QUESTIONS POSED BY A CLINICIAN ABOUT AN OPEN BITE THAT DEVELOPED FOLLOWING ORTHODONTIC TREATMENT

(My responses in blue)

Dr. Bob: I have a question for you regarding a statement made by a referring orthodontist regarding a 16 year old female patient. The patient originally underwent orthodontic treatment (completed at age 14) which included palatal expansion, corrected posterior crossbite/crowding and extraction of four 1st bicuspid teeth to level and align teeth and close her anterior openbite. Approximately one year following treatment, the patient's anterior openbite reopened 1 - 2 mm and has continued to worsen. The patient's original orthodontist felt that the anterior open bite relapsed largely due to the steep angle of her mandible and strong skeletal openbite tendency in addition to continued jaw growth of the mandible. Both the original and referring (current) orthodontists do recognize the presence of an abnormal tongue habit/lip incompetence. Airway issues were suspected and have recently been evaluated and are currently being managed. Better late than never to evaluate for airway interferences. That horse had left the barn long ago.

I'm interested in your thoughts on this statement made by the *referring* (current) orthodontist:

"There was some talk of her anterior open bite being associated with jaw overgrowth. But that makes no sense to me. If that were true, it would have caused a posterior open bite, not an anterior open bite. But the reality is that it would not have caused any open bite, because if the teeth were to separate, natural supra-eruption would have brought them back together. The real issue here is tongue habits."

Is this statement accurate? No, it is not.

I thought that if there was supra-eruption of the posterior teeth (because of potential jaw growth in this case *or* as a consequence of an increase in normal freeway space due to an interdental tongue posture) then differential eruption would contribute to an anterior open bite. What am I missing here? Nothing. I am impressed that you understand the concepts of the freeway space and differential dental eruption. Well said and well thought out!

Some comments:

1) The suspicion of an unresolved airway issue should have been addressed before the orthodontic treatment was initiated, or soon after. Removing braces following closure of an anterior open bite in the presence of an airway issue is asking for relapse to occur.

2) The statement that this 16 year old female's mandible is characterized by a steep mandibular plane indicates that more overgrowth of the mandible has occurred in the *body* of the mandible rather than the *ramus*. Additional growth would be compatible with an anterior open bite reoccurring rather than a posterior open bite. To develop a posterior open bite, there would be more additional growth in the *ramus* of the mandible rather than the *body*.

3) If the tongue is an issue and the mandible was hinged open by the presence of a forward interdental rest posture of the tongue, differential eruption would occur, with supra-eruption of posterior teeth but no additional eruption of anterior teeth due to the interdental position of the tongue that would prevent anterior eruption. The posterior over-eruption would be related to the freeway space (and mandible) being open beyond the normal range rather than to the development of a posterior open bite.

4) Most often, late, additional growth of the mandible occurs in the body of the mandible. Along with this, the gonial angle (the angle formed by the posterior edge of the ramus and the lower border of the body of the mandible – where they meet at the posterior-inferior border of the mandible) would increase, or "open".

5) The idea that jaw overgrowth self-corrects with natural supra-eruption of teeth is not confirmed by clinical research. When one jaw overgrows, it is usually the mandible, and overgrowth almost always would result in an anterior open bite, not a posterior open bite that spontaneously closes down.

6) The *rest posture of the mandible* should have been noted and dealt with prior to the removal of braces, and checked periodically in retention. I suspect that the orthodontists involved think of "tongue thrusting" (now termed *tongue fronting*) as the mechanism involving the tongue with anterior open bites rather than a *forward, interdental lingual rest posture*. Any perceived link between tongue fronting and the development of an anterior open bite is a false association since tongue fronting (thrusting) does not cause dental changes. Since there is no mention by either orthodontist of any finding relative to the rest posture of the mandible, we can assume that they have not evaluated the rest posture of the tongue and are not aware of the link between an abnormal rest posture of the tongue and a developing open bite.

7) While growth of the maxilla is complete by age 12 years, the mandible can continue to grow well into the twenties. Because of this, open bite corrections need to be monitored for many years, especially the resting tongue posture, and tongue posture needs to be stable when additional growth is experienced.

8) Still another variable is the orthodontic mechanics used to close down the open bite. Retracting anterior teeth can help to close down an anterior open bite, but orthodontic extrusion of upper incisors, or lower incisors, or both, may introduce an additional relapse opportunity if the extrusion of incisors was not maintained over time.

You are right to question here the validity of the statement made by the orthodontist. For a posterior open bite to develop under these conditions is not feasible and certainly not a reasonable speculation.

The one orthodontist is correct in speculating that: "The real issue here is tongue habits." However, it is a bit late to link tongue habits with the open bite.

In mentioning "tongue habits", the orthodontist is alluding to *tongue fronting*, with no apparent appreciation for the contribution of an interdental rest posture of the tongue with a developing open bite during the retention period. Both orthodontists need to become informed about the role of an abnormal interdental rest posture of the tongue as the link with dental changes, including an anterior open bite, and about how to *evaluate* the rest posture of the tongue. They also need to become informed about what happens when the freeway space is open beyond the normal range, for hours per day, triggering the additional eruption of posterior teeth without concomitant eruption of anterior teeth due to the presence of a protruded tongue interposed between the anterior dentition; an eruption process known as *differential eruption*.

The patient should have been referred to an ENT or allergist to treat the airway issues prior to initiating orthodontic treatment. Lingual habit patterns, both fronting and an abnormal rest posture, should have been documented in the initial orthodontic exam. Your services should have then been requested to correct an abnormal tongue rest posture, and also, to eliminate the tongue fronting pattern that was noted, prior to orthodontic treatment. I'm sure that you would have insisted on an ENT/allergy evaluation before agreeing to treat the patient.

The sequence needed now is to identify and resolve the airway issues and to establish and stabilize an appropriate tongue rest posture. Following that, some additional orthodontic treatment may be needed. If so, your help should also be needed in monitoring the patient in the retention period.

There are *three* contributions that an orofacial myofunctional clinician can make to counter post-orthodontic relapse. They are: 1) to achieve and stabilize a lips-together rest posture and a nasal mode of breathing; 2) to make sure that the vertical dimension of occlusion at rest (the freeway space) is normal, and; 3) to insure that the tongue does not rest interdentally (you can ask the patient to report where his tongue tip is resting). If none of the three components amenable to change by you are abnormal, you can advise the orthodontist to look for some other explanation for the source of relapse (such as late mandibular growth, expanding canines during treatment, or other factors associated with relapse familiar to orthodontists); otherwise, there is no role for you to play in treating this individual.

Thank you for your excellent observations and questions. Good luck with any efforts you may make to further enlighten these orthodontists about the components of OMDs discussed here. I suggest that you share with them the article *For Dentists and Physicians* found on our website under *Position Papers, Guidelines and Articles* that explains the importance of an abnormal rest posture of the tongue in creating dental changes, the perspective that tongue fronting is an adaptive behavior to a malocclusion already there rather than a cause of malocclusion, and details associated with the concept of differential dental eruption.

Dr. Bob

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