



## MYOFUNCTIONAL APPLIANCES

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**Abstract:** A functional appliance uses forces found in nature and directs them in a specific direction towards the teeth and alveolar bone. A class of intraoral gadgets known as myofunctional appliances rely on the forces inherent in the orofacial musculature to work. Generally speaking, they are passive and detachable. Rather than using active forces, they either guide, remove, or transmit the natural forces of the orofacial musculature to repair abnormal dentofacial structure growth and function. Through the medium of the appliance, they either reduce the aberrant forces of the orofacial musculature or convey the favourable muscle forces to the teeth and alveolar bone. In skeletal conditions classified as Class II div 1 and Class III, their main purpose is growth modulation. They are considered primarily for growth modification in skeletal Class II div 1 and Class III skeletal conditions. This article gives an overall view of myofunctional appliances.

**Introduction:** In order to achieve the goals of occlusal harmony, function & esthetics, early detection & effective treatment of developing malocclusion might be beneficial in the short & long term . It is possible to direct growth & detect malocclusion at the transitional stage of dental development. Roux was the first to document how natural forces & functional stimulation affect form in 1883.Later, Karl Haupl recognised the potential of the Roux hypothesis & clarified how functional appliances operated by using orofacial muscles. The orofacial musculature provides the force force for functional appliances also known as myofunctional appliances in contrast to removable appliances using components like springs, elastics & screws. The inherent forces of the musculature are either transmitted, diminished / guided by these devices.<sup>1</sup>

Moyer's defines myofunctional appliances as “loose detachable devices intended to change the neuromuscular environment of the orofacial area in order to enhance occlusal development and/ or craniofacial skeletal growth”.<sup>2</sup>Growth modification techniques used to prevent & correct jaw discrepancies involve the use of functional equipment. They could bring about the following modifications:-

1. Change in jaw size
2. A shift in the jaw
3. Spatial connection of the jaw is changed.
4. Direction of the growth is altered.<sup>4</sup>

The mandible can be held open/closed, forward/ backward depending on the functional appliances according to Proffit A functional appliance in words of White, Gardner, Leighton; harnesses natural forces & transmits them in a predetermined direction to teeth and alveolar bone.

Appliances that are functional act by either preventing a problem before it arises or by utilising the muscle forces.<sup>2</sup> When the functional appliances are utilised during period of active

growth in a child such as before the onset of puberty, causes skeletal growth adjustments and stops unbalanced growth by rerouting the growth of upper and lower jaw.<sup>4</sup>

### **Classification of myofunctional appliances**

#### Primary Classification

1. Removable Functional appliances-These are functional appliances that the patient can take out & put back in his mouth as he pleases such as activator, bionator & Frankel's appliance.
2. Fixed Functional appliances-These are functional appliances that have been affixed to teeth & are not removable by the patient by will.
3. Combination of removable & fixed appliances-These appliances include Twin block, Herbst.
4. Removable -fixed / Semi – fixed appliances-There are functional appliances with some components attached & others removable such as Bass appliance, Denholtz etc.

#### **Classification forwarded by Tom Graber**

1. Group A- Appliances supported by dentition such as Catlans appliance, inclined plane.
2. Group B- Teeth/tissue supported such as lip bumper, activator, bionator.
3. Group C- Vestibular positioned devices with isolated tooth/ tissue support such as Frankel's appliance & Vestibular screen.

#### **Classification forwarded by Proffit**

1. The tooth borne passive appliances/ Myotonic appliances:-These are devices that are anchored to the teeth but lacks only springs or other mechanisms that would naturally generate force. For the intended therapeutic effects, they rely on muscle activation like the Andresen activator, Herbst appliance & Balter's bionator.
2. The tooth borne active appliances/ Myodynamic appliances:-To give intrinsic force for transverse/ anteroposterior adjustments, there are variations of passive tooth borne functional appliances that also include screws/other active components such as springs. Examples include Bimler's appliance, stockfish appliance, kinetor, modified bionator.
3. Tissue borne passive appliances:-The majority of appliances are found in vestibules & make minimal or no touch with the teeth. Example- Functional regulator.

4. Tissue borne active appliances:-These appliances are positioned in vestibule & have contact with the teeth. Some of the components of the appliance transmits force. For instance lip bumper, oral screen
5. FOMAS or functional orthopedic magnetic aids.

### **Classification based on force transmission**

Appliances in Group I- To correct malocclusion, there are appliances that transmit muscle force directly to the teeth like an inclined plane.

Appliances in Group II-They readjust the mandible & the delivered force is imparted on teeth which includes activator & bionator.

Appliances in Group III -They like wise reposition the mandible but they work outside the dental arch, in the vestibule. For instance they include the Frankels' s appliance, the Vestibular screen.<sup>1</sup>

**Mechanism of action of functional appliances:** All functional appliances exploit the common mechanism of bone turnover, rhythm, activation, Resorption & creation for their action, taking advantage of the interplay between mechanical function and morphological pattern. Due to their capacity to change the equilibrium of the stomatognathic muscles, these effects are brought about . The following forces are adjusted by a functional appliance:-

1. Primary forces on the dentition include a variety of forces coming from the tongue, lips & cheeks. Functional appliances utilize these natural forces and transmitting them to specific locations for intended change. This is one of the main goals of these appliances.
2. Secondary forces are the reactive forces created in the target tissue as a result of Functional appliances in response to primary forces.

To put it simply, primary forces are transformed into secondary forces that cause the desired changes. It is vital to keep in mind that both tooth movement and skeletal change (caused by growth modification) have practical uses. The lip bumper is the most effective functional appliance for tooth movement. Lip bumper transmits secondary pressure and force from from initial lip force to the periodontal ligament. This secondary force causes the molar to distalize which was the anticipated outcome. Functional

appliances send stress to the condylar region for growth modulation ( from muscles/ viscoelastic stretch of soft tissue).

**Forces that functional appliances produce have the following characteristics:**

Functional appliances are typically worn for only 12-16 hours per day, the duration of force in most functional appliance treatment is interrupted. Exceptions include bonded Herbst & Jasper jumper appliance.

In fact one of the key factor in the initial appeal of fa's was their capacity to produce light & physiologic force. Two treatment philosophies can be distinguished when it comes to force:-

- Application of force
- Elimination of force

When a force is applied , the structures involved are subjected to compressive stress & strain, which causes a primary change in form and a secondary adaptation in function. Force reduction removes unnatural & constrictive external effects, enabling ideal development. Force elimination is used by the Frankel buccal shield and lip bumper. A secondary adaptation in form comes after the rehabilitation of the function.

As pressure is released, the viscoelastic displacement of bone forming reaction in the afflicted areas might cause a tensile strain . Most bone structures are made to resist pressure but not tension. Tension can be more effective than pressure. The primary goal of the utilising a functional appliance , aside from tooth movement, is to influence mandibular growth in order to harmonize the skeletal bases.<sup>3</sup>

The following modifications can be produced by functional appliances:-

1. Orthopaedic adjustments
2. Dento-alveolar alterations
3. Muscle alterations

**Orthopaedic adjustments**

1. The growth in the condylar region can be hastened by myofunctional appliances.
2. They can cause the glenoid fossa to restructure

3. They may be constructed to limit the growth of jaws
4. They have the ability to alter the growth orientation of jaw.

**Dento- alveolar modifications:** In the sagittal, transverse & vertical orientation, the functional appliances can cause modification to the dento – alveolar structure. The lower anteriors can tip labially & the upper anterior can tip palatally in the majority of fa's. By adding screws to them or by keeping the buccal muscles away from the dental arch, they can expand the dental arches in the transverse direction. They can be made to allow for the selective eruption of teeth in vertical plane.

**Muscle alterations:** The strength of the oro – facial musculature can be increased by functional appliances.<sup>4</sup>

### References

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