POSITIONAL CHANGES OF THE LIPS CONCOMITANT TO INCISOR RETRACTION: AN IMPORTANT ISSUE IN ORTHODONTICS

Lip response to incisor retraction following extraction therapy is continuously investigated. The following is a summary of available evidence in this regard. The reaction of the lips to incisor retraction cannot be predicted with certainty. This is due to many variables such as gender, growth, morphology, and function. Also, for some patients, it is difficult to completely relax their lips during cephalogram taking. All these variables interact in studies on this topic. World J Orthod 2009;10:e9–e11.

Key words: incisor retraction, lip position

Lip configuration in emotional conditions is a key factor of facial beauty and attractiveness. For a good number of patients, lip position is the major motive behind seeking orthodontic intervention. In this respect, however, orthodontists should avoid making unrealistic promises. Information about how orthodontic intervention might affect lip position is of utmost importance.

INTERPRETATION OF THE AVAILABLE EVIDENCE

Orthodontic treatment and concomitant changes in facial esthetics and lip position have been an issue of continuous investigation, both quantitatively and qualitatively. Even if there is little doubt that orthodontic treatment affects the soft-tissue profile, how and to what extent is still controversial. Some believe that the upper lip moves forward,¹ ² according to others it moves backward,³ ⁴ and yet others see no correlation between incisor retraction and lip position.⁵ These deviating statements are very confusing, especially in view of the fact that retraction of the maxillary incisors often amounts to about 5 mm for overjet correction.

To resolve this controversy, a good understanding of the lip position in regard to the underlying dentoalveolar framework is needed. In repose, the lips could have more than one relationship to each other and the supporting hard structures. There could be a completely relaxed lip seal or a gap of varying widths between the lips. The latter condition is called lip incompetence and is a result of insufficient tonicity. Also, the configuration and thickness of the lips are important because the changes of thin lips differ remarkably from those of thick ones. In general, thin lips are very sensitive to any change in incisor position.

In patients with first premolar extraction, the ratio of the maxillary to mandibular incisor retraction is within the range of 1.9:1.0, followed by a ratio of 1.0:1.2 for the upper to lower lip retraction.⁴ ⁸ The ratio of retraction of

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the maxillary incisors to the upper lip is within the range of 2.0:1.0 to 2.9:1.0. The respective ratio for the retraction of the mandibular incisors to the lower lip amounts to 1.1:1.0. This denotes clearly that the lower lip retracts more than the upper. It seems paradoxical that the lower lip is more affected by incisor retraction than the upper, especially when considering that the position of the mandibular incisors is less changed. This suggests strongly that the maxillary incisors affect lower lip position more than the mandibular incisors. In this context, in 1907, Angle stated that “. . . the upper incisor teeth, not the lower . . . establish(es) the curve of the lower lip.”9 This is supported by the findings of Yogo-sawa,10 according to whom the upper and lower lips position 40% and 70%, respectively, more dorsally after maxillary incisor retraction.

The changes of the lower lip concomitant with incisor retraction were described as increasing,10 decreasing,4 or not changing at all.1,11 Ozaki et al12 found that following extraction, the lower lip position in Angle Class II, Division 1 patients is primarily influenced by the improved maxillary incisor inclination.13 The influence of the maxillary incisors on the lower lip can be explained in view of Jacobs’14 findings. He states that with their intrusion, the influence of the maxillary incisors on the lower lip will decrease during retraction. This results in a greater horizontal dorsal movement of the lower lip accompanied by lengthening and flattening of the mentolabial fold and a decrease in the interlabial gap. Conversely, if the maxillary incisors are extruded, their influence on the lower lip increases, thus resulting in a correspondingly smaller horizontal change and an increasing vertical interlabial distance.

The amount of anterior dentoalveolar protrusion and vertical height, on the one hand, and length and thickness of the upper lip on the other are the two factors that determine whether lip closure is competent or to what degree it is incompetent. The effect of lip competence on the ratio of upper lip retraction and maxillary incisor retraction in first premolar extraction treatments was studied by Ramos et al.15 The authors recorded a ratio of 1.00:0.75 and 1.00:0.70 for patients with pretreatment competent and incompetent lip seal, respectively. In all, the difference between these two ratios is too small to be of clinical significance.

Lower facial height is another factor to be considered because it determines the necessary lip strain to close any interlabial gap. Further, lip fullness should be considered because full lips can camouflage dentoalveolar protrusion to varying degrees, especially in those with a short lower face height. In any case, the ideal lip position to be achieved by extraction therapy can be described as unstrained.

In patients with maxillary or bimaxillary dentoalveolar protrusion, lip position can differ. Generally, the upper lip has contact with the maxillary incisors, while the lower lip is in contact with the mandibular incisors curling on the palatal side of the maxillary ones. In patients with bimaxillary protrusion, however, the lower lip most often rests against the maxillary as well as the mandibular incisors. Normally, both lips are influenced mostly by the retraction of their respective incisors. The lower lip is mostly influenced by the retraction of the maxillary incisors.

Growth and gender are other aspects to consider with respect to lip response on incisor retraction.16,17 Subsequently, the net ratio of incisor retraction and lip changes in young individuals is the product not only of treatment but also growth, which does not exist in adults. Therefore, any of the abovementioned ratios that were extracted from growing patients are clinically irrelevant in adults. This also partially explains the differing results. Because any lip position reaction is widely individual, patients can be informed only about average changes.

The current widespread use of microimplants as anchor units makes a study of Upadhyay et al18 very interesting. These authors concluded that there is no significant difference in the amount of upper lip retraction subsequent to en masse retraction of anterior teeth supported by microimplants and that of conventional retraction techniques.
All the abovementioned data can be applied only if a standardized pretreatment cephalogram with the lips in complete repose, as described by Burstone,\(^\text{19}\) is available.

**CONCLUSION**

Lip position changes as a result of incisor retraction following extraction therapy are a controversial issue. Any prediction is prone to failure, especially in young patients, because growth will impact it. Factors to be taken into account in adults are lip morphology, gender, and function.

**REFERENCES**