

QUESTIONS AND ANSWERS ABOUT THE DENTITION

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Clinicians aspiring to a career in the area of orofacial myology have a desire and need to assimilate dental terminology and concepts pertinent to the discipline. Many dental/orthodontic concepts and terms are not easily located in the dental literature. Our purpose here is to provide useful selected dental information for myofunctional clinicians that can aid in communicating evaluation findings to dental personnel. The selected topics will be presented in a question and answer format.

Q: What are the basic differences between the dentitions of children and adults?

A: There are several differences:

- 1) Children's incisor teeth are upright, while adult's incisor edges are flared slightly toward the lips. The reason for this is that adult incisors are wider than those of children, so there is a need to create more room for them in the dental arches; thus, they flare forward and in doing so, increase the circumference of the dental arches. If adult central incisors erupt in an upright position, it is typical for the lateral incisors to be blocked out of the dental arch either toward the lips (labially or facially), or blocked palatally (toward the palate or tongue).
- 2). Children's canines are smaller than those of adults; nonetheless, sometimes it is difficult to tell whether the canines are primary or adult teeth. To resolve the confusion, if you wiggle the tooth and it moves, it is a loose primary canine. If there is wear or flattening on the canine tip, it is more likely a primary canine. Another clue: ask the patient or parent.
- 3) Molar teeth of children are larger than the bicuspid teeth that will replace them in the adult dentition. Some crowding can spontaneously disappear as the primary molars are replaced by the bicuspids (remember that there are no bicuspids in the primary dentition).
- 4) There is very little or no Curve of Spee in the dentition of children. The gentle curve downward from incisors and then back up at the molars occurs in the adult dentition, reaching a maximum of @ 2 mm at the bicuspids by age 16. Orthodontic treatment usually flattens and eliminates the Curve of Spee. This is not usually a problem.
- 5) Just a reminder – the full dentition in a child includes 20 teeth whereas in the adult, there are 32 teeth counting the wisdom teeth.

Q: What dental terms or conditions are well known to dentists and orthodontists but not usually easily found in dental texts?

- A:**
- 1) One term is *ectopic*, which denotes a tooth that is or has erupted out of place, or in the wrong place (such as palatally).
 - 2) Another common term is *blocked out*, as used above, which simply describes a tooth out of position either facially or lingually because there is insufficient room in the dental arch for the tooth.
 - 3) *Canting* is a term that you will see on some orthodontic reports and problem lists. Canting is when the teeth are slanting to the left or right from a perpendicular line when facing the patient. Either or both arches may exhibit canting. A cant of the anterior dentition may develop spontaneously in the mixed or adult dentition, or even during orthodontic treatment. The causative factors are not well known. In some patients, a cant can be linked to ankylosed and submerged (below the line of occlusion) retained primary molars, or late erupting teeth on one side that

contribute to alveolar bone vertical height differences. Why the canting usually involves a left to right downward slope is not known, although a right to left cant may occur infrequently. Orthodontic leveling of a canted upper or lower dental arch usually presents a treatment challenge.

Although the many potential reasons for the development of canting are not well documented, the rest posture or functions of the tongue have not been linked as contributing factors.

4) A *Bolton discrepancy* is known by all orthodontists and may be mentioned in their reports. W. A. Bolton (AJO, 1980) developed a **tooth size analysis**, also called a **Bolton analysis**, by measuring the mesiodistal widths of each permanent tooth. A table of Bolton's data found in any orthodontic text is used to compare the summed widths of maxillary and mandibular anterior teeth, and as well, the widths of all upper and lower teeth excluding second and third molars. Where there is a discrepancy between the ratios of tooth widths between upper and lower teeth, the term *Bolton discrepancy* is used.

As a quick check for tooth size discrepancies of anterior teeth, you can compare the widths of upper and lower *lateral incisors*. If the upper lateral incisors are not wider than the lower laterals, a discrepancy will usually exist in the form of some lower incisor crowding. As you may already know, size variations of the maxillary lateral incisor are the most common variations seen in the dentition, such as peg-shaped upper laterals.

The suggested application of this information is as follows: if you note lower anterior crowding and, after evaluating the widths of upper and lower lateral incisors you determine that the upper laterals are small in comparison to lower laterals, it is appropriate for you to include this information *as a question* in your clinical report to an orthodontist. You can state that your evaluation revealed a possible Bolton (or tooth size) discrepancy with anterior teeth that may be linked to lower anterior crowding, and would the orthodontist kindly evaluate this observation?

Q: Why do many adults develop lower anterior crowding as they age?

A: If you have high definition TV, you will note many crowded lower anterior teeth in adults.

There are several reasons for this:

1) The most overused reason is that anterior crowding begins as the wisdom teeth erupt. While this may be a contributing factor for some, there are many more whose lower incisors do not become crowded with 3rd molar eruptions. Overall, dentists have blamed too much lower crowding on the eruption of posterior teeth. The reason for this overly-applied cause and effect linking eruption of wisdom teeth with anterior crowding is that dentists know that teeth tend to drift forward, or mesial (toward the midline).

2) As teeth experience wear over time in adulthood, the bite closes slightly. This tucks the lower incisors up under the cingulum of upper incisors and thus, contributes to crowding.

3) Since the cortical (covering) plate of bone on the facial and lingual surfaces of the lower incisors is thin in comparison to all other locations in the dental arches, crowding is more apt to develop. Resting tongue and lip pressure differentials also contribute to the development of the crowding at the lower incisors.

Q: What should we look for in evaluating the dentition?

A: There are several observations that are recommended for you to make:

1) Check the midlines. The dental midlines ideally should match the facial midline, which is judged at the middle of the soft tissue lip at the Cupid's bow, the middle of the philtrum or the middle of

the nose. If the maxillary and/or mandibular dental midline deviates from the facial midline, additional observations are suggested. Example: if the upper dental midline is deviated to the right, perhaps there is a small right lateral incisor, or a blocked out canine on the right, or a missing tooth on the right. If the upper midline is “off” and the lower midline is “on” (as orthodontist would describe the midlines), then the problem is with the upper arch only. Where both midlines deviate to the right, this may suggest some irregularity in the TMJ’s, or the ramus or body of the mandible on one side.

2) Check for the Class of occlusion (you should already know about Class I, II and III). If your patient is in mixed dentition, with some adult teeth and many remaining primary teeth, it may be difficult to evaluate the occlusion. If you are having a problem, you can make your evaluation of posterior occlusion at the canines. For Class I, the lower canine tip will fit in the space between the distal of the upper lateral incisor and the mesial of the upper canine (or the lower canine is ½ a tooth ahead of the upper canine). Make sure you evaluate both sides, since a person can be Class I on the right and either Class II or III on the left. Evaluating at the canines can work for evaluating the adult dentition as well; however, compare your observations at the canines with occlusion at the molars. With spacing or other problems, a person may be Class I at the canines but not at the molars.

3) Check for *overbite* and *overjet*. Even dentists occasionally get confused about these terms. Most patients will tell you that they have an overbite (everyone should have an overbite) when they in reality have an excessive overjet. Remember that an overbite is a vertical relationship of teeth. With front teeth a normal overbite (also called vertical overlap) should normally involve an overlap during biting of 1/3 to ½ of upper incisors covering lower incisors. For overjet (also called horizontal overlap), the upper incisors should extend facially beyond the lower incisors, whose facial surfaces should ideally contact the lingual surfaces of the upper incisors. Note: all teeth around the dental arches should normally exhibit some overjet and overbite. These are normal terms that should be qualified by “excessive” when there is a problem. A deep overbite can also be called a closed bite.

4) Check the *esthetic line*. The esthetic (or E-line) of Ricketts indicates the relationship of the dentition with the facial profile. Remember that where the teeth are located (positioned) determines the position of the lips in the horizontal plane. The E-line is constructed by drawing an imaginary line between the tip of the nose and the chin. In a well-balanced face and profile, the lower lip will be at or near the E-line, while the upper lip will be positioned slightly behind the line. Example: if both lips are well behind the E-line, extraction of teeth for orthodontic treatment is contraindicated since the profile will become even more retruded or dished-in at the lips following closure of the extraction spaces. Lips positioned far behind the esthetic line are a clear indication that extractions are not indicated, but remember that it is the dental provider’s role to make the decision to extract or not. Conversely, if the lips are positioned ahead of the esthetic line and if there is lip incompetence, extraction of teeth would be an expected part of the treatment protocol. The spaces provided by extractions are then closed by retracting the anterior dentition into the extraction spaces and thus, improving the facial profile and lip posture.

5) Check for the presence of open bites and cross bites: anterior, posterior, unilateral; bilateral. Where the lower incisors project ahead of upper incisors, the anterior crossbite is also referred to as a *negative overjet*, while the public may call this an *underbite*. You will recall that you can have a crossbite at a single tooth location or at multiple locations, such as involving an entire posterior segment from canine or first bicuspid on back.

6) Where you have questions about the dentition, remember to count teeth. Many patients have a malocclusion because of a missing incisor or canine or bicuspid. If a canine is missing, the dental midline will be expected to deviate to that side. Also remember that a rule in orthodontics is to avoid, wherever possible, extracting a canine.

Q: Why are the first bicuspid teeth the usual teeth to be extracted for orthodontic treatment?

A: In most extraction cases, it is the first bicuspid teeth that are extracted; then the canines are moved distally into the extraction spaces. Where retraction of anterior teeth is indicated, teeth closest to the area to be extracted are removed. To close extraction spaces from front to back, the posterior teeth are used as anchors to pull the anterior teeth posteriorly (or distally – away from the midline) during orthodontic treatment.

For esthetic purposes, it is unwise to extract incisors or canines. Orthodontists always avoid removing canines. Why? Because the canines are located at the greatest curve of the arch and have very long roots. As such, they stabilize the dental arches and also contribute to opening and closing gestures of the jaws during chewing referred to as *canine rise* in dentistry; a chewing relationship that dentists like to achieve. Where this is impossible or impractical and where the posterior teeth control opening and closing activities, this chewing pattern is referred to as *group function* of the dentition. Group function is a normal functional behavior.

Q: Please provide some information about spacing between teeth. Is surgery necessary to remove extra tissue?

A: A space between adjacent adult teeth, a *diastema* (pronounced die-ass-tuh-muh), is a common occurrence, especially between the adult upper central incisors. By contrast, the spaces seen between primary anterior teeth are not termed diastemas. Spacing in the primary dentition is a normal and positive indication that the adult incisors have enough room to erupt normally since primary incisors are smaller than their adult counterparts.

A central diastema is common in the mixed dentition, especially where the lateral incisors have not yet erupted. In many individuals, the diastema will close spontaneously after the lateral incisors erupt, so resist the temptation to conclude inappropriately that the patient will need frenum surgery. In other instances, a diastema can be linked to a tooth-size discrepancy.

Orthodontic treatment for spacing typically involves braces rather than a retainer with springs. The reason for this is that retainer springs will only tip the teeth toward the midline to close the space. This leaves a window open just below the gingiva. Braces close the space by bodily moving the teeth together. The roots remain upright, which is desired for long-term dental stability.

In many patients, the cause of the diastema is the presence of extra connective tissue strands that continue from the frenum in the labial sulcus across the dental arch between the upper incisors and ending on the palatal side of the anterior alveolar ridge. In some cases, this connective tissue band will have to be surgically removed or altered. However, there is a universally accepted rule in orthodontics that you would never recommend surgery on the frenum until after the diastema is closed orthodontically. If surgery is done before orthodontics, a window will be seen at the gingival margin. In contrast, if surgery on the frenum is needed after closure of the diastema, the procedure would involve sculpting the gingiva so as to preserve the natural curve of the gingiva interproximally.

Interestingly, only about 5% (10% at the most) of thick labial frenums (or frenulae) will need surgical correction following orthodontic space closure of a central diastema. In most cases, the

tissue remodels sufficiently following orthodontics so that no surgery is needed. Orthodontists monitor the situation following space closure and make a referral for surgery only after it is demonstrated over time that the space will not remain closed without some surgical assistance in connective tissue sculpting.

A central diastema has a genetic link in some families. A diastema can occur anywhere in the dental arches, but the central diastema is the most recognizable example.

Q: Are there any guidelines for clearly writing evaluation reports to other professionals?

A: This question reveals a common and potential problem in communicating information to professionals from other disciplines, especially dentists and orthodontists: the vocabulary of the MFT and SLP often differs from those in other disciplines. Here are some examples of things to remember in writing reports:

1) The alveolar ridge encompasses all teeth in both dental arches, or from "ear to ear". That is, all teeth are housed in alveolar bone. It can be confusing to dentists when reports discuss *lingual-alveolar* tongue contacts, What is really meant is a tongue tip to incisive papilla contact, or, alternately, a tongue tip to anterior maxillary alveolus contact.

2) An *articulator* in dentistry is a metal apparatus on which dental study models are attached (mounted) for purposes of evaluating occlusion and movements of the mandible. In mentioning the *articulators*, it is recommended that you qualify your statement by identifying that you are discussing the *speech* articulators.

3) Many in speech-language pathology report that they conducted an *oral-peripheral* evaluation. Other medical personnel would wonder "Peripheral to what? Were the peripheral nerves evaluated? Where is that report?" More clearly, what you are reporting on is an *orofacial evaluation*, so that is what should be stated.

4) When reporting on *oral diadochokinetic* testing, remember to include the word *oral*. The use of diadochokinetic testing to assess the tongue and lips is derived from medical testing of rapid and repeated finger movements to grossly assess cerebellar competence. The term diadochokinesis was coined from this medical assessment.

5) Many terms are seldom used in dentistry, such as distocclusion and mesiocclusion. (Class I, II and III are sufficient). Also, *frenum* is preferred to *frenulum* (acceptable but more anatomical) and the same for nasal *turbinate* rather than *concha* (which is actually the correct anatomical name). Please remember that orthodontists prefer the name of their discipline as *orthodontics* rather than *orthodontia*, a term that smacks of the olden days of orthodontics.

Q: Is it appropriate for MFT's to mention their dental findings in a report to dentists/orthodontists?

A: There is nothing wrong with making observations about the status of the dentition and including your findings in reports to dentists. However, there is a way to pass on your observations. It is recommended that you include your observations as: "It appears that the patient exhibits..." or "The patient appears to exhibit..." and request that the dentist or orthodontist verify your impressions with a definitive evaluation. In our opinion, any in dentistry would welcome your observations if you defer to them for the diagnosis. In this way, you cannot be accused of diagnosing dental conditions, which you legally cannot do as a myofunctional clinician.