

## FACIAL PROFILE ANALYSIS RESULTS ON PHOTOGRAPHY AND LATERAL CEPHALOGRAMS OF ORTHODONTIC PATIENTS IN FACULTY OF DENTISTRY UPDM

### *(HASIL ANALISIS PROFIL WAJAH PADA FOTOGRAFI DAN SEFALOGRAM LATERAL PASIEN ORTHODONTI DI FKG UPDM (B))*

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#### **ABSTRACT**

The face and facial profile are the main parts of the body that can help a person form impressions and interact with other people in their environment. Both faces and facial profiles have some special characteristics that differentiate individuals. Analysis of a person's facial profile can be carried out by measuring the soft tissue profile at certain anatomical standard points as a reference and using photographic data (lateral facial photos of the patient) and radiographic (soft tissue profile in lateral cephalogram of the patient). This study was conducted to explain the differences in the facial profile analysis results performed on orthodontic patients' photographs and radiographs. A total of 44 orthodontic patients participated in this study, and by using the purposive sampling method, research materials were obtained in the form of photographs and lateral cephalograms of patients with skeletal class II malocclusion characteristics. The results of facial profile

analysis on radiographs are smaller than those of facial profile analysis on photographs. In conclusion, it can be said that there is a statistically significant difference between the results of facial profile analysis on photographs and radiographs of orthodontic patients.

**Keywords:** facial profile; lateral cephalogram; malocclusion; profile photograph; skeletal class II

### **ABSTRAK**

*Wajah dan profil wajah merupakan bagian utama dari tubuh yang dapat membantu seseorang untuk membentuk kesan dan berinteraksi dengan orang lain di lingkungannya. Baik wajah maupun profil wajah memiliki beberapa karakteristik khusus yang membedakan individu satu dengan lainnya. Analisis profil wajah seseorang dapat dilakukan melalui pengukuran pada jaringan lunak profil pada titik baku anatomis tertentu sebagai acuan, dan menggunakan data fotografik (lateral foto fasial pasien) maupun radiografik (profil jaringan lunak pada sefalogram lateral pasien). Penelitian ini dilakukan untuk menjelaskan sejauh mana perbedaan hasil analisis profil wajah yang dilakukan pada fotografer dan radiograf pasien ortodonti. Sejumlah 44 pasien ortodonti berpartisipasi dalam penelitian ini dan dengan purposive sampling method, diperoleh materi penelitian berupa fotografer dan sefalogram lateral pasien dengan karakteristik maloklusi klas II skeletal. Hasil analisis profil wajah pada radiograf lebih kecil dibandingkan hasil analisis profil wajah pada fotografer. Sebagai kesimpulan dapat dikatakan bahwa terdapat perbedaan yang secara statistik bermakna antara hasil analisis profil wajah pada fotografer dan radiograf pasien ortodonti.*

**Kata kunci:** *fotografer profil; maloklusi skeletal klas II; profil wajah; sefalogram lateral*

Individual facial profiles are unique/characteristic because of the different harmonization and relationships of the teeth and the skeletal structures that form them.<sup>1</sup> Therefore, the face and the facial profile provide special characteristics to each individual. One of these characteristics is the categorization into several types of profiles associated with a malocclusion's skeletal and dental pattern. It was confirmed by the development of cephalometric analysis in the 1950s, which made orthodontists more aware of the role of jaw disproportion in forming a malocclusion.<sup>2</sup>

The assessment of a successful treatment, until now, is calculated from the plaster model in occlusion placed on the table, which, when viewed from the focus of orthodontic treatment, is the assessment of the teeth in centric occlusion. This fact shows that there is still very little focus of attention directed to the profile (appearance) of the patient's face.<sup>2</sup> If the visual aid used in discussing plans for orthodontic treatment with patients is only a set of models of upper and lower teeth. The focus of the discussion is almost specific and focuses on improving the occlusion condition of the patient's teeth. However, when the patient's facial becomes the focus of discussion in the orthodontic treatment plan, considerable attention will also be

directed to the facial profile resulting from orthodontic treatment.<sup>2</sup>

In today's modern society, an attractive physical form has a higher place to make someone considered attractive. In this regard, facial aesthetics is an essential factor against which opinion and perception of individual character are assessed, including individual abilities.<sup>3</sup> Self-perception of dentofacial attractiveness is an important patient factor in orthodontic treatment planning.<sup>3</sup>

A recent study on the psychosocial effects of orthognathic surgery concluded that patients generally improved self-esteem and body and facial image with better social adjustment.<sup>4</sup> The goal of orthodontic treatment is to achieve a proportional dentofacial complex with a good balance of skeletal, dental, and soft tissue in esthetics and function. Therefore, it is unsurprising that an important key of orthodontic diagnosis and treatment planning is soft tissue analysis, including the analysis of aesthetic facial soft tissue profiles.<sup>3</sup> In this regard, soft tissue profile analysis is carried out by measuring changes in profile shape and variations in the position of profile components, namely the nose, lips and chin.<sup>5,6</sup>

Photography in orthodontic treatment has been around for a long time, around 1839. Through photographs of

patient facial profiles (Figure 1), orthodontists not only obtain documentation of patient profiles before treatment and monitor treatment progress and results of treatment on facial shapes but can also make a profile type diagnosis (convex, concave or straight), develop a treatment plan. Photography can help provide a good assessment of alignment between external craniofacial structures, including soft tissue contributions.<sup>7,8</sup>



**Figure 1.** Photograph of a patient's facial profile for orthodontic treatment diagnosis.

Lateral cephalometric radiography (cephalogram) is a diagnostic record that is very useful in helping to obtain data on skeletal, dental and facial soft tissue profiles so that the correct diagnosis can be made and changes as a result of treatment can be better understood.<sup>9,10</sup> By profile photograph (Figure 1) and lateral cephalogram (Figure 2), dentists can perform profile analysis for patients undergoing orthodontic treatment.

Most facial visual effects are obtained from the facial soft tissue structure. Therefore, evaluation of the relative contribution of soft tissue structures

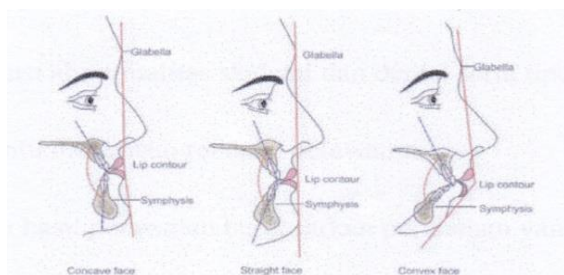
such as the nose and chin will complement the description of the results of other analyses of hard tissue structures in the maxilla and mandible to produce a better orthodontic treatment plan according to patient expectations.<sup>11</sup> The soft tissue of the face is seen as a dynamic structure, which can still change regardless of the underlying skeletal structure. In addition to length and muscle tone variations, tissue thickness will affect the position and relationship of the facial structures.<sup>12</sup>



**Figure 2.** Pre-orthodontic treatment lateral cephalogram is usually made before orthodontic treatment gets started.

Facial profile analysis on photographs and lateral cephalograms was carried out using three anatomical standard points, namely the Glabella (G), the lowest point on the forehead, located in the middle between the right and left eyebrows. The upper lip or the foremost point of the upper lip and soft tissue Pogonion is the anterior point of the chin in the mandibular symphysis area.<sup>1,13</sup> Determination of the

facial profile type is done by measuring the angle formed by the intersection of two reference lines: the line connecting the anatomical point of the glabella and the upper lip and the line connecting the anatomical point on the upper lip and soft tissue pogonions. The angle formed by the intersection of the two lines will produce three types of facial profiles (Figure 3), namely: a) straight facial profile, when the two lines form an almost straight line; b) convex facial profile, when the intersection of the two lines forms an acute angle toward the soft tissue of the chin and c) the concave facial profile, when the intersection of the two reference lines forms an obtuse angle (larger).<sup>14,15</sup>



**Figure 3.** (from left to right): Concave (left), straight (centre) and convex facial profiles.<sup>15</sup> (right)

Determination of the type of facial profile is also carried out on the profile picture on the patient's lateral cephalogram after first being traced and identifying the anatomical standard points needed for measuring and determining the profile type. The results of measurements on these two

facial profiles were compared to explain the extent of the differences so that their contribution to the diagnosis and formulation of orthodontic treatment plans could be identified.

## METHOD

A total of 50 academic program students at the Faculty of Dentistry, University Prof. DR. Moestopo, who wished to undergo orthodontic treatment, participated in this study. The purposive sampling method was used to obtain a homogeneous sample with a skeletal classification of class II malocclusion. It is because patients with class II malocclusion are known to be the majority of patient candidates for orthognathic surgery. After all, they perceive their facial profile as aesthetically less attractive.<sup>3</sup> In general, patients with skeletal class II malocclusion have a convex (convex) profile type so that after treatment, patients want to see the difference that occurs through a picture of their facial profile. Another study conducted by Spyropoulos and Halazonetis proved that the perception of facial attractiveness was influence by the outline form of soft tissue profile.<sup>3,16,17</sup> During the implementation process, 6 participants left this study for one reason or another, so that the final total number of participants in this study was 44 and consisted of 17 men and

27 women. From the collected samples, 44 facial profile photographs were obtained and 44 lateral cephalographs traced to produced 44 soft tissue facial profile images.

The details of the sociodemographic characteristics of the participants in this study can be seen in Table 1.

**Table 1.** Sociodemographic characteristics of the participants

Age Characteristics (Depkes RI 2009)	n	%
6-11	6	13.6
12-16	26	59.1
17-25	5	11.4
36-45	6	13.6
46-55	1	2.3

## RESULT

Facial profile analysis performed on profile photographs and radiographs on the lateral cephalogram of orthodontic patients resulted in scores as shown in Table 2 below.

**Table 2.** Average measurement results in the analysis of the patient's facial profile

Parameters	n	mean	Std. Deviation
Radiograph	44	155.14	5.174
Photograph	44	157.32	5.174

In Table 2 above, it can be seen that the average results of facial profile measurements/analysis performed on the patient's radiograph (lateral cephalogram)

yielded a lower score (155.14°) than that obtained from measurements on the patient's lateral facial photograph (157°). The difference from the average value of the two is 2.18°. Considering that the number of samples is less than 50, the distribution normality test of the Shapiro Wilk is carried out on the data obtained to determine which further statistical tests will be used. The test results, as shown in Table 3, reveal that the measurement data on radiographs and facial profile photographs show values of  $\alpha$  above 0.05 (profile photographs -0.116 and radiographs -0.101). Thus, further statistical tests can be carried out with the parametric *Paired t-test*.

**Table 3.** Shapiro Wilk's normality test

The Results of Facial Profile Analysis	Parameter s	Test of Normality		
		Shapiro-Wilk Statistic	df	Sig.
Radiograph	Fotograph	.957	4	.10
		.959	4	.11
			4	6

*Paired t-tests* were conducted to explain the differences between the two measured data, namely facial soft tissue profile analysis using photographs and radiographs. There is a significant difference with a p-value <0.05, which means that there is a statistically significant difference between the results of facial profile analysis on photographs and the

results on radiographs (lateral cephalogram) of orthodontic patients.

## DISCUSSION

It is known that the facial soft tissue profile has an essential role in orthodontic diagnosis and treatment.<sup>18</sup> Soft tissue is also an important factor in determining facial esthetics because the first thing that attracts attention is the soft tissue covering the head and face.

Concerning the analysis of facial soft tissue profiles, profile photograph media can be said to have a slight advantage because the visible image can be directly captured by the patient's senses (eyes) so that it can help the patient to understand the explanation of the problems explained by their orthodontist and to discuss wishes and expectations of patients with orthodontic treatment. After orthodontic treatment is completed, through this profile photo, patients can also easily see changes in their soft tissue profile resulting from orthodontic treatment that has been undertaken. In other words, for someone, this facial appearance may be said to be important to gain acceptance in society or environment and gain inner satisfaction or self-confidence.<sup>19</sup> This form of awareness has contributed to the increasing need for aesthetic orthodontic treatment in developing and industrial countries. This

aesthetic improvement is one of several important goals in orthodontic treatment.

20,21,22,23

This study, which compared the results of facial soft tissue profile analysis on photographs and radiographs (lateral cephalogram), was conducted to determine the extent to which the results differed between the analyzes of the two different materials and this study was approved by the ethics commission for health research, Faculty of Dentistry, University of Prof. Dr. Moestopo (Beragama) with a decree numbered

27/KEPK/FKGUPDMB/IV/2022. The fact that there are differences in the results of facial soft tissue profile analysis between photographs and radiographs of lateral cephalogram indicates that the two soft tissue profile analysis media are not interchangeable. Each of them needs to be done, and every effort must be directed to the prospective patient for orthodontic treatment. The results of facial soft tissue profile analysis in this study for lateral cephalogram radiographs ranged from the lowest score (147<sup>0</sup>) to the highest (165<sup>0</sup>), while the results of facial soft tissue profile analysis in photographs went from the lowest score (149<sup>0</sup>) to the highest high (170<sup>0</sup>). These results clearly show the increasing importance of facial soft tissue profile analysis performed on both records.



The scores resulting from the analysis of these two media types can be a tool or a means to build intra-disciplinary and multi-disciplinary communication to develop the best treatment plan suitable for the aesthetic goals of orthodontic treatment for patients. Therefore, the results of facial soft tissue profile analysis can also be placed in the patient's problem list to be considered in planning the biomechanical approach of the treatment strategy to be carried out. For policymakers, this finding can help compile and prepare the completeness of orthodontic treatment service facilities with the equipment needed to generate the two data types used in this study, including a proper camera.

## CONCLUSION

This study proves a significant difference between the results of measurement or analysis of facial soft tissue profiles on photographs and radiographs (lateral cephalogram) of orthodontic treated patients. The difference in the analysis results ( $2.18^\circ$ ) with a more excellent value obtained from the profile analysis results on the photograph is statistically significant.

## CONFLICT OF INTEREST

The researcher has no conflict of interest with any party concerning this research.

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