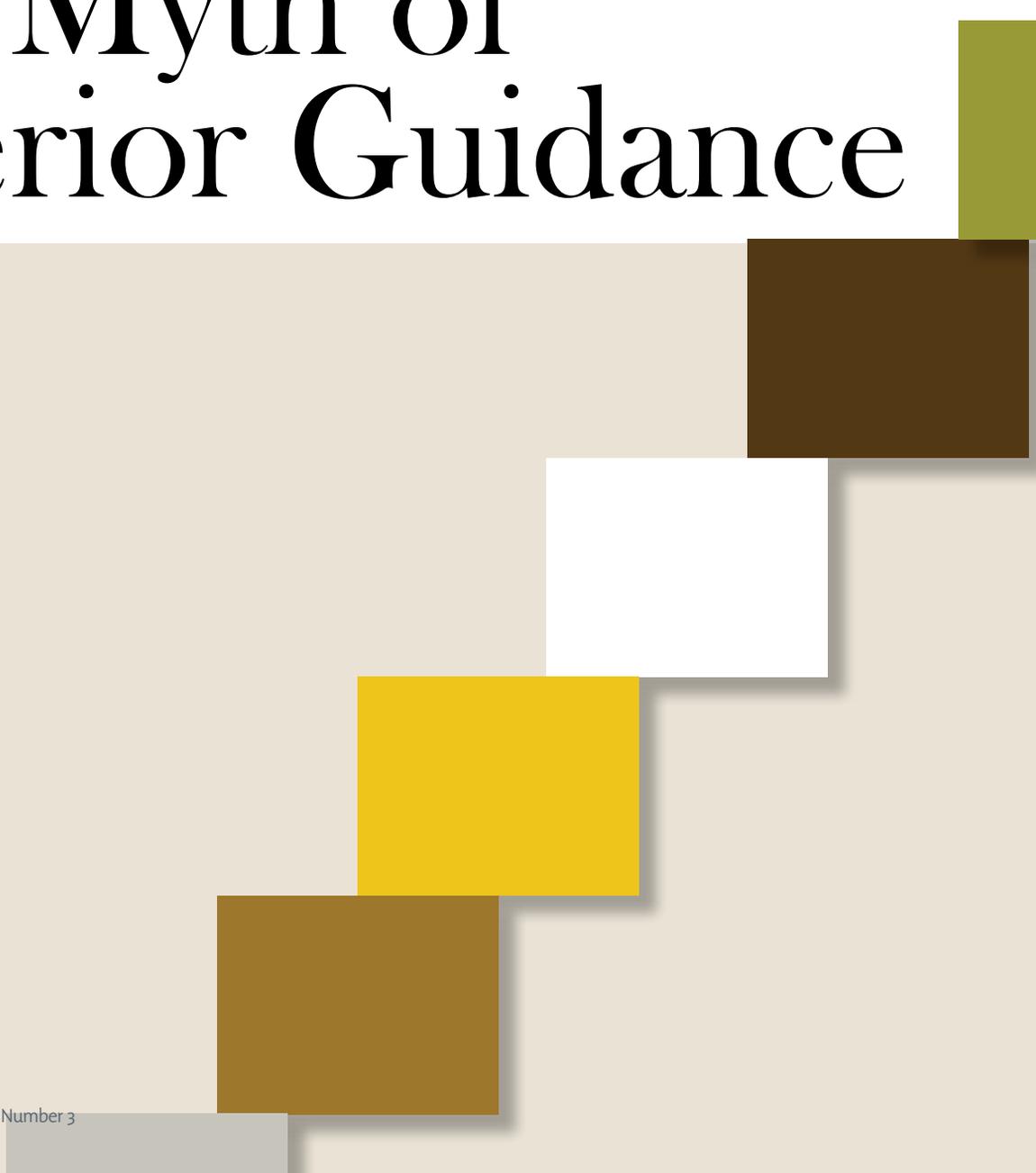


The Myth of Anterior Guidance



10 Steps in Designing Proper Clearance for Functional Pathways

Elizabeth M. Bakeman, DDS, FAACD
John Kois, DMD, MSD

Key Words: Functional pathways, anterior guidance, lingual contours, anterior teeth, occlusion

Introduction

When restoring anterior teeth, the establishment of the incisal edge position and the development of the facial contours are dependent upon dentofacial (esthetic) parameters.¹⁻³ Establishment of the teeth's lingual contours is dependent upon functional considerations such as the dynamic relationship of the maxillary and mandibular anterior teeth when chewing, speaking, swallowing, and breathing. If the lingual contours are not appropriately developed, unfavorable consequences can occur, including chipped restorations, sore muscles and joints, tooth mobility, cement fatigue, and attrition.⁴

“Evaluating this dynamic relationship in the clinical setting requires an approach that more closely mimics the outside/in functional pathways.”

Unique Pathways

We have traditionally been taught to examine the intra-arch relationship of anterior teeth by evaluating lateral and protrusive guidance. This is done by placing the patient in a supine position, placing articulating paper between the teeth, and asking the patient to occlude their teeth. The patient brings the posterior teeth into occlusion and then moves the mandible in lateral and protrusive directions. These movements represent the teeth rubbing together, starting from a position of maximum intercuspation. This examination of anterior guidance can be summarized as an evaluation of inside/out mandibular movements.

The problem with this approach is that these inside/out mandibular movements do little to represent the dynamic movements and relationships of the teeth that occur during function. During function, the teeth are apart and the mandible moves via a range of pathways to a position of maximum intercuspation. Functional movements occur from an outside/in direction and fluctuate with different degrees of muscular load.⁵ These pathways are unique to each patient and can vary within an individual based on such factors as the type, consistency, and size of the food bolus, patient position (supine vs. upright), and skeletal influences on speech patterns.

Evaluating this dynamic relationship in the clinical setting requires an approach that more closely mimics the outside/in functional pathways. This distinction is important because outside/in movements (functional movements) require muscle activation and increased load to the teeth. Conversely, inside/out movements (excursive movements used to evaluate anterior guidance) require muscle deactivation and decreased load to the teeth. They are not the same.

10-Step Approach for Clinical Management

1. Make sure the patient is in an upright position. Functional pathways vary with postural changes. A patient will have a slightly larger envelope of function in the upright position, and this must be taken into account.



2. Insert articulating paper between the teeth. The paper should be 200- μ thick, which is the clearance required to prevent premature loading of the teeth as well as the distance needed to comfortably and appropriately form sibilant sounds when speaking.



3. Ask the patient to “chew”—to open and close and bring their back teeth together to maximum intercuspation, as if they were chewing food.



4. Ink streaks made by the articulating paper on the lingual aspect of maxillary incisors (provisional or definitive) represent premature loading of the teeth. The lingual contours of the maxillary incisors are adjusted until the marking ink is no longer expressed as surface streaks during chewing.





5. There will still be a light mark on the lingual aspect of the incisors at the most terminal aspect of the chewing stroke.



6. Polish tooth contours to create smooth transitions and remove any sharp angles that may have been created during the adjustment.



7. In the upright position, all posterior teeth and the cuspids should hold shimstock ($8\ \mu$) in maximum intercuspation.

8. In the upright position, the incisors should allow shimstock to slide through when the teeth are in maximum intercuspation. This does not mean the incisors are out of contact, but that the intensity of the contact is less on the incisors than it is on the posterior teeth.



9. There should be no fremitus on the maxillary anterior teeth.



10. The patient should feel as though the posterior teeth can be brought together without bumping or being constrained by their anterior teeth.



Precise records and transfer of information regarding provisional restorations, adequately designed to account for functional pathways, will minimize the need for adjustment of the definitive restorations. Even so, it is important to evaluate functional pathways in the same manner when delivering provisional or definitive restorations to avoid prematurely loading the anterior teeth.

Proper lingual contours can be predictably designed by simulating functional postures and movements. Limiting our thinking to confirmation of anterior guidance does not guarantee functional success. Inside/out movements are not representative of movements patients engage in on a daily basis when chewing, speaking, swallowing, and breathing. Designing proper clearance for functional pathways can be achieved with proper knowledge and training and will help to ensure predictable, long-term restorative outcomes.

References

1. Gillen RJ, Schwartz RS, Hilton TJ. An analysis of selected normative tooth proportions. *Int J Prosthodont.* 1994;7(5):410-7.
2. Misch CE. Guidelines for maxillary incisal edge position—a pilot study: the key is the canine. *J Prosthodont.* 2008 Feb;17(2):130-4.
3. Vig RG, Brundo GC. The kinetics of anterior tooth display. *J Prosthet Dent.* 1978 May;39(5):502-4.
4. Dawson PE. Evaluation, diagnosis and treatment of occlusal problems. 2nd ed. St. Louis: Mosby; 1989. p. 321-52.
5. Gibbs C, Lundeen H. Jaw movements and forces during chewing and swallowing and their clinical significance. *Advances in occlusion.* Los Angeles: John Wright; 1982. p. 2-32.
6. Hiiemae K, Heath MR, Heath G, Kazazoglu E, Murray J, Sapper D, Hamblett K. Natural bites, food consistency and feeding behavior in man. *Arch Oral Biol.* 1996 Feb;41(2):175-89. **JCD**

“ Proper lingual contours can be predictably designed by simulating functional postures and movements. ”



Dr. Bakeman is an Accreditation and Fellowship Examiner for the AACD. She has served as chair of Accreditation for the AACD and chair of the American Board of Cosmetic Dentistry®.

Dr. Bakeman, an AACD Accredited Fellow, is a clinical instructor at the Kois Center in Seattle, Washington. She practices in Grand Rapids, Michigan.



Dr. Kois is the director of the Kois Center, in Seattle, Washington. He also is in private practice in Seattle.

Disclosure: The authors did not report any disclosures.