Arch length related problems

David L. Turpin, DDS, MSD

I use mandibular lingual arches in mixed dentition patients to save arch length, and I once assumed that almost everyone else did as well. But a good friend of mine challenged that notion recently, claiming "I never use them because they don't work."

That comment caused me to question my reliance on the use of leeway space in the presence of lower incisor crowding. What gain in arch length can we expect, and will any long-term increase be stable?

The clinical feature in this issue (Early mixed dentition treatment: postretention evaluation of stability and relapse, page 311) addresses these questions. Dugoni et al. report on long-term stability in 25 patients treated only in the mixed dentition. These patients presented with incisor crowding and were treated with a passive lingual arch and maxillary fixed appliances on the incisors and molars. Extraoral traction was added for those who had Class II problems.

In answer to my first question, the authors reported that overall arch length was maintained or slightly increased when a lingual arch was used during the time the remaining primary teeth were exfoliated. The lingual arch was effective in saving the leeway space, and satisfactory alignment of the incisors was achieved. In answer to my second question, the report indicated that mandibular arch length decreased by more than 3 mm during the 9-year postretention period. However, even with this change, 76% of the patients had lower incisor alignment that was clinically acceptable. Maturational changes alone often account for greater changes in arch length. These authors noted that a small increase in lower molar width remained stable, and they related that stability to possible maxillary expansion resulting from the use of headgear.

That raises the issue of maxillary expansion indices currently in vogue for predicting transverse changes. Nimkarn et al. addressed this topic in their examination of Pont's index, Schwarz's analysis, and McNamara's rule of thumb. (The validity of maxillary expansion indices, page 321.) Their results suggest that these indices may overestimate the arch expansion required to alleviate crowding.

Finally, how can we talk about tooth size–arch length problems without taking another look at the Bolton analysis. Wayne Bolton originally calculated proportionality by measuring the dental casts of 55 patients with excellent occlusion. The most common use of the analysis today requires measuring the casts of patients with crowding. Shellhart et al. tested the reliability of the Bolton analysis when a needle-pointed divider and a Boley gauge were used to measure the teeth. (Reliability of the Bolton tooth-size analysis when applied to crowded dentitions, page 327.) They found that clinically significant measurement errors can occur when the analysis is performed on casts with 3 mm of crowding.

Look for more articles on arch length and stability in future issues of *The Angle Orthodontist.*