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TEMPOROMANDIBULAR JOINT DYSFUNCTIONS: A SYSTEMATIC REVIEW.

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ANNOTATION

Temporomandibular disorders (TMD) is a collective term for a group of musculoskeletal conditions involving pain and/or dysfunction in the masticatory muscles, temporomandibular joints (TMJ) and associated structures. It is the most common type of non-odontogenic orofacial pain and patients can present with pain affecting the face/head, TMJ and or teeth, limitations in jaw movement, and sounds in the TMJ during jaw movements. Comorbid painful and non-painful conditions are also common among individuals with TMD.

Key words: *TMJ, stress, pain, dysfunction*

ANNOTATSIYA

Chakka-pastki jag‘ bo‘g‘imi (chpjb) disfunksiyalari (ChPJBD) *bu chaynash mushaklari, temporomandibulyar (tepa-jag‘) bo‘g‘imlar va ularga bog‘liq tuzilmalarida og‘riq va/yoki disfunktsiya (noto‘g‘ri ishlash) bilan namoyon bo‘ladigan mushak-skelet tizimiga oid kasalliklar guruhi uchun qo‘llaniladigan umumiy atamadir.*

Bu holat tishlar bilan bog‘liq bo‘lmagan eng keng tarqalgan orofasial (og‘iz va yuz) og‘riq turi hisoblanadi. Bemorlarda yuz/boshda, tepa-jag‘ bo‘g‘imida va/yoki tishlarda og‘riq, jag‘ harakatining cheklanganligi hamda jag‘ni harakatlantirganda bo‘g‘imdan chiqadigan ovozlar (shovqinlar) kabi belgilar kuzatilishi mumkin.

ChPJBD *bilan og‘rigan bemorlarda og‘riqli va og‘riqsiz holatlar ham tez-tez uchraydi.*

Kalit so‘zlar *:ChPJB, stress, og’riq,disfunksiya**.***

АННОТАЦИЯ

Дисфункции височно-нижнечелюстного сустава (ДВНЧС) *— это собирательный термин для группы мышечно-скелетных заболеваний, проявляющихся болью и/или нарушениями в работе жевательных мышц, височно-нижнечелюстных суставов (ВНЧС) и связанных с ними структур.*

Это наиболее распространённый тип не одонтогенной (не связанной с зубами) лицевой боли. У пациентов могут наблюдаться боли в области лица/головы, ВНЧС и/или зубов, ограничение движений челюсти, а также звуки(щелчки) в суставе при движении челюстью.

У людей с ДВНЧС также часто встречаются сопутствующие болевые и неболевые состояния.

Ключевые слова: *ВНЧС, стресс, боль, дисфункция*

Temporomandibular Joint Dysfunctions: A Systematic Review.

Annotation

Temporomandibular disorders (TMDs) constitute a heterogeneous group of musculoskeletal

conditions affecting the temporomandibular joint, masticatory muscles, and associated structures, and are recognized as the leading cause of non-odontogenic orofacial pain. Their etiology is multifactorial, involving biological, psychological, and social determinants that interact dynamically with environmental stressors. Comorbid conditions, such as insomnia, irritable bowel syndrome, and generalized fatigue, further underscore the systemic and biopsychosocial nature of TMD.

Over recent decades, diagnostic approaches have advanced significantly. The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) and its evidence-based revision, the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), have become internationally recognized standards. These instruments employ a dual-axis model: Axis I addressing biological aspects through clinical examination, and Axis II evaluating psychosocial domains. This framework highlights the essential, though often underestimated, role of psychological and global health factors in both the onset and prognosis of TMD.

The present article reviews current knowledge regarding the epidemiology, etiology, and diagnostic frameworks of TMD within a biopsychosocial paradigm. Special emphasis is placed on the implications of standardized diagnostic criteria for interdisciplinary collaboration and clinical practice in dentistry, particularly orthodontics and prosthodontics. Understanding the multifactorial origins and prognostic determinants of TMD is critical for improving diagnostic accuracy, tailoring treatment strategies, and preventing chronicity.

Temporomandibular disorders (TMDs) comprise a diverse spectrum of musculoskeletal conditions that primarily affect the masticatory muscles, the temporomandibular joint (TMJ), and surrounding anatomical structures. These disorders are commonly manifested through pain, restricted mandibular mobility, and functional impairments. Importantly, TMDs are recognized as the leading cause of non-odontogenic orofacial pain, representing a significant clinical and public health concern due to their high prevalence and impact on patients' quality of life. Clinical manifestations commonly include pain in the facial and cranial regions, discomfort localized to the TMJ or dentition, restricted mandibular mobility, and joint noises during functional movements. In addition, patients with TMD frequently exhibit concomitant painful and non-painful comorbidities.

The diagnosis of temporomandibular disorders (TMDs) has evolved substantially over the past several decades. Early clinical assessments were often inconsistent, relying heavily on subjective interpretation and varying clinical experience. This lack of standardization limited both the comparability of research findings and the reliability of treatment outcomes.

A major step forward occurred with the development of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) in 1992. This dual-axis system introduced a biopsychosocial perspective to TMD assessment, incorporating both clinical (Axis I) and psychosocial (Axis II) dimensions. While the RDC/TMD represented an important milestone, subsequent studies highlighted its limitations, particularly in terms of diagnostic sensitivity for certain conditions and applicability in routine clinical practice.

To address these shortcomings, the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) were established in 2014 as an evidence-based revision. The DC/TMD has since gained international acceptance for both research and clinical applications. Its design emphasizes reliability, validity, and ease of use, making it applicable across diverse clinical settings, including dentistry, orthodontics, maxillofacial surgery, and physical therapy.

The system classifies 12 of the most common TMD entities, dividing them into painful disorders—such as myalgia, arthralgia, and headache attributed to TMD—and non-painful conditions, including disc displacement, degenerative joint disease, and subluxation. By offering precise diagnostic categories, the DC/TMD promotes accurate case identification, facilitates interdisciplinary communication, and supports the development of tailored treatment strategies.

Furthermore, the adoption of standardized diagnostic criteria has enabled a more robust

body of epidemiological data, helping to clarify the prevalence and distribution of TMDs across populations. Current evidence suggests that TMDs affect approximately 5–12% of the general population, with a higher prevalence observed among women, particularly during their reproductive years. This gender and age distribution underscores the multifactorial nature of TMD pathogenesis, where biological, psychological, and social factors intersectIn recent decades, substantial progress has been made in improving the diagnostic accuracy of temporomandibular disorders. The introduction of the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) has provided a validated and widely accepted framework for the assessment of these conditions. This standardized system enhances diagnostic reliability, ensures consistency across clinical and research settings, and facilitates interdisciplinary communication. The DC/TMD encompasses 12 of the most frequently observed TMD categories, which include both painful conditions—such as myalgia, arthralgia, and TMD-related headaches—and non-painful entities, including disc displacement, degenerative joint disorders, and joint subluxation.

Emerging evidence indicates that the pathophysiology of painful TMD is complex, multifactorial, and best understood within a biopsychosocial model. No single factor appears to account for its onset; rather, various predisposing, initiating, and perpetuating elements have been identified, encompassing both peripheral and central mechanisms. Ongoing research aims to elucidate specific causal pathways and, ultimately, to translate this understanding into mechanism-targeted diagnostic and therapeutic approaches.

In alignment with this multifaceted etiology, current clinical guidelines advocate for conservative, multidisciplinary management. Recommended strategies typically involve patient-centered self-care, behavioral interventions, physiotherapeutic modalities, and pharmacological support.

Etiology and Pathophysiology

Painful temporomandibular disorders (TMD) are now widely recognized as biopsychosocial and multifactorial in nature, making the identification of a single causative factor in an individual patient highly improbable. Psychological characteristics and heightened pain amplification have been hypothesized as key domains contributing to the etiology of painful TMD. ecent research has highlighted the role of comorbidities and systemic health factors in the development and persistence of temporomandibular disorders. Conditions such as irritable bowel syndrome, fibromyalgia, and chronic insomnia have been identified as significant, independent predictors for the onset of painful TMD. In addition to these systemic associations, patients frequently present with nonspecific orofacial complaints, including muscular stiffness, fatigue, and generalized discomfort. Collectively, these manifestations are conceptualized within the broader framework of "general health and global symptoms," underscoring the complex biopsychosocial nature of TMDs. This perspective supports the view that TMDs are not purely localized musculoskeletal disorders but may represent a component of multisystem dysfunction, thereby necessitating an interdisciplinary diagnostic and therapeutic approach.

Together, these three domains—psychological factors, pain amplification, and global health symptoms—comprise diverse sets of risk determinants. They are thought to be modulated by gene expression and shaped by social as well as environmental influencesAccumulating evidence suggests that psychosocial and global health domains play a pivotal role in the initial onset of temporomandibular disorders, while mechanisms of pain amplification are more strongly associated with disease progression and long-term prognosis. The etiology of TMD is increasingly understood through a biopsychosocial framework, in which biological predispositions, psychological traits, and social vulnerabilities interact dynamically with environmental and contextual stressors. This multifactorial interplay can precipitate the emergence of painful TMD and its associated comorbidities, even in the absence of a clearly identifiable initiating event, such as microtrauma or macrotrauma.

Once symptoms develop, prognostic determinants—including the degree of pain-related interference in daily activities, general health status, pain sensitivity thresholds, psychological resilience or vulnerability, and social support systems—become critical in shaping the clinical course. These factors collectively influence whether the disorder transitions toward chronicity or, conversely, resolves spontaneously or with intervention. Understanding these prognostic indicators is essential not only for predicting outcomes but also for tailoring individualized treatment strategies and preventing long-term disability.

Biopsychosocial etiology

The etiology of temporomandibular disorders (TMDs) is widely recognized as multifactorial, arising from the complex interplay of biological, psychological, and social determinants. From a biological perspective, a range of contributing mechanisms have been identified. These include traumatic injuries to the orofacial region, systemic immune-mediated or inflammatory conditions, and, less frequently, neoplastic processes involving the temporomandibular joint (TMJ) and associated structures. Local biomechanical factors—such as occlusal interferences, malposition or premature loss of teeth, postural deviations, and dysfunctions of the masticatory musculature—are also considered important predisposing elements. In addition, intrinsic and extrinsic alterations within the TMJ, together with nonfunctional mandibular activities (e.g., bruxism and clenching), are consistently associated with the onset and perpetuation of TMD-related symptoms.

Psychological influences represent another major etiological dimension, with depression, anxiety, heightened stress reactivity, and maladaptive coping strategies serving as recognized risk factors for both the initiation and chronification of TMD. Social determinants, meanwhile, often manifest through learned behavioral responses to pain, reduced social support, and the influence of environmental or occupational stressors. Collectively, these biological, psychological, and social variables converge within a biopsychosocial framework, emphasizing that TMDs should not be regarded as isolated local pathologies, but rather as conditions shaped by systemic and contextual influences.

For diagnostic purposes, the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), and its subsequent revision into the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), have gained international recognition as standardized and validated frameworks. Both systems are grounded in the biopsychosocial model of health and disease, reflecting the multifactorial nature of TMD. A central feature of these instruments is their dual-axis structure: Axis I focuses on the biological and clinical aspects of the disorder, including musculoskeletal and joint-related findings obtained through standardized examination protocols; Axis II evaluates psychosocial dimensions such as pain-related disability, emotional distress, and behavioral factors, typically through structured, validated questionnaires.

The incorporation of this dual-axis approach underscores the pivotal contribution of psychosocial domains—such as stress, anxiety, depression, and pain coping behaviors—to both the onset and progression of TMD. Nevertheless, these factors remain underrecognized in routine dental practice, where the emphasis often falls disproportionately on occlusal or biomechanical variables. Integrating Axis II assessments more consistently into clinical workflows is therefore essential for achieving a comprehensive understanding of TMD and for developing effective, individualized treatment strategies [14].Stress is considered a potential contributing factor in the development of temporomandibular disorders (TMD), as it may lower the pain perception threshold within the central nervous system, intensify parafunctional habits, and increase fatigue and tension of the masticatory muscles, thereby initiating pathological changes [5]. Clinical observations consistently demonstrate that individuals with TMD exhibit higher levels of depression compared to healthy controls. Moreover, studies differentiating patients based on the presence or absence of pain have reported significantly greater levels of depressive symptoms among those with painful TMD than among patients with non-painful forms of the disorder.

An additional noteworthy observation is that children exposed to adults suffering from depression are at an elevated risk of developing painful TMD during early adulthood [6]. The role of anxiety in the pathogenesis of TMD remains more controversial. While numerous investigations suggest a positive association between TMD and anxiety [7], other studies report conflicting evidence [8], indicating that anxiety may play a less significant role than depression in this context. The discrepancies among published findings may be attributable to methodological differences, including study design, the characteristics of the study population, and the diagnostic or psychometric tools employed.

Role of occlusion

The etiological significance of occlusal factors in temporomandibular disorders (TMD) remains one of the most debated and controversial topics in the literature. Similar to other contributing elements, occlusal factors should be regarded as potential risk modifiers rather than as sole causative agents. The extent of occlusal disharmony does not appear to serve as a reliable predictor of dysfunction severity. Nevertheless, unstable occlusal conditions may be considered predisposing factors. For instance, individuals with dolichofacial morphology may experience joint overload, as a steep articular eminence has been reported to increase susceptibility to intracapsular derangements.

The evidence concerning the relationship between occlusion and TMD is inconsistent. While some clinical studies have demonstrated statistically significant correlations between long-term occlusal interferences and the occurrence or frequency of TMD signs and symptoms [4], other investigations have concluded that occlusal features possess limited predictive value in detecting muscular disorders of the stomatognathic system [3].

Condylar position within the glenoid fossa has also been extensively investigated. Weinberg reported a correlation between condylar displacement and TMJ dysfunction. Anterior displacement of the condyle may influence the musculature by eliciting hyperfunctional responses within the proprioceptive system, whereas posterior displacement is commonly associated with intra-articular alterations such as disc derangements, reciprocal clicking, potential anterior disc dislocation, abnormal swallowing patterns, and nociceptive stimulation of the proprioceptive system [12].

Effects of TMD on oral-health related QoL

Naito et al. (2006) reported that both oral health status and oral health–related quality of life (QoL) are significantly compromised in individuals with temporomandibular disorders (TMD), with many patients experiencing substantial impairments in daily functioning and overall well-being [13]. A subsequent study conducted at Universiti Malaya further highlighted the negative impact of TMD on oral health–related QoL by employing the Oral Health Impact Profile for TMD (OHIP-TMD). Domain-specific and global OHIP-TMD scores were compared according to the severity of TMD.

The results demonstrated statistically significant differences ($p < 0.001$) across all seven domains—functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap—as well as in global scores. A clear gradient was observed, with OHIP-TMD scores highest in the severe TMD group, followed by moderate, mild, and no TMD categories. Higher global scores reflected poorer oral health–related QoL, indicating a progressive decline in perceived well-being with increasing severity of TMD.

Among the domains, the greatest mean difference in OHIP-TMD scores between severity groups was noted in the Physical Pain category, whereas the smallest difference was observed in the Social Disability domain. These findings suggest that TMD not only compromises quality of life but that the degree of impairment is directly proportional to the severity of clinical signs and symptoms.

Conclusion

Recent advances in painful TMD research have provided valuable insights into its natural history and prognosis, indicating that the disorder should not be regarded merely as a localized

"jaw" condition. Instead, it reflects a multifactorial and complex pathology involving biological, psychological, and social determinants. Recognition of this complexity has shifted the clinical focus from symptomatic treatment alone to a more integrative approach aimed at addressing causal and contributing mechanisms.

Current evidence emphasizes the importance of adopting a biopsychosocial assessment framework, utilizing validated DC/TMD diagnostic protocols to ensure accurate evaluation. In terms of management, conservative and multidisciplinary strategies are regarded as the standard of care. These may include physiotherapy to improve joint mobility and reduce muscular hyperactivity, behavioral and cognitive interventions to address stress-related parafunctional habits, pharmacological approaches for pain modulation, and occlusal appliances where indicated to reduce mechanical strain on the temporomandibular joint. The integration of these modalities underscores the need for individualized, patient-centered treatment plans that not only alleviate symptoms but also improve long-term function and quality of life.

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