Orthodontics about face: The re-emergence of the esthetic paradigm

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The emphasis and direction of orthodontic treatment planning philosophies over the past century is a story almost all orthodontists are familiar with. In the latter part of the 19th century, Norman Kingsley, the leading orthodontist of the era, emphasized the esthetic objectives of orthodontic treatment. In the Kingsley paradigm, the articulation of the teeth was clearly secondary to facial appearances. Exercising considerable intellectual influence in the early 20th century, Edward Angle's emphasis on occlusion led him to teach that optimal facial esthetics always coincided with ideal occlusion and that esthetics could essentially be disregarded because it took care of itself. Later, both Tweed and Begg challenged Angle's nonextraction philosophy partially on esthetic grounds.

Throughout most of the 20th century, the idea persisted that occlusion was the primary objective of orthodontic treatment, with esthetics playing only a secondary role. Even when orthognathic surgery developed in the 1970s and growth modification treatment reappeared for children, the goal was to obtain better occlusion more than better facial proportions. In the 1980s, the introduction of new esthetic materials in restorative dentistry led to the widespread adoption of "esthetic dentistry." At about the same time, it became clearer to all involved that orthognathic surgical goal setting was esthetically driven. Although ideal occlusion remained the primary functional goal, it was acknowledged that the esthetic outcome was critical for patient satisfaction. Esthetic considerations in the selection of other orthodontic treatment approaches—expansion versus extraction, camouflage versus correction of jaw relationships—began to receive the emphasis they deserve.

For centuries, artists and physicians alike have tried to quantify the ideal proportions of the face. These attempts continue to this day, attractive to orthodontists because they provide guidelines for esthetics. One hundred years ago, Professor Wuerpel explained to Angle

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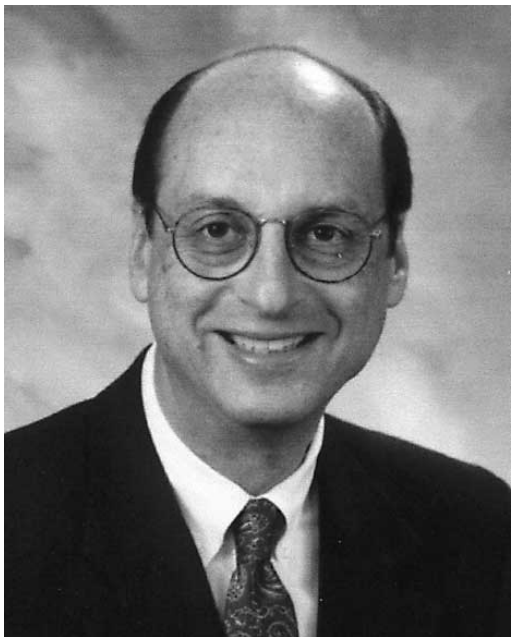

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that an almost infinite variety of faces could be esthetic. That is as true now as it was then. It is a significant error to attempt to put everyone into the same esthetic framework and an even greater error to try to do this from hard tissue relationships alone, taking it for granted that the soft tissues will follow along in a predictable fashion. We now must acknowledge 2 things: (1) esthetic considerations are paramount in planning appropriate orthodontic and orthognathic treatment, and (2) rigid rules cannot be applied to this process.

This produces a dilemma for the orthodontist. If you can't write strict rules regarding what you should do to achieve optimal esthetics, is it impossible to apply scientific methods in planning treatment that emphasizes esthetic goals? The interesting outcome is this: rules that rigidly define esthetics may be impossible, but it is entirely possible to write general guidelines for how to optimize dentofacial esthetics while satisfying other treatment goals. These guidelines are as follows:

1. Dental and facial esthetic relationships must be evaluated in 3 dimensions, primarily through clinical examination of the patient. These relationships should be examined both dynamically and statically, rather than statically alone. Thus, hard tissue relationships observed on cephalometric radiographs are inadequate to our task. Treatment designed around the profile simply ignores the way that others see our patients and how our patients see themselves. Two-dimensional hard tissue measurements as seen on sagittal or frontal radiographs are an imperfect reflection of what exists clinically; we must admit it. The three quarter view of the face often reveals dentofacial characteristics, which although not measurable, yield valuable information in both diagnosis and treatment planning. Facial symmetry and vertical canting of the occlusal plane are important. It is quite possible to produce both ideal occlusion and a profile that look perfect, and leave the patient with an unattractive face because symmetry was not given enough attention. This is particularly important if an asymmetric facial skeleton underlies an asymmetric dentition. It is not enough to just correct the teeth.
2. Anterior tooth display, as observed in frontal and three-quarter views of the face, is more important than tooth prominence in profile views. If in doubt, how the anterior teeth appear clinically should almost always override the traditional cephalometric measurements. Recorded measurements of resting and dynamic soft tissue relationships as well as imaging of animated views of lip-tooth relationships are recommended. The upper incisors are the key to esthetic orthodontic treatment planning. They must be positioned advantageously relative to the adjacent soft tissues both anteroposteriorly and vertically. Therefore, the relative prominence of the nose and chin in relationship to the lips and overall facial contours is important in this decision. It must be kept in mind that sometimes esthetic results cannot be achieved without including hard and soft tissue (both gingival and facial) surgical change in these elements.
3. Extending the soft tissue envelope by expanding dental arches to increase hard tissue support for the lips and cheeks or enlarging the facial skeleton surgically to increase hard tissue support, usually is more esthetic than the reverse, especially when the effects of aging are considered. Greater soft tissue fullness gives a more youthful appearance. This is not an argument for routine expansion of severely crowded arches, since anything can be overdone, but it does represent a significant limitation of extraction treatment *if* the soft tissue envelope would thereby be decreased. When possible, computer imaging should be utilized to simulate the soft tissue facial outcome that would most likely result from the proposed hard tissue changes. This allows for the patient's input in the decision-making process.

For much of the 20th century, orthodontists have equated mensuration with science; however, measurement is valuable only if one is measuring the right thing. Thus, measuring cephalograms to evaluate dentofacial esthetics is simply not valid. Hopefully, in the 21st century, we will develop biometric tools to evaluate the hard and soft tissue factors that are responsible for beautiful smiles and attractive faces.

In summary, the 3 basic requirements for assessing dentofacial esthetics in orthodontics are:

1. A dynamic and static 3-dimensional evaluation of the face derived primarily from the clinical examination of the patient.
2. A determination of lip-tooth relationships and anterior tooth display at rest and during facial animation.
3. An analysis of the dental and skeletal volume of the face as it effects the soft tissue facial mask. When possible this should be an interactive process with the patient and is best facilitated through the use of graphic images via computer simulation.