Mini-Review

Relationship Between Body Posture, Dental Occlusion, and the Fascial System: Implications for Physiotherapy—A Literature Review

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Abstract: Postural control is a complex process involving the integration of musculoskeletal structures, sensory systems, and neuromuscular regulatory mechanisms. Evidence suggests that the stomatognathic system—including the temporomandibular joint, teeth, mandible, and masticatory muscles—may influence overall body posture. The fascial system is also recognized as a mediator of force transmission, proprioception, and biomechanical integration throughout the body. This mini-review examines the relationships among dental occlusion, postural control, fascial connectivity, extracellular-matrix remodeling, and hormonal influences, with emphasis on their implications for physiotherapeutic assessment and intervention. Current findings support a possible functional interaction, but the association is multifactorial and does not establish a universal causal relationship. Integrated assessment and interdisciplinary care may be useful in selected patients, while more rigorous and standardized studies remain necessary.

Keywords: posture; dental occlusion; temporomandibular disorders; fascia; physiotherapy; postural control.

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1. Introduction

Body posture results from the integration of musculoskeletal structures, sensory systems, and neuromuscular mechanisms responsible for maintaining alignment and balance under static and dynamic conditions. The central nervous system combines visual, vestibular, and somatosensory information to regulate body position and coordinate the muscular activation required for stability.

Within this context, the stomatognathic system—formed by the teeth, mandible, temporomandibular joint (TMJ), and masticatory muscles—has been investigated as a potential contributor to postural control. Anatomical and functional connections between the TMJ and the cervical region form the craniocervicomandibular system. Studies have reported associations between malocclusion, head posture, plantar support, and postural stability, although the magnitude and clinical relevance of these associations vary among populations and assessment methods [1-6].

This mini-review analyzes the relationship between dental occlusion, postural control, and fascial continuity and discusses the possible implications for physiotherapeutic assessment and treatment.

2. Relationship Between Dental Occlusion and Body Posture

The relationship between dental occlusion and body posture has been investigated through the interactions among musculoskeletal organization, neuromuscular control, and sensory integration. The stomatognathic system may modulate postural responses through changes in mandibular position, masticatory-muscle activity, cervical stabilization, and trigeminal sensory input [1-6].

Malocclusion can modify mandibular position and may be accompanied by adaptations in masticatory and cervical muscle activity. Reported postural findings include forward-head posture and changes in cervical alignment. However, observational associations do not demonstrate that occlusal alterations are the primary cause of these findings, and results are influenced by age, breathing pattern, pain, parafunctional habits, emotional factors, and pre-existing musculoskeletal conditions [3-6].

Experimental and clinical studies of postural balance have also produced mixed results. Occlusal splints and therapeutic exercises may affect balance in some patients with signs and symptoms of temporomandibular disorders, while broader evidence indicates that dental occlusion, postural stability, and gait are not consistently correlated in all adults [6,15]. Therefore, not every occlusal alteration produces postural dysfunction, and not every postural alteration originates in the stomatognathic system.

3. Role of the Fascial System in Postural Integration

Fascia is a continuous three-dimensional connective-tissue network that surrounds, connects, and separates muscles, bones, nerves, vessels, and organs. It contributes to mechanical-force transmission, proprioception, tissue sliding, and movement coordination. This continuity supports an integrated view of the body in which local restrictions can be associated with compensatory responses in distant regions.

Anatomical studies describe sensory innervation and mechanoreceptors within fascial tissues, supporting a role in proprioceptive signaling and modulation of muscle tone [7,8]. Fascial thickness also appears to be associated with aging and flexibility [7]. These properties suggest that the fascial system participates in body stability together with the visual, vestibular, and somatosensory systems, although mechanistic explanations should not be interpreted as proof of a direct clinical causal chain.

The TMJ and the cervical region are linked within the craniocervicomandibular complex. Changes in orofacial muscle activation may redistribute regional tension and contribute to compensatory patterns. Clinical studies of fascial manipulation and myofascial approaches report benefits in selected musculoskeletal and temporomandibular conditions, but findings remain condition-specific and do not justify generalized treatment claims [9,11-14].

4. Influence of the Extracellular Matrix and Hormonal Factors

The extracellular matrix (ECM) is a three-dimensional network of collagen, elastin, proteoglycans, and glycoproteins. In addition to mechanical support, it regulates cellular communication, proliferation, migration, differentiation, and tissue repair [18-21]. Within musculoskeletal and fascial tissues, ECM organization contributes to force transmission, mechanical adaptation, and efficient movement.

The ECM is continuously remodeled in response to mechanical and biochemical stimuli. Fibroblasts regulate the synthesis and degradation of matrix components, including through matrix metalloproteinases. Disruption of this balance may contribute to fibrosis, reduced elasticity, and functional impairment [18-21].

Hormonal status can modulate connective-tissue composition and mechanical behavior. Experimental evidence indicates that fascial cells alter the production of collagen I, collagen III, and fibrillin in response to sex-hormone levels [10]. Hormonal variation may therefore influence hydration, stiffness, tissue sliding, and adaptation to mechanical load. These effects are relevant to an individualized physiotherapeutic assessment, but they should not be used alone to infer the cause of pain or postural change.

5. Clinical Implications for Physiotherapy

A clinically useful interpretation requires a biopsychosocial and interdisciplinary approach. In patients with temporomandibular symptoms, physiotherapeutic assessment may include craniocervical posture, cervical and masticatory muscle function, breathing

pattern, motor control, pain behavior, parafunctional habits, and relevant functional limitations. Dental examination is necessary when occlusal or intra-articular TMJ disorders are suspected.

Interventions described in the literature include education, therapeutic exercise, cervical stabilization, manual therapy, and techniques directed toward craniomandibular or myofascial structures. Systematic-review evidence supports potential benefits of manual therapy for selected temporomandibular disorders, but treatment should be based on diagnosis, patient response, and the totality of evidence rather than on presumed fascial chains alone [16,17].

Interdisciplinary collaboration with dentists, orthodontists, physicians, and other health professionals may be appropriate when symptoms cross anatomical or professional domains. The objective is not to attribute all postural complaints to dental occlusion, but to identify relevant contributing factors and establish a safe, individualized plan.

6. Limitations and Future Directions

The available literature is limited by heterogeneous definitions of posture and malocclusion, small or selected samples, cross-sectional designs, different measurement instruments, and inconsistent control of confounding variables. Studies of manual or fascial interventions also vary in treatment protocols and comparator groups. These limitations restrict causal inference and generalization.

Future studies should use preregistered protocols, standardized occlusal and postural measures, blinded outcome assessment, adequate sample sizes, clinically meaningful endpoints, and longer follow-up. Research should also distinguish anatomical plausibility from demonstrated clinical effectiveness.

7. Conclusion

The relationship among body posture, dental occlusion, and the fascial system is complex, multifactorial, and not fully elucidated. The stomatognathic system may influence postural control through anatomical, neuromuscular, and sensory connections with the cervical region, while fascia contributes to mechanical-force transmission and integration between body segments.

Although multiple studies report associations between occlusal and postural alterations, methodological inconsistencies and conflicting findings prevent the establishment of a direct, universal causal relationship. For physiotherapy, the most defensible approach is a comprehensive, individualized assessment that considers the craniocervicomandibular complex without overlooking other biological, psychological, and behavioral factors. Interdisciplinary collaboration may benefit selected patients. More rigorous and standardized research is needed to strengthen clinical recommendations.

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