

Integrated functional therapy - A need of an hour

Uday N. Soni^{1,*}, Mayuresh J. Baheti², Shyama Dash³, Nandlal G. Toshniwal⁴, Abhijit Misal⁵

^{1,3}P.G. Student, ²Private Practitioner, ^{4,5}Professor & Head Dept. of Orthodontics and Dentofacial Orthopaedics, Rural Dental College, Pravara Institute of Medical Sciences, Loni

***Corresponding Author:**

Email: udaysoni88@rediffmail.com

Abstract

The function of the oral facial muscles has been a concern of the dental community dealing with malocclusion for almost 100 years. Numerous appliances have been developed to help alleviate the problem, but the process of actually teaching the patient to control and change his muscle function has frequently been discounted and unused. The lack of understanding of the purpose of myofunctional therapy, the lack of education of therapists, and the lack of standardization of controls has created this lethargy. Until the time comes when our universities determine the need for a course of study in myofunctional therapy and correction of myofunctional disorders, and until true professionals are educated, the location of MFT should be in the dental office. The team approach, which can be so successfully used in the dental office, can allow the patient the best possible muscle function improvement and must be an integral part of orthopedic gnathological treatment. These exercises are extremely beneficial for initiating balance between the oral facial muscles. Along with the exercises proper diet, functional appliances are also beneficial for initiating balance between orofacial muscles. This article describes the importance various exercises, diet and functional appliances for maintaining balance between orofacial muscles.

Keywords: Orofacial Muscles, Myofunctional Therapy, Exercises, Integrated Functional Therapy.

Introduction

Orthodontists have long been concerned about the effect of the dentofacial form on orofacial muscle function and vice versa.^(1,2,3) The muscles environmental to the oral cavity may well be termed nature's orthodontic mechanism. By the normal action of these structures, dental arches are guided and molded to proper form and individual dental units are placed in perfect alignment. Subsequently, these structures are maintained in this condition by the balance action of these muscular forces.

Conversely, by abnormal muscular action, denture form and tooth alignment are proportionately modified from normal and, intern, maintained in this undesirable and disfiguring condition by muscles whose actions are normal but nevertheless have established a balanced inter play of forces among themselves. The facial musculature consists of the muscles of the upper face, mid-face and lower face and neck. The facial musculature has important roles in performing a variety of orofacial functions such as speech, mastication, and swallowing.^(1,2) The facial muscles, in particular the mimetic muscles, also perform many complex functions such as the expression of emotion and affection. Abnormal swallowing patterns and orofacial muscle imbalance are contributing factors to many kinds of malocclusion.⁽⁴⁾ The importance of occlusion to good dental health is well understood in dental profession and the importance of role of facial musculature in this regard is attracting increasing attention. The orofacial complex is a functionally design, delicately balanced and amazingly complex machine.

Although it is routine opinion that the operator cannot change the muscular balance that is inherently

every case that comes to him and that prohibits treatment by denture expansion, he can, by instigating proper exercises, reduce abnormal action in these muscular structures, strengthen their functional capacity and, in the case of mouth breathers, greatly improved the supporting and restraining function of the muscles of the lips. Consequently it is important that muscular training should be routine in the practice of every orthodontist.

The entire human body, from the neck down at least, responds very favorably to the exercises provided by resistance training. The science of physical therapy, the trend for personal trainers, and the narcissistic "body Sculptors" of muscle beach all use the same general principle to achieve their goals- through rigorous movement and exercises of the muscles(pumping ion), the body can be made more healthy and beautiful. All other fields of medicine have recognized the need for exercise to assist in normal growth and development and to maintain optimal health, Orthodontics is no exception to it. Every other part of the body is made more beautiful through exercise- the face is no exception with the exercises, diet and proper functional appliances is also important assist in normal growth and development and to make the face more healthy and beautiful.⁽⁵⁾

Myofunctional therapy (from greek word myo, muscles) is a regimen designed to correct orofacial muscle imbalance and abnormal swallowing pattern. It exist not as a separate discipline but as a valuable adjunct to orthodontic and dentofacial orthopaedics.^(5,6) Myofunctional therapy is an aid to eventual solution of various types of dentofacial problems, a "ten-cent part of million dollar aero plane." the role of orofacial muscles is a factor that cannot be overlooked in either preventive or interceptive orthodontics. Occlusal relationships

cannot be dissociated from the forces exerted by the orofacial muscles; any attempt to do so may lead to collapse of corrected dentofacial balance.

This text is an attempt to fill a need for clinical information about myofunctional therapy and to answer questions now raised by many practitioners concerning both the role of orofacial musculature in occlusion and the necessity to include integrated myofunctional therapy in the complete dental regimen.

Recognition of Orofacial Muscle Imbalance and the Abnormal Swallow

We as a dentist should conduct a detailed study of orofacial musculature, hypertonicity or hypotonicity or for any other abnormality so as to evaluate their effect on the oral cavity as a whole.

Problems to be observed,⁽⁴⁾

1. Hypertonic upper and / or lower lip.
2. Hypotonic upper and / or lower lip.
3. Poor lip posture.
4. Strong circumoral contraction.
5. Strong mentalis contraction.
6. Short lingual frenum.
7. Hypertonic/hypotonic muscles of mastication.
8. Poor Tongue posture.
9. Oral habits.
 - a. Digital sucking
 - b. Tongue sucking
 - c. Lip biting
 - d. Mouth breathing

Oral exercises and their effectiveness

Lip exercise: Lip and facial muscles must first be taken into consideration. Weak, flaccid, as well as hypotonic lip and facial muscles help create malocclusion and poor retention after Crozat orthopedic treatment. Lip strength should be determined on the first visit. Measurement can be taken by the use of a scale and button. Normal lip strength is approximately 4 lbs. Exercises to improve lip strength are as follows:

a. To lengthen the upper lip

1. **The lip-elongating exercise:** Bring the upper lip down by forced muscular action until it completely covers the upper incisors and presses strongly against their crowns. The mandible must be depressed in order to do this, but care should be taken not to have the lower lip press against the lower incisors unless this action is desired. Sometimes, in order to avoid the latter pressure, it is necessary to have the child grasp the lower lip with the fingers and pull it away from the lower front teeth while the upper lip is contracted. (Fig. 1)



Fig. 1: Lip elongating exercise

- b. **Exercises for hyper toned muscles:** The only helpful treatment the author has to offer consists of air- or water- blowing as described below, manual lip stretching and facial massage.⁽⁶⁾
 1. **The water- and air-blowing exercise:** Have on hand a glass of water and a mirror. Take a small quantity of water and hold it in the mouth. Close the lips lightly and slowly force the water against the lips and cheeks, allowing these structures to completely relax so that as they swell out with water there is not a wrinkle in them to designate muscular resistance. Hold the water against the lips and count 20. Repeat this procedure 5 to 10 times.
 2. **Manual lip stretching exercise:** Place the middle finger of both hand at the corner of mouth with the palmer surface against the mucous membrane and pull labially and buccally without allowing the muscles to resist the pull. Hold the lips in this stretched condition while 20 in counted. Repeat 20 times. Practice this exercise 3 times a day and as much often as possible. (Fig. 2)



Fig. 2: Manual Lip Stretching exercise

3. **The lip massage:** The third exercise is called the lip massage, it is intended to exercise several orofacial muscles and at the same time extend the upper lip. The lower lip is placed over the upper lip and massages it.

c. **For hypotoned and flabby lips.**

1. **The orbicularis oris exercise:**⁽⁷⁾ Place the teeth gently together. Take a hand mirror and keep the eyes centered on the mouth. Close the lips gently and then contract the left corner of the mouth and keep this contracted until 10 is counted to one's self. Relax and then contract the right corner of the mouth, hold and count 10. Repeat and alternate these contractions for one minute. Then rest for a few seconds and repeat the exercise for another minute. Do this exercise at least 3 times a day and as many more times as possible.(Fig. 3)



Fig. 3: Orbicularis oris exercise

2. **The Wilson Exercise:** This was suggested by William E. Wilson, of Pasadena, and is useful when the undergrown and hypotoned lips are due to chronic mouth breathing which is usually the case. This exercise develops the orbicularis oris and associated muscles, establishes normal muscular tonus in the tissues around the oral opening and stimulates the nasal passage by a heavy rush of air through one nostril.

1. Stand in front of the mirror.
2. Close the teeth and lips without forced action.
3. Contract the muscles at the left corner of the mouth causing the corner to be pulled backward and upward. Then, with the palmar surface of the fingers of the left hand placed on the *right* cheek, press these cheek tissues forward and to the left, at the same time holding the right nostril closed with the index finger of the left hand. The tissues at the left corner of the mouth must continue in contraction all through this muscle pulling.
4. While these tissues at the left corner are still contracted and the right cheek is under pressure by the fingers, breathe deeply 3 times through the left nostril.
5. Relax the muscles and remove the left hand.
6. Contract the tissues at the right corner of the mouth, place the palmar surface of the fingers of the right hand on the left cheek and pull these tissues forward and to the right, closing the left

nostril with the index finger of the right hand. Breathe deeply 3 times.

3. **Passive swallowing exercise:**⁽⁸⁾ This is an exercise to train the muscles, active in the swallowing function, to work smoothly and without perverted contractions, especially along the line of a hyper suckling contraction and a tongue thrusting spasm.

1. Have at hand a mirror and glass of water.
2. Take a small sip of water just to moisten the mouth.
3. Watch the mouth carefully in the mirror.
4. Place the teeth together and keep them in this position all through the exercise.
5. Close the lips gently and then swallow, with three things in mind:
 - To keep the teeth together.
 - To keep the lips perfectly sealed.
 - To keep the tongue in the mouth and not pressing against the front teeth.
6. Repeat the swallowing slowly, taking a sip of water whenever it becomes hard to perform this act.
7. Do this for two minutes and at least for three sessions a day. Do it frequently between practice periods and increase the length of the exercise session, after one week, to three minutes. This exercise is one of the most useful and important of all the exercises and, if mastered by the patient and used routinely, will remove one of the most prevalent causes of malocclusion and the active agent in the production of much recurrence after treatment.

- d. **The exercises for correction of improper tongue position:** The exercises used for correction of improper tongue position during the swallowing act are the

- One elastic swallow
- Tongue hold exercise.

1. **The one elastic swallow:** The exercise used for the anterior positioning of the tongue is called the one elastic swallow. In this exercise, the patient puts a 5/16 inch elastic on the tip of the tongue, the tip of the tongue is raised to a designated spot just posterior to the incisive papilla, and the patient is asked to clench the back teeth, open the lips, and swallow. All swallowing exercises are performed with the lips open. It is a reflex action for the tongue to meet the lips; this reflex is broken by opening the lips.⁽⁹⁾

2. **The tongue hold exercise:** A second exercise for positioning the anterior part of the tongue is the tongue hold exercise. A 5/16 inch elastic is placed on the tip of the tongue to hold it in a designated spot for a prescribed period of time. Gradually the holding time is extended from 5 minutes to an hour. This is the only exercise in the initial phase of

therapy that is done with the lips closed. Its purpose is threefold:

1. To place the tip of the tongue in the proper position during the swallowing act;
2. To stimulate nasal rather than oral breathing by forcing the lips to be closed during the exercise; and
3. To accustom the patient to negative pressure during the swallowing act by placing the entire tongue in the mouth cavity in the correct position rather than only the anterior part, as occurs with an anterior abnormal swallowing pattern.

e. **Exercises for the midpoint of the tongue:**

1. **Two elastic swallow:** The following exercises are utilized for the midpoint of the tongue. The first exercise is called the two elastic swallow. Two 5/16 inch rubber bands are placed on the tongue. (Fig. 4) One is placed on the midpoint of the tongue and one on the tip. The patient is asked to place the first rubber band in a previously determined spot, the second at the hard palate, and then to swallow. The purpose of this exercise is to force the anterior and midpoint of the tongue to the proper positions on the hard palate during the swallowing acts. This new pattern contrasts with the abnormal swallowing pattern, in which the anterior part of the tongue is lowered and the midpoint of the tongue is collapsed.⁽¹⁰⁾



Fig. 4: Two elastic swallow

2. **The hold-pull exercise:** The second exercise for the midpoint of the tongue is that known as the hold-pull exercise. The tip of the tongue and the midpoint are placed against the palate, and the mandible is opened gradually with the front and midpoint of the tongue held against the hard palate. The purpose of this exercise is to accustom the front and midpoint of the tongue to the correct position during the swallowing. This is also an excellent exercise for the slight stretching of the lingual frenum.

f. **Exercise for the posterior part of the tongue:**

1. **The three elastic swallow:** The exercise designed to retrain the posterior part of the tongue is called

the three elastic swallow. In this exercise, three 5/16 inch elastics are placed on the tongue, and the patient is asked to swallow while holding the elastics in place.⁽¹¹⁾

It will be remembered that the posterior part of the tongue is placed against the pharyngeal wall in a normal swallow. Therefore, by anchoring the first, second, and third parts of the tongue against the hard palate, the posterior part of the tongue is forced against the pharyngeal wall during this swallowing act. This exercise is also performed with the lips open, in order to break the reflex of the tongue meeting the lips during the swallowing act.

g. **Exercise to aid in strengthening osseous trabeculae of the alveolar processes:**

1. **The masseter, temporal and internal, pterygoid exercise:**⁽¹²⁾ In mouth breathers and in anemic, hypotoned and rachitic children it is surprising how little growth and development has taken place in the muscles of mastication. If the operator places his fingers over the muscle mass of the masseter and tells the child to press his teeth together, there will be comparatively little push felt on the fingers. In such cases the patient should practice the following routine:
 2. Place the palmar surface of the fingers of each hand gently on the cheeks about 1 inch in front of the ear and on a level with the ear opening.
 3. Press the teeth hard together so that the fingers are forced outward as the muscles of the jaws contract.
 4. Hold this hard contraction of the muscles until ten is counted to one's
 5. Relax the muscles and then repeat the exercise 10 times. Take a rest and do the exercise 10 times more. Gradually increase the number of repeats until 20 are being done and then continue on this number of contractions for the routine work.
 6. Repeat this exercise at three specific periods daily and at other times when it is thought of.
 7. This will develop the muscles of mastication and increase the stability of the tooth supporting bony structures. (Fig. 5)



Fig. 5: Masseter exercise

2. **The inclined plane pulling exercise:** When the lower teeth and body of the mandible are in distal relationship to cranial anatomy, or when a corrected case is showing some signs of relapsing to a distal inclined plane relationship, this exercise is of service.
 1. Thrust the mandible forward by contracting the external pterygoid muscles, until the lower front teeth are in normal relationship to the upper.
 2. Press the teeth firmly together and count 10.
 3. Slowly let the mandible slide to its normal resting position and during this slide continue to press the teeth hard together. The inclined planes will thus be made to dictate a stimulating growth force to the bone cells in the alveolar process of the mandible that will be exceedingly advantageous.
 4. Repeat this 20 times and do it for three or more periods a day.

Role of 'functional appliances'

"A functional appliance harnesses natural forces which it transmits to the teeth and alveolar bone in a predetermined direction".—White, Gardiner, Leighton. The term 'Myofunctional appliance' or commonly called as "Functional appliances" are a variety of intraoral appliances that depends upon the natural forces of oro-facial musculature for their action. Functional appliances with an exception of few are generally removable and passive in nature. These appliances instead of applying active forces transmit, eliminate or guide the natural forces of the oro facial musculature for correction of aberrant growth and function of the dentofacial structures. These appliances transmit the favorable muscular forces to the teeth and alveolar bone through the medium of the appliance. At the same time some myofunctional appliances eliminate the abnormal forces of oro-facial musculature. These appliances are considered primarily for growth modification in skeletal class II div 1 and class, III skeletal conditions to influence the facial skeleton of the growing child and aids in balancing between form and function.⁽¹³⁾

The correction of muscular imbalance may occur in three ways:

1. Spontaneous correction during or after treatment with mechanical appliances which alter the environment enough to allow such correction,
2. By means of myofunctional therapy, or
3. By means of functional removable appliances such as the activator, bionator, orthopedic corrector, Frankel's function regulators and other similar appliances.

Nutrition

Nutrition considerations are most critical during growth and development and during environmental challenges. Such challenges characterize the growing orthodontic patients, especially the adolescent facing the physiologic and psychologic stresses of puberty. Growth

and development of all tissues and structures, including that of oral cavity, directly depends on adequate nutrition. The nutritional status of the orthodontic patients can affect the biological response of the periodontal ligament and bone to orthodontic forces. The orthodontic patients are in special need of dietary counseling, especially patient undergoing myofunctional therapy. Nutritional imbalances or deficiencies may be involved in etiology of craniofacial anomalies or myofunctional disorder. With present day usage of refined food with decrease in fiber diet the use of masticatory apparatus is decreasing with reduction in jaw size & increase in incidence of malocclusion.

Interdisciplinary (Team) approach in integrated myofunctional therapy (Ift)

Myofunctional disorders have been considered historically to be primarily matters of orthodontic concern. Consequently, some of the resultant influences that extend into other areas of dentistry have been almost overlooked. A more comprehensive understanding of the situation may be achieved by pulling together some of the neglected concepts. We will not attempt a full harvest; merely a sampling of this fruit brings the realization that the seed is scattered into almost every specialized field of dentistry.⁽¹⁴⁾

Successful OMFT demands a Team approach

- All specialists in dentistry
- ENT/Speech therapist
- Physiotherapist
- Oral myologist

Monitoring the schedule and outcome:

Use of "FITT Principle" for various exercises:

It is very essential to practice the myofunctional therapy or myofunctional exercises for a certain fixed interval of time. Thus monitoring the schedule of the prescribed exercise plays an important role in it. The outcome, as desired, is possible only if the given therapy/exercise is done properly with correct number of times, with correct intensity, for proper duration. There are different exercises for different muscles and their condition.

This all is rightly explained by "FITT PRINCIPLE. "Think of The FITT principle as a set of rules that must be adhered to in order to benefit from any form of fitness training program.

The FITT principle is a simple set of rules for getting the most out of an exercise program. FITT is an acronym that stands for Frequency, Intensity, Time, and Type, each in relation to exercise.

These rules relate to the frequency, intensity, type and time (FITT) of exercise...

- i. Frequency = six days per week. One day rest.
- ii. Intensity = amount of resistance and goals to be achieved.
- iii. Time = number of repetitions (10-20 times) and sets (5-10 sets daily).

- iv. Type = strength training exercises for all major muscle groups

The therapy program should be designed for -

- i. Each individual's age,
- ii. Mental and physical abilities and
- iii. Environment circumstances.

Conclusion

There is no panacea for the correction of oral facial muscle imbalance. Exercises which are rarely prescribed will not achieve the goal. An alert therapist and observant dentist will prescribe the exercises, diet & functional appliances which uniquely fit the needs of each patient. Friendship, warm feelings, and a close personal relationship with the patient will provide an atmosphere where the patient feels comfortable and non-threatened. The hard work of myofunctional therapy has the rewards of a grateful and better functioning patient and is one of the most valuable services offered by the healing arts.

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