



Stress Related Somatic Manifestations and Their Influence on Temporomandibular Disorder Severity

An Evidence Informed Biopsychosocial Review

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Abstract

Temporomandibular disorders (TMDs) include painful and dysfunctional conditions affecting the temporomandibular joints, masticatory muscles, and related structures. Structural findings alone often do not explain differences in pain intensity, disability, or persistence. Psychological stress can be accompanied by somatic manifestations such as headache, neck and shoulder pain, fatigue, disturbed sleep, gastrointestinal discomfort, dizziness, palpitations, and widespread bodily pain. These symptoms may influence TMD severity through autonomic arousal, altered hypothalamic-pituitary-adrenal regulation, increased oral parafunction, muscle guarding, impaired sleep, heightened pain vigilance, and central sensitization. The relationship is bidirectional: stress and somatic burden may increase vulnerability to painful TMD, while continuing jaw pain and functional limitation can intensify distress and bodily symptoms. Prospective findings from the Orofacial Pain Prospective Evaluation and Risk Assessment programme identify global psychological and somatic symptoms as important predictors of first-onset painful TMD. Recent systematic evidence also links stress, anxiety, depression, and somatization with TMD development and severity. Clinical assessment should therefore combine physical diagnosis with evaluation of pain-related disability, somatic symptom burden, mood, sleep, oral behaviours, and daily function. Screening does not imply that pain is imaginary or exclusively psychological. Management should begin with conservative, reversible care and may include education, graded jaw exercise, manual therapy, cognitive behavioural therapy, stress regulation, sleep intervention, and coordinated referral. A biopsychosocial approach can reduce unnecessary procedures while addressing the physical and psychosocial factors that sustain symptom severity.



Keywords: temporomandibular disorders, psychological stress, somatic symptoms, pain severity, somatization, biopsychosocial care

Introduction

Temporomandibular disorders are a group of musculoskeletal and neuromuscular conditions involving the temporomandibular joints (TMJs), masticatory muscles, and associated tissues. Common manifestations include jaw or facial pain, headache attributed to TMD, joint sounds, locking, restricted mandibular movement, tenderness, and difficulty chewing. Clinical severity varies considerably. Some people have clear joint sounds or imaging changes with little disability, whereas others experience marked pain and functional limitation despite modest structural findings. This variation requires an account that includes tissue pathology while also examining pain processing, behaviour, sleep, emotional state, and social context (National Academies of Sciences, Engineering, and Medicine [NASEM], 2020).

Stress is relevant to this broader account, but it should not be presented as a single cause. TMD can follow trauma, joint disease, muscle overload, or other local factors. Psychological stress may increase susceptibility, amplify symptoms, or slow recovery in some patients. Persistent pain can also become a source of stress. A biopsychosocial model treats these influences as interacting processes and preserves the reality of the physical complaint (Engel, 1977).

Stress Related Somatic Manifestations

Somatic manifestations are bodily symptoms that occur in association with physiological strain, emotional distress, medical illness, or combinations of these influences. In patients with TMD, relevant symptoms may include headache, neck and shoulder pain, fatigue, nonrestorative sleep, dizziness, palpitations, gastrointestinal discomfort, and pain in several body regions. The term somatic symptom burden describes the number and severity of such symptoms. It does not establish that symptoms are medically unexplained, fabricated, or caused only by psychological factors.

The Patient Health Questionnaire-15 (PHQ-15) is commonly used to grade somatic symptom severity, while the shorter Somatic Symptom Scale-8 (SSS-8) can reduce assessment burden. The PHQ-15 has been incorporated into the psychosocial assessment associated with the Diagnostic



Criteria for Temporomandibular Disorders (DC/TMD) (Kroenke et al., 2002; Schiffman et al., 2014). A high score should prompt broader assessment of medical conditions, medication effects, sleep, mood, health anxiety, pain distribution, and functional impact. It should never substitute for physical examination or appropriate investigation.

Somatic burden is clinically important because painful TMD frequently overlaps with headache, neck pain, fibromyalgia-like symptoms, fatigue, and sleep disturbance. A systematic review estimated substantial levels of depression and moderate-to-severe somatization among patients diagnosed with TMD, although included studies varied in setting and measurement (Felin et al., 2024). This clustering suggests that the jaw complaint may form part of a wider pain and symptom-regulation pattern in some patients.

Biological and Behavioural Pathways

Stress activates autonomic and endocrine responses intended to support short-term adaptation. Repeated or prolonged activation may disturb hypothalamic-pituitary-adrenal (HPA) regulation, sleep, immune signalling, and descending pain modulation. Sympathetic arousal may increase muscle tension and reduce opportunities for recovery. These processes do not directly produce the same symptoms in every person, but they can alter the threshold at which peripheral input is experienced as painful.

Behaviour provides another pathway. During demanding periods, people may increase awake tooth contact, clenching, jaw bracing, nail biting, gum chewing, or guarded posture without noticing it. Sustained masticatory muscle activity can provoke fatigue or tenderness, particularly when the tissues are already sensitized. Sleep disturbance may worsen pain inhibition, concentration, coping, and emotional regulation. The resulting fatigue can increase bodily vigilance and make ordinary sensations more intrusive.

Persistent nociceptive input can also change central processing. Central sensitization refers to increased responsiveness of the central nervous system to sensory input and may be expressed as reduced pain thresholds, pain beyond the original site, or disproportionate responses to pressure (Woolf, 2011). It is one potential mechanism for chronic or widespread symptoms, not a universal



explanation for TMD. Local joint or muscle pathology, neuropathic conditions, systemic disease, and headache disorders still require careful differential diagnosis.

Influence on Temporomandibular Disorder Severity

Stress-related somatic manifestations can influence several dimensions of TMD severity. Increased jaw-muscle activity and guarding may intensify tenderness and pain during chewing. Headache, neck pain, and poor sleep may add to the total pain burden and reduce recovery between episodes. Fatigue and dizziness can restrict activity, while gastrointestinal or cardiopulmonary sensations may increase health concern. As symptoms accumulate, patients may report greater interference with eating, speaking, working, social contact, and sleep even when mandibular range changes little.

Severity should therefore be measured across more than pain intensity. Clinically meaningful assessment includes pain frequency and duration, mandibular function, graded pain-related disability, sleep disruption, participation in daily activities, treatment use, and quality of life. Repeated measurement helps determine whether improvement reflects lower pain, better function despite continuing symptoms, or both.

Cognition and emotion shape this relationship. Pain catastrophizing can increase the expected threat of jaw movement, while fear of damage can lead to avoidance and repeated checking of the bite or joint. Reduced movement may then weaken confidence and reinforce disability. Anxiety can heighten attention to bodily sensations, and depressive symptoms may reduce activity and treatment engagement. These processes do not mean that the pain is imagined; they describe how the nervous system assigns salience and threat to genuine sensory input.

Prospective evidence supports the clinical relevance of these factors. In the OPPERA cohort, initially TMD-free adults completed measures of stress, affect, coping, and bodily symptoms. Global psychological and somatic symptom scores emerged as especially strong predictors of first-onset painful TMD in multivariable analysis (Fillingim et al., 2013). Other OPPERA reports describe TMD onset as the product of multiple phenotypic vulnerabilities rather than one necessary cause (Slade et al., 2016).



Recent synthesis reaches a similar conclusion. A 2025 systematic review and meta-analysis of 21 studies reported significant associations between TMD and anxiety, depression, stress, and somatization; stress was also associated with development and severity (Saini et al., 2025). These findings support routine psychosocial assessment, but much of the evidence remains observational. Correlation cannot determine whether distress preceded pain, resulted from it, or shared an underlying cause.

Clinical Assessment

Assessment should establish both a physical diagnosis and the factors that influence disability. DC/TMD Axis I uses history and standardized examination to identify pain-related and intra-articular diagnoses. Axis II evaluates pain intensity, pain-related disability, jaw function, emotional distress, somatic symptoms, and oral behaviours (Schiffman et al., 2014). The axes are complementary. A patient can have demonstrable myalgia or arthralgia and also have insomnia or high somatic burden that changes prognosis and treatment needs.

The history should cover onset, duration, pain location, aggravating movement, locking, trauma, headache, sleep, oral behaviours, previous procedures, medication, stressors, and interference with daily life. Examination should assess mandibular movement, familiar pain on movement or palpation, joint sounds, and possible dental or neurological alternatives. Imaging is appropriate when it is likely to change management, not simply because symptoms are severe. Fever, swelling, progressive occlusal change, cranial nerve findings, unexplained weight loss, cancer history, or a new severe headache requires prompt medical evaluation.

Brief screening may include the PHQ-15 or SSS-8 for somatic burden, PHQ-9 for depressive symptoms, Generalized Anxiety Disorder-7 (GAD-7), a pain-disability measure, sleep assessment, and the Oral Behaviors Checklist. Scores guide conversation and referral; they do not diagnose a mental disorder by themselves. Clinicians should explain that these questions are routine because sleep, stress, mood, and nervous-system regulation influence pain. Such language validates the patient and reduces the risk that psychosocial screening will be heard as dismissal.



Management Implications

Initial management should usually be conservative, reversible, and matched to the dominant contributors. Education can explain the diagnosis, reassure the patient that pain is real, and describe how loading, sleep, stress, and pain modulation interact. Self-management may include relaxed jaw posture, reduced sustained clenching, temporary modification of painful chewing, graded jaw movement, general physical activity, local heat or cold, and appropriate short-term analgesia. A systematic review of etiological factors supports attention to sleep, depression, anxiety, somatization, and oral parafunction alongside physical findings (Warzocha et al., 2024).

When distress, catastrophizing, avoidance, or insomnia maintains disability, psychological care becomes part of pain treatment. Cognitive behavioural therapy (CBT) can address threatening interpretations, avoidance, ineffective coping, and relapse planning. Stress-regulation practice, biofeedback, and sleep-focused intervention may help selected patients. A systematic review of psychological treatments reported benefits for painful TMD, although differences in interventions and study quality require individualized decisions (Christidis et al., 2024).

Current evidence for chronic TMD pain also supports integrated conservative care. A 2023 clinical practice guideline strongly recommended CBT with or without biofeedback or relaxation, therapist-assisted mobilisation, manual trigger-point therapy, supervised postural exercise, supervised jaw exercise and stretching, and usual care such as education and home exercise (Busse et al., 2023). These recommendations apply to chronic pain and should not be transferred uncritically to every acute presentation.

Referral for psychological or psychiatric assessment should be framed as an expansion of care rather than evidence that the symptoms are unreal. Complex cases may require collaboration among dentistry or orofacial pain, primary care, physiotherapy, nursing, psychology, sleep medicine, neurology, rheumatology, or psychiatry. Outcomes should include chewing tolerance, mandibular function, sleep, participation, emotional distress, medication use, and confidence in self-management in addition to pain intensity.



Nursing and Interprofessional Practice

Nurses can identify the wider symptom pattern because routine assessment often includes sleep, stress, medication, nutrition, daily functioning, and pain outside the jaw. They can reinforce relaxed jaw posture, pacing, graded activity, sleep hygiene, and treatment adherence. They can also detect deteriorating mood, excessive analgesic use, or symptoms that require urgent referral. Consistent communication across the team is essential. Statements such as “nothing is wrong” or “the pain is psychological” can increase shame and vigilance. A more accurate explanation is that joint or muscle pain and nervous-system regulation interact, and both can be treated.

Research Considerations

Future research should use longitudinal and repeated-measures designs to determine whether changes in stress, sleep, oral behaviour, and somatic burden precede changes in TMD severity. Studies should apply validated DC/TMD diagnoses, distinguish myogenous from joint-related pain, and report pain, disability, function, quality of life, and adverse effects. Cultural differences in reporting emotional and bodily distress also require attention. The purpose of somatic assessment is to improve clinical precision, not to assign a psychosomatic label without evidence.

Conclusion

Stress-related somatic manifestations can increase the severity and persistence of TMD through interacting biological, behavioural, and cognitive pathways. Headache, widespread pain, fatigue, poor sleep, autonomic symptoms, and gastrointestinal discomfort may add to pain burden and functional limitation. The relationship is reciprocal, and stress should not be treated as the sole explanation for jaw pain. A complete assessment combines physical diagnosis with measurement of disability, somatic burden, emotional distress, sleep, and oral behaviours. Conservative physical care, stress regulation, CBT, graded exercise, and coordinated referral can then be matched to the individual factors sustaining symptoms.



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