

JCO ROUNDTABLE

Early Orthodontic Treatment, Part 1

EUGENE L. GOTTLIEB, DDS, Moderator
Senior Editor, *Journal of Clinical Orthodontics*

MARGARET M. BRAZONES, DDS, MS
Private practice of orthodontics, Petoskey, MI

ARNOLD J. MALERMAN, DDS
Clinical Associate Professor of Orthodontics, University of Pennsylvania School of Dental Medicine
Private practice of orthodontics, Dresher, PA

ELLIOTT M. MOSKOWITZ, DDS, MS
Contributing Editor, *Journal of Clinical Orthodontics*
Associate Clinical Professor, Department of Orthodontics, College of Dentistry, New York University
Private practice of orthodontics, New York, NY

GERALD S. PHIPPS, DMD, MS
Private practice of orthodontics, Spokane, WA

DAVID M. SARVER, DMD, MS
Adjunct Professor, Department of Orthodontics, University of North Carolina, Chapel Hill
Private practice of orthodontics, Vestavia Hills, AL

Editor's Note: Participants in the following discussion were selected from among respondents to JCO's quarterly Readers' Corner.

DR. GOTTLIEB One of the great controversies in orthodontics today concerns early vs. late treatment. How early would you start treatment? Are there conditions that you would treat in the deciduous dentition?

DR. MOSKOWITZ There are few malocclusions that I would treat in the deciduous dentition. One notable exception would be an anterior crossbite of the maxillary four incisors. Many of these anterior crossbites represent either maxillary dental or skeletal retrusions, so that early treatment is justified. Assuming that there were no significant management issues, these cases respond well to maxillary protraction with or without maxillary expansion, and treatment is usually short-term. Dr. Patrick Turley has shown some impressive treatment results in such cases.

DR. BRAZONES I do not treat malocclusions in the deciduous dentition. Having the first permanent molars and the maxillary and mandibular central incisors erupted are necessary for me to accomplish my early treatment objectives in a reasonable amount of time.

DR. PHIPPS The only time I have recommended treatment in the deciduous dentition has been for the maxillary deficient Class III, to take advantage of open skeletal sutures and to, hopefully, avoid orthognathic surgery in the future.

DR. SARVER There are conditions that should be treated in the deciduous dentition, and they fall into two broad categories. One is management of the leeway space that will be available in the transitional dentition. This treatment has been around for a long time in terms of lingual arch therapy. The other condition is growth modification in Class II or Class III treatment.

DR. MALERMAN Severe skeletal discrepan-

cies can be treated in the deciduous dentition, but I prefer to wait until the early transitional dentition. I find the child in the transitional dentition to be more manageable than the child in the deciduous dentition, and it is great to have those nice large first permanent molars for appliance attachment.

DR. MOSKOWITZ To a certain degree, of course, this is a moot question, since most orthodontists rarely get the opportunity to see patients in the deciduous dentition. Patients are generally not referred to the orthodontist at this stage of dental development.

DR. GOTTLIEB Do you treat Class IIIs and Class I anterior crossbites at age, say, 7 or 8?

DR. MALERMAN Class I anterior crossbite should be treated as early as possible to allow eruption of the permanent teeth into the best order possible. An anterior crossbite can act the same as a mandibular protraction appliance, causing excessive mandibular growth. Additionally, correction of the crossbite as the incisors are erupting is simpler than having the teeth erupt into a severe malrelationship.

Patients with a Class III dental malocclusion should have their dental relationship converted to a Class I in the early transitional dentition. Functional appliances and/or reverse-pull headgear are effective for this. The aim is to reduce the amount of treatment that will have to be done in the late transitional/early permanent dentition.

If a skeletal Class III is caused by a retrusive or hypoplastic maxilla and the mandible is normal, it should also be treated as young as possible. Repositioning the maxilla with a palatal expansion appliance and reverse-pull headgear will allow for normal growth. However, if the Class III skeletal pattern is caused by mandibular excess and the maxilla is normal, the probability is that it will require orthodontic treatment and orthognathic surgery after the patient has stopped growing.

DR. MOSKOWITZ There are functional rea-



Fig. 1 Early adverse periodontal changes seen on lower left central incisor due to traumatic relationship caused by anterior crossbite.

sons for treating anterior crossbites early, such as removing interferences that contribute to unfavorable transverse and sagittal mandibular positions. Additionally, periodontal damage will sometimes occur as a result of the traumatic relationship between the upper and lower incisors (Fig. 1). Dental arch length is frequently compromised in the anterior portion of the maxillary dental arch in cases with anterior crossbites. Finally, esthetics alone might justify early intervention when multiple teeth are in an anterior crossbite relationship.

Treatment of anterior crossbites will frequently entail maxillary protraction with or without maxillary expansion. Some colleagues claim that maxillary expansion causes some beneficial disjunction of the sutures, thereby facilitating maxillary protraction.

DR. BRAZONES Whether I treat these conditions at a young age will depend on the diagnosis. My objectives are to create an overjet and overbite. I can usually do that in a Class I anterior crossbite or a dental Class III with an anterior functional shift into crossbite, and for a mild midface deficiency. I take diagnostic records with mounted models to determine if there is a skeletal component to the malocclusion. I would postpone treatment of a skeletal Class III if it is a true mandibular prognathism or if the midface deficiency is severe.

DR. PHIPPS I treat the maxillary deficient

Class III, the dental Class III, and Class I anterior crossbite at age 7 to 8. I would postpone the mandibular prognathic skeletal Class III.

DR. SARVER The dental Class III and the Class I anterior crossbites I prefer to have corrected early to avoid attrition on the facial of the upper anterior teeth, and in many cases we see the lower incisors being displaced anteriorly with periodontal consequences if they are left untreated. Protraction treatment in the skeletal case can be quite successful and can provide improved facial appearance during the developing years, even if surgical correction is ultimately required. I have found that patients recognize a value in that.

DR. GOTTLIEB How do you make the distinction at age 7 or 8 between a skeletal Class III and a dental Class III?

DR. BRAZONES This is a great question, and I think that an accurate diagnosis is critical or the proposed treatment will not be successful. I have found that diagnostic records with models mounted with a centric-relation bite registration are critical to an accurate diagnosis and eventual treatment plan. To determine the skeletal relationship, the CO-CR conversion is transferred to the cephalometric tracing. The skeletal discrepancy can then be determined prior to any anterior shift of the mandible. The ability to diagnose a true skeletal Class III midface deficiency has helped me not to start a patient in treatment that I cannot correct. Parents and children get very tired of orthodontic treatment if the first phase lasts too long. There will be little cooperation left for Phase II.

DR. MOSKOWITZ At age 7 or 8, it is exceedingly difficult to differentiate between dental and skeletal contributions to anterior crossbites. Postural changes of the mandible as a result of anterior crossbites will frequently limit the value of conventional lateral cephalometric readings such as SNB and ANB. Maxillary incisor malpositions and difficulty in locating A point might contribute to additional cephalometric inaccura-



Dr. Gottlieb

cies. Also, untoward mandibular forward growth has usually not manifested itself at that age to the extent that it will later in true skeletal disharmonies. These realities, as well as our inability to accurately and consistently predict growth changes of the mandible in growing individuals, place great demands on the clinician in making decisions about treatment. On occasion, certain Class III type cases exhibit unusual disparities, such as early excessive mandibular body length, that are indicators of cases that might grow so disharmoniously that orthognathic surgery would be indicated after growth has ceased. If such cases are treated early, they are the very cases in which orthodontists literally “chase” the mandible with excessive and inappropriate maxillary protraction. Parents should be informed that adverse growth changes might limit or negate much of the short-term success of early intervention in these cases.

DR. SARVER At age 7 or 8, it is critical to distinguish between a skeletal Class III and dental Class III. I agree that this is a tough call to make based on cephalometric measurements alone. Clinical examination may divulge the anterior slide into Class III or pseudo-Class III, and a better appreciation for the facial characteristics of anteroposterior jaw dysplasia. If seen early enough, I feel we have room for what I term “observation and quantification”. Parents are often

not ready to accept treatment for their child at age 7. In their youth, one didn't see the orthodontist until all the permanent teeth were in. My general approach is to give the parents room to maneuver: "Here is the problem. Let's take records and see you in a year to repeat the cephalogram. If the superimpositions show synchronous growth, we may be able to wait it out a little, but disproportionate growth will require a decision at that time."

DR. GOTTLIEB How do you then treat it?

DR. SARVER My treatment of true skeletal Class IIIs has changed over the years. Twenty years ago, chin cups were about the only option other than dental compensation or surgery. Today, you see mostly maxillary protraction. My current protocol for protraction is to place a facemask the same day the expander is placed. The expander is activated once a day for one week, and the facemask is worn for 90 days. Then the RPE is activated for another week and the facemask worn for another 90 days. The cycle is repeated one more time. The idea is not to try to get it all in one hit, but to agitate the sutures, allow healing in the midpalatal suture as in normal RPE, and then re-agitate. What we are trying to get is more skeletal change compared to dental movement.

DR. GOTTLIEB Are the results stable?

DR. SARVER Of course, the real key is how well does protraction hold up in the long term, and there are a number of studies published with varying results. In 1997, I published a prospective study performed in my office, with a three-year post-treatment follow-up.¹ In this study, patients with negative overjet experienced a 100% success rate in immediate treatment response from negative to positive overjet. My patient sample revealed that maxillary protraction is pretty stable. Relapse, if it occurs, is not so much due to losing the amount of maxillary protraction, but instead is a result of subsequent disproportionate maxillary and mandibular growth.

DR. GOTTLIEB A frequent source of disagreement about early treatment is when to treat Class II, division 1 malocclusions. What, in your opinion, is the optimum time to treat these?

DR. SARVER It depends on the diagnosis. The term Class II, division 1 describes a dental relationship, but does not describe a skeletal relationship. This is a limitation of our Angle classification system. If the patient is Class II, division 1 because of mandibular deficiency, then we would plan treatment to coincide with the prepubertal growth spurt. If it is a maxillary dentoalveolar protrusion and the mandible is normal, then we would wait until the permanent dentition is reached and treat with extraction and protrusion reduction. I would temper that comment with the idea that profiles and faces tend to flatten with age, and that the moderately protrusive maxillary Class II may still be treated with growth modification so that the youthfulness of the face is protected with age.

DR. MOSKOWITZ The most appropriate time to begin orthodontic treatment in the vast majority of Class II cases would be in the late mixed dentition. "E" space is still present and second molars have not erupted. Treatment at this stage would most likely be a single comprehensive treatment rather than a Phase I-Phase II sequence, which itself is a tremendous advantage. "Non-compliant" techniques, which include maxillary molar distalization appliances, have their best chance of success at this stage.

There are some instances that compel us to treat Class II cases earlier than in the late mixed dentition stage. Class II cases with significant maxillary incisor protrusions that predispose young patients to incisal fracture must be managed earlier rather than later. Class II cases with noxious habits such as thumbsucking should be addressed earlier. The same can be said of cases with the lower lip interposed between the upper and lower incisors. Class II cases with other problems such as functional crossbites should be treated earlier as well.

DR. BRAZONES The optimum time to treat a



Dr. Brazones

Class II, division 1 is during the growth spurt if cooperation is available, and if the eruption of the permanent teeth is complete, including the second molars. The answer lies in the diagnosis and in what the treatment objectives are. I used to start earlier, but found that the second molars would become partially impacted and were not in occlusion when I was ready to retain the case.

DR. MALERMAN For me, the optimum time to treat a Class II, division 1 problem depends on the type of problem the patient presents. If the maxilla and/or maxillary teeth are too far forward, I prefer to use a headgear to reposition maxillary posterior teeth and/or restrain horizontal maxillary growth. An ideal time to do this is the beginning of the prepubertal growth spurt, approximately ages 9 to 10. Patient cooperation is usually better at this age than it is in an older patient, and working with the patient's growth spurt reduces the time in appliance therapy.

If the Class II, division 1 is caused by the mandible being retrusive or mandibular teeth tipped too far back, I will again recommend harnessing the prepubertal growth spurt to enhance mandibular growth. To do this, I usually recommend a functional appliance, most often a bionator, less often an Andresen activator.

DR. GOTTLIEB Is the severity of the Class II relationship or of ANB an issue?

DR. SARVER I factor the gradations of Class II into the treatment plan, since various degrees of distance require various degrees of treatment, but I very rarely use the ANB difference to make the decision to treat early. The reason for this is that these measurements have little to do with the timing of treatment, or even the measurement of the problem that I am trying to treat. For example, a patient may have a large ANB difference, but thick soft-tissue components, which camouflage the underlying skeletal relationships. I think most of us recognize that extreme overjet can expose the patient to greater risk of traumatic injury and is a valid reason for early treatment. As I discussed previously with regard to Class III patients, early treatment sometimes can improve the facial appearance enough to be worth the investment in terms of time and money.

DR. MOSKOWITZ The greater the ANB difference, the more likely it is that I will consider intervening in the transitional dentition. If we can create a Class I skeletal relationship and a Class I dental relationship by early intervention, we are left with a much simpler task of correcting tooth alignment when the time comes to place conventional fixed orthodontic appliances.

Most Class II cases with large ANB values have both dental and skeletal contributing factors. Extremely large skeletal disharmonies might dictate beginning orthodontic treatment earlier. Part of the overall Class II correction in growing individuals relies upon the differential growth vectors of the maxilla and mandible. The mandible will generally grow several millimeters more per year than the maxilla. If the maxilla and maxillary dental arch are restrained in forward growth or forward positioning, this differential growth contributes to the Class II correction as the mandible catches up in its growth. These large skeletal disharmonies might very well require extra time to convert from Class II to ideal sagittal relationships.

DR. BRAZONES I find that a full-cusp Class II molar relationship cannot be corrected fully in a Phase I treatment, so I wait for eruption of the permanent dentition in those cases. The greater



Dr. Malerman

the ANB angle, the less I know that I can do with orthodontics alone. If my treatment objectives are to create a Class I molar relationship with an ideal overbite/overjet, optimum facial esthetics, and a functional occlusion, then waiting for complete eruption of the permanent dentition is necessary. This may result in a surgical correction, which can shorten the treatment time and the need for headgear or extractions. Furthermore, treatment of the Class II with headgear or extraction of premolars will affect the nasolabial angle. If the maxilla is well positioned in the facial profile, and the mandible is deficient, I do offer the option of nonextraction, no headgear, with a surgical correction in the mid-teens.

DR. PHIPPS The evidence of science and experience demonstrates that there is little benefit in treating most Class II, division 1 patients earlier than the late mixed dentition or early permanent dentition. As far as the severity issue is concerned, an overjet greater than 8mm is an indication to me for earlier treatment.

DR. GOTTLIEB A recent study compared patients with 7mm or more of incisor overjet treated either early with a bionator or a combi headgear or postponed until the permanent dentition.² All three groups showed some additional fracture, but it was not significantly greater in the group whose treatment was postponed. Does that

change your mind about this justification for an early start of treatment?

DR. PHIPPS No. Unless this is a concern of the referring dentist or parent, I would not use the concern for incisor crown fracture as a criterion for early treatment in most patients.

DR. MALERMAN The risk of crown fracture is only one of the many factors taken into consideration when evaluating a patient for treatment.

DR. SARVER I am aware of the study, but I take the stance that there are other reasons for early treatment. Often, the most important is the psychosocial gain of having a severe overjet or underbite improved. The possibility of incisor fracture can be an additional factor, as well as appearance issues. I suspect that as a profession we are all over the map as to what is correct. Each clinician simply has to evaluate case by case. If the parent declines early treatment and is presented the facts in a well-documented informed-consent form, I have no problem delaying treatment.

DR. BRAZONES Many times I ask the parents if there are any negative social factors—teasing, lack of self confidence, etc.—and let parents know that early intervention won't prevent comprehensive treatment, but may help with self-esteem during middle school. I have never recommended early treatment to prevent incisor fracture.

DR. GOTTLIEB Apart from the possibility of incisor fracture and questions of patient self-esteem, what other criteria would influence your decision to treat upper anterior protrusions early?

DR. BRAZONES If the upper incisors have spacing or are proclined, I may recommend retraction of the incisors to allow the lower incisors to occlude on the lingual of the upper. This is helpful to stop the supraeruption of the lower incisors into the palate. The establishment of incisal coupling and incisal guidance is important in preventing the increase in the overbite and maintaining the vertical dimension.

DR. MALERMAN Maxillary incisor protrusion in and of itself is not a sole determinant for early treatment. The greater the amount of horizontal overjet—which is somewhat different from maxillary incisor protrusion—the greater the indication for early intervention. I am more prone to intervene early when the problem is skeletal than when it is dental. Just as the orthopedist attempts to mold bone as young as possible, I think the same should hold true for the orthodontist.

DR. MOSKOWITZ I think that there is sufficient variation from individual to individual as to the functional consequence of maxillary protrusion. Therefore, I would evaluate the effects of such maxillary protrusion for each patient without any preconceived yardsticks that may or may not be appropriate for individual patients.

DR. PHIPPS Since I predominantly use a Herbst for Class II correction, severe Class II patients with 8mm or more of overjet will occasionally receive an early treatment with the Herbst to provide a second opportunity to treat them should they relapse.

DR. GOTTLIEB How do you control the possible undesirable effects of Herbst treatment, such as increasing IMPA, on these young patients?

DR. PHIPPS I use an edgewise Herbst design, as described by Dr. Terry Dischinger, which combines lingual-torque lower incisor brackets with a rectangular archwire to minimize lower incisor proclination.

DR. GOTTLIEB Is there any greater urgency in your mind to treat a unilateral Class II, division 1 malocclusion early?

DR. MALERMAN That depends on the cause of the unilateral Class II problem. If the maxillary teeth are too far forward unilaterally, the earlier the molars can be repositioned back where they belong, the better the teeth in the buccal segment will erupt. If the mandibular teeth are too far back, we probably have to wait for eruption of the majority of the permanent teeth before correcting the problem.

DR. MOSKOWITZ The presence of a subdivision does not necessarily compel me to treat earlier than I would in other Class II cases, but frank mandibular asymmetries would cause me to treat earlier.

DR. SARVER If the unilateral Class II relationship is due to mandibular asymmetry, I often treat that with a unilateral Herbst in order to improve the symmetry of arch and mandible.

DR. GOTTLIEB How do you control the possibly unfavorable forward movement of the lower incisors?

DR. SARVER In these cases I am willing to accept the dentoalveolar changes that are inherent in Herbst therapy. Since the Herbst is a toothborne appliance, tooth movement occurs. Depending on the age of the patient, varying ratios of skeletal/dental response to treatment occur. In general, younger patients get more skeletal response than late adolescents, who get more dental response. But none gets a totally skeletal response. The clinician has the responsibility of deciding what are the goals of treatment, and the treatment design follows.

DR. GOTTLIEB Do you treat Class II, division 2 malocclusions before the full permanent dentition has erupted?

DR. MOSKOWITZ Much of the same rationale for treating Class II, division 1 malocclusions applies to Class II, division 2. Beginning treatment of either one in the late mixed dentition has many advantages in that some of the early movements, such as maxillary expansion, can be done at this time. There might be some factors that would compel me to treat earlier in the Class II, division 2 situation. This might include the functional consequences of leaving a very deep impinging overbite and overly flared maxillary lateral incisors.

DR. MALERMAN If a patient presents with a Class II, division 2 in which the maxillary buccal segments are too far forward, I will consider early treatment to convert the molar relationship

from Class II to Class I. If a patient presents with a Class II, division 2 in which the mandible is too far back, usually treatment will be put off until the late transitional-early permanent dentition.

DR. PHIPPS I almost always wait until the permanent dentition is erupted to treat any Class II. I start the division 2 patient six months earlier to decompensate them into a division 1 before placing them edge-to-edge with the Herbst.

DR. SARVER As with the Class II, division 1 malocclusion, we treat division 2s before the full permanent dentition has erupted if the problem is skeletal and growth guidance is required.

DR. BRAZONES I offer a Phase I to align upper and lower incisors if needed. I would also evaluate for headgear and biteplane therapy. My objective is to place upper incisors in a more ideal position and to avoid attrition of the upper and lower incisors. This does not reduce Phase II. I explain the growth pattern, and the family knows that comprehensive treatment will be needed in a Phase II.

DR. GOTTLIEB Do you depend on compliance-based appliances such as headgear in early treatment?

DR. MOSKOWITZ Headgear is perhaps the most pure and time-honored force-delivery system in orthodontics. When properly prescribed and worn, the results of extraoral force are superior to most adjunctive orthodontic appliances. Regrettably, headgear is probably one of the most unpopular appliances in orthodontics today. It is seldom used in many practices. I try to use it as much as possible. Patient selection is an important factor in the success of headgear. Also, taking the time to describe the benefits and provide support to the patient and parent are critical factors in the use of headgear. Headgear can provide orthopedic effects without adverse reciprocal movements that frequently accompany some of the “non-compliant” and functional appliances. Having said this, I realize that some parents and patients will simply not accept the use of headgear and, consequently, we all must look

for other ways to resolve orthodontic disharmonies, which might include the use of non-compliant techniques.

DR. MALERMAN We tend to use compliance-based appliances for sagittal correction and non-compliance-based appliances for transverse correction. We find that 8-, 9-, and 10-year-old kids are usually very compliant. The 6- and 7-year-olds get bored quickly. The 11- and 12-year-olds are starting to become resistant to authority. Compliance-based appliances work very well for the “middle-aged” transitional dentition patient.

DR. PHIPPS I rarely use headgear due to variable compliance. I much prefer the Herbst.

DR. BRAZONES I use headgear frequently. If compliance is a problem, I also discuss the other options in Phase II—extraction of permanent teeth and/or jaw surgery. Some patients still won't wear the headgear, and others become more motivated. It is important to determine if the patient is going to work with you or if we are on our own. That can make or break the result in Phase I.

DR. SARVER I still use quite a bit of headgear in early treatment. I use non-compliance appliances in the very severe cases where I need 24-hour forces and the cases in which, obviously, compliance is an issue. But in my opinion, there are some force applications that require an extraoral vector to achieve the three-dimensional change I want vs. the mostly anteroposterior change of the Herbst.

DR. GOTTLIEB Do you use functional appliances in a first phase of treatment?

DR. PHIPPS Some consider the Herbst to be a functional appliance, but I expect you're referring to removable functional appliances, in which case my answer is no.

DR. SARVER I very rarely use removable functional appliances any more.

DR. BRAZONES I don't use mandibular advancing appliances. I am concerned about the

joint and what is truly happening long-term. If the diagnosis is a craniomandibular discrepancy, correction should not be focused on joint remodeling.

DR. MALERMAN We tend to use functional appliances at the beginning of the prepubertal growth spurt, approximately age 9 for girls and 10 for boys. We usually get a burst of three to six months of excellent cooperation, after which cooperation begins to tail off. If we're going to make any correction, it has to be at the beginning of functional appliance therapy. Our success has been good, usually with 25-50% reduction in the patient's ANB difference.

DR. MOSKOWITZ I have used functional appliances with some success in the mixed dentition, but I am not as keen about them as I used to be. It has never been adequately demonstrated that any of the functional appliances in the long run work any better than directing our forces towards the midface during Class II correction. The clinician is often overly impressed with short-term gains with functional appliances, only to find long-term stability of the mandibular dentition significantly compromised. Adverse and excessive mandibular dentition advancement often accompanies the use of functional appliances, and we end up trading one malocclusion for another.

DR. GOTTLIEB Do you overtreat molar distalization in correcting Class II, division 1 malocclusions in the mixed dentition?

DR. SARVER We try to overtreat molar distalization cases in the mixed dentition if the diagnosis is other than mandibular deficiency. Crowding and protrusion are good indications for molar distalization. Our rationale for overcorrection is that once the permanent dentition is reached, it is a lot easier to lose anchorage than it is to gain more anchorage.

DR. BRAZONES I don't overcorrect because I feel that any relapse or rebound in the AP correction is the result of not having an accurate AP diagnosis prior to starting the treatment. Once I



Dr. Moskowitz

started mounting the models in centric relation and measuring the difference in CR and CO, I found that the relapse or rebound was due to the inaccuracy of handheld models.

DR. MALERMAN We tend to slightly overtreat all corrections, including Class II to Class I, because there seems to be physiologic recovery in the human body that tempers our overall treatment result. Slightly overcorrecting Class IIs allows for some rebound without losing our correction.

DR. MOSKOWITZ I overcorrect the molars into a super-Class I relationship. I prefer to begin this effort in the late mixed dentition.

DR. GOTTLIEB Do you try to maintain the overcorrection until Phase II is started?

DR. MOSKOWITZ After the maxillary molar has been distalized, we try to hold it in place and avoid any mechanics that would cause it to tip forward. I prefer a modified 2 x 4, which has a mild distalization effect upon the maxillary molars. Headgears can be adjusted by raising the outer bow to achieve root uprighting, if necessary.

DR. PHIPPS Since the only Class II, division 1 patients I start early are those with severe overjet, I anticipate they may relapse. I try to maintain the overcorrection as much as possible.

DR. BRAZONES I wish I could, but that doesn't seem to happen too often. I usually find that if the patient has a good growth pattern, the correction does hold during growth. If the growth pattern is unfavorable, there may be an improvement, but the skeletal pattern is more of a concern than the dental relationship.

DR. SARVER We also try to maintain the over-correction until the permanent dentition is reached and we are ready for full treatment.

DR. GOTTLIEB If you treat Class II, division 1 with a two-phase plan, what is your average total treatment time compared to one-phase treatment?

DR. PHIPPS I only treat very severe patients early, and the average total treatment time for this group is 32-40 months vs. 28-36 months for one-phase treatment.

DR. SARVER The average treatment time for a Phase I usually runs 9-12 months, with the Phase II running approximately 12-18 months. The average total treatment time for one phase of treatment normally runs about 27 months.

DR. BRAZONES I try to limit treatment time in Phase I to 12 months and Phase II to 18-24 months. The best compliance with headgear is in the first 12 months. I have found that the amount of time in Phase II does not decrease much. I am now doing fewer two-phase treatments.

DR. MALERMAN My average total treatment time for two-phase treatment is approximately the same as it would be for one-phase treatment. The difference is that when we split treatment into two phases, the appliance therapy becomes simpler for the patient. Additionally, splitting treatment into two phases means less time in braces, less breakage, and fewer compliance problems.

DR. MOSKOWITZ Two-phase treatment is generally longer if one includes the "resting" phase between treatment intervals. We have been trying to move away from Phase I-Phase II



Dr. Phipps

sequencing. I believe it has created more problems in practice management than we realized. Parents and patients often do not appreciate or understand why orthodontists break up treatment into two phases. This misunderstanding breeds discontent and resentment among parents and patients. Phase I-Phase II sequencing is merely some artificial construct in the minds of orthodontists that should be, if not eliminated, greatly curtailed. Its benefits have been greatly and unfairly exaggerated to patients, parents, and the dental profession. In fact, treatment is really no different than if planned as a long comprehensive procedure.

A much better way to manage these situations is to inform parents that treatment could take up to four years or more, depending upon a number of different factors, which might include the rate of exfoliation of primary teeth and subsequent eruption of the underlying permanent teeth, patient cooperation, the magnitude and direction of dentofacial growth, and the individual patient's response to treatment. They are also informed of contingency planning such as the potential need for extraction of permanent teeth, maxillary canine exposures, and so on. Extravagant and ambitious claims of the advantages of Phase I/Phase II treatment, such as "We won't have to extract permanent teeth", have sometimes locked the orthodontist into a corner, so that needed midcourse treatment changes never

occur.

DR. GOTTLIEB What appliances do you use for the period between Phase I and Phase II?

DR. BRAZONES I usually use a lower bonded lingual wire and a maxillary Hawley with a labial wire from lateral incisor to lateral incisor. Maintaining the Phase I correction is pretty easy as long as the upper and lower incisors haven't been moved beyond the alveolar ridge.

DR. MALERMAN Skeletal corrections are often stabilized six to nine months after completion of the correction. From that point onward, no retention may be necessary. Dental corrections may require removable and/or fixed retainers.

DR. MOSKOWITZ The interim appliance recommended will depend upon the problem that was addressed. If overjet and a Class II jaw relationship were addressed during Phase I, I would consider more aggressive interim appliances, which might include headgear. Transverse problems might call for some form of fixed palatal appliance or removable "stay plate". Lower lingual arches might be appropriate for cases in which lower incisors were moved.

DR. SARVER I usually use a conventional Hawley retainer.

DR. PHIPPS I use a maxillary Hawley and a mandibular fixed lingual arch.

DR. GOTTLIEB What signals the start of the second phase?

DR. BRAZONES The second phase starts after the eruption of the permanent dentition including the second molars.

DR. MALERMAN We like to begin the second phase of treatment just before the patient is ready to lose their second deciduous molars. At that point, they are fully reevaluated before making final second-phase treatment decisions. By beginning treatment before the second deciduous molars exfoliate, we can take advantage of the



Dr. Sarver

leeway space, often converting borderline cases into nonextraction cases.

DR. GOTTLIEB Do you charge one all-inclusive fee for two-phase treatment, or do you charge two separate fees for the two stages?

DR. MALERMAN We charge two separate fees. Our fee for the first phase of treatment will vary from a few hundred dollars to approximately \$2,000, depending upon the amount of treatment required. The patient who needs some deciduous teeth removed by their family dentist, and space maintainers fabricated by us, will be charged a minimal fee. The patient who requires maxillary and mandibular expansion with a reverse-pull headgear to reduce a Class III skeletal discrepancy will require much more appliance therapy and will require, therefore, a maximum Phase I treatment fee. The fee for the second phase of treatment is determined by the anticipated length of treatment and the severity of the case. The longer the patient will be in treatment, the more severe the case, the more the fee.

DR. PHIPPS I charge two separate fees. The total fee for two-stage treatment is approximately \$1,300 more than single-phase treatment. The fee for Phase II is discounted approximately \$1,000 vs. the fee for single-phase treatment. However, I am recommending far fewer two-phase treatments than I used to, since it is rarely

cost-effective for the patient or orthodontist.

DR. SARVER We make two separate charges. The fee for the first phase is generally not calculated to anticipate the second phase. Too many things can happen between the first and second phase, such as the patient moving to another city, the patient deciding to change orthodontists, or the patient deciding to not follow through with the second phase.

DR. BRAZONES I also charge two separate fees for the two phases of treatment. I usually give a discount off the Phase II fee if cooperation was good during Phase I. I am doing less and less Phase I, as the children and parents get worn out and many times do not see why Phase II is needed. The esthetic results in Phase I are quite good, and that's what the parents see. I use a Phase II to obtain a good function after the eruption of the permanent teeth, but some families are reluctant to start the second phase if the smile looks good.

DR. MOSKOWITZ More and more I am trying to get away from the Phase I and Phase II separate fees. I much prefer to present these cases as long comprehensive cases and attempt to charge accordingly. When that cannot be done, I still charge for Phase I and Phase II separately, and these cases are the most expensive ones at our office. I cannot agree with the idea that Phase I and Phase II should cost about the same as one comprehensive treatment started later on, or that one should discount the Phase II fee. I don't remember my internist giving me a credit for the physical exam and testing that I had two years ago.

(TO BE CONTINUED)

REFERENCES

1. Williams, M.D.; Sarver, D.M.; Sadowsky, P.L.; and Bradley, E.: Combined rapid maxillary expansion and protraction facemask in the treatment of Class III malocclusions in growing children: A prospective long-term study, *Semin. Orthod.* 3:265-274, 1997.
2. Koroluk, L.D.; Tulloch, J.F.C.; and Phillips, C.: Incisor trauma and early treatment for Class II division 1 malocclusion, *Am. J. Orthod.* 123:117-126, 2003.