

## Muscle Function Evaluation and the Emerging Field of Oro Facial Myology: Connecting dots with the Muscles

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### Naurine Shah\*

BDS, COM (Certified Oral Myologist), Certified Orthodontic Auxillary, Calgary OroFacial Myology, Sierra Dental Centre, Calgary, Alberta, Canada

### Abstract

*Just like there is physiotherapy for the rest of the body, there is 'Myofunctional Therapy' for the muscles of the mouth. Substantial amount of evidence is emerging connecting muscle dysfunction with periodic increase in the stress accumulation of oral muscles, just like anywhere else in the body.*

For instance, where the posture of the back is not perfect, treatment is based on correcting that before trying to fix functional issues. Same thing happens when a prosthesis is prescribed. Muscles are trained to adapt to that prosthesis by encouraging strengthening and toning exercises. It would make total sense to define the normal 'posture' for the position of the tongue, lips and cheeks that would complement the position and surfaces of the teeth. The mouth is a complex of numerous muscles that work collectively to perform functions of swallowing, chewing breathing and speech. It is therefore absolutely essential for ALL dental treatments to incorporate how each treatment would affect the normal posture or in other words the inherent balance that has to exist in the oral cavity to stay healthy. It is also necessary to eliminate any pre-existing muscles dysfunctions like tongue thrusts and reverse swallows before embarking on ideal dental treatment to defer any chances of relapse or recurrence.

### Introduction

The background of Myofunctional therapy is based on many studies that date as far back as the 1950's. Various researches have now proven its efficacy in modalities of growth, orthodontics, speech, swallowing, treatment of thumbs sucking and tongue tie as well as tongue thrusts and mouth breathing [1].

*Rest "posture" is essentially where the lips and tongue rest while no function takes place except saliva swallowing. If the tongue habitually stays down and away from the palate, as in the case of mouth breathers it is certain to be hypotonic; (81% of Mouth breathers have decreased tone in the tongue; under developed musculature of the tongue) (Holik 1958)*

This low posture of the tongue reckons it less qualified to perform functions of swallowing normally with the tip up. In turn, it finds its comfort on the lower anterior teeth making them crowded in most cases or hangs out between the teeth to act like a splint [2].

In children this 'tongue down posture' results in the lack of natural exfoliation of the teeth and interferes with differential eruption [3].

In adults it would explain the scalloping of the tongue and the anterior thrusts for speech and swallow [4].

The constant struggle to stabilize the bite against the force of the tongue and its low and lateral posture is always a challenge. Although the pressure of the bite is transient, that of the rest posture is more consistent. Can this connect with and add to the neuromuscular stresses that we categorize as 'general' stress before we put electrodes on and start to find a happy spot for the jaw to make splints and orthotics? [3].

### Materials and Methods

*Orofacial Myofunctional Therapy is neuromuscular re-education of the orofacial muscles to eliminate dysfunctions of swallowing, tongue thrusting, mouth breathing as*

\*Corresponding author: Naurine Shah, Calgary OroFacial Myology, Sierra Dental Centre, Calgary, Alberta, Canada, Email: naurine.shah@gmail.com

well as the rest posture of the lips tongue and cheeks. Green SE. *Int J Orofacial Myology*. 2010 Nov;36:44-59.

OroFacial Myofunctional Therapy (OMT) has a wide scope of application and needs to be an integral part of every dental examination. It is a therapy program that is customized by training the tongue and oral muscles to strengthen and perform ideal functions of chewing, swallowing, speaking and breathing. Therapy involves various exercises that are aimed at toning and resistance training of the oral muscles bad habits for such as tongue thrusting can be eliminated [5].

## Discussion

Whether it's the excessive saliva production at a hygiene visit that entails constant use of the suction in some patients or the persistent gagger in your chair, more investigation needs to be done for tongue function. Do the back of the tongue muscles pick up the saliva for your patient when they are not thinking about it? Do the palate and the back of the tongue ever meet when the swallow happens? If not, it would explain why the brain chooses to initiate the gag reflex when something foreign touches it.

Understanding and diagnosing the reverse swallow is another area that is often missed and underdiagnosed. A normal swallow is with the tip against the roof of the mouth with the back of the tongue meeting the soft palate to initiate the 'peristalsis' needed to move food through our gut. On the other hand, "the tongue down- push against the front teeth" swallow, common to mouth breathers forces down solids or liquids through the oropharyngeal opening via a 'push' instead. This push does not get any help from the back of the tongue making it further hypotonic and adding to the negative pressures in the front and back of the tongue while at rest [6,7].

How does this rest pose of the tongue feel when a splint is constructed in its space? Will this make the stress in the muscles better or worse? What happens to the freeway space that is absolutely essential for a balanced bite or is it expected to be recreated? Why not tone the tongue to stay up on the roof and function there instead of grinding on the splint profusely to find the right bite? [8,9]

Similar situations arise when the maxilla does not grow against the palate, yet again in the case of mouth breathers. It makes total sense to expect some pressure against the mid-palatine suture if the tongue rests against the palate while a normal swallow happens. Those micro amounts of pressure are necessary for the right expansion to happen so the teeth can erupt in their designated spots. When the tongue lies low and lateral that component of force is totally missing from the equation resulting in narrow palates and more vertical growth. The maxilla has no stimulus from the tongue to grow horizontally and therefore literally falls down on the lower jaw preventing its horizontal growth too. Growth still happens as it is a natural phenomenon but because the top jaw will not let it happen in the horizontal direction, the face will grow long with more vertical growth [10].

When these patients show up at the orthodontist, the teeth are corrected to the perfect smile without any attention to why this may recur because the posture that helped create this malocclusion has not been eradicated. Also there is a huge expectation on behalf of orthodontists, that all muscle

dysfunction will 'magically' disappear or the muscles will learn to complement the new position of the teeth. This may not be a realistic thought, because if we are changing the position of teeth, is biting our only function that we are considering necessary to adjust? We only bite when we chew, probably way less than the number of swallows that we do in a day.

Another important aspect that OMT can help with is the use of the actual tongue tip to create sounds of T,D L and N etc. Most patients with the low and lateral tongue posture habitually use the jaw to create those sounds without even moving the tip of the tongue. From a speech pathologists point of view it may not be of concern but Myofunctionally, it would add to the hypo tonicity or the laziness of the tongue creating the same issues mentioned above. Moreover dentists will notice a hyperactive jaw that does not find comfort in any splint position [11].

Lips are an essential part of the oro facial complex. Do we look at the functions of the lips to stay together while chewing and resting away from the anterior teeth as something that needs to be evaluated? All brackets come with standard prescriptions and thus cannot be customized for patients that have lip incompetence or tight lips that the braces may need to work against resulting in prolonged treatment times (Figure 1).

## Conclusion

It is essential to put the pieces of the puzzle together and start incorporating muscle function as a part of the diagnostic process. More and more dentists are recognizing its effects on long term dentistry. Look out for the relationship of the tongue with the teeth and ask patients to swallow with the lips open if there is an open bite and lips together when there is not. For example every patient with an open bite has a tongue thrust but not every patient with a tongue thrust has an open bite (Proffit and Fields 1986). Ask your patient to breathe through the nose when the mouth is open. It is not an easy transition as nose breathing cannot happen if the tongue is down. The brain will always choose to breathe through the mouth when the lips stay habitually incompetent. This will create the low lateral posture of tongue and its effects are numerous.

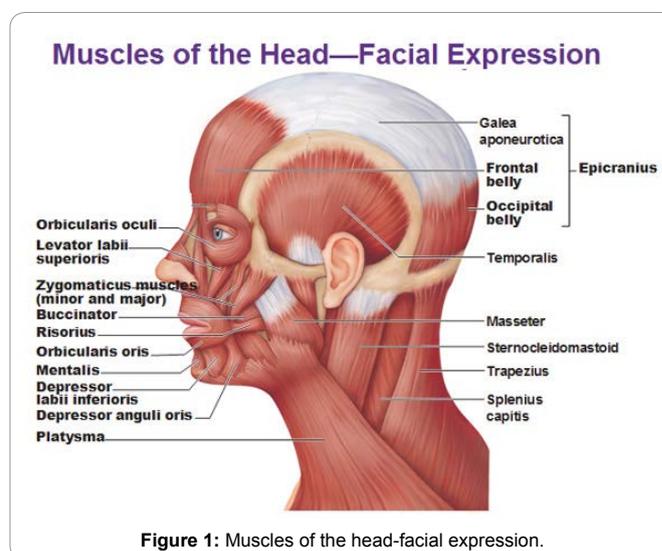


Figure 1: Muscles of the head-facial expression.

OMT involves retraining the muscles to find a balance for all functions. There is an exercise and awareness regime that is customized for every patient. This will help eliminate speech problems, hyperactivity of the jaw, reverse swallow, mouth breathing, grinding, clenching as well habits of nail biting, thumb sucking and lip licking. So from full mouth reconstructions to orthodontic treatments, and from splint therapies to treatment of snoring and sleep apnea, paying attention to muscle function will go a long way as far as ideal dental results are concerned.

Development of a posterior tooth together swallow: Failure to masticate food properly and incorrect swallow (dysphagia, tongue thrust) can lead to orthodontic relapse, malocclusion, GERD and other Digestive disorders (Lieberman 2011, Phua et al. 2005) periodontal disease (Gulati 1998); high narrow palate (Kilaris, Karsaros 1998) grinding and clenching (Wong 2011) and TMD (de Felicio et al. 2010). OMT exercises have been demonstrated to help alleviate snoring and sleep apnea (OSA) (Guimaraes, K et al. 2009).

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