Facial Profile Changes After 6 Months of Fixed Orthodontics Treatment

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Abstract. Orthodontic treatment is a form of treatment in dentistry that serves to improve mastication, phonetics, and aesthetics. Changes that occur during orthodontic treatment can be divided into three stages: stage 1, leveling and alignment; stage 2, working; stage 3, finishing. Dentoskeletal changes due to orthodontic treatment can be evaluated and analyzed by cephalometry. Cephalometric analysis can be analyzed using Steiner analysis. Steiner analysis is divided into three examinations, which is skeletal, dental and soft tissue. Aim: The aim of this study is to know facial profile changes after 6 months of fixed orthodontic treatment using the Steiner method, lateral cephalometric study at RSGM UMY. Methods: This type of research is a longitudinal prospective with a cohort study design. The population in this study were 7 people who performed lateral cephalometric radiographs with the inclusion and exclusion criteria, and obtained from the medical records of fixed orthodontic patients at RSGM UMY in March 2021. The sampling technique used in this study was total sampling. Data analysis used normality analysis using Saphiro Wilk and Wilcoxon test was performed because the data distribution was not normal. Result: There is no change in facial profile before and after 6 months of fixed orthodontic treatment at RSGM UMY.

Keywords: Fixed orthodontics · Lateral cephalometry · Steiner's Analysis

1 Introduction

Orthodontic treatment is a type of dental treatment that improves mastication, phonetics, and aesthetics [1]. The overall goal of orthodontic treatment is to improve masticatory function and facial and dental esthetics, fixed orthodontic appliances are attached to the patient's teeth and cannot be opened by the patient, whereas removable orthodontic appliances can be placed and removed by the patient [2].

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2 Method

Cephalometry can be used to assess and analyze changes that occur as a result of orthodontic treatment. A cephalometric radiograph is a form of radiograph used in dentistry, particularly by orthodontists, to classify and diagnose patient malocclusion. Sagittal (lateral) and transverse cephalometry are the two types of cephalometric radiographs, but lateral cephalometry is the most commonly used by orthodontists. Lateral cephalometry is a supporting technique for detecting dental, skeletal, and dentoskeletal anomalies, as well as analyzing the craniofacial growth pattern. Because they may show soft and hard structures in detail, lateral cephalometric radiographs are frequently used. Lateral imaging is performed by positioning the left side of the patient's face next to the image receptor, with the midsagittal plane parallel to the image receptor and the Frankfort plane parallel to the floor. The left side of the patient's face is placed next to the image receptor, with the midsagittal plane parallel to the image receptor and the Frankfort plane parallel to the floor, providing lateral imaging [3].

According to Steiner, cephalometric analysis is an analytical procedure aimed to determine the patient's aesthetic worth, with the calculation focusing on soft tissue and hard tissue [4]. Steiner's analysis was divided into three sections: skeletal, dental, and soft tissue. According to Steiner, soft tissue analysis focuses on the soft tissue profile as the underlying structure of the cranium [5]. The lips on the face should touch the line that comes from the soft tissue, the contour of the chin, to the center of the "S" formed by the bottom border of the nose. The "S-line" is the name given to this rail line [6]. The S-line is the line that connects the soft tissue of the chin (Pogonion) to the center of the S-shape formed by the Sn (Subnasal). The upper lip's position in relation to the S-line and the lower lip's position in relation to the S-line are measured using Steiner soft tissue analysis. The condition of the lips is classified by Steiner into three categories: balanced, retrusive, and protrusive. The normal value for the Upper lip to the S-line is 0 mm, if the value is > 0 mm then it is categorized as protrusive lip and the normal value is for Lower lip. Lip to the S-line is $+ 2$ mm, if the value is > 2 mm then it is categorized as protrusive lips. According to research conducted by Komalawati, et al. (2013), the condition of the lip profile is related to the condition of the face profile. It is stated to be convex if the lip profile is protrusive, concave if the lower lip profile is retrusive, and straight if the upper and lower lips are straight [7].

3 Result and Discussion

The normality test (Table 1) revealed a significant value of 0.000 (p0.05), indicating that the data were not normally distributed. We next used a non-parametric test, the Wilcoxon test, to see if there were any differences between before and after 6 months of fixed orthodontic treatment. The Wilcoxon test (Table 2) revealed a significant value of 0.317 ($p > 0.05$), indicating that the facial profile did not change between before and after 6 months of fixed orthodontic treatment.

The results of the study, which was conducted on 5 samples of fixed orthodontic patients at RSGM UMY, were changes in the facial profile from convex to straight in male patients before and after 6 months of fixed orthodontic treatment, while the

Table 1. Shapiro-Wilk Normality Test.

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Profil Wajah Sesudah	0.473	5	0.001	0.552	5	0.000

Table 2. Statistic Wilcoxon Test.

	Profil Wajah Sesudah – Profil Wajah Sebelum
Z	– 1,000[b]
Asymp. Sig. (2-tailed)	0.317

facial profile in female patients was constant or there was no change in facial profile before and after 6 months of fixed orthodontic treatment. This is in keeping with Formby et al.'s (1994) study of changes in adult facial profiles, which found that as males age, their overall profile becomes straighter and their lips grow more retrusive. The upper lip's thickness will continue to decrease, while the lower lip's thickness will slightly increase. In women, the facial profile does not straighten, and the upper lip thickness decreases with a slight increase in the lower lip thickness [8].

The Wilcoxon test yields Sig. (2-tailed) 0.317 or $p > 0.05$, indicating that there is no difference in facial profile before and after 6 months of fixed orthodontic treatment at RSGM UMY. These findings show that the research does not support the study's original hypothesis. Because anterior tooth retraction was required to create changes in the face profile, there were no alterations in the facial profile before and after 6 months of treatment. Because of variances in the thickness of the soft tissue and the underlying bone, the findings of this study are consistent with Nainggolan's (2014) research, which also explains that hard tissue alterations are not always followed by the same big soft tissue changes. Orthodontic treatment in the form of retraction of the maxillary front teeth, which influences the retraction of the upper lip, might prevent changes in lip convexity. Changes in mandibular position affect pogonion movement in orthodontic treatment; every 1° forward rotation of the jaw affects pogonion movement by 0.649 mm [3].

4 Conclusion

This research was aimed to know facial profile changes after 6 months of fixed orthodontic treatment using the Steiner method, lateral cephalometric study at RSGM UMY. Saphiro Wilk and Wilcoxon test was performed because the data distribution was not normal. However, this research shows no change in facial profile before and after 6 months of fixed orthodontic treatment at RSGM UMY.

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