

Soft-tissue profile changes in adult patients treated with premolar extractions

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Introduction: The objective of this study was to identify the soft-tissue profile changes and the potential pretreatment cephalometric parameters that clinicians could use to predict the lip response after premolar extraction treatment in adult patients. **Methods:** Pretreatment and posttreatment lateral cephalograms of 75 white patients treated with premolar extractions were analyzed. The following initial cephalometric measurements were recorded: upper and lower lip to E-plane, vermilion thickness, lip length, maxillary and mandibular incisor inclination, and mentolabial and nasolabial angle. Pretreatment and posttreatment radiographs were superimposed using the Björk structural method to record lip retraction and incisor/lip retraction ratio. Pearson correlation and Kruskal-Wallis tests were used to compare lip retraction and incisor/lip retraction ratio with the cephalometric variables. The sample was divided according to different extraction patterns. **Results:** The mean upper and lower lip retraction values were 1.4 mm and 1.7 mm, respectively. Vermilion thickness showed a negative and statistically significant correlation ($P < 0.05$) with lip retraction and incisor/lip retraction ratio. In addition, the mean incisor/lip retraction ratio was 61% and 98% for the upper and lower thin lip, respectively, whereas the mean incisor/lip retraction ratio was 17% and 44% for the upper and lower thick lip, respectively. The comparison among extraction patterns did not highlight any noticeable difference. **Conclusions:** The choice of a specific extraction pattern did not impact lip response. The vermilion thickness was the key factor influencing lip retraction: an increase in this parameter was related to a decrease in lip retraction and vice versa. (Am J Orthod Dentofacial Orthop 2024; ■: ■-■)

There have been considerable fluctuations over time in the rate of patients with extraction in orthodontic practice.¹⁻³ Low percentages were reported in the early 1900s, followed by a gradual increase to a peak around the 1950s. The subsequent years have displayed a gradual decline to the present day.¹⁻³ According to some authors, the introduction of nonextraction philosophies on the basis of indiscriminate arch expansion, such as the Damon technique and clear aligner therapy, may be responsible for this trend.² This treatment approach may be perceived as easier for poorly trained clinicians, less invasive, and therefore more acceptable to the

patient.² Furthermore, this decrease in the frequency of extractions seems to be due to unwarranted clinician concerns about esthetics, stability, and temporomandibular disorder.³ However, the literature has now largely ruled out any potential negative impact of extractions on these factors.⁴⁻⁸

Regarding the effect on soft tissues, the conclusion that extractions may result in a dish-shaped or more retruded profile has been reported as unacceptable.⁶ In fact, there is no support in the literature for the hypothesis that soft tissue acts as a passive drape that follows dental changes to a predictable degree.⁷ Studies have shown that the choice of extraction or nonextraction treatment does not cause variations in profile changes in the medium and long term.^{7,8} Zierhut et al⁸ reported a gradual flattening of the facial profile in growing patients who underwent both extraction and nonextraction treatment, suggesting that maturational changes rather than extraction were responsible for this phenomenon.

However, predicting the behavior of soft tissue after extraction treatment is challenging because of the influence of various factors, including patient age, ethnicity, and skeletal, dental, and soft-tissue characteristics.^{9,10}

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All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest, and none were reported.

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Submitted, January 2024; revised and accepted, April 2024.
0889-5406/\$36.00

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<https://doi.org/10.1016/j.ajodo.2024.04.011>