

Muscles: Orthodontist's Perspective

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Muscle as we know is an important part of soft tissue matrix and according to the most accepted Functional Matrix theory, origin, growth and maintenance of the skeletal unit depends exclusively on the soft tissue matrix. In Orthodontics, the orofacial musculature should be understood in a different context i.e. its effect on the growth of face and also its effect on malfunctioning of jaws and facial structures.

The muscles are broadly classified into three categories: Facial muscles, Jaw muscles and Portal group of muscles. Facial muscles are derived from the 2nd branchial arch, help in expressing emotions, swallowing and maintain the integrity of the arches. The jaw muscles are designated as elevators, depressors, retractors and protractors which are all derived from 1st branchial arch. This group constitutes mainly the muscles of mastication and hyoid group of muscles. Lastly the portal group is derived from 3rd and 4th branchial arch which includes the muscles of tongue, soft palate, pharynx and larynx.

Moving onto the orthodontic perspective of these muscles are infantile swallow, buccinator mechanism, posture of head on cervical column during mastication, mature swallowing and airway maintenance. All the functioning of these muscles can be studied by various methods like Anatomic; Functional and Behavioral. Furthermore the anatomic methods can be by dissection or histological sectioning of the muscles hence limited to structural findings of the muscles. Similarly, the functional studies can be done by observing the movements, force and pressure exerted by the muscles or electromyography. But this method is also not that applicable to humans as it cannot exactly predict the amount of activity nullified by the antagonist muscles on the muscle studied. Hence a disciplined observation of the total muscle activity in natural state is the most practical method i.e. the behavioral method. Recent advances in the method of studying the muscle function include the use of Scoliosmeter; Electronic and Mechanical Axiograph, Kinesiography and Computed tomography as well.

The most primary role which can be mentioned is the role of muscles in functional jaw orthopaedics. Diverse views from Andresen and Haupl till date have been presented regarding the neuromuscular changes brought about with functional appliance treatment. Lateral pterygoid traction regulates the growth of mandibular condyle by increasing the proliferation of chondroblastic layer on the condylar cartilage. There is a decrease in posterior temporalis muscle activity during the protrusive positioning of the mandible. Both this action together is called the Pterygoid response. Clasp knife mechanism is also one of the mechanisms involving the muscles in which first the muscle resists, and then relaxes resembling that of a spring loaded knife. This phenomenon is also seen during the functional appliance therapy.

Another important aspect of muscle activity is on the Temporomandibular Joint Dysfunction (TMD). The masseter, lateral pterygoid and temporalis most frequently demonstrates myalgia in patients with TMDs. TMDs can be grouped majorly as Joint pathologies or muscle fatigue/spasm. Overwork of muscles may also cause detrimental habits like the Lip sucking, Bruxism, Tongue thrusting, etc.

Muscles not only play a role in creating malocclusion, planning of orthodontic treatment but also it is important even after the treatment has been completed be it by fixed orthodontic appliance, functional appliance or orthognathic surgery. Three principles that can in-

fluence post surgical stability are: (A) suprahyoid musculature; (B) Neuromuscular adaptation for e.g. Repositioning of tongue for airway management; and (C) Neuromuscular adaptation affecting the muscle length not the orientation. It has been stated by many authors that whatever be the mechanics of the treatment undergoing on the dentofacial structures, there is a zone of stability for each tooth, bone and muscle. If that zone is identified and maintained throughout the treatment, there will not be any kind of relapse.

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