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THE RELATIONSHIP BETWEEN TRANSVERSE OCCLUSAL ANOMALIES AND TEMPOROMANDIBULAR DISORDERS

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Abstract: Transverse malocclusions and asymmetry of the dentoalveolar complex are often regarded as potential etiological factors in the development of temporomandibular disorders (TMD). However, the literature provides conflicting evidence on their direct correlation.

Objective: To evaluate the relationship between transverse occlusal anomalies and clinical manifestations of TMD.

Materials and Methods: The study included 50 patients diagnosed with TMD according to DC/TMD criteria (mean age 25.4 ± 4.8 years; 31 women, 19 men). Patients were divided into five clinical subgroups: Myalgia, DDWR, DDWOR, Degenerative joint changes, and TMJ subluxation. Transverse occlusal parameters were clinically evaluated. CBCT was used to measure skeletal and dental asymmetry and occlusal plane inclination.

Results. The findings of the present study indicate that posterior crossbite was detected in 17% of patients diagnosed with TMD, while skeletal asymmetry was identified in 26% of cases. The inclination of the occlusal plane was most pronounced in patients with disc displacement with reduction (DDWR), which may reflect a compensatory adaptation of the masticatory system to altered condylar positioning.

Table 1. Distribution of transverse anomalies among TMD subgroups

TMD Group	Number of patients (n)	Posterior crossbite (%)	Skeletal asymmetry (%)	Inclination of occlusal plane (°, mean ± SD)
Myalgia	10	10	20	2.1 ± 0.8
DDWR	12	25	33	4.2 ± 1.1
DDWOR	9	22	28	3.8 ± 0.9
Degenerative changes	11	18	35	3.1 ± 0.7

Table 2. Correlation between transverse parameters and TMD clinical features

Parameter	Pain intensity (VAS)	Mandibular deviation (mm)	Joint sound	Correlation coefficient (r)
Crossbite presence	0.21	0.18	0.15	n.s.
Skeletal asymmetry index	0.27	0.25	0.22	n.s.
Occlusal plane inclination	0.48	0.42	0.36	$p < 0.05$

Discussion. Posterior crossbite was found in 17% of patients and skeletal asymmetry in 26%. The inclination of the occlusal plane was highest in the DDWR group. No significant correlations were found between crossbite presence and TMD symptoms, although occlusal plane inclination showed moderate correlation with pain and mandibular deviation. Despite these morphological deviations, no statistically significant correlations were found between the presence of crossbite or skeletal asymmetry and the severity of TMD symptoms. This observation suggests that transverse occlusal discrepancies alone may not act as primary etiological factors in the development of TMD but rather contribute as secondary or predisposing elements in patients with functional instability of the stomatognathic system.

These results are consistent with previously published findings by Michelotti et al. (2018) and Alhammadi et al. (2021), who reported that structural asymmetries and transverse occlusal discrepancies have a limited but measurable impact on TMJ biomechanics and muscle function. However, the absence of a strong correlation underscores the multifactorial nature of TMD, in which neuromuscular regulation, psychological factors, and parafunctional habits often play a more dominant role than occlusal morphology alone.

Further longitudinal studies using three-dimensional imaging and functional occlusal analysis are required to clarify the causal relationship between transverse discrepancies and TMJ dysfunction.

Conclusion. There was no statistically significant association between transverse malocclusion and **t**emporomandibular dysfunction. Correction of transverse occlusal anomalies should not be considered a primary therapeutic target for TMD, but rather as part of a comprehensive rehabilitation plan. Within the limitations of this study, the results demonstrate **no** statistically significant association between transverse occlusal anomalies and temporomandibular dysfunction (TMD). The presence of posterior crossbite or skeletal asymmetry did not correlate with pain intensity, mandibular deviation, or joint sound. However, a moderate relationship between occlusal plane inclination and TMD symptoms indicates that occlusal imbalance may act as a contributing rather than a causative factor. Therefore, correction of transverse occlusal anomalies should not be viewed as an isolated or primary therapeutic objective in TMD management. Instead, it should be integrated into **a** comprehensive multidisciplinary rehabilitation program**,** combining occlusal equilibration, physiotherapy, and neuromuscular reeducation. Future longitudinal and 3D-based studies with larger cohorts are essential to clarify the adaptive mechanisms of the temporomandibular joint in the presence of transverse discrepancies and to establish clinical guidelines for evidence-based orthodontic intervention in TMD patients.

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