Relapse remains the arch-nemesis of the industry, but is the answer just too hard to swallow?

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In a sweeping review on the subject, incorporating 40 years’ worth of articles, Bondemark et al. (2007) found the tenor of the debate on orthodontic relapse rest-ed with which retention regimen is most effective.

That the hot question in orthodontics today is whether bonded or removable retainers are more effective does not bode well for the future of our science. The focus of studies must shift toward what is causing the relapse and its subse-quent prevention.

What does the current evidence tell us about the causes of relapse? An expansive literature review (Blake and Bibby 1998) found fac-tors that may affect post-treatment stability are:
- Alteration of arch form
- Periodontal and gingival tissues
- Mandibular incisor dimensions
- Continuing growth
- Third molars
- Neuromusculature

Despite these factors, there exists a common misconception that orthognathic surgery is somehow the definitive answer to a skeletal discrepancy. What does the evidence suggest? Profitt et al. (2007) have amassed an impressive vol-ume of data on the subject, involv-ing more than 100 research articles and 2,264 patients.

They conclude that only maxil-lary advancement can be considered “stable,” although even in this pro-cedure, “moderate relapse” (being “potentially clinically significant”) is expected in 20 percent of patients.

This study that labels downward movement of the maxilla and man-dibular setback “problematic”; 66 percent suffered “clinically highly significant” relapse of downward maxillary movement within a year. Those who underwent mandibular setback registered similar figures, with up to 50 percent expected to record relapse.

If even surgery is no match for relapse, which of the aforemen-tioned factors has the power to reshape and remodel bone?

“Well, there is a struggle between muscle and bone, bone yields,” writes Graber in his semi-nal 1963 manifesto on the influence of muscles on malformation and malocclusion.

More recently, Chang et al. (2006) regarded muscular forces as the principal factor in relapse of mandibular setback. In his review of open-bite treatment, Shapiro (2002) suggested the high rate of instability, with or without surgery, is most likely due to “non-adaption of the tongue.”

In their review of the orthodontic influence of mandibular muscles, Pepicelli et al. (2005) corroborate it as “well accepted” that the position and function of the facial and man-dibular muscles are “critical influ-ences” on alignment and stability. These include a dysfunctional swal-low and incorrect tongue posture.

Mentioning “muscle function,” however, does not immediately champion functional appliances and preclude fixed. Despite the fact that most traditional advocates of braces may completely ignore the influence of muscles, the functional appliances school is guilty of doing the same while still paying muscles lip service.

A surprisingly common mis-conception amongst orthodon-tic practitioners is that functional appliances are analogous to myo-functional appliances. They are, in fact, polar opposites, both in terms of underpinning philosophy as well as mechanism of action.

Functional appliances simply expand maxillias and posture man-dibles forward without correcting soft-tissue function at all. Myo-functional appliances, conversely, directly target these underlying muscular causes.

A case in point is this 14-year-old with a large overjet, narrow arches and subsequent dental crowding. A muscular assessment shows a low tongue posture is responsible for the narrow arches and a severe reverse swallow with labio-mental action.

After six months of myofunc-tional appliance use and myofunc-tional exercises, the overjet has substantially reduced, the arches have broadened and the crowding has been eliminated. Skeletally and dentally, this is a positive, if unremarkable, result.

What is striking, though, is how the patient has eliminated her own reverse swallow habit, with the profile shot indicating the labio-mental furrow under her lower lip has also dissipated. With both the muscle function and posture having been treated, this case has a much higher chance of stability (Pepicelli et al. 2005, Ricketts et al. 1979, Bench et al. 1978) (Figs. 1, 2).

Although some may be deterred by the concept of a nuanced solu-tion to a problem, arming the prac-titioner with all three tools will fulfill all therapeutic desires. Like any progressive science, the orthodontic industry must dissolve old antagonisms, lose its prejudices and embrace change.

By combining the skeletal effects of functional appliances, the lapi-dary movements of fixed appliances and the treatment of underlying causes with myofunctional appli-cances and therapy, we might just have the ultimate answer.

References