

Myofunctional therapy

Orthodontics—tongue thrusting—speech therapy

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The term *myofunctional therapy* was coined by B. E. Lisher in 1934 to identify the contributions made by Alfred P. Rogers,¹ whose era prevailed from 1918 through the 1930s. Rogers had been one of Angle's first students, and he was the first orthodontist in Boston. He was a well-educated, recognized scholar with a charming personality. He was president of the American Society of Orthodontists in 1911, and he continued to be active in Society functions throughout his life. He was an associate professor of orthodontics at Harvard, a director of the Harvard-Forsyth Postgraduate School of Orthodontia, and president of the New York Society of Orthodontists in 1935.²

Rogers had the respect of the American Society of Orthodontists and was given the podium at the annual meetings for many years—Chicago in 1918,³ Atlantic City in 1921,⁴ Atlanta in 1925,⁵ Chicago in 1927,⁶ Buffalo in 1928,⁷ Estes Park, Colorado, in 1929,⁸ and Los Angeles in 1938.⁹ He also spoke before the Pacific Coast Society in 1923,¹⁰ the New York Society of Orthodontists in 1934¹¹ and 1935,¹² and the European Orthodontological Society in 1929¹³ and again in 1930.¹⁴

As could be expected of a man with Dr. Rogers' recognition, educational background, and academic position, he was under constant pressure for two decades to explore all of the possible avenues of myofunctional therapy. He was extremely thorough in his study, and he produced more than fifty articles on muscle training. *Practical Orthodontics*, the text by Martin Dewey and more recently by George M. Anderson that went into eight editions, contains a chapter contributed by Rogers entitled "Myofunctional Treatment of Malocclusion,"¹⁵ which condenses much of the mechanics recorded in his articles. In the 1933 edition of Strang's¹⁶ *A Text Book of Orthodontia*, several pages are devoted to Rogers' contributions, but there are only a few paragraphs on the subject in the 1943 edition.

In his earlier articles, Rogers explains the details of his simple orthodontic appliance, the various muscle exercises, the office procedures, and the consulta-

tions with the patients. He also illustrates his results with photographs of patients and casts. He wrote that the principles of his thesis are as follows:

"First, the mechanical re-establishment of arch form and cusp relation by the simplest mechanical means, thus removing any interference which tends to discourage the normal function of the muscles. Second, the principle of muscular balance and mechanical advantage in the complete organism, including special guidance and control of those muscles concerned in the particular weakness upon which our attention is to be directed, urging them on to their normal development and strength until the harmoniously developed face completes the restoration of the organism to its normal inheritance."³

In San Francisco, in 1923, he summarized his philosophy of treatment: ". . . that malocclusion which would in all probability continue progressively may be stimulated toward normal development by fostering greater muscular activity." Another recommendation was: ". . . take this paper at its face value, remembering that the author claims only that these practices are an aid in treatment and retention, and not offered as a panacea for all orthodontic problems." He also outlined his various exercises: (1) the pterygoid exercises, (2) the masseter-temporal exercise, and (3) the tongue exercise.¹⁰

In 1925, at Atlanta, he illustrated the significance of the tongue's action. He showed two sets of casts made at intervals of several months, during the early mixed dentition, in which the lower mandibular anterior teeth had moved into alignment, with the argument that if the tongue had not been active in moving these teeth into arch form there would have been no development of the lower jaw and no improvement in the alignment of the anterior teeth.⁵

At the American Society of Orthodontists meeting in 1928 at Buffalo, Rogers presented a paper on "The Living Orthodontic Appliances,"⁷ in which he expressed the need for muscle stimuli and the benefits of muscle exercise. It was followed with case reports by Drs. Grove and Blumenthal, his associates in Boston, Dr. La Grow of Oak Park, Illinois, and Dr. Lowrie of Chicago. Again in 1929, at the Society's meeting at Estes Park, Colorado,⁸ he presented a similar philosophical paper, which was followed by papers by Dr. Dinghan and Dr. Logan. Also, Dr. Leshner of San Francisco and Dr. Ketcham of Denver were strong proponents of Rogers' work. Dr. Friel of Dublin, Ireland, and Dr. Izard of France were advocates recognized overseas. These distinguished doctors represented some of the many prominent orthodontists who were following Rogers' work in myofunctional therapy.

In later articles, Rogers noted that his thesis had not been generally accepted. He referred to those who criticized myofunctional therapy as a group opposed to the stretching of the pterygoid muscles. Specifically, they consisted of Martin Dewey, Milo Hellman, Clinton Howard, Frank Delabarre, and Cecil Steiner.² At the 1929 ASO meeting at Estes Park, following the presentation of Rogers' paper, Martin Dewey led a lively discussion on the question of whether the external pterygoid muscle or the binding ligamentous tissue of the temporomandibular joint controlled the position of the mandible.⁸ Following this, Rogers' influence waned at the Society meetings.

In subsequent years, Rogers' presentation went into reversions to his previous

articles, with a philosophical plea for muscle exercises. He also started recommending treatment at an early age and the promotion of more comprehensive health care by investigation of the patients' environmental conditions. He also prescribed changes to influence their eating, sleeping, playing, and social contacts.¹³

The fallacy of his thesis and treatment procedures came to a climax in 1934 with his paper entitled "The Problems of a Dual Bite With Particular Reference to the Temporomandibular Articulation." He took credit for introducing the term *dual bite* as being a normal physiologic occlusal jaw function. He noted that his patients reverted to a dorsal jaw position when functioning or masticating but that, when told to bite in a proper position, they would advance the mandible to a recommended anterior occlusal relationship.¹⁶ With this observation, his philosophy and myofunctional treatment were considered a useless expenditure of time.

Personal observations

My personal experience with myofunctional therapy reflects two periods that came early in my practice. The first occurred when I reviewed a series of patients whose treatment reflected Rogers' influence. One patient was an adult in "show business" who had beautiful wide arches and a broad smile when he extended his jaw forward into a "showmanship" position. Then, as he talked or as his jaw functioned, he reverted to a complete posterior occlusal position. He wore retainers that held the alignment of his teeth in this prescribed arch circumferential form. He was quite happy and accepted this "dual bite" as becoming to his profession.

Another patient was a teen-aged boy who also had a broad arch form and who also had a two-place jaw position. He had been under treatment for many years and was wearing a maxillary retainer with a ridge in back of the anterior teeth, so that it was uncomfortable for him to bite at his rearmost jaw position, but he could move his jaw forward so that his teeth came into a good occlusal position. He had been instructed to bite hard in this forward position and was curious as to when his jaw position was going to change to the new forward position. (So was I.)

Later, I was associated in a group practice where myofunctional therapy was a major consideration of treatment. We thoroughly evaluated the patient's malocclusion as well as his muscle habits. Our procedures included a formal consultation with the patient and his family. The usual orthodontic records were reviewed and the course of treatment was outlined and explained to all concerned. Following this, orthodontic treatment was initiated and frequent sessions were set up for the practice of muscle exercises.

We had a complete review of Rogers' philosophy and gadgets. Where Rogers had recommended a linen strap with a built-in bite guide that was to be used by the patient to pull against the teeth with jaws closed,¹³ we fabricated latex elastic puller straps that had a built-in raised area that could be used against the lower teeth for treatment of distal occlusion or the upper teeth for mesial occlusion. The patient could bite on the Y portion of the latex and exert pressure against the closed teeth while pulling with the handle extension.

We also used an orbicularis oris muscle spreader, as recommended by Rogers, with elastic forces to strengthen the function of the orifice muscles. It was quite similar to the one shown by Rogers in 1923¹⁰ and described in his chapter in Anderson's¹⁵ *Practical Orthodontics*.

We used a variety of tongue exercises. We instructed the patient to place the tongue to the distal of the maxillary anterior teeth and to raise the body of the tongue as he swallowed, so that the dorsum of the tongue contacted the posterior palate upon swallowing, as recommended by Rogers. We used parts of peppermint candies or Lifesavers, to be placed on the surface of the tongue as point contact when swallowing. We also used bands on the maxillary molars with dangling chains or threads, to remind the patient while swallowing to raise that posterior portion of the tongue to the roof of the mouth. We also used a variety of cribs, fences, rakes, hoes, and spikes as a part of lingual arches or attached to the bands on the maxillary or mandibular anterior teeth.

In addition to following Rogers' recommendations, we made a bite register to record the amount of muscle pressure that a patient could produce by biting hard before treatment and then again at subsequent appointments following exercise therapy. We speculated that the muscle tonicity was enhanced and that we increased the biting pressure. We did observe that in time the patients recorded more muscle force following the use of exercises than they had before; whether this was due to the exercises or to age or growth change, we did not know, of course.

We believed that we were helping our patients. However, most of the young patients and their parents became frustrated with the appliances and muscle treatment that continued over many months. In no case did I see a rapid response to treatment as indicated by Rogers where, in a matter of 6 to 8 months, bite conditions changed.⁴ Instead, where there were several siblings in the family and the older ones were under-going routine orthodontic treatment, their treatment would be completed while their younger sisters or brothers were continuing with the drudgery of myofunctional therapy and long periods of growth observation. Parents became annoyed at the numerous times they needed to travel to the office and at the home discipline requiring prolonged cooperation as the many months extended into years.

The ultimate fallacy of a "dual bite" was shown recently in the case of a young college-age girl, who was referred for treatment of temporomandibular joint pain. She gave a history of having had orthodontic treatment. Casts were made of her mouth and recorded to the hinge axis on a "Centriculator" and compared to nonarticulated casts. The patient had worn her retainers faithfully, and the nonarticulated models of her teeth showed an excellent occlusal relationship, whereas her "Centriculated" cast showed a unilateral distal occlusion. Tomographic x-ray films showed a severe pathologic involvement of one condyle in which the condylar head had been eroded half away. This patient had been out of orthodontic treatment only a few years, and she had worn her retainers faithfully so that her teeth had remained in good position, but the joint tissues had suffered irreparable damage. Now she was destined for surgical treatment and an appropriate prosthesis. A "dual bite" can be expected to result in (1) tooth

wear, (2) destruction of supporting underlying tissue, or (3) pathologic changes in articulation structure.

Speech therapy

Following publication of Dr. Walter Straub's¹⁷ thesis on bottle feeding as the cause of tongue thrusting, there was another wave of interest in myofunctional therapy. During this period, speech therapists were invited to assist in controlling the tongue-thrusting habits. Many of these therapists received college degrees and in some instances became part of an orthodontic practice. Others included correction of tongue thrusting along with their speech therapy practice. This is a logical sequel, since part of the tongue's function is to aid in vocalizing thoughts and a person with faulty speaking habits can also have undesirable tongue pressures or faulty tooth alignment. As this phase of their practice increased, they observed changes in the arch alignment and positions of the teeth and believed that therapy ". . . could indeed induce tooth movement through the application of established principles of muscle balance."¹⁶

From their objective as speech therapists, they state that "(1) there seems to be no clear explanation of diagnostic procedures, with (2) . . . a lack of a clear-cut expression of a 'philosophy' of treatment, and (3) the area of responsibility for proper diagnosis and referral has not been clearly defined."¹⁶ In addition, "the therapist further learned that he could be of aid in achieving successful physical results such as (1) the improvement and correction of mouth breathing; (2) the removal of the counterforce of the tongue to give additional strength to orthodontic appliances; (3) to aid in the correction of certain periodontic problems; and (4) to materially aid in the correction of certain occlusal problems."

There is no parallel to Koch's law for speech habits or tongue thrusting. Audio reports assist the speech therapist in diagnosing the patient's ability and performance in speaking the sounds of letters or combinations of symbols.²⁶ There have been proposed classifications of the characteristics of tongue thrusting, as to both its effects on the facial form and the mechanics of the tongue actions.^{28, 29} Also, along with Straub's³⁰ work on the "Malfunction of the Tongue," there has been emphasis on treatment technique for the various age levels and different characteristics of tongue-thrusting habits. The observations and recommendations have an image similar to those noted by Rogers and others during the original wave of myofunctional therapy. This is understandable, considering the broad aspect of Rogers' interest, the depth and extent of his research, and the over-all general acceptance during that period of time.

Orthodontic goal

Orthodontists have a reference for the diagnosis and the perfection of their endeavors in the Angle classification of malocclusion. The gnathologic approach to orthodontics, wherein the hinge axis is a plumb to measure the extent of gnathostatic and gnathologic defects present before treatment and the effects of treatment results, is an accomplished orthodontic goal.

Conversely, orthodontists have observed that usually patients spontaneously abort their apparent bad tongue habits during the course of orthodontic treat-

ment. For those who do not respond favorably, however, they would be delighted to enlist the aid of a therapist from any field who could help. Unfortunately, orthodontists have observed that these patients also do not respond favorably to myofunctional therapy.

Recently two sisters, 7 and 8 years of age, in the mixed-dentition stage of dental development came in for consultation. Each girl had good arch formation and occlusal relationships but showed evidence of an incipient anterior open-bite with the probability of a tongue-thrusting habit. If this could have been aborted and the lip function strengthened, these children probably could have developed acceptable dentitions that would not require orthodontic intervention. They were referred to a speech therapist with the recommendation that he treat them for tongue thrusting. There was no further communication for 2 years. Then, the father of the girls, a highly respected physician, called to inquire as to the qualifications of the therapist. He questioned why the therapist was inquiring into the patients' home and family life, asking if Mama liked Papa, etc. He wanted to know whether the therapist was a psychiatrist or a psychologist in addition to his occupation as a speech therapist. The father also said that he did not see much change in his daughters' teeth in return for his expenditure of several hundred dollars. Subsequent examination of the two girls revealed that nothing had been accomplished during this period of time except that their dental development had advanced to a stage where the mechanical intervention of orthodontic treatment was now indicated. This was quite reminiscent of Rogers' recommendations made in 1929, when he advised analyzing a patient's environment, nutrition, sleeping, playing, and social habits.¹³

Positioner treatment

The use of a gnathologic positioner can have myofunctional effects.²¹ The Impak clear plastic material has tough elastic qualities when used following active treatment in which a positive attempt has been made to have the teeth in physiologic occlusion, with the centric occlusion corresponding to the centric relation as specified by Schuyler²² in 1929 and subsequently recommended by Stallard.²³ Following treatment, the active appliances are removed, the mandibular position is recorded at the posterior terminal hinge axis relationship, and the patient's casts are mounted on an acceptable articulator reproducing this axis. The positioner is constructed at this physiologic jaw position. The plaster teeth are cut from the casts and rearranged into optimum articulation. The opening for the positioner material is on an arc, as recorded by the hinge and as recommended by Gritman²⁴ in 1899 and Gysi²⁵ in 1910. The hinge opening of the finished positioner coordinates the teeth to the jaw axis.

The use of the positioner with strenuous biting exercises is recommended. As the power-closing muscles bring the jaws together and the sinews bind the separate parts, the teeth are moved within their underlying tissues to promote a complete coordination of the systems of the gnathic organ. Also, the positioner material confines the teeth to an enclosed area, so that the tongue has to adapt with limited movement and function during the time that the positioner is being worn. This has been a routine procedure for several thousand patients, and there

has been a happy sequence with subsequent good coordination of the respective tissues.

However, some patients have an undetected degree of malocclusion following the removal of active appliances. It is referred to as a "dual bite" and becomes apparent when posttreatment casts are related gnathologically. Even though a positioner is made to take the patient to his posterior hinge axis closure and he shows every evidence of cooperation, the teeth do not move far enough; nor does the jaw position change to encompass the required distance to eliminate the "dual bite." Orthodontic treatment then has to be reinitiated to correct the untreated occlusion. Otherwise, at the hinge axis closure, the patient will stumble over protruding cusps; even though he bites forward into an acceptable forward position, he has a dual bite. This exemplifies the strong forces affecting the jaw structures and the necessity to coordinate the teeth to their action.

Conclusion

The present wave of interest in myofunctional therapy has been promoted primarily by speech therapists. Their vocation has been to help people speak properly and distinctly, and they have perfected teaching methods that change the habitual pattern of the tongue movements. They have observed favorable tongue habits, and they have seen others in which the tongue pushed against the teeth with excessive pressure.²⁷ They have extended their knowledge of the factors of voice expression so as to consider the effects of these good and bad habits on the alignment of the teeth.²⁷

As their interests broadened, they began to assume greater scope in the perspective of their work. They approached the action of muscles as the significant role of dentofacial development and occlusion. Garliner²⁹ expressed this phase as: "Thus, the oro-facial musculature plays a significant role in occlusal relationships. Neglect of this basic understanding of cause and effect will negate the excellent results the practitioner achieves through the use of other weapons in his armamentarium, for unless soft tissue equilibrium is achieved, malocclusion must inevitably result. Muscular imbalance creates an environment within which the imbalanced musculature can function. This implication is extremely significant in any dental specialty which attempts to change occlusal relationships."

Orthodontists express concern that the results of tongue-thrusting treatment are not consistent or uniform. They fear that myofunctional therapy is superfluous. Yet they are still anxious to solicit aid for this serious problem. Where definite examples of tongue thrusting are apparent, orthodontists will coordinate exercises along with their treatment and, if available, solicit the aid of competent speech therapists.

Orthodontists observe that many patients with probable tongue-thrusting habits lose those habits during orthodontic treatment, as the teeth are brought into a harmonious alignment, never to regain the habits again as their teeth retain their new positions beautifully. Others may have pernicious habits that persist during treatment and complicate retention. Orthodontists would be delighted to compliment anyone who could minimize the bad tongue habits. Even if the habit can be subdued during orthodontic treatment, it would be better if it

did not exist; it would also lessen the work involved and minimize concern about retention.

The logical time for treatment of tongue thrusting is at birth or during the period of infant feeding, as suggested by Straub.^{17, 30} If this is the genesis of the problem, then the period soon after birth is the most desirable time for therapists to squelch the habit patterns and start the infant on a healthful growth course.

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Education in orthodontia, however, has not been as good in the past as it might have been, due to various reasons: First, the student was not sufficiently impressed with the importance of the subject—the evils of malocclusion and the necessity for treatment—in consequence of which he did not feel sufficiently interested to avail himself to the fullest extent of such educational opportunities as were presented. It was not uncommon for students to remark that they did not care for orthodontia—that they did not intend to practice it—that people were not sufficiently interested to have the work done—that they would send their cases to a specialist—that all they cared for was to pass the chair . . .

The teacher also recognized that the student lacked interest, and that there was insufficient time for proper training, besides the probability that there would be little call for this work in the young dentist's practice, therefore he too lacked enthusiasm and carried on his work in a more or less perfunctory manner . . .

There has been a marked advancement in the theory and practice of orthodontia, and the public has also been educated somewhat to know something of the possibilities and the necessities of treatment in this branch of dentistry, thus the conditions for education and practice are more favorable than they were in the past . . .

With a greater appreciation of the evils of malocclusion, and the causes that produce it, observing that these are much further reaching than has been properly recognized in the past, this subject becomes one of the most important in dentistry. (Assar A. Weiss: *Dental Colleges in Relation to the Teaching and Practice of Orthodontia*, *International Journal of Orthodontia*, predecessor of the *American Journal of Orthodontics* 2: 327, 1916.)