD) on the functioning of the masticatory system. Four specific research aims were defined: to analyze the localization of muscle pain in patients with muscular TMD, to evaluate mandibular range of motion and movement quality (clinical and axiographic examination) in these patients compared with a control group, to assess mandibular positional changes between the reference position and the maximum intercuspatation in patients with painful muscle dysfunction, and to analyze condylar movements during selected functional activities (swallowing, speech, bruxism) in TMD patients versus healthy individuals.

Material and methods. The study involved 52 generally healthy individuals aged 18–65 years, of both sexes. The study group consisted of 26 patients diagnosed with muscular TMD (according to DC/TMD criteria: local myalgia, myofascial pain with or without spreading or referred pain), with no signs of intra-articular dysfunction. The control group included 26 participants free from TMD symptoms or functional disturbances of the masticatory system. All subjects presented stable occlusal support in four posterior zones and had not undergone splint therapy, anti-inflammatory, or muscle-relaxant treatment in the previous 3 months. Each participant underwent a

standardized clinical examination based on the DC/TMD protocol (interview and physical examination, including muscle palpation, mandibular range of motion, and detection of acoustic phenomena or joint blocking). Subsequently, instrumental analysis was performed using electronic registration of mandibular movements with the Cadiax 4 axiograph (Gamma Dental, Austria). An individualized reference position (independent of occlusal contacts, corresponding to the clinical centric relation) was established and used as the starting point for all recordings. Maximum mandibular movements (opening, protrusion, lateral excursions) and selected functional activities (swallowing, speaking, simulated bruxism) were registered. Condylar motion traces were analyzed for range, quality, symmetry, and condylar positional changes between the reference position and maximum intercuspatation. Statistical comparisons between study and control groups were carried out, including analyses of age and sex as potential confounders.

Results. In the TMD group, pain most frequently involved the masseter muscles bilaterally, often combined with the temporalis muscles. Patient-reported pain locations were consistent with findings from palpation, supporting the reliability of the clinical interview. No statistically significant differences were found in maximal mandibular range of motion (e.g., mouth opening, protrusion, lateral excursions) between the study and control groups. However, patients with muscular TMD presented a significantly higher incidence of mandibular deviations (deflections) during mouth opening compared with controls. Despite the absence of intra-articular pathology, axiographic records revealed altered condylar motion patterns in TMD patients, including more frequent asymmetries of condylar trajectories during opening. Analysis of mandibular relations showed discrepancies between the reference position and maximum intercuspatation: in the study group, condyles were more often displaced from the reference trajectory (especially caudally, indicating joint distraction), whereas in controls these discrepancies were rare. Such non-coincidence of condylar position highlights the need for precise evaluation of mandibular relations beyond occlusal contacts. Conversely, condylar movements during functional activities (swallowing, speech, and bruxism) did not differ significantly between groups; motion patterns were largely symmetrical and comparable.

Conclusions. Patients with muscular forms of TMD did not exhibit a marked reduction in mandibular range of motion compared with healthy individuals. Instead, their dysfunction was characterized mainly by subtle qualitative alterations: mandibular

trajectory deviations, asymmetry of condylar paths, and discrepancies between reference and intercuspal positions. These findings suggest that chronic myogenous pain affects the quality and symmetry of mandibular movements rather than the magnitude of motion or the execution of functional tasks. The results underline the diagnostic value of axiography in detecting such subtle disturbances, which may facilitate early intervention, prevent secondary intra-articular complications, and support individualized treatment planning in prosthetic and occlusal rehabilitation.