

The 6-elements orthodontic philosophy: Treatment goals, classification, and rules for treating



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The *American Journal of Orthodontics and Dentofacial Orthopedics* is celebrating its 100-year anniversary. For more than half of those years, I have practiced and been a student of orthodontics. For those reasons, Dr Behrents invited me to write a guest editorial about some personal perspectives regarding orthodontics past, present, and future.

When the *American Journal of Orthodontics* was commissioned in 1915, orthodontics had no scientific treatment goals, a classification system that was not positionally accurate, and brackets with no built-in features. The same was true 43 years later when I began my career in 1958. Those uncertainties provided great opportunities for research.

I caught the research bug in 1960. Since then, I have devoted every other week of my orthodontic career to searching for solutions to those seemingly perpetual weaknesses. Retrospectively, I would have preferred to have been taught as a resident what has taken me 57 years of research to learn. My treatment results would have immediately been more satisfying, and I could have devoted all those research weeks to playing golf.

This guest editorial will be an overview of my research findings. The most important are believed to be orthodontics' most scientific treatment goals for the 6 areas for which orthodontists have diagnostic responsibility (arches, anteroposterior jaw positions, maxilla width, jaw heights, chin prominence, and occlusion), a positionally accurate classification system, and effective and efficient rules for treating. Collectively, they are the fundamental components of the 6-elements orthodontic philosophy.

My first research project began in 1960. It involved trying to gain a better understanding about American Board of Orthodontics (ABO) posttreatment standards. Where better for a rookie orthodontist to learn about treatment excellence than from the ABO treatment results displayed at national orthodontic meetings? The research findings showed a large posttreatment tooth-position range and consistent undercorrection of interarch relationships. The common characteristic of that posttreatment sample was that each orthodontist's treatment results were, in some ways, uniquely different.¹

For another perspective about what may constitute excellent tooth positions and interarch relationships, I decided to search for persons with naturally harmonious dentitions and take impressions. Once the sample reached 120 subjects, they were studied to look for common characteristics. Six were found, and they were called the 6 keys to normal occlusion.^{2,3}

Later, the occlusal plane was used as the landmark, and the facial axis of each clinical crown was used as the referent to quantify the angulations and inclinations of the teeth of the 120-cast sample.⁴ The tooth positions for each tooth type, regardless of the patient's race or sex, were found to be so similar that, in the 1970s, that information led to my inventing the standard straight-wire appliance.⁵ It was designed to be a fully programmed appliance for arches not requiring any tooth to be translated. A fully programmed appliance is one that, when properly designed and sited, will correct tooth positions with few, if any, archwire bends. Later, translation brackets were designed to be used on teeth that require bodily mesial or distal translation. Teeth that required translation were those that were consistently undercorrected on the ABO treatment results.¹

Translation brackets provide the angulation and rotation countermoments needed for teeth that need to truly translate. When the right combination of

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Am J Orthod Dentofacial Orthop 2015;148:883-7

0889-5406/\$36.00

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<http://dx.doi.org/10.1016/j.ajodo.2015.09.011>

standard and translation brackets is correctly prescribed for the mesial or distal treatment needs of each patient, then that appliance will be fully programmed. It is difficult and rare for posttreatment tooth positions and for occlusal interfacing to meet the 6 keys and the 6 elements functional and occlusion standards when standard brackets are used on patients needing tooth translation.¹ A fully programmed appliance is essential for orthodontists who want to routinely provide patients with the 6 keys and occlusions that function gnathologically.⁵⁻⁷ However, fully programmed appliances are not the whole story.

In the 1980s, I undertook a new research project to search for a solution to orthodontics' long-standing extraction vs expansion and archwire shape controversies. Those controversies existed because there was no scientific treatment goal for the anterior or lateral borders of an arch. If that information were known before treatment, it could be determined whether there would be enough room for all teeth when an arch is diagnostically taken to those borders.

The 120-cast sample was revisited to search for anterior and lateral arch-border answers. This led to the discovery of the WALA ridge.^{8,9} WALA is an acronym for Will Andrews and Larry Andrews, who collaborated in the discovery. The ridge is the most prominent portion of a mandible's mucogingival junction.

The mandibular casts of the 120-cast sample were used to quantify the faciolingual distance between each crown's facial axis point and the WALA ridge.⁹ The range was so small that the facial axis points qualified as the 6-elements referents for diagnosing the anterior and lateral borders of a mandibular arch relative to the WALA ridge, which qualified as the 6-elements landmark. The WALA ridge also serves as the template for forming archwires that will match the anterior and lateral borders of the WALA ridge. That shape will be uniquely correct for each patient regardless of race or sex.

The 6 keys study in the 1960s did quantify the depth of the occlusal borders of the mandibular arches. It was found to range from 0 to 2.5 mm. The location of an arch's distal border is determined by the sum of the mesiodistal diameters of the teeth included in treatment. However, the anterior and lateral borders of the sample were not considered at that time, so to that extent, the 6 keys have been incomplete.

Archwires that are shaped differently than the WALA ridge may align the teeth and improve the smile, but the roots will not be centered within the alveolar process and over basal bone. The more an archwire shape differs from the WALA ridge shape, the more likely there will be

undesirable side effects to the gingiva, alveolar process, roots, or all three.

An arch will be uniquely harmonious for each person when its components have the same characteristics found to be consistently present on the casts of the 120-cast sample. The components are teeth individually (positions), teeth collectively (anterior, lateral, occlusal, and distal borders), and their supporting tissues. Orthodontists do not directly treat the gingiva, alveolar process, or roots, but it is important to not abuse them.

Arch diagnosis involves using pretreatment casts (plaster or digital) to measure the arch's pretreatment arch length discrepancy. The casts and lateral headfilm are then used to compute the effects on the pretreatment arch discrepancy that will result from hypothetically correcting the pretreatment borders to match the border characteristics of the 120-cast sample. Those hypothetical corrections can cause a pretreatment arch to become more or less crowded. If the diagnosis indicates excess room, then treatment will require translating posterior teeth mesially. If the diagnosis indicates insufficient room, then the treatment options are to move posterior teeth distally or to extract. If the crowding is beyond what can be accomplished by moving posterior teeth distally, then extractions are required.

The WALA ridge solves orthodontics' long-standing controversies regarding the anterior and lateral arch-border positions and archwire shapes, and whether to extract or expand, or both. It also solves the maxillary arch-border and the maxilla width controversies because a uniquely correct mandibular arch's lateral borders serve as the landmark for the lateral borders for both the maxillary arch and the maxilla.¹⁰

Also in the 1980s, I undertook a research project to search for scientific treatment goals for anteroposterior tooth and jaw positions. This required a large profile sample of subjects judged to have facial harmony. The intents were to search for common characteristics and, if so, to find landmarks and referents to quantify them.

The research began by finding and compiling over 1000 profile images of persons judged to have facial harmony. A prerequisite was for the forehead and the maxillary central incisors to be visible so that the entire profile could be seen. For this study, a person's forehead and maxillary incisors were considered to be a part of the face when the forehead is free of hair and the lips allow the maxillary incisors to be seen, such as when smiling or laughing.¹¹ This is an important consideration because people care a lot about how they look in profile in social situations. The sample included all races and both sexes. Most of the images were found in magazines.

The persons who initially judged the profile images to be harmonious were primarily representatives from model studios, professional advertisers, movie studios, artists, and society. Those judges appeared to instinctively use the forehead's prominence and inclination as the landmark and the favorably positioned maxillary incisors as the referents for determining the harmony of tooth and jaw positions in profile.

The common characteristics of the profile sample were that the more inclined the forehead, the closer the favorably positioned maxillary incisors (which are attached to the maxilla and indirectly represent its anteroposterior position) were to an envisioned line that is both tangent to glabella and parallel to the head's frontal plane.¹⁰ No judge used internal cephalometric landmarks for evaluating anteroposterior incisor and maxilla harmony. Maybe orthodontists should take note.

Orthodontists who have learned about these research findings are now routinely adding to their records a profile photograph with both the forehead and maxillary incisors bared. In consultations, parents and adult patients are much more agreeable about a treatment plan that will fix what is clinically more obvious than can be determined from a lateral photograph in repose with hair covering the forehead or from a lateral headfilm.

The 120 casts and the 1000-plus profile images provided the samples that led to discovering scientific treatment goals for the 6 areas for which orthodontists have diagnostic responsibility. When the components of each area match the characteristics that are consistently present on either the 120-cast or the 1000-plus profile samples, that area earns the title of "element" and is assigned a Roman numeral for its area: eg, element I, arch¹¹; element II, anteroposterior jaw positions¹²; element III, maxilla width¹³; element IV, jaw heights¹⁴; element V, chin prominence¹⁵; and element VI, occlusion.¹⁶ When the components of all 6 areas are harmonious, they are called the 6 elements of orofacial harmony. Orthodontists who routinely diagnose and treat relative to those goals are called "6-elements orthodontists."

The 6 elements landmarks and referents provide the bases for a positionally accurate classification system. It is called the "6-elements classification system."¹⁷ Orthodontists can now accurately communicate the patient's orofacial conditions relative to the 6 elements, or as close to the 6 elements as the patient elects. For each of the 6 areas, the colors black (too distal, narrow, or short), green (harmonious), and red (too anterior, wide, or tall) are used for directions, and millimeters are used for distances. The 6-elements landmarks and referents are used for all measurements. Orthodontics' current official classification system is not positionally accurate for even one of the 6 areas. It is not possible

to have a positionally accurate classification without scientific treatment goals.

The "6-elements rules for treating" are an inventory of treatment options from which an orthodontist can choose that have proven to be effective for reaching the treatment goals as efficiently as the patient and biology will permit.¹⁸ The primary subjects for the rules are methods, concepts, precepts, policies, diagnosis, forces, strategies, and materials.

The 6 elements of orofacial harmony, the 6-elements classification system, and the 6-elements rules for treating comprise the 6-elements orthodontic philosophy.

With the 6-elements information, orthodontists can become "the experts" in occlusion. This is because they know the components of all 6 areas, and they know their characteristics when a person has oral harmony. Orthodontists also have more control over all the components than anyone else in dentistry; they know the 6-elements rules for treating, and they can and should be designated as the primary care providers for patients with occlusion-related orofacial malaise (eg, temporomandibular disorders).

The ongoing critiquing of ABO treatment results displayed at national orthodontic meetings continues to provide evidence that the use of partly programmed appliances and arbitrary archwire shapes may lead to aligned teeth and improved smiles.¹⁹ However, if those treatment results were to be diagnosed relative to the 6 elements, they would be incomplete, and unless the casts are mounted, there is no way to know whether they are registered in centric relation or whether they will function gnathologically.

Articulator brands that use the Frankfort horizontal plane as a landmark for measuring the position of the maxilla relative to the jaw joints will produce flawed information. This is because the Frankfort horizontal plane is perceived by many as parallel to the head's transverse plane, but it seldom is.²⁰ The extent to which it is not parallel is the extent to which it will provide flawed information.

The fact that the Frankfort plane is an ineffective landmark motivated me to design a new articulator system that uses the head's transverse plane as 1 of the 3 landmarks for measuring the position of the maxilla. This new articulator system was designed specifically for orthodontists and has benefits not possible with Frankfort-style articulators. One of the most important benefits of the new articulator is that it helps to identify the extent to which an occlusion meets the 6-elements treatment goals.

A 6-elements orthodontist can contribute to orthodontics reaching its full potential by providing better facial harmony for patients than can plastic surgeons.

This will occur when a 6-elements orthodontist corrects tooth positions and arch borders to element I standards; then, in cooperation with an oral and maxillofacial surgeon who is privy to the 6 elements and to the 6-elements surgery techniques, the teeth and jaws can be positioned in the face to match the 6-elements standards. This will provide a harmonious foundation for the soft tissues of the face in ways that plastic surgeons cannot.

In recent years, oral and maxillofacial surgeons have learned how to move jaws beyond what orthodontists can do orthopedically. Many of them find the 6 elements useful for planning jaw surgery because, until the 6 elements were discovered, oral and maxillofacial surgeons, as well as orthodontists, did not have scientific treatment goals for jaws.²¹

Jaw surgery is a treatment option that 6-elements orthodontists are increasingly offering to patients who cannot be treated to the 6 elements without jaw procedures. Parents and adult patients deserve to know what is possible even if they elect a nonsurgical approach.

It is strongly recommended that a 6-elements orthodontist should work with an oral and maxillofacial surgeon who understands the 6 elements and has learned the special 6-elements surgical techniques that will result in jaw-positioning accuracy of 1 mm. Most oral and maxillofacial surgeon residency programs are not yet teaching the 6 elements or 1-mm accuracy.

The recommended person from whom oral and maxillofacial surgeons can learn about the 6 elements and the 1-mm surgical accuracy is Tim Tremont.²² He is a 6-elements orthodontist and has scrubbed in and participated in more combined orthodontic and surgical procedures than probably any other orthodontist. He identified the surgical-technique problems that too often led to disappointing results. He then found solutions. Most surgeons who take the time to learn from Tim adopt what he teaches. Tim prefers the orthodontist and his or her surgeon of choice to jointly attend his course. Oral and maxillofacial surgeons love to work with 6-elements orthodontists because they know how to prepare the arches for a good fit during surgery, and 6-elements orthodontists love to work with oral and maxillofacial surgeons who can surgically position jaws with accuracy of 1 mm. Tim's email is timtremont@gmail.com.

In 1990, the 37 years of research had finally led to discovering the 6-elements orthodontic philosophy. Since then, it has been exclusively practiced in my office to determine whether it works as perceived. It does. In 1992, Will Andrews joined the practice. Since then, he has exclusively practiced the 6-elements orthodontic philosophy and been a major contributor

in research, teaching, cowriting teaching syllabi, and preparing a book about the 6-elements orthodontic philosophy.

Treatment goals that are both scientific and universal have been searched for as long as orthodontics has been practiced. The credit for finding an effective research method can initially be attributed to serendipity. How that happened will be explained in the soon-to-be-published 6-elements orthodontic philosophy book (probably in 2016).

Will and I have lectured about the 6 elements worldwide. There are a growing list of orthodontists who are practicing the 6-elements orthodontic philosophy and a growing number of universities that are teaching the 6-elements orthodontic philosophy. I'm sure there are exceptions, but Will and I have not happened on an accredited orthodontic program that would not welcome a 6-elements teacher.

For 6-elements orthodontists, excellence is defined as the 6 elements, or as close to them as the patient elects and is willing to cooperate. The 6-elements classification system and the 6-elements rules for treating are used exclusively.

Many clinical orthodontists, students, and faculty have taken the time to research and compare their findings with 1 or more of the 6 elements. Eight of those researchers have published their findings in peer-reviewed journals,²³⁻³⁰ and one is published in a 2-volume oral and maxillofacial textbook.²¹ All have been supportive. More information about the 6 elements can be found at the Andrews Foundations Web site: www.andrewsfoundation.org.

If the 6 elements continue to pass the test of time and become adopted as the 6 keys and the straight-wire concept have been, then 21st century orthodontists will be spared from another 100 years of uncertainty regarding treatment goals, classification, and rules for treating; orthodontic treatment goals will evolve from art to science, and treatment results will be more in the best interest of patients, orthodontists, and orthodontics.

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