KLINIK HAL • CASE REPORT

Extra-Occlusal Correction in the Interdisciplinary Approach to the Treatment of Temporomandibular Joint Dysfunction

Eduard Tsymbalov, MD, PhD, DO; Alexander Kantsepolsky, MD, PhD, DO; Ahu Musayeva, DO

Dental Clinic "Harmony of Occlusion" (Russia); Israeli Osteopathic Medical Association (Israel); Center of Osteopathy and Azerbaijani Traditional Medicine (Azerbaijan)

The diagnosis and management of dysfunctional conditions of the temporomandibular joint (TMJ) represent a clinically relevant interdisciplinary challenge. This case report presents an interdisciplinary protocol in which extra-occlusal osteopathic correction combined with the Proprioceptive–Deep Tendon Reflex (P-DTR) method is applied prior to dental intervention, with objective assessment via computerized occlusal analysis, stabilometry, standardized photography, and the HADS questionnaire.

Keywords: *temporomandibular joint dysfunction, extra-occlusal correction, osteopathy, P-DTR, interdisciplinary approach*

6. Introduction

The diagnosis and management of dysfunctional conditions of the temporomandibular joint (TMJ) represent a clinically relevant interdisciplinary challenge. Traditionally, the most widely employed therapeutic modality for temporomandibular joint dysfunction (TMD) has been dental occlusal correction utilizing intraoral appliances (splints, occlusal guards, and orthotics). Indeed, suboptimal occlusion is well established as a causative factor in the impairment of the stomatognathic system as a whole [1,2]. Concurrently, extra-occlusal influences on the dental occlusion have been substantiated by numerous investigators, who have demonstrated the interrelationship between the stomatognathic system—comprising the TMJ, teeth, gums, masticatory musculature, and occlusion—and the condition of the musculoskeletal system [7], psychoemotional status, chronic stress, and dysregulation of adaptive mechanisms [8]. Studies have indicated that occlusal intervention performed without consideration of systemic processes may precipitate maladaptation [3–5].

In recent years, the interdisciplinary approach to TMD management has become standard practice. The Dental Clinic "Harmony of Occlusion" (Russia), the Clinic of Osteopathy and Rehabilitation "Kanpal-Ezramed" (Israel), and the Center of Osteopathy and Azerbaijani Traditional Medicine (Azerbaijan) have implemented a multidisciplinary protocol for the management of TMD. This protocol incorporates extra-occlusal correction prior to the initiation of dental intervention, with the objective of mitigating excessive strain on adaptive mechanisms. To enhance the adaptive capacity of the organism, we employ extra-occlusal osteopathic correction in combination with the Proprioceptive–Deep Tendon Reflex method (P-DTR). Individualized osteopathic correction is administered across all levels of identified somatic dysfunction (global, regional and local).

6.1 Assessment methods

The efficacy of extra-occlusal correction is assessed through analysis of the following parameters:

1. **Biomechanical (structural) component**, evaluated using: the T-SCAN NOVUS computerized occlusal analysis system (Tekscan, USA); the Stabilan-01-2 stabilometric platform with biofeedback (OKB RITM, Taganrog, Russia), assessing the ELLS parameter (mm^2, area of the stabilokinesiogram) during the Romberg test; and a standardized photographic protocol. Normative values for occlusal balance are within ±5%.
2. **Neurodynamic (psychoviscerosomatic) component**, evaluated using the Hospital Anxiety and Depression Scale (HADS): 0–7 points — normal; 8–10 — subsyndromal; 11–21 — clinically significant anxiety/depression.

Analysis is performed twice: at the initial consultation and following extra-occlusal correction.

7. Case Report

A 25-year-old male patient, Vladislav M., presented with chief complaints of a dull, aching pain in both TMJs elicited by any functional loading.

History of present illness. Two years prior, the patient developed intermittent clicking in the right TMJ during wide mouth opening and sneezing. Subsequent onset of pain in the right TMJ progressively intensified. Computed tomography revealed degenerative changes involving the condylar processes bilaterally. The patient was admitted to a rheumatology department and discharged with a diagnosis of juvenile rheumatoid arthritis of the TMJ.

Past medical and personal history. Head trauma from a stone impact at age 5. Surgical extraction of third molars. Fracture of the fourth metacarpal bone of the left hand; fracture of the left distal radius with displacement. Scar tissue on the index and ring fingers of the left hand, on the right lower leg, and on the anterior right thigh. In 2020, compressive head trauma during a basketball game.

7.1 Primary Diagnostic Assessment

Symptomatology. Cephalgia, vertigo, dental hypersensitivity, bilateral TMJ pain, facial pain, tinnitus, restricted mouth opening, masticatory dysfunction, positional postural disturbances, and thoracic kyphosis.

Objective examination. Forward head posture, facial asymmetry, convex facial profile, and pronounced mentolabial fold. Mouth opening restricted to 30 mm with rightward deflection. The right TMJ demonstrated hypomobility. Reduction in the vertical dimension of the lower facial third was noted.



Figure 1–2. Extraoral and intraoral photographic protocol at the diagnostic stage.



Figure 3–4. CBCT of the head and T-SCAN occlusal analysis.

Intraoral signs of occlusal disharmony. LVI index: reduction in interalveolar height of 8 mm; Class II Angle malocclusion on the right side in the sagittal plane; protrusion of the maxillary central incisors; mandibular incisor crowding with associated attrition; fracture of the incisal edges of the maxillary anterior teeth. Myodynamic imbalance included an infantile swallowing pattern, non-orthotropic tongue posture, impaired hyoid bone mobility, deformation of the Spee curve, and lingual inclination of the teeth.

Cone-Beam Computed Tomography. Rotation of C2, Kimmerle anomaly, degenerative changes of the TMJ, and ossification of the stylohyoid ligaments, predominantly on the left side.

Initial digital occlusal analysis. Premature occlusal contact upon intercuspation in the region of tooth 4.7. At maximum intercuspation, occlusal imbalance was detected with a left-sided predominance of 39.5% / 60.5%.

Initial stabilometric assessment. A 63% improvement in the ELLS parameter of the Romberg test was observed during the habitual dental occlusion trial (65.5 mm^2) compared to the mandibular physiological rest position trial (176.8 mm^2).

Table 1. Diagnostic ELLS values (Romberg test).

Trial	ELLS (mm^2)
Mandibular physiological rest position (1)	176.8
Habitual dental occlusion (1)	65.5

Initial HADS assessment. Anxiety subscale: 8 points (subclinical anxiety); depression subscale: 1 point (normal).

Rapid myofascial system screening. Global osteopathic listening revealed a posterior fascial pull. Neurodynamic manual muscle testing revealed hypertonia associated with an intra-articular dull pain receptor in the cervical region. Inhibition of the cervical region reduced TMJ pain, increased mouth opening amplitude, and altered habitual dental occlusion.

7.2 Clinical Diagnosis

K07.6 — Painful temporomandibular joint dysfunction syndrome. K07.2 — Anomalies of jaw position, distal occlusion (Class II malocclusion). M02.9 — Reactive arthropathy of the TMJ, bilateral. M99.0 — Global neurodynamic disorder.

7.3 Follow-up Diagnostic Assessment

Following extra-occlusal osteopathic correction combined with the P-DTR method, significant changes were observed. The patient reported complete resolution of pain and unrestricted mouth opening. Photographic protocol documented normalization of shoulder level symmetry, correction of head rotation and lateral tilt, and realignment of the abdominal midline.

Follow-up occlusal analysis. The premature occlusal contact shifted in both localization and laterality, now identified in the region of tooth 3.7. Occlusal balance normalized during maximum intercuspation (right 49.2% / left 50.8%).

Table 2. ELLS values before and after extra-occlusal correction.

Trial	ELLS (mm^2)
Rest position — baseline (1)	176.8
Habitual occlusion — baseline (1)	65.5
Rest position — post-correction (2)	138.2
Habitual occlusion — post-correction (2)	55.2

Follow-up HADS assessment. The anxiety subscale score decreased to 5 points (normal range); depression scores remained unchanged.

8. Conclusions

1. Clinical signs of TMD were resolved.
2. The laterality of the premature occlusal contact shifted following intervention.
3. Occlusal balance normalized during the maximum intercuspation trial.
4. Postural alignment and stabilometric parameters improved.
5. Psychoemotional status improved.

9. Discussion

Patients presenting with TMD characteristically exhibit both specific symptoms—restricted mouth opening, involuntary dental clenching, tooth hypersensitivity, and articular noise—and non-specific manifestations such as irritability, insomnia, pain syndromes, and reduced mobility of major joints remote from the TMJ. The formulation of an effective treatment strategy therefore necessitates a comprehensive evaluation of systemic processes. The majority of clinicians favor occlusal therapy—predominantly splint-based treatment—wherein the prognosis is determined only in the course of treatment itself. However, such a narrowly specialized approach is not consistently justified given the comorbid pathology frequently present in this population. In the present case, stabilometric evaluation, digital occlusal analysis, standardized photographic documentation, and the HADS questionnaire collectively enabled objective confirmation of the efficacy of the interdisciplinary approach.

10. Conclusion

Following extra-occlusal correction of somatic dysfunctions, improvements were observed in postural alignment and occlusal balance, normalization of psychoemotional status was achieved, and the specific TMD-associated complaints of pain and restricted mouth opening were resolved. The integration of osteopathic correction and the P-DTR method within an interdisciplinary approach yielded positive clinical outcomes prior to the initiation of orthodontic intervention.

References

1. Dzingutė A. et al. Evaluation of the relationship between the occlusion parameters and symptoms of the temporomandibular joint disorder. *Acta Medica Lituanica.* 2017;24(3):167–175.
2. Mishra S.K., Somkuwar S., Chowdhary R. Occlusion and Temporomandibular Joint Disorders. In: *Temporomandibular Joint Disorders.* Singapore: Springer; 2021. p. 133–143.
3. Kutsevlyak V.I., Bayan A.M. Systematization of etiopathogenetic factors of the development of musculoskeletal dysfunction of the TMJ. *ScienceRise: Medical Science.* 2018;(6):62–67.

4. Carlsson G.E. Dental occlusion: modern concepts and their application in implant prosthodontics. *Odontology.* 2009;97(1):8–17.
5. Mitrirattanakul S., Jariyasakulroj S. Dental treatment as perceived etiology of temporomandibular disorders. *CRANIO.* 2020;38(2):109–114.
6. Milutka Yu.A., Yushmanov I.G., Badmaeva A.N. Possibilities of osteopathic correction in complex therapy of temporomandibular joint dysfunction. *Russian Osteopathic Journal.* 2019;(1–2):43–50.
7. Greenbaum T., Dvir Z., Emodi-Perlman A., et al. Relationship between specific temporomandibular disorders and impaired upper neck performance. *European Journal of Oral Sciences.* 2020;128(4):292–298.
8. Sójka A., Stelcer B., Roy M., Mojs E., Pryliński M. Is there a relationship between psychological factors and TMD? *Brain and Behavior.* 2019;9(9):e01360.
9. Mokhov D.E., Belash V.O. *Methodology of Clinical Osteopathic Examination.* St. Petersburg: NWSMU named after I.I. Mechnikov; 2019. 80 p.
10. Gagey P.-M., Weber B. *Posturology: Regulation and Disorders of Human Body Balance.* St. Petersburg: SPbMAPO; 2008. 316 p.