

## Commentary

**A**s reviewed by Bishara, recrowding of the anterior teeth after the completion of orthodontic treatment and discontinuation of the retention appliances is the most frequent posttreatment change.<sup>1</sup> Even the extraction of premolars to alleviate the tooth size-arch length discrepancy does not seem to ensure the stability of the alignment of the anterior teeth. These conclusions have been based on numerous retrospective studies of nontreated individuals as well as those receiving extraction or nonextraction orthodontic therapy. These investigations have indicated that there is a large unexplained variance from sources that have not been measured. Variables such as age, sex, classification of malocclusion, crowding, overbite, overjet, arch width, arch length, tooth size proportion, and pattern of incisor rotation prior to treatment are of little value, singly or in combination, in predicting long-term stability or in establishing reliable prognoses.

These morphological changes may be better understood if they are considered in association with concomitant functional changes. Orthodontic therapy may temporarily alter intraoral muscle physiology and, for a time, even reverse it. Conversely, muscle imbalance can also be created with orthodontic treatment where none existed before treatment.<sup>2</sup> However, following mechanotherapy and the period of retention-restraint, the developmental maturation process resumes. Clearly, there is a need for prospective clinical research which will examine muscle pressure and activity, before, during, and after orthodontic treatment and correlate the results to the traditional morphological parameters. Quantifying variations in functional patterns in cases of similar occlusal and facial morphology may help to explain the differences in appliance effects.

One of the most interesting points of the Lubit et al. study is the emphasis on the need to develop reliable methods of quantitatively evaluating muscle forces as a part of routine orthodontic diagnosis. Such an evaluation may prove to be very important in identifying physiologi-

cal factors involved in posttreatment relapse and developing diagnostic techniques to identify them. Practitioners need reproducible, reliable clinical measurements for obtaining diagnostic, prognostic, and treatment data. We must avoid being misled by poorly collected or biased clinical observations into making incorrect diagnoses.<sup>3</sup>

The conclusions of the article by Lubit et al. substantiate the work of Ingervall, Thüer and Janson. In 1981 they published a study using the Posen pommeter to measure the strength of the lips in 50 children aged 7 to 13 with varying types of malocclusions.<sup>4</sup> The lip strength was related to the electromyographically (EMG) recorded activity of the lips and to bite and facial morphology. Lip strength measurements were found, in duplicate determinations, to have limited reproducibility. No significant correlations were found between lip strength, EMG activity of the lips, dentoalveolar cephalometric variables, or lip morphology.

In 1985 the group reported on simultaneous recordings of lip pressure and EMG lip muscle activity in rest position and during chewing and swallowing from 27 children with a median age of 10.6 years.<sup>5</sup> Pressure from the lips on the teeth was measured using a similar pneumohydraulic system. Both lip pressure and muscle activity showed great interindividual variations. The median resting lip pressure was not correlated with EMG activity in the lips. In contrast, lip pressure during chewing and swallowing were correlated with EMG activity of the lips. From this data it appears that lip pressures at rest and during chewing and swallowing are different in character: lip pressure during rest is dependent on lip tonicity while lip pressure during function is dependent on muscle activity.

Direct comparison between the published work of Thüer, Ingervall and Janson and the Lubit et al. article is difficult since the sample distribution in the latter study is not defined. Similarly, it would have been helpful if the replicability of the measurements had been specified. This is especially useful when comparing

studies which have used different measuring devices.<sup>6</sup> Statistical tests for replicability and validity of foil strain gauges, load cells, and semiconductor pressure transducers have demonstrated significant differences among the devices. In addition, some functional exercises are replicable over time, while others are not. The nature of the Lubit et al. study suggests

that the authors have a large amount of morphological data from cephalometric radiographs and dental study models to augment the physiological data. It would be very interesting to see a further report on the relationship (if any) of the dentoalveolar form and function.

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### References

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