

# Relapse - the elephant in the room

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

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*“the high rate of instability, with or without surgery, is most likely due to non-adaption of the tongue...”*

In a sweeping review on the subject incorporating 40 years worth of articles, Bondemark et al. (2007)<sup>1</sup> found that the tenor of the debate on orthodontic relapse rested 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 towards what is causing the relapse and its subsequent prevention.

So what does the current evidence tell us about the causes of relapse? An expansive literature review (Blake and Bibby, 1998)<sup>2</sup> found factors that may affect post-treatment stability are:

- Alteration of arch form;
- Periodontal and gingival tissues;
- Mandibular incisor dimensions;
- Continuing growth;
- Third molars; and
- 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? Proffit et al. (2007)<sup>3</sup> amassed an impressive volume of data on the subject, involving over 100 research articles and 2264 patients.

They conclude that only maxillary advancement can be considered ‘stable’, although even in this procedure, ‘moderate relapse’ (being ‘potentially clinically significant’) is expected in 20% of patients. The study then labels downward movement of the maxilla and mandibular setback ‘problematic’; 66% suffered ‘clinically highly significant’ relapse within a year of downward maxillary movement. Those who underwent mandibular setback registered similar figures, with up to 50% expected to record relapse.

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

“Whenever there is a struggle between muscle and bone, bone yields”, writes Graber<sup>4</sup> in his seminal 1963 manifesto on the influence of muscles on malformation and malocclusion. More recently, Chang et al. (2006)<sup>5</sup> regarded muscular forces as the principle factor in relapse of mandibular setback. In his review of open bite treatment, Shapiro (2002)<sup>6</sup> suggests that 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)<sup>7</sup> corroborate it is ‘well accepted’ that the position and function of the facial and



Figure 1. Pre-treatment, October 2009.

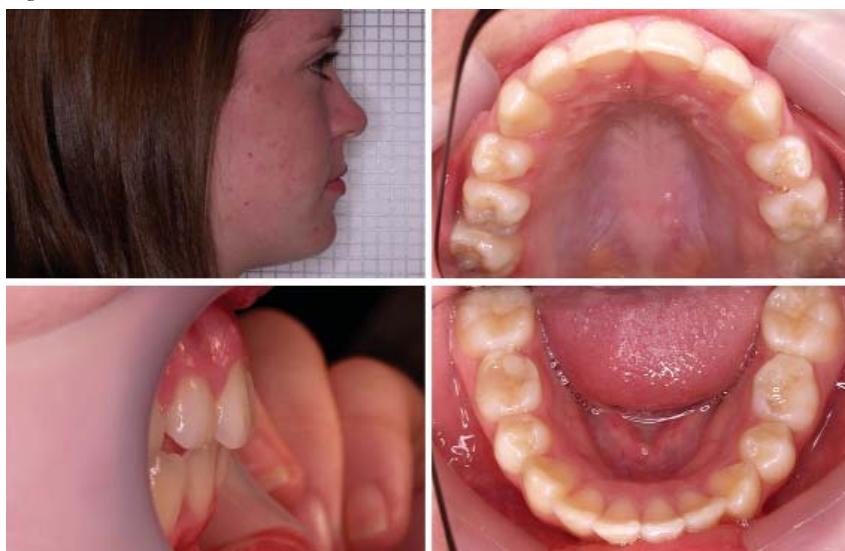


Figure 2. Post-treatment, April 2010.

mandibular muscles are ‘critical influences’ on alignment and stability. These include a dysfunctional swallow 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 appliance school is guilty of the same while still paying it lip service.

A surprisingly common misconception amongst orthodontic practitioners is that *functional appliances* are analogous to *myofunctional appliances*. They are in fact polar opposites both in terms of underpinning philosophy as well as mechanism of action. Functional appliances

simply expand maxillas and posture mandibles forward without correcting soft tissue function at all. Myofunctional appliances, conversely, directly target these underlying muscular causes.

A case in point is illustrated in Figures 1 and 2 with this 14-year-old patient 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-mentalis action. After 6 months of myofunctional appliance use and myofunctional 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 that 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,<sup>7</sup> Ricketts et al. 1979,<sup>8</sup> Bench et al. 1978<sup>9</sup>).

Although some may be deterred by the concept of a nuanced solution to a problem, arming the practitioner with all three tools would 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 lapidary movements of fixed appliances and the treatment of underlying causes with myofunctional appliances and therapy, we might just have the ultimate answer.

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## About the author

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