

# JCO ROUNDTABLE

## Early Orthodontic Treatment, Part 2

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**DR. GOTTLIEB** What are your criteria for serial extraction in Class I crowding cases?

**DR. MOSKOWITZ** Our criteria go far beyond the degree of crowding present. Significant crowding of 7mm or more, dental arches that appear to have reasonable width, protrusive position of the maxillary and mandibular incisors, lip strain upon closure, normodivergent to hyperdivergent skeletal patterns, and profiles that would benefit from some reduction are ideal candidates for serial extraction.

**DR. PHIPPS** For me to use serial extraction, severe crowding, 7mm or more, or other factors such as a vertical facial growth pattern must be present.

**DR. BRAZONES** My criteria for crowding in these cases would be at least 4mm and partially impacted second molars. I also look at the facial esthetics, soft-tissue strain, and the skeletal growth pattern, stage of dental development,

angulation of the incisors, and position of the second molars. I always take diagnostic records with mounted models, to confirm that the molars are a true Class I and that there is no mandibular positioning, prior to removing permanent teeth.

**DR. MALERMAN** We do classic serial extraction for patients with a Class I dental relationship, Class I skeletal relationship, minimal overbite/overjet, an orthognathic profile, and six or more millimeters of crowding in each arch.

**DR. GOTTLIEB** What is your treatment program for serial extraction?

**DR. MALERMAN** For these patients, deciduous canines must be removed no later than simultaneously with eruption of the mandibular permanent lateral incisors. This permits self-alignment of the permanent incisors, allowing the crowding in the incisor segment to be transferred to the buccal segments. This in turn should slow eruption of the permanent canines. If the patient



**Dr. Gottlieb**

does not present for treatment until the permanent lateral incisors have been well established, it is too late to slow eruption of the permanent canines. This means we have to begin serial extraction for girls no later than age 7, for boys no later than age 8.

The second step in the serial extraction process is designed to enhance eruption of the first premolars. When the root of the first premolar is half to three-quarters formed, and the cusp tip emerges through the alveolar bone, removing the first deciduous molars enhances eruption of the first premolars. The first premolars can then be removed as soon as they erupt, along with the remaining second deciduous molars. This will permit the permanent canines to erupt distally and the second premolars to erupt mesially, filling the first premolar space.

**DR. MOSKOWITZ** Removing the primary canines and then the primary first molars provides an immediate opportunity for the incisors to align and encourages the first premolars to erupt ahead of the permanent canines. It's important for lingual arches to be used in some of these cases to prevent over-lingualizing the incisors prior to the use of fixed appliances. If severe rotations and unusual crowding are present, I have no problem in using limited fixed appliances for a brief period to align the upper and lower incisors. This is sometimes beneficial.

After the eruption of the permanent canines and extraction of the first premolars, comprehensive fixed appliances are placed.

**DR. PHIPPS** When first bicuspid show 50% root development, I extract primary first molars. I extract first bicuspid as they erupt, or intervene surgically if they are impacted or if the canines have already erupted. I wait until eruption of the second molars before starting fixed appliance treatment.

**DR. BRAZONES** Usually, if the canines have started to erupt, this will be occurring in the lower arch prior to the upper arch. I then take diagnostic records to establish a treatment plan for the extractions. If I am certain that extraction of permanent teeth is required, I will have the deciduous first molars and the first premolars removed all at the same time. This is then a one-time procedure that is well tolerated by the child. The oral surgeon uses sedation, and the memory of the procedure is minimal. I don't start any treatment until the permanent dentition is completely erupted.

**DR. SARVER** On occasion, we perform serial extraction, but really not very often. Crowding is not the only variable that is an indication of whether to take teeth out or not. Other issues include profile, incisor angulation, and so on. My treatment ideal for serial extraction would be a normal or slightly protrusive profile. In the normal profile, I would prefer that crowding be severe enough for a virtual one-for-one exchange. Transverse smile dimension would also be part of this decision, in that some anterior expansion might be desirable for a more significant smile projection.

**DR. GOTTLIEB** Do you employ any procedures to maintain the leeway space?

**DR. BRAZONES** I used to, until I found that many patients then did not have enough room for second molar eruption. I had a treatment objective of preventing premolar extraction, but ended up impacting the second molars. I decided that second molars were more important than pre-

venting premolar extraction.

**DR. MALERMAN** If a patient presents with overall arch-length insufficiency that can be minimized by preventing leeway space loss, the approach is often to remove deciduous canines to allow autokinesis, and at the same time to place a mandibular lingual arch to prevent loss of leeway space. Corrective orthodontic treatment then begins just as the second deciduous molars are trying to exfoliate, so that the second premolars can be distalized to the molars, rather than the molars allowed to drift to the mesial into contact with the second premolars.

**DR. MOSKOWITZ** The maintenance of leeway space in certain cases is critical. Frequently, the decision to extract premolars as part of the overall orthodontic treatment effort rests upon the evaluation of the mandibular dentition. The curve of Spee and the position of the lower incisors play an important role in this evaluation, as well as the need for profile reduction. Assuming that the profile does not require reduction, a number of borderline extraction cases can be converted to frank nonextraction cases merely by preserving the “E” space differential. On occasion, this differential is considerable—2mm or even greater per side (Fig. 2).

When needed, we place a passive lower lingual arch. We are essentially utilizing the differential space between the lower second primary molar and lower second premolar. Pushing the envelope even further, the use of a lip bumper might provide additional space as lower molars are uprighted to some degree, and lower incisors might be advanced. Gianelly has described a protocol and rationale for the protection of leeway space.<sup>3</sup> Essentially, our protocol is quite similar.

**DR. SARVER** To manage the leeway space, we use lingual arch treatment, or removable appliances if the patient is very cooperative.

**DR. PHIPPS** I use fixed space maintainers, upper Nance appliances, and lower lingual arches.

**DR. GOTTLIEB** Does the maintenance of the leeway space tend to result in the development of



**Fig. 2** This overretained lower second primary molar provides unusual opportunity to see amount of leeway space that can be gained when lower second deciduous molar exfoliates.

a Class II malocclusion?

**DR. BRAZONES** Yes, in some cases, by not allowing the first molars to move mesially into the leeway space.

**DR. PHIPPS** Occasionally it does, especially when using a lower lingual arch exclusively.

**DR. SARVER** Maintenance of the leeway space would contribute to a Class II molar relationship, since the shift forward of the lower molar is one of the factors in correcting the Class II relationship.

**DR. GOTTLIEB** If that happens, how do you proceed?

**DR. PHIPPS** I consider the use of a maxillary molar distalizing appliance or extractions.

**DR. SARVER** If preserving the leeway space results in a Class II molar relationship, either the molars are distalized or growth modification is applied in the orthodontic phase of treatment.

**DR. MOSKOWITZ** If I am concerned about this, I would address the upper molar position. An upper 2 × 4 arch is an effective way to create some distal movement, or at least hold back the mesial movement of the upper molar after the upper second primary molar is lost. Remember,

this molar movement is to some extent a “plaster concept”, because differential growth factors between the maxilla and mandible play a role in the final molar relationship. There are other ways to handle this situation, depending upon the actual needs of the upper dental arch.

**DR. MALERMAN** I deal with this by beginning Phase II treatment just before the mandibular second deciduous molars are lost, as I mentioned earlier. The maxillary second deciduous molars should still be present. The molars may be in an end-on buccal relationship. That makes it simple to nudge the maxillary molars distally into a full Class I relationship.

**DR. BRAZONES** I learned to diagnose better in the beginning, and now I do more deciduous extractions and premolar extractions if the second molars will not have sufficient room later.

**DR. GOTTLIEB** If first molars drift forward in the mixed dentition stage due to premature loss of deciduous molars, do you regain the space in a first-phase treatment?

**DR. MALERMAN** Proper diagnosis and treatment planning should reveal, when the patient first presents for treatment, whether there will be adequate room for eruption of all the permanent teeth. If not, there is no point in regaining space only to do extractions and then lose space. If we can treat the patient nonextraction or if there is an opportunity to convert an extraction situation to a nonextraction treatment plan, we regain space. This is accomplished as early as possible in the transitional dentition, and then the correction is retained with either a maxillary Nance holding arch or a mandibular lingual arch.

**DR. MOSKOWITZ** One criterion for intervening early to regain the space would be the evaluation of the probable consequences of not doing so. Not intervening in this particular instance would predictably necessitate some corrective procedure in the permanent dentition and might encourage the upper second premolars to assume ectopic positions in their development.

Regaining the appropriate space is usually



**Dr. Brazones**

relatively routine. I prefer to use fixed appliances to regain the space intended for the upper second premolar. Sectionals work just fine. Lingual arches, palatal buttons, and conventional space maintainers can all keep the upper molar positioned distally while we await the eruption of the upper second premolars.

**DR. BRAZONES** If the crowding is not severe, the arch can accommodate all the teeth, and the second molars are well positioned, I regain space and correct rotations of the molars. I hold the correction with a space maintainer or a Nance.

**DR. GOTTLIEB** If you have overretained deciduous teeth and delayed eruption of permanent teeth, at what point do you interfere?

**DR. MALERMAN** Overretained deciduous teeth should be removed the moment that it is noticed that they are overretained, because they are an impediment to eruption of the underlying permanent teeth. Removing the offending deciduous tooth often enhances eruption of the permanent tooth and reduces the severity of the case. If a deciduous tooth has to be extracted, we make a determination as to whether space maintenance is required. If the underlying permanent tooth will erupt in less than six months, and if we will not be losing leeway space during that time, no space maintainer is required. If it is anticipated that the underlying permanent tooth will require

more than six months to erupt, or if we anticipate loss of leeway space, a space maintainer will be placed.

**DR. MOSKOWITZ** As soon as I am certain that the deciduous teeth are overretained and that the underlying permanent teeth are being compromised in their eruption, I discuss it with the parents, and hopefully they consent to the removal of the deciduous tooth or teeth in question. On occasion, a clinician will find long, curved roots on mandibular second primary molars, which have deflected mandibular second premolars to ectopic positions in the alveolus (Fig. 3). These deciduous teeth may not be strictly classified as overretained, but they are behaving as if they are and should be removed as soon as possible.

**DR. PHIPPS** When roots of permanent teeth are more than 50% formed and/or a permanent tooth is erupting ectopically, I refer for extraction of the primary tooth.

**DR. BRAZONES** I take periapical x-rays or panorex at six-month intervals, and monitor for deciduous root resorption and permanent tooth root development. I do nothing if vertical alveolar growth is good and if the occlusion of the opposing teeth is maintained. If the occlusion is beginning to open on the adjacent teeth, I have the deciduous teeth extracted. In other words, if the occlusal plane starts to change in the area of the overretained tooth, I will have it extracted. If the permanent tooth is being displaced even though the root is forming normally, I will have the deciduous tooth removed as soon as I see it.

**DR. SARVER** We interfere with overretained deciduous teeth if they are ankylosed and produce a deformation of the alveolus. If the family is socially conscious and wants appliances on and off before the patient starts high school, for example, we will consider removal of primary teeth with a clear understanding that it may not be necessary, but simply their choice.

**DR. GOTTLIEB** Do you use arch development (transverse expansion) to gain space in the mixed



**Fig. 3 Ectopic development of lower left and right second premolars due to failure of resorption of second deciduous molars' long, curved roots. These deciduous teeth should be removed as soon as possible.**

dentition?

**DR. SARVER** We expand the maxilla and await spontaneous uprighting of the lower buccal segments. We very rarely expand the mandible.

**DR. MALERMAN** I consider arch development for patients with a Class I malocclusion and less than 6mm of crowding. Many of these patients have narrow maxillae combined with exaggerated lingual tipping of their mandibular first permanent molars—an exaggerated curve of Wilson. Uprighting the mandibular posterior teeth and expanding the maxilla provides us with greater arch length to accommodate eruption of the permanent dentition. We don't do it as a knee-jerk reaction to crowding. If we can reshape the arch to accommodate all of the permanent teeth in good position, well supported over basal bone, with the mandibular incisors perpendicular to the mandibular plane, without altering intercanine width, we will then proceed with arch development.

**DR. MOSKOWITZ** I use quite a bit of maxillary expansion in my practice. Many malocclusions have some form of perversion or disharmony in maxillary transverse width. Maxillary expansion has become an important adjunctive procedure in the overall management of numerous malocclusions with transverse issues and some degree of arch-length inadequacy. It is one of the instances in which we are really effecting an

orthopedic movement. Clinicians should be clear as to why they are prescribing maxillary expansion and should be cautious about thinking that maxillary expansion is a panacea for significant crowding.

**DR. BRAZONES** I don't do transverse expansion just to make space. My goal in early treatment with a transverse deficiency is to align upper and lower incisors in good overbite and overjet and to align midlines. I expand transversely if the maxillary molar width is deficient—less than 36mm from lingual cusp to lingual cusp. I then monitor the positions of the upper permanent canines, and if they are mesially inclined, I have the deciduous canines extracted. I also monitor crowding of both arches during Phase I retention and plan sequential extractions of deciduous molars to aid in eruption. I usually take a cephalometric x-ray prior to the eruption of the upper canines and then the lower second premolars to evaluate space needs, and then plan extraction of permanent teeth or let eruption continue on its own. If only the deciduous molars are in crossbite but the 6-year molars are in good occlusion, I don't expand, as the premolars almost always erupt wider than the deciduous molars.

I never do transverse expansion of the lower arch other than uprighting the teeth. I will sometimes upright lower deciduous molars if they are tipped lingually, but the mandibular alveolar width is not stable if the teeth are expanded beyond normal dental width.

**DR. GOTTLIEB** At what age would you start such treatment?

**DR. BRAZONES** I like to see patients before the lower incisors are fully erupted and after the upper centrals are erupted. The maxillary laterals are usually crowded, and the canines are starting mesial inclination. My rationale is to try and normalize the transverse occlusion prior to the start of the late mixed dentition, so that the eruption path of the premolars and canines is in better alignment with the lower arch, and to allow the upper incisors to be aligned toward a more nor-

mal overbite and overjet relationship. I try to place the posterior teeth into a normal position rather than an expanded position.

**DR. PHIPPS** I rarely use arch development in the mixed dentition. It takes much more expansion than what is actually gained as arch length. In the presence of significant crowding, it is rarely indicated.

**DR. GOTTLIEB** What appliances do you use for arch development?

**DR. BRAZONES** I use a rapid palatal expander or a transpalatal arch with expansion and rotation. I have used a maxillary removable appliance, but compliance may be an issue. Some kids have a greater tendency to misplace it or throw it away, or the dog gets it. I prefer a fixed appliance for greater control over the amount of time the appliance is needed. It also requires fewer appointments and less maintenance. If the upper first molars are in a good occlusion with the lower first molars, but the deciduous molars and canines are in crossbite, I may use an anterior expander for anterior arch development.

**DR. MALERMAN** In the maxillary arch, I most often use a Haas appliance. In the mandible, depending upon the angle of the mandibular plane, the amount of crowding, and the location of the crowding, different expansion appliances will be chosen for different problems. If the incisors are tipped lingually, a lip bumper placed high will allow them to tip forward. If the incisors are in good position and we wish to develop the premolar area, a lip bumper placed low but expanded in the premolar area may be the appliance of choice. Care must be taken not to overutilize a mandibular lip bumper, or the first permanent molars can be distalized into the erupting second permanent molars and cause their impaction.

The appliance most often used in the mandible to gradually distract the mandibular incisor region is a Schwarz plate. If I feel that the patient will not wear a removable Schwarz plate successfully, I will use a semiremovable lip bumper



Dr. Malerman

to alter the configuration of the mandibular arch. On occasion, I will employ a mandibular lingual arch with pin-and-tube attachments on the molars and vertical loops in the premolar areas to allow adjustment transversely as well as sagittally.

**DR. MOSKOWITZ** I prefer to use a Hyrax maxillary expander to address transverse dimension and a Schwarz appliance in the mandibular arch in the mixed dentition to upright lower posterior segments that might have tipped lingually. Sometimes we choose a bonded palatal expander.

**DR. SARVER** I generally use rapid palatal expansion. The rationale is that RPE tends to tip teeth buccally less than lower force levels. In addition, the gain of arch length is greater, and RPE has some skeletal response that can be advantageous.

**DR. PHIPPS** I use a fixed palatal expander in the maxilla. Fixed expansion, when accomplished at an early age, is largely orthopedic in nature and tends to be more stable. Removable appliances tend to tip teeth buccally and are prone to greater relapse.

**DR. GOTTLIEB** Do you expand both arches simultaneously?

**DR. MALERMAN** The two arches are expand-

ed simultaneously, with the mandibular teeth expanding to fill the void created when the buccinator muscles are repositioned as the maxilla is expanded.

**DR. BRAZONES** I treat both arches simultaneously, but I don't expand the lower arch. I do align the lower incisors into a more ideal angulation and AP relationship in the mandible. It's easier to know where to start; it's harder to know where to finish once you have started if you are expanding both arches simultaneously.

**DR. MOSKOWITZ** Maxillary expansion, either slow or rapid, is frequently accompanied by some form of mandibular posterior teeth uprighting. I tend to expand one arch at a time.

**DR. GOTTLIEB** Do you ever prefer slow maxillary expansion instead of rapid?

**DR. BRAZONES** I can't think of any reason to use slow expansion in a growing child. The rapid expansion works well with very little or no discomfort. It is tolerated by both parents and patients. The treatment proceeds quickly with rapid expansion, and the patient does not want to wear it any longer than needed.

**DR. MALERMAN** Patients with anomalously steep mandibular planes and narrow arches are expanded slowly to prevent clockwise rotation of the mandible.

**DR. MOSKOWITZ** I have been using a slower type of expansion in the past few years. The results appear to yield just about the same clinical outcome as RPE without the associated dramatic effects of rapid expansion.

**DR. PHIPPS** I use what I consider to be a rapid expander for maxillary expansion, turning the jackscrew one turn per day, approximately  $\frac{1}{4}$ mm per day. The only additional means of expansion I achieve is through progressive archwire changes and the effect they have on modifying the archform.

**DR. SARVER** I prefer RPE, and my personal bias is influenced by a number of RPE studies I

have been involved in. I have had little experience in slow expansion, and it is generally not a part of our treatment regimen.

**DR. GOTTLIEB** If expansion in the mixed dentition is performed to gain space and to avoid extractions later, are the results as stable as cases treated with extraction in the permanent dentition?

**DR. BRAZONES** No. I used to do that, but found more relapse as the occlusal and muscle forces would try to put teeth back over the alveolar bone. I no longer expand in the mixed dentition with the objective of avoiding extraction of permanent teeth. I expand to develop the maxillary arch toward a normal width for that particular patient. If all the teeth fit over the alveolar bone without extraction, and the second molars will have room to erupt, and the soft tissue and facial esthetics are not compromised, the objectives have been met. When I used to attempt arch expansion for the objective of not extracting premolars, the results were not stable and crowding returned. I also found that the second molars did not have sufficient room for complete eruption, and I needed to extract in Phase II to make room for the second molars. If my objective in expanding was to prevent extraction of permanent teeth and we ended up extracting in Phase II, Phase I had been a waste of time. As orthodontists, we should be able to determine arch length and tooth size so that the diagnosis and treatment plan have a predictable outcome.

**DR. MALERMAN** If we can reshape the dental arches and allow for expansion of teeth and alveolar housing without expanding beyond basal bone support, the post-treatment result is every bit as stable as if we took teeth out. If the arches are expanded beyond basal bone support, a cantilever is created and we lose stability.

**DR. MOSKOWITZ** I do not try to make nonextraction of permanent teeth a treatment goal. As with most of my colleagues, esthetics, function, and stability are important treatment goals in our practice. If I can achieve all three without

extracting permanent teeth, that would be preferable, but it is not my goal in itself. Many cases can be expanded to "fit the teeth into the dental arch". That does not mean that this should be done with every patient. There are limits that if exceeded will provide poor function, stability, and esthetics. Profile considerations, transverse and anteroposterior positions of individual teeth, and growth vectors all play an important role in determining whether permanent teeth should or should not be removed. It might sound very attractive to parents and referring dentists, but orthodontists should be somewhat cautious in telling parents that "if we start early and expand the dental arches, then extractions of permanent teeth will not be necessary". All too frequently this decision cannot be accurately made in the mixed dentition stage. In mild-to-moderate crowding situations, it is sometimes very difficult to decide upon the overall benefits of premolar extractions in the mixed dentition.

**DR. GOTTLIEB** Do you treat a bimaxillary protrusion early?

**DR. MOSKOWITZ** If there is no crowding, just protrusion of the incisor teeth, and no ectopically developing teeth or overjet considerations, there might be little benefit in beginning these cases early. They are usually first premolar extraction cases, and I can wait to treat this type of case unless there are other compelling reasons to begin early.

**DR. MALERMAN** I consider a bimaxillary protrusion to be like a Class I crowded malocclusion in which the front teeth are tipped forward but aligned, rather than upright and crowded. These patients benefit from premolar extractions to allow uprighting and retraction of their incisors, so that the anterior segments can be properly oriented in relation to their basal bone support. This is best accomplished in the late transitional-early permanent dentition.

**DR. PHIPPS** I occasionally start serial extractions at age 8-10 if significant crowding is present in the bimaxillary protrusion. The goal





Dr. Moskowitz

would be to minimize protrusion and the need for retraction.

**DR. BRAZONES** If the bimaxillary protrusion involves moderate-to-severe crowding, I may get involved to determine tooth-size/arch-size disharmony and plan a serial extraction approach with anchorage control during eruption. Most bimaxillary cases treat best after complete eruption of the permanent dentition.

**DR. SARVER** We do not treat bimaxillary protrusion early. The rationale is that full anchorage mechanics and extractions would be the treatment of choice and, therefore, second molars should be incorporated into the anchorage units.

**DR. GOTTLIEB** Do you treat bilateral posterior crossbites early?

**DR. MALERMAN** Bilateral posterior crossbites are treated as early as possible. For the most part, these patients present with a maxilla that is narrower than it should be in relation to the mandible. As a result, the successor teeth have insufficient room to develop. This often results in aberrant paths of eruption for the maxillary canines and the maxillary second molars.

We use a Haas appliance to correct the transverse skeletal problem. After the expansion has been completed, the appliance is left in place for three months until we have bone fill. At the

end of three months, the appliance is removed and a removable palatal stent fabricated for the patient to wear for an additional three months, full-time, as the bone begins to mature. The patient then continues with the appliance at night for an additional six months, and then no retention until they reach braces age.

**DR. BRAZONES** I treat bilateral posterior crossbite as soon as the first molars are erupted. I like to unlock the occlusion to allow the maxillary arch to develop and grow naturally, and to allow normal function of the upper and lower first molars.

**DR. PHIPPS** I like to treat bilateral crossbites early—age 7-9—because sutural expansion is most effective and stable at an early age.

**DR. SARVER** We treat bilateral crossbites as soon as we see them, since the crossbite is the only factor that appears to be related to temporomandibular joint dysfunction in adults.

**DR. MOSKOWITZ** Bilateral posterior crossbites without any other orthodontic problem have a rather wide window of treatment opportunity. What advantage is gained by treating early unless there are other associated factors such as excessive wear of posterior teeth, mandibular displacement, anterior overjet, or TMD symptoms?

**DR. GOTTLIEB** Do you distinguish between a true unilateral posterior crossbite and a mild bilateral crossbite with a convenience mandibular shift?

**DR. BRAZONES** I try to make that distinction as I make my diagnosis, based on models mounted in CR. I also do a TMJ exam to record signs and symptoms. Depending on the occlusal plane and the transverse dimension of the maxillary arch, I will determine if extraction or equilibration of deciduous canines will eliminate the functional shift. I usually find a transverse width disharmony with a functional shift and treat with an RPE and  $2 \times 4$ .

A true unilateral crossbite with no shift will

usually also have an asymmetric mandible, and mandibular vertical growth is usually deficient on one side of the face. This is visible on the lateral ceph and PA ceph. I still approach this the same way, with an RPE to unlock the occlusion, as I'm not sure if the dental crossbite caused the skeletal component or if the skeletal asymmetry caused the crossbite. If the mandible does not center itself after expansion, then the crossbite is due to a mandibular asymmetry. I still try to normalize the maxillary occlusal plane so that both arches are not continuing to grow asymmetricaly.

**DR. MALERMAN** The unilateral crossbite with a functional shift is very common. They are, for the most part, bilateral posterior crossbites in centric where the mandible shifts to one side into maximum intercuspation. They are a bilateral posterior crossbite of less severity than a complete bilateral crossbite. Treatment is exactly the same.

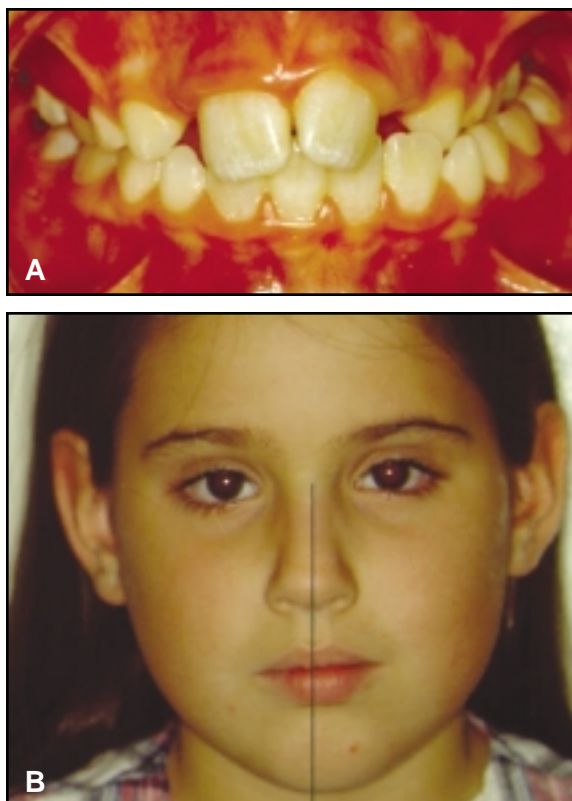
A true unilateral crossbite, one in which the mandible is centered, the maxilla is asymmetric, and teeth on one side in the maxilla are tipped to the lingual, is relatively rare. We do treat these malocclusions as early as possible to correct the crossbite, thus allowing the successor teeth to erupt into better order. This is usually done with an appliance that is designed to tip the teeth in the asymmetric quadrant toward the buccal and into a symmetrical relationship.

**DR. MOSKOWITZ** A true posterior crossbite has a crossbite on one side of the dentition without a functional shift. Unilateral functional posterior crossbites have subtle or frank mandibular shifts upon closure. The shift is almost always in the direction in which the unilateral posterior crossbite is observed in centric occlusion. Upper and lower dental midlines do not coincide, and the lower dental midline is off to the same side of the shift (Fig. 4).

**DR. GOTTLIEB** Do you treat unilateral posterior crossbites early?

**DR. MOSKOWITZ** I believe that as with the

bilateral posterior crossbite, a wide window of treatment opportunity exists for the true posterior crossbite, and I am not so sure that I would rush in and treat it as soon as I see it. The unilateral functional posterior crossbites, however, should be treated earlier rather than later. They present a situation of a growing individual with an imposed asymmetry. Clinical impressions have been validated by research on this subject. Pinto et al. have shown that there are morphological changes as well as positional changes associated with the mandible in samples of children with unilateral posterior crossbites and functional shifts.<sup>4</sup> Sonnesen, Bakke, and Solow have demonstrated that both bite force and TMD



**Fig. 4 A.** True unilateral functional crossbite, in which mandible has shifted to left side, where crossbite is observed. Bilateral expansion is needed. **B.** Frontal facial asymmetry indicates functional shift of mandible to left side upon closure.

symptomology are statistically different in patients who have functional crossbites.<sup>5</sup> I believe that this is yet another instance in which we as orthodontists and dentofacial orthopedists play an important role in restoring both form and function. Failure to treat this anomaly earlier rather than later might contribute to future mandibular asymmetries and other problems later on.

**DR. BRAZONES** I always take records prior to starting Phase I treatment. The diagnosis determines the treatment, and the treatment objectives determine the timing of the treatment.

**DR. PHIPPS** Growing patients with unilateral crossbites and a functional shift are at risk of asymmetric mandibular growth. I agree on the importance of treating them early.

**DR. GOTTLIEB** How do you treat them?

**DR. PHIPPS** The true unilateral crossbite requires a unilateral force—crossbite elastics—to localize the correction in the area desired. I use fixed palatal expansion and a lower lingual arch with crossbite elastics, if needed.

**DR. MOSKOWITZ** I have treated these functional crossbites with both removable and fixed expansion devices, and again, the choice of appliance should be based upon the needs of the individual patient. The good news is that treatment for functional crossbites is relatively short-term, predictable, and reproducible. Interestingly, Pinto et al. found that all patients in their sample who received treatment for functional crossbites responded well, and morphological changes were restored to normal as a result of treatment in the mixed dentition.<sup>4</sup> I can't emphasize too much the importance of early diagnosis and treatment in these types of cases.

**DR. SARVER** A true unilateral crossbite would be indicative of mandibular asymmetry rather than a functional shift, and the two conditions require a different approach to treatment. In my office, unilateral Herbst treatment or functional appliance therapy would be indicated for the mandibular asymmetry, while rapid palatal



Dr. Phipps

expansion would be indicated in the crossbite with a functional shift.

**DR. GOTTLIEB** Do you treat anterior open bites early?

**DR. BRAZONES** The diagnosis is the deciding factor. The longer that I am in practice, the more I know my limitations. If the anterior open bite is present with other orthodontic disharmonies, I take diagnostic records to evaluate the skeletal and dental factors. If the patient has a Class I malocclusion with mild-to-moderate crowding, or spacing and an anterior open bite, I will not recommend any early treatment. If the crowding is severe, or if there is a transverse discrepancy or spacing along with a crossbite, I will recommend early treatment to treat all these conditions. Closure of the open bite may occur during this treatment.

If the anterior open bite is caused by abnormal tongue function, I usually see upper and lower spacing from canine to canine. The posterior occlusion is usually good. A tongue fence works well, and the open bite will close if the tongue is primary. If skeletal growth is the primary factor, and if there is a significant cranial-base-to-mandible skeletal disharmony and both arches are well aligned, I do nothing until all permanent teeth are erupted. Usually in those cases, I find that the posterior ramus height is short and

the gonial angle is obtuse. Posterior vertical maxillary hyperplasia is usually present. The open bite does not improve, but actually worsens with growth and eruption of the second molars. This could then involve comprehensive treatment with a maxillary Le Fort osteotomy.

**DR. SARVER** We do not treat anterior open bites early since many of them—the literature reports as much as 85%—close spontaneously with maturation. So we give it a chance to self-correct, but not an indefinite chance.

**DR. MALERMAN** We treat some anterior open bites early, depending on their cause. Many of the youngsters we see with anterior open bites have one of three problems. The first of these is a habit, such as thumb- or fingersucking. Efforts to discourage the habit should start no later than age 4.

The second problem that we see associated with anterior open bite is a tongue thrust. If the tongue thrust is secondary to the malocclusion, correcting the malocclusion usually eliminates the tongue thrust. For example, the youngster who has a narrow maxilla and concomitant tongue thrust usually has the anterior open bite closed when the maxilla is widened to permit normal tongue function. A small percentage of patients, however, have a neuromuscular pattern that results in a primary tongue thrust. This very small percentage of patients will always have a tongue thrust, and no matter what is done in the way of correction, their anterior open bite will return. Unfortunately, the only way to distinguish between the primary and secondary tongue-thrust patients is to correct their malocclusions. If the tongue thrust disappears, which happens most of the time, the tongue thrust was secondary to the malocclusion. If the tongue thrust does not disappear and open bite returns, the tongue thrust was primary.

The third cause of anterior open bite that we see is crowding in the maxillary incisor region. Sometimes the incisors literally get stuck. If there is insufficient arch length, sometimes the contacts are so tight in the anterior that the teeth cannot erupt fully. It's unusual, but it does occur



Dr. Sarver

on occasion.

**DR. MOSKOWITZ** Anterior open bites are always challenging. The degree of anterior open bite, skeletal pattern, and etiology are important factors in helping the clinician decide upon both treatment timing and specific treatment procedures. Mild anterior open bites that might be due to reverse or infantile swallowing patterns should not necessarily be treated early. Over 50% of these types of cases are self-correcting as many patients mature into a more normal pattern of swallowing.

**DR. GOTTLIEB** Which came first, the open bite or the tongue thrust?

**DR. MOSKOWITZ** It is difficult to determine which came first. Tongue posture might be more important than anything else. The tongue will go where it is allowed to go. If you have an anterior open bite, the tongue will interpose between the upper and lower teeth, certainly during swallowing.

**DR. GOTTLIEB** What is your preferred form of treatment?

**DR. MOSKOWITZ** One of the most effective ways to treat anterior open bites that are associated with forward tongue posture is to use tongue spurs. I learned this from Roberto Justus of Mex-

ico City. These spurs are contoured and quite sharp. I used to think that this was not a good idea and that it was barbaric. Quite the contrary. The patient will perhaps touch the spurs once with the tongue and after that will avoid either positioning or thrusting the tongue forward upon swallowing. Dramatic results are observed as the dentition is given the opportunity to correct without interferences from the tongue. As an aside, I generally use some form of lower lingual arch, because altering the tongue/lip force balance will cause the lower incisors to crowd when the tongue spurs are used. The tongue-spur appliance is kept in place for six months or so. I have also used these tongue-spur appliances in adult patients.

Naturally, one must determine if disharmonious skeletal relationships are contributing to anterior open bites. Adverse development, as with vertical growers, can be a cause of anterior open bite relapse. In the mixed dentition stage, however, most of these anterior open bites seem to have a strong dental etiology.

**DR. GOTTLIEB** Have you had any success with myofunctional therapy for tongue thrust?

**DR. MALERMAN** I do not think that myofunctional therapy is effective. Fix the craniofacial relationships, and muscle function usually improves. Trying to improve muscle function when the parts don't go together properly is not particularly effective.

**DR. MOSKOWITZ** I have not had much success with myofunctional therapy, either.

**DR. PHIPPS** I have had better success with myofunctional therapy than with orthodontic treatment alone. I only treat open bites early when they are associated with habits. If we can eliminate the detrimental habit before eruption, the open bite is often self-correcting. We first identify the habit, educate the patient and parent, and design an appliance to remind the patient. We start with conservative, minimally invasive treatment and progress to more aggressive treatment in conjunction with myotherapy, as needed.

**DR. GOTTLIEB** Do you treat anterior closed bites early?

**DR. BRAZONES** If the skeletal pattern is Class I and the molars are Class I with deep anterior overbite, I will offer Phase I treatment to align the upper and lower incisors into a more ideal overbite and overjet relationship, using upper and lower 2 × 4 appliances and a short-term biteplane. My rationale is to unlock the occlusion, position the upper and lower incisors in a more ideal angulation in each arch, and create a good overbite and overjet. This approach is aimed at decreasing lower incisor attrition, stopping progression of the overbite, and improving the potential for eruption of the remaining permanent teeth into a good occlusion with minimal crowding. I always tell the parents that the overbite cannot be corrected fully until the second molars are included on the archwire.

**DR. MALERMAN** Anterior deep bite is treated in my office simultaneously with other treatment modalities. If a patient presents with no other problem than a vertical anterior deep overbite, and usually some anterior crowding, treatment will probably be put off until braces age. If we are doing other procedures, such as using a functional appliance to correct a sagittal malrelationship, very often we will build anterior vertical correction into the appliance. For the most part, a deep vertical overbite is not caused by undererupted posterior teeth—which means, incidentally, that a Hawley with a biteplane is not the appliance of choice—but usually is the result of overeruption of anterior teeth. If the incisors are overerupted, the way they should be treated is to intrude anterior teeth, not extrude posterior teeth. This is best accomplished with a fixed appliance.

**DR. MOSKOWITZ** I prescribe a bite plate for bites that are so deep that the palatal mucosa is traumatized and early treatment is indicated for functional reasons. Also, on occasion, deep bites will show excessive wear of the lower incisors, and I believe that this situation would dictate early treatment as well. As a rule, however, I do not treat deep bites early.

**DR. PHIPPS** I agree with that.

**DR. SARVER** We tend not to treat closed bites early, since once they are corrected, the facial pattern generally causes the deep bite to return. Also, there are usually no significant functional issues at an early age relative to deep bite.

**DR. GOTTLIEB** Do you treat an upper central diastema early?

**DR. BRAZONES** I usually treat a central diastema early if the centrals are tipped distally and blocking the eruption path of the lateral incisors. I also will treat if requested by the parents for social, esthetic, or speech reasons. I use a 2 × 4 or 2 × 6 and retain with a Hawley with finger springs.

**DR. SARVER** I tend not to treat maxillary diastemas early unless we need the space for eruption of the upper laterals.

**DR. PHIPPS** I, too, will only treat the diastemas early when they are severe enough to impair eruption of the lateral incisors. An oversize diastema will often contribute to ectopic eruption of the lateral incisors.

**DR. MOSKOWITZ** The size of the diastema is certainly a factor. Ruling out mesiodens, one has to look at the development of the dentition. The “ugly duckling” stage—a term not used today—shows a large maxillary midline diastema in the mixed dentition that seems to close as the patient matures. Well, sometimes they do and sometimes they don’t. Large active frenum attachments will prevent such spontaneous closure of maxillary midline spaces.

**DR. GOTTLIEB** How often do you use frenectomies?

**DR. MOSKOWITZ** Frenectomies are performed in only a small percentage of our cases.

**DR. MALERMAN** Patients who present with low attachment and lingual pull of the maxillary labial frenum are considered for a maxillary labial frenectomy. This is especially true if an x-ray

shows a microcleft in the maxillary midline.

**DR. PHIPPS** I only recommend frenectomy when the frenum pull is sufficient to cause a blanching of the anterior palate when the lip is pulled labially.

**DR. SARVER** I rarely prescribe frenectomy for diastemas. Over the years, I have been struck by the fact that the maxillary frenum migrates superiorly with passive eruption, and that cases that I would have thought would need frenectomy 20 years ago gain no advantage from having a frenectomy done at an early age. But decreased incisor display is sometimes due to a diminished smile curtain secondary to a high frenum attachment and, in this case, reattachment of the frenum is indicated at the end of passive eruption.

**DR. BRAZONES** I always explain the potential involvement of the frenum and that complete closure may not be possible until comprehensive treatment is started. If the frenum aberration is severe, I refer it to a periodontist.

**DR. GOTTLIEB** Do you recommend frenectomy before or after space closure?

**DR. SARVER** I recommend it be done after space closure of the diastema, so that the gingival architecture can be tailored to the final tooth position. Doing the frenectomy before space closure runs a risk of a blunted papilla and a black triangular hole.

**DR. MOSKOWITZ** I rarely suggest frenectomies prior to diastema closure, because there are a number of cases in which the frenum shrinks during diastema closure. For those cases in which the frenum actually thickens during diastema closure, we strongly recommend that the frenum be removed.

**DR. BRAZONES** I also usually close the diastema prior to the frenectomy.

**DR. MALERMAN** Referring the patient in the transitional dentition for a surgical procedure can create scar tissue, and the scar tissue can act to prevent optimum incisor alignment. I prefer to

wait until the maxillary central incisors are optimally aligned before referring a patient for a frenectomy. This usually means a few months before braces are removed.

**DR. PHIPPS** I rarely recommend a frenectomy unless the frenum is truly excessive and has prevented space closure with dental development. In these circumstances, I prefer to have the frenum reduced prior to complicating the procedure with space closure.

**DR. GOTTLIEB** How do you retain the diastema closure?

**DR. PHIPPS** I use removable and, sometimes, fixed retention.

**DR. MOSKOWITZ** I prefer to place a lingual wire from the maxillary lateral incisor to lateral incisor to maintain diastema closure.

**DR. MALERMAN** In my practice, diastema closure is retained with the same retainer that we use for our full treatment result.

**DR. BRAZONES** I retain with a bonded wire lingual to the upper incisors, or with a Hawley with finger springs.

**DR. GOTTLIEB** Do you treat severely rotated teeth early?

**DR. MOSKOWITZ** Generally speaking, I think that there is a benefit to treating severely rotated anterior teeth early. For one thing, severely rotated teeth will compromise arch length and create other problems. Additionally, I believe that esthetics will often dictate whether or not to intervene. There is a belief that the longer you allow rotated anterior teeth to remain rotated, the more relapse will follow after correction. I am not sure about this, and I am not familiar with any evidence-based studies in this area.

**DR. BRAZONES** Severe rotations of the upper or lower incisors are usually accompanied by severe crowding. I usually start early with extraction of the deciduous canines to allow for some spontaneous alignment. I then use a 2 × 4 appli-

ance to finish the rotation correction. Many of these malocclusions involve extraction of the first premolars to prevent additional crowding, so I continue to monitor the occlusion, with serial extraction if needed.

**DR. SARVER** I do not advocate early treatment of rotations.

**DR. MALERMAN** I do not correct rotations early because I do not want to cause dilaceration of the roots, nor do I want to move the roots of lateral incisors into unerupted canine crowns and cause damage to the roots of the laterals. Rather, I encourage self-alignment of the incisors by extracting deciduous canines in arch-length insufficiency cases. If we can allow the incisors to unravel themselves, we have less of a retention problem after treatment.

**DR. GOTTLIEB** Do you overtreat severely rotated teeth?

**DR. MALERMAN** Severely rotated teeth—more than 45°—are very slightly overcorrected in my practice.

**DR. MOSKOWITZ** We do not overtreat severely rotated teeth. Years ago, I used to, and it made no difference. Also, if you ascribe to any preadjusted or even partially preadjusted appliances, overtreatment of teeth interferes with other treatment objectives.

**DR. BRAZONES** I don't overtreat severe rotations.

**DR. PHIPPS** I also do not overtreat severely rotated teeth.

**DR. GOTTLIEB** Do you employ supracrestal fiberotomy?

**DR. MOSKOWITZ** We sometimes recommend supracrestal fiberotomies. They do have an effect on reducing the degree of rotational relapse. We believe in their benefit. The work done by Edwards on this technique is worth reading.<sup>6</sup>

**DR. SARVER** I used to use sulcus-slice procedures routinely, but ceased after rotations still

tended to be problematic even after doing it. In all candor, it may be due to my lack of aggressiveness with the SCF. I am certain that Dr. John Edwards would do a better sulcus slice than I would.

**DR. BRAZONES** I rarely use this procedure.

**DR. PHIPPS** Nor I.

**DR. MALERMAN** I treat rotations of long standing with supracrestal fiberotomy. Older teen-agers, adults, and non-growers who have had severe rotations for a long time are the patients for whom supracrestal fiberotomies are recommended.

**DR. GOTTLIEB** How do you retain the correction?

**DR. MALERMAN** These patients are retained full-time for a year after braces are removed, and then they will sleep with the retainers at night essentially for the rest of their lives.

**DR. MOSKOWITZ** I like to place a bonded lingual wire behind any rotated teeth. The relapse tendency is strong, and I do believe that the longer you hold these teeth in corrected positions, the less relapse you might have. I have no evidence to support this. However, rotational relapse of upper incisor teeth is not a great practice builder.

**DR. GOTTLIEB** Do you treat first molar rotations early?

**DR. BRAZONES** I don't correct first molar rotations early unless I am doing early treatment for other reasons. I will correct rotations prior to RPE, and I correct them while in a 2 × 4 appliance. I have not had any relapse.

**DR. MALERMAN** First molar rotations are usually corrected later, when we put braces on teeth to achieve alignment. It is rare for us to consider molar derotation as a separate procedure in the transitional dentition.

**DR. MOSKOWITZ** First molar rotations by themselves are usually not candidates for early

treatment. However, maxillary molar rotations with mild Class II tendencies should have the molars rotated, as this might be an etiological factor in some Class II malocclusions. Rotated maxillary molars generally remain in good positions after correction.

**DR. SARVER** We only treat molar rotations early to provide space that would be critical to avoid extraction therapy.

**DR. PHIPPS** I wait until the dentition matures before correcting molar rotation. Anchorage to correct it can pose a problem until more permanent teeth have erupted.

**DR. GOTTLIEB** How do you handle impactions or ectopic eruptions in early treatment?

**DR. PHIPPS** I watch young patients age 7-12, both in and not in treatment, and take annual panoramic films to evaluate eruption. When there is an obvious deviation from the norm, we discuss options for treatment. There is no "cookbook" to address every circumstance.

**DR. BRAZONES** I look for impactions and ectopic eruption patterns early based on a panorex. The most common teeth involved are the upper permanent canines. If they have a mesial inclination, I will extract the maxillary deciduous canines. This usually gives these teeth a chance to change the path of eruption. I also try deciduous extractions if I see early indications of transposed teeth. If the ectopic teeth are not the canines, I usually use deciduous extraction to try to guide the permanent tooth toward the desired position in the arch.

**DR. MALERMAN** The better we can get teeth to erupt, the less correction they will need. In the transitional dentition, if a tooth is deemed to be impacted or to be erupting ectopically, the underlying deciduous tooth is removed and, if necessary, space maintenance placed. This often results in a less severe impaction or a better path of eruption for the underlying permanent tooth. Ectopic eruptions of first permanent molars are treated as early as possible to encourage eruption



of these teeth into a Class I relationship.

**DR. SARVER** I am concerned about early treatment of cuspid impactions for fear of damage to the roots of the laterals.

**DR. MOSKOWITZ** This is an interesting area in which a number of iatrogenic problems are created. Failure to take a panoramic radiograph in the mixed dentition will sometimes cause the clinician to miss ectopically developing maxillary canines or other teeth. I feel that severely ectopic maxillary canine development should be addressed early. Removal of the primary canines and some maxillary expansion will often help to redirect the path of ectopically developing maxillary permanent canines that might otherwise require surgical exposure and orthodontic traction. Sometimes it is difficult to predict which ectopic canines will spontaneously redirect to normal eruptive patterns, but it is worth the effort to try to avoid a surgical exposure. Whenever I examine a patient in the mixed dentition with maxillary lateral incisor crowns distally inclined, I suspect a possible problem with the maxillary canines. A radiograph can confirm this clinical impression. Also, we sometimes find second and third molar spatial relationships so poor that the third molars are actually preventing the second molars from erupting properly. In my opinion, no mixed dentition orthodontic examination is complete without a panoramic radiograph.

**DR. GOTTLIEB** Do you ever refer for early third molar enucleation?

**DR. MOSKOWITZ** I almost never recommend enucleation of third molars. That procedure was in favor some time ago, but does not seem to have much credibility at this point. In a small percentage of cases, the developing third molar crown can actually be preventing the lower second molar from erupting. Those are cases in which I would recommend the earlier removal of the third molars, upper or lower.

**DR. BRAZONES** If the third molar tooth bud is blocking the eruption of the second molar, I have referred for early extraction of that third

molar bud.

**DR. MALERMAN** I recommend it only if the third molars are interfering with eruption of the second molars. These ectopic teeth have to be removed if the second molars are to have a chance to erupt normally.

**DR. PHIPPS** I rarely recommend third molar enucleation. I do, if other surgical procedures are necessary and it is obvious that the third molars will require eventual extraction.

**DR. GOTTLIEB** How early do you diagnose asymmetries?

**DR. BRAZONES** As soon as I see them.

**DR. MALERMAN** Asymmetries are diagnosed with posterior-anterior cephalometric x-rays and by model analysis. Study models are trimmed symmetrically to the median raphe so that asymmetries in the arch can be readily visualized against the symmetry of the model base.

**DR. SARVER** We diagnose asymmetries by direct clinical measurement of the patient's face and teeth. My rationale is that it is the only way to directly visualize facial proportions and the relationship of the midlines to each other. A frontal radiograph, while mildly useful, does not yield the amount of information that direct clinical examination does. We diagnose asymmetries as soon as they walk in the door.

**DR. GOTTLIEB** How early do you treat asymmetries?

**DR. MALERMAN** Craniofacial anomalies that result in skeletal asymmetries are treated as early as possible to guide facial growth to be as symmetric as possible. Asymmetries in the dental arches are corrected when we do arch alignment. The more evenly we can get a patient to grow, the more balanced their face is, the more balanced the tooth-bearing bone is, the easier it is to straighten.

**DR. MOSKOWITZ** Asymmetries that are caused by mandibular shifting should be treated

early. However, some of these asymmetries are not due to shifting of the mandible, but actual disturbances in condylar development. These situations must be assessed differently. Often, other specialists are needed to manage these problems. Growth activity of hyperactive condylar centers should be assessed for the best time to intervene. When asymmetries are part of larger dentofacial problems, orthodontic intervention must be coordinated with surgical and other nonorthodontic treatment. Other asymmetries might include dental arch problems, and each case has to be evaluated upon its own merits.

**DR. PHIPPS** I prefer to intervene in the late mixed to early permanent dentition while the patient is still growing, in an effort to avoid surgery, but I need sufficient permanent teeth for anchorage.

**DR. BRAZONES** I do not treat skeletal asymmetries early.

**DR. SARVER** The timing of treatment depends on whether the asymmetry is skeletal or dental. Skeletal asymmetries would be treated during the prepubertal growth spurt, whereas dental asymmetries may be treated as soon as they are seen if molar distalization is required, before the 12-year molars are interfering with that movement.

**DR. GOTTLIEB** Several of you have mentioned pubertal and prepubertal growth spurts. How do you assess the timing of these growth spurts?

**DR. BRAZONES** I routinely use a hand-wrist x-ray.

**DR. MALERMAN** In addition to the usual indicators of voice change and the appearance of facial hair in boys, and the onset of menarche in girls, we often do repetitive height and weight recordings. Craniofacial growth and dentitional development often closely follow changes in somatic growth.

**DR. MOSKOWITZ** There have been a lot of references to the growth spurt and that this is an ideal time to treat many if not most Class II mal-

occlusions. Most experienced clinicians will readily admit that some of the most dramatic and successful Class II corrections in their offices were due to rather generous and unpredicted favorable growth of the mandible during treatment. Unfortunately, there is no terribly accurate method to predict pubertal growth spurts at this time. Hand-wrist x-rays have a rather limited use in orthodontics. Their accuracy has been shown to be no more than within one standard deviation. This would be approximately 66% of a given sample. One can flip a coin and be almost as accurate as utilizing hand-wrist x-rays. We just can't accurately predict when a growth spurt will occur and what its magnitude might be. In an ideal world, it would be a great help if we could. We would all be better orthodontists, and treatment in many cases would be shorter and more efficient, and the outcomes would be better.

**DR. PHIPPS** The pubertal growth spurt is the more critical one, since it often coincides with completion of development of the permanent dentition, with the exception of the third molars. For girls it usually occurs between age 11 and 12, lasts about one year, and is exemplified by a girl turning into a woman—sometimes so quickly it seems like from one appointment to the next. Boys, on the other hand, experience a pubertal growth spurt that usually occurs around age 13 or 14 and often lasts for several years. The prepubertal growth spurt is not so much a spurt, but an acceleration of childhood growth that occurs between age 8 and 11.

**DR. SARVER** Physical characteristics, more obvious in the female, are important pieces of information. The recent work out of Italy and the University of Michigan on cervical spine maturation also appears to be a very good indicator of skeletal maturation relative to the growth spurt.<sup>7,8</sup>

**DR. GOTTLIEB** Any final comments?

**DR. MOSKOWITZ** For years, orthodontists have rightfully questioned the benefits of early treatment in many Class II cases in their offices. All too often, very early treatment in moderate

Class II cases resulted in longer and more expensive treatment without any more measurable benefit than what could have been gained from a single-phase treatment that was started later. As an aside, it is interesting to note that many of the relatively recent randomized clinical trials associated with Class II treatment outcomes are consistent with clinicians' experience. Indeed, the researchers and clinicians have found some common ground that should help to change some previously held dogmatic and unsubstantiated clinical beliefs. Lionel Sadowsky has referred to this type of unidimensional thinking as "if I hadn't believed it, I never would have seen it" type of thinking. We should all try to be a bit more introspective and honest about our own experiences in our practices. Examining accurate orthodontic records of patients in our practices can often shed some interesting and humbling light on what we really do and what we think that we do. Furthermore, we should all try to support our academic colleagues who expend a great deal of time and effort in designing and implementing serious and meaningful studies to evaluate our treatment protocols. Our patients will be the ultimate beneficiaries of such efforts.

**DR. BRAZONES** The questions about early treatment all go back to the basics:

- What is the diagnosis-problem list?
- What are the goals that should be accomplished in early treatment, and then what is to be finished in comprehensive treatment?
- What are the parents' goals?
- Do the parents understand the limitations of early treatment?
- Can these goals be accomplished in early treatment?
- Should these goals be attempted in early treatment?
- Why should the teeth or bone be corrected or altered in a Phase I treatment?
- What is in the best interest of the patient?
- Will the malocclusion and skeletal pattern be more difficult to correct in the permanent dentition if nothing is done early?

Orthodontists are still addressing the same

questions and concerns as we did 50 years ago.

- When will we agree or establish a standard of care?
- Are we under pressure from our referring doctors to do "something" early?
- Are we under pressure from the parents for their child to look as good as possible?
- Are we under pressure to increase production for a certain lifestyle?
- Are we afraid that the doctor down the street will start the patient first?

We cannot take advantage of parents who are looking for what is best for their children. They trust us to provide the best. Does the best orthodontic treatment plan and outcome include a two-phase treatment plan or only a one-phase treatment?

**DR. MALERMAN** The decision to do early treatment or not should be based on the individual practitioner's comfort level, understanding, and experience. Whether we choose to do early treatment or not, the decision about when to treat should be made by the treating orthodontist, but it is up to the orthodontic community to educate the public, and to work closely with the general dental and pedodontic community, to assure that patients are referred the moment anomalies are noted. The orthodontist can then evaluate each patient as to their individual needs.

**DR. PHIPPS** A few years ago, concomitant with the AAO Early Treatment Conference, I took a long, hard look at early treatment as a treatment philosophy. In most cases, total treatment times were longer and total cost of treatment was greater than single-phase treatment. But results were quite similar. More importantly, the total chair time of two-phase treatment was considerably more—well beyond the cost/benefit of the additional fee. Since that time I have chosen to be far more selective with early treatment. The outcome, to date, has proven to be beneficial for all.

**DR. SARVER** When I first opened my practice, I visited a number of pediatric dentists who, at the time (the early 1980s), were all convinced

that most orthodontists were refusing to do any early treatment. Their message was, "If you will provide early treatment for my patients, you will get many referrals." Music to the beginner's ears! Feeling sure that I was offering services to patients that they could not get otherwise, I treated quite a number of early cases. Some reacted to treatment spectacularly, some did not. So the number of cases I treated early dropped a bit as I became more selective of those I thought would really benefit from a Phase I treatment. I have settled into case-by-case decision making with good informed consent, driven by the parents' desires and my recognition of all the factors that lead to a worthwhile Phase I treatment, including reduction of severe overjet, improvement of negative overjet, expansion and/or molar distalization for space and dental esthetics, and improved appearance if it is important to that family.

**DR. GOTTLIEB** On behalf of JCO's readers, I would like to thank all of you for this interesting and informative discussion of early treatment.

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