

FUNCTIONAL ORTHODONTIC THERAPY IN SKELETAL OPEN BITE

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REZUMAT

Terapia funcțional este una cauzală, ortopedică și utilizează forțe naturale. Ea trebuie privită și înțeleasă într-un context mai amplu, nu numai în sensul utilizării aparatelor funcționale precum activatoarele, ci și prin utilizarea mioterapiei, cu scopul de reeducare a componentei neuro-musculare. Recidiva după tratamentul funcțional este minimă. În ocluzia deschisă, indiferent că este scheletică sau funcțională, cel mai bine se pretează terapia funcțională. Lucrarea de față prezintă aspecte terapeutice funcționale din ocluzia deschisă, exemplificate prin cazuri clinice rezolvate.

Cuvinte cheie: ortodonție, terapie funcțională, ocluzie deschisă scheletală

ABSTRACT

Functional therapy is a causal one, offering many possibilities of guiding skeletal growth and modifies the patient's neuro-muscular behaviour. Relapse after functional therapy is minimal. Functional therapy is also orthopaedic: it improves skeletal patterns by bone remodeling. Our study will present the effects of functional therapy in skeletal open bite.

Key Words: orthodontics, functional therapy, skeletal open bite

INTRODUCTION

It was Edward Angle, the founder of modern orthodontics, that emphasized the morphogenetic relevance of the soft-tissue environment to the dentition.^{1,2} Angle's belief that relapse is caused by forces on the teeth resulting from an improper soft-tissue environment appeared to be a rational conclusion from a biomechanical point of view.^{3,4}

According to Häupl, the functional orthopedic treatment can be performed only with appliances, which are passive and are only transferring muscle stimulus.⁵ Today we know, that each force application means a strain of the tissues, independent from the origin of the force.

Classic orthodontics uses fixed appliances in order to solve dental malocclusions after the craniofacial growth had been completed. But whenever possible, it is better to use natural functional forces instead of strong mechanics.

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THE GOALS OF FUNCTIONAL THERAPY

Functional therapy is a causal one: it offers many possibilities for guiding skeletal growth and modifies the patient's neuro-muscular behaviour.³ Relapse after functional therapy is minimal.

The clinical observation that an open bite can be closed without using any device which interferes with tongue movement or tongue posture suggests that tongue thrust alone may not be the primary cause of that malocclusion and that there may be a functional relationship between the postural behavior of the tongue and lips.⁶ Proffit suggested that rapid-movement functions, such as swallowing, chewing, and speaking, have little impact on the morphology of the dentition, while the impact of postural alterations leading to changes in lip and tongue resting pressure and posture is significant.⁷

Functional therapy is also *orthopaedic*: it improves skeletal patterns by bone remodeling. (Fig. 1)

The most common symptoms of skeletal open bite (long face syndrome) are: excessive vertical growth of the maxilla, increased facial height with Jarabak ratio under 58%, a large discrepancy between posterior and anterior face height, posterior rotation of the mandible, short mandibular ramus, tongue thrust swallowing.¹⁻³



Figure 1a, b, c, d. Facial and oral characteristics of a patient with skeletal open bite

Functional therapy in skeletal open bite has muscular, skeletal and dental goals.⁸

The *muscle* goals include increasing of masticatory muscles volume, contraction force and tonic activity; myotherapy of lips in order to obtain labial competence during rest and physiologic competence during oral function; elimination of abnormal oral habits: tongue thrusting, digit sucking, pacifier and dummy sucking, lip and nail biting, mouth breathing, clenching, occupational habits.

The *dento-alveolar* goals include: anterior rotation of the lower jaw, posterior rotation of the upper jaw, and bite closing.⁹

Other therapeutic objectives include transverse expansion of both dental arches, reducing mandibular angle, remodelling TMJ structures, slowing the vertical facial growth.^{10,11}

FUNCTIONAL TREATMENT

Functional therapy with the activator

The activator is an appliance which is passive to itself and serves as a transmitter of forces generated by the oral and facial musculature. The change in muscle pattern produce not only a new and favourable muscular pattern but also a change in the bony structures as they adapt to the new functional stresses. (Fig. 2)

Experimental evidence shows that the temporo-

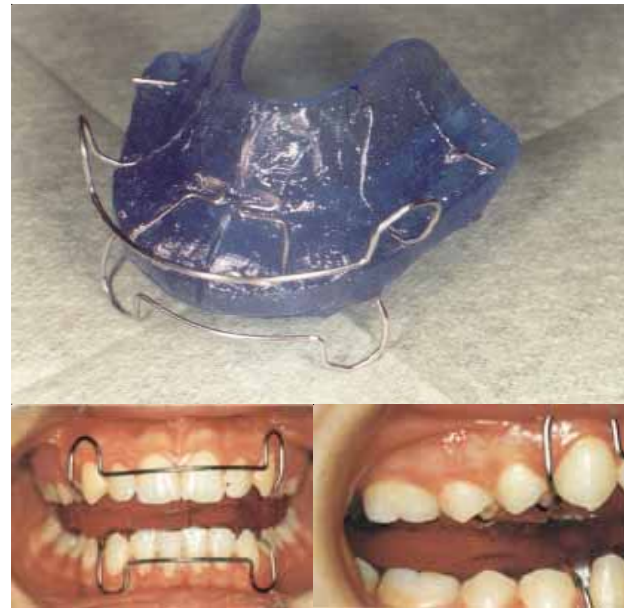


Figure 2. Activator with a high interocclusal opening (6 mm).

mandibular joint (TMJ) is capable of adapting itself to the functional requirements.¹² When the activator is worn, the mandible is held forward and the masticatory muscles will be stretched beyond their rest position. The forward postural position induces growth at the mandibular condyles and temporo mandibular joint structures, which will modify the length of the mandible and basal bone relationship. Unlike the fixed appliances, the activator allows effective oral prophylaxis and maintenance of better tissue integrity.

In the open bite correction, the activator will act as a habit breaker, especially in the tongue thrust and finger sucking.¹³ The posterior teeth eruption is prevented and the anterior teeth will be encouraged to erupt.

The effects of an activator on the temporal and masseter muscles activities in subjects with an Angle Class II division 1 malocclusions were investigated.¹⁴ Results showed that activities of both muscles with the activator decreased in the rest position at the end of treatment when compared to the beginning of the treatment.

Myofunctional therapy

The patient will benefit of better results when myotherapy is used at the same time with the activator. The effects of myotherapy in open bite include elimination of abnormal oral habits, voluntary contractions to improve the orbicular tonus in order to achieve labial competence.¹⁵

Priority will be given at a very early stage to the rehabilitation of respiration: restoring nasal ventilation is indeed an essential condition to obtain balanced oral functions because oral ventilation conditions both muscular posture and the performance of other functions. (Fig. 3)



Figure 3 - Neuromuscular orbicular and mentalis imbalance in Class II malocclusion with open bite. Myofunctional exercises

CONCLUSIONS

1. The functional appliances primarily transmit, eliminate or guide natural forces. Functional therapy in skeletal open bite modifies mandibular rotation and maxillar growth in the same time.

2. Functional myotherapy can improve the results of the orthopaedic treatment. It can be used before, during or after the orthodontic treatment.

3. Functional therapy can be succesfully used during active skeletal growth, early intervention will guide skeletal growth and teeth eruption.

4. Since many patients with dysfunction of the orofacial musculature undergo simultaneous myofunctional and orthodontic therapy, treatment planning and

choice of orthodontic appliances should be carefully coordinated.

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