

Commentary

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Clinical Exchange

Tooth Movement Associated with Orofacial Myology from a Dental Hygiene Clinician's Perspective

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This article has been written as a rebuttal to the conclusions drawn by Dr. Marvin Hanson in his article, "Tooth Movement Associated with Oral Myofunctional Therapy: A Clinician's Report" which appeared in the November, 1992 issue of the *International Journal of Orofacial Myology*. This rebuttal relates to the broader implications of all tooth movement which Dr. Hanson's title implies, and includes the specific reference to overjet reduction which the abstract of Dr. Hanson's article informs us is the focus of his clinical observation and measurement.

Background

This author would agree with Dr. Hanson on the reason for the origin of the specialty area of orofacial myology. That is, orofacial myology evolved as a result of the orthodontists' conclusions that abnormal forces involving the orofacial musculature (the lips, tongue cheeks, etc.) may indeed be interfering with the orthodontic alignment and retention of the dentition and contributing to the "natural tendency of teeth" to move toward their pretreatment relationships (in other words, *relapse*). However, this *ex post facto* conclusion failed to take into consideration the probability that these same forces may have been a major contributing factor to the original malocclusion, and consequently that the normalizing of these forces could in effect **prevent** or **intercept** the abnormal development of the oral cavity and the alignment of the dentition. It is this consideration that leads Dr. Hanson to state that orofacial myologists have the goal of "providing an oral environment optimally conducive to stability or development of the dentition. When this goal is related to children with primary or mixed dentitions, it is considered to be developmental and therefore *preventive* or *interceptive* in nature. When the goal is related to orthodontic referrals, it is to provide a stable oral environment. The assumption here is that the violations of the neutral (equilibrium) space will cause a malocclusion if the behaviors persist (Kraus, Jordon, Abrams, 1992). Even though we cannot measure prevention, the implication is that these behaviors which therapy addresses would have caused abnormal tooth movement.

Also, Dr. Hanson implies that it is possible to close open bites and reduce overjets in "extraordinary" cases. He further states that all experienced clinicians can come up with portfolios of examples of such spontane-

ous tooth movement as a result of therapy alone. The inference here is that spontaneous tooth movement is some sort of aberration, or the result of a combination of clinician expectations and/or "muscle strengthening" which Dr. Hanson sees as redundant if the patient is capable of normal rest posture and normal (or near normal) speech articulation. It is at this juncture that Dr. Hanson addresses what he sees as two common misconceptions made by clinicians or assumed by their audiences. The first misconception is that many anterior malocclusions can be corrected with therapy alone. The second misconception is that the amount of movement of teeth accompanying therapy can be used as an assessment of therapy success. Dr. Hanson's conclusions seem to be that (1) therapy prevents orthodontic relapse by changing behaviors, (2) therapy prevents malocclusions by normalizing the neutral space alignment of the developing dentition and (3) therapy can normalize malocclusions in "exceptional" cases.

However, Dr. Hanson's article warns us that expecting tooth movement as a result of therapy is a misconception that orofacial myologists should not entertain or imply to their patients or colleagues. Dr. Hanson also advises the orofacial myologist to avoid using "tooth movement" as a criterion for therapy success (even though it is a valid criterion for orthodontic failure). His conclusions were based on an investigation of 214 case records in which the criterion was reduction of the overjet only. The 214 records included patients with normal overjets, and evidently, all types of malocclusions. The results of his investigation found that an overjet mean reduction of 1 mm. over a period of one year occurred in the subjects selected. Based on this statistic, Dr. Hanson concludes that such minimal overjet reduction (which could have been caused by normal bone growth) does not warrant orofacial myologists to claim or expect to move teeth by therapy alone. Perhaps one should take a look at the "extraordinary" cases, and see how they differ from the subjects in Dr. Hanson's report and his conclusions thereof.

Procedures

Subject Selection: According to the report, the criterion for subject selection was based on age (mean age 10.1 years), absence of orthodontic intervention for the first three months of therapy, "other" types of anterior malocclusions, and elimination of those who dropped

out of therapy before the first three months had passed. Overjets of at least 1 mm. were necessary for inclusion in the study.

Why were normal overjets (between 1 and 3 mm.) included in the subject selection? They serve no purpose other than to skew the data. It would be rare that the orthodontist or the orofacial myologist would want (or expect) to decrease a normal overjet of 3 mm. or less. Both the orthodontist and the orofacial myologist may have the opposite goal (that of increasing the overjet measurement) by eliminating habits such as tongue sucking where the tongue is directed against the mandibular incisors, tongue pressure against the anterior segment of the mandibular arch in rest position or swallowing, or functional mandibular protrusion. These behaviors may be responsible for a *Pseudo Class III* where the molar relationship remains Class I, but the incisor relationship becomes end/end or in cross bite. In the case of mandibular protrusion, the molar relationship may be changed during function from Class I to Class III (Moyers, 1988). This is an area where controlled research is needed in order to determine whether interarch discrepancies of this type in the anterior segment are the result of differential growth patterns, habits, functional shifts or combinations of these factors. Also, by excluding "other" anterior malocclusions for purposes of Dr. Hanson's paper, the data are again being distorted by not including the malocclusion frequently found in the case load of the orofacial myologist—problems with anterior and posterior open bites.

A most important factor central to this rebuttal is the fact that there was no attempt to separate genetic from functional malocclusions. The premise of this paper would agree with Dr. Hanson's article in that genetic or structural malocclusions are not going to change as a result of orofacial myofunctional therapy, even when they are accompanied by abnormal behaviors. Only the orthodontist can produce those results. This means that genetic Class I malocclusions with crowding will not change by therapy alone, nor will Class II Division 1 and 2, or Class III molar relationships, overbites, overjets or anterior crossbites which have resulted from genetic interarch discrepancies. If, however, the etiology of the malocclusion is functional (environmental or behavioral) in nature, and if the violation of the neutral space is contributing to the malocclusion, then the elimination of those aberrant behaviors can result in occlusal changes if the therapy is initiated before the patient is an adult. (Some changes may even occur in the adult dentition). The patient may still need and benefit from orthodontic treatment, but therapy alone may provide an environment which produces desirable tooth movement.

Conversely, skeletal Class II malocclusions are more likely to maintain an abnormal overjet even though orofacial myofunctional therapy is successful. If the overjet is reduced in a skeletal Class II malocclusion via orthodontic treatment, and if there is no change in the

abnormal swallowing pattern or the orofacial resting posture patterns, the integrity of the orthodontic result may be at risk due to the abnormal muscle functions. The assumption is that the subjects in Dr. Hanson's clinical report were predominantly orthodontic referrals. Orthodontic referrals would include a higher ratio of structural malocclusions in addition to the inclusion of patients with normal overjets, and were consequently not valid subjects for his stated hypothesis.

Measurements

The method of measurement for Dr. Hanson's clinical report does sound reliable. However, there was no mention at this point as to whether the subjects were measured at each interval even if orthodontic intervention had occurred in the interim. Since this would tend to skew the data toward greater decrease in overjet, the assumption is that only unbanded patients were measured. Dr. Hanson explains in his FINDINGS section that measurements were taken only prior to orthodontic banding. This would decrease the reliability of the report as some patients may have been banded at three months (thereby not giving the overjet adequate time to spontaneously diminish), while others were not banded for one year or more. Conversely, the elimination of open bites from the report would increase the reliability of the measurement and simultaneously ignore a possible source of a diminished overjet measurement as a result of orofacial myofunctional therapy.

Findings

Since the findings are similar to the comparison of "apples and oranges," it is difficult to come to any conclusions about the data. The in-depth examination of the cause of the problem will aid the natural tendency of the dentition to return to its heredity-induced and skeletally-induced predetermined position.

The most important variable is "age." The second most important variable is direction of movement. The dentition aligns itself on two unrelated two-dimensional linear curves (an anteroposterior curve and a mediolateral curve). This alignment, along with the natural forces of self-protective features, is designed to enhance functional occlusal alignment (Kraus, Jordon, Abrams, 1992). The younger the individual, the more adaptive the oral environment to both normal and abnormal forces. Vertical movement is the simplest for teeth, given the dentition's passive and active eruption patterns. Interference of the active eruption of teeth can occur through abnormal forces and can be reinstated by the removal of those forces.

Passive eruption is a life-long process which dictates that all teeth seek their antagonists in the opposing arch, unless physically precluded from doing so (Brand, Isselhard, 1990). Orofacial myofunctional therapy, with its emphasis on tongue rest posture on the palate would remove such physical forces as a tongue resting between the teeth (if this was not a protective measure to prevent occlusal trauma from interferences or

prematurities). Habits such as cheek biting and/or sucking, digit sucking, nail biting, and tongue thrust swallowing would also be eliminated. As a result of these behavioral changes, there could be closure of a vertical open space if there were no other physical interference and if the age were pre-adult. This phenomenon can also enhance the orthodontic results in closure of vertical problems (open bites) at any age.

The alignment of the dentition also facilitates mesial movement of teeth by the design of the anterior component of force, and the intercuspation of the occlusal tables. These self-protective features (plus the impact of gravity) are responsible for mesial drift, which, from the orofacial myologist's point of view could contribute to the elimination (over a period of time) of diastemas caused by tongue pressures once these pressures were eliminated (Kraus, Jordon, Abrams, 1992). Distal movement, which includes overjet reduction, is the most difficult to achieve except for abnormal labial axial inclination not supported by basal bone mass (i.e. created by abnormal digital sucking habits, a Class II-Division 1 or flaring resulting from tongue thrusting). Genetically abnormal overjets are not reduced by elimination of behaviors as they are the result of interarch discrepancies. Transverse movement of teeth accompanied by expansion of the palate with normal tongue rest posture (as a result of myofunctional exercises) in conjunction with elimination of leaning-on-fist habits has been documented by this author in patients who are young (under ten years of age).

To purport that the orofacial myologist exists only as an auxiliary of the orthodontist in order to provide a "stable oral environment for orthodontic retention" is to demean the potential of this health-related specialty area. This attitude fails to recognize the vast number of people who could benefit from orofacial myofunctional therapy by normalizing their oral environment, and then (if necessary and if possible) seek the help of the orthodontist whose treatment might be shorter and less complicated due to this normalization. If therapy does begin before or during mixed dentition, and if the occlusion is being influenced negatively by the orofacial muscles, it is not uncommon for positive tooth movement to take place with successful therapy. It is not the "exception" as proclaimed by Dr. Hanson, but it becomes the rule. However, these kinds of observations

could easily elude one who does not routinely take comparable photographs or study models and who chooses to focus on only the horizontal component of malocclusion during the growth and development years. This does not mean that one should solicit referrals on the basis of tooth movement, but only on the premise of assisting in providing a more harmonious orofacial environment which will enhance the normal development of the individual. Orofacial myofunctional therapists have been led to believe that it is dishonest to proceed with therapy under the guise of modifying the dentition or the oral structure (not to mention the unprofessional and unethical aspects of this behavior). However, would it not also be dishonest to deny, ignore, or conceal such a reflection of the efficacy of such early intervention?

The rationale of dental hygiene, and of other members of the dental community, is that early detection and elimination of undesirable habits can be considered preventive and/or interceptive in nature. Dr. Hanson seems to agree with this premise. However, if we all waited until a patient was seen by an orthodontist and referred to the orofacial myologist for an "optimally stabilized oral environment," we would miss well over one-half of the population with malocclusions who never would have seen an orthodontist (Burt, 1992).

If the orofacial myologist has the knowledge and the therapeutic capability of normalizing (even to a less than perfect occlusion) the dentition of some individuals, it is the ethical and moral responsibility of this specialty to inform the public and to provide that service whenever possible. This should not be seen as a threat to the dental or orthodontic community, but rather as a public health issue which may carry profound implications. We are all partners in this endeavor to improve life and to help people. Perfect occlusion is a rare phenomenon, and teeth that fit together (cusp/fossa) make a unique contribution to the stomatognathic system. Teeth that are aesthetically pleasing make a unique contribution to one's psychological well-being. These should be the goals of the orofacial myologist and the orthodontist working together or independently.

Dr. Hanson's clinical report has achieved the purpose of all good research—it has inspired discussion, repetition and rebuttal. It is time to attack the file cabinets and prove or disprove our theories!

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