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Male and Female Characteristics of Facial Soft Tissue Thickness in Different Orthodontic Malocclusions Evaluated by Cephalometric Radiography

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ABSTRACT

Background: This study was conducted to assess the Male and Female Characteristics of Facial Soft Tissue Thickness in Different Orthodontic Malocclusions Evaluated by Cephalometric Radiography.

Material and methods: This research involved the assessment and analysis of lateral cephalograms derived from cephalometric radiography to determine facial soft tissue thickness (FSTT) in a cohort of 100 adult orthodontic patients, comprising 60 females and 40 males. The lateral cephalograms were obtained as part of standard diagnostic procedures for the patients under evaluation. Individuals were excluded from the study if they had experienced trauma, had craniofacial anomalies, cleft lip and palate, or had undergone previous orthodontic, prosthetic, or orthognathic surgical interventions. All participants included in the study received a comprehensive clinical evaluation, which encompassed an analysis of their dental and skeletal characteristics, as well as their soft tissue profiles as observed in the cephalometric radiography. The statistical analysis was conducted using a database where the data were organized.

Results: In this study, there were 40 males and 60 females. The findings showed that male patients had a significantly greater facial soft tissue thickness in A-SN, PR-SLS and J-LS areas as compared to females.

Conclusion: From the findings of this study, it can be concluded that patients had a significantly greater facial soft tissue thickness in A-SN, PR-SLS and J-LS areas as compared to females.

Keywords: *FSTT, Malocclusion, Orthodontics*

1. INTRODUCTION

The human face stands out as the most distinctive and identifiable feature of the human body. It serves as the primary medium through which a variety of emotions are conveyed. Attractiveness is often assessed based on facial appearance, and social acceptance is significantly influenced by how one's face is perceived. An appealing face is associated with notions of beauty and health, as well as feelings of social success, intelligence, and happiness. The face plays a crucial role in interpersonal communication and social interactions, with our initial memories of individuals often linked to their facial image.[1-3]

A harmonious relationship among the various components of the face is essential for its aesthetic appeal. The profile of the face is influenced by the thickness of facial soft tissues and the characteristics of dental and skeletal structures.[4] Traditionally, the contours of the face have been viewed as a result of the positioning of fundamental hard tissues, such as dental and skeletal elements, followed by the overlay of soft tissues.[5]

However, contemporary approaches are shifting the focus from solely analysing hard tissues to incorporating soft tissue considerations. The development of muscles, subcutaneous fat, soft tissue, and skin can occur in both proportional and disproportionate ways relative to the underlying skeletal structures. Variations in the thickness, length, and tone of soft tissue can significantly impact facial aesthetics.[6,7]

This study was conducted to assess the Male and Female Characteristics of Facial Soft Tissue Thickness in Different Orthodontic Malocclusions Evaluated by Cephalometric Radiography.

2. MATERIAL AND METHODS

This research involved the assessment and analysis of lateral cephalograms derived from cephalometric radiography to determine facial soft tissue thickness (FSTT) in a cohort of 100 adult orthodontic patients, comprising 60 females and 40 males. The lateral cephalograms were obtained as part of standard diagnostic procedures for the patients under evaluation. Individuals were excluded from the study if they had experienced trauma, had craniofacial anomalies, cleft lip and palate, or had undergone previous orthodontic, prosthetic, or orthognathic surgical interventions. All participants included in the study received a comprehensive clinical evaluation, which encompassed an analysis of their dental and skeletal characteristics, as well as their soft tissue profiles as observed in the cephalometric radiography. The statistical analysis was conducted using a database where the data were organized. The statistical parameters employed included the mean, standard deviation (SD), and range of variation (minimum to maximum). The second phase of the statistical analysis involved testing the scientific hypotheses by selecting appropriate statistical tests based on the nature of the statistical landmarks, the measurement scale, and the sample size. The student's t-test was utilized to compare the mean soft tissue values between the two independent groups of men and women. Data processing was carried out using the SPSS version 8.0 statistical software for Windows.

3. RESULTS

Table 1: Gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Males	40	40
Females	60	60
Total	100	100

In this study, there were 40 males and 60 females.

Table 2: Sex differences in mean facial soft tissue thickness (FSTT) in patients with a skeletal relationship of class I.

Linear distance FSTT (Facial Soft Tissue Thickness)	Males	Females	t-test	P value
A-SN (area of the floor of the nose)	17.25±3.03	15.81±1.55	2.036	P<0.05
PR-SLS (sulcus labrale superius)	13.97±3.12	11.67±1.78	3.006	p<0.01
J-LS (labrale superius)	13.97±3.56	11.98±1.59	2.895	p<0.05

The findings showed that male patients had a significantly greater facial soft tissue thickness in A-SN, PR-SLS and J-LS areas as compared to females.

4. DISCUSSION

Enhancements in facial aesthetics have historically been identified as the primary motivation for individuals seeking orthodontic treatment. A crucial factor influencing facial aesthetics is the comprehension of the interplay between facial bones and soft tissues. Earlier beliefs suggested that the soft tissue profile was predominantly influenced by the underlying skeletal structure. However, recent studies have indicated that soft tissue can function independently of the fundamental dentoskeletal framework, as it exhibits considerable variability in thickness and is regarded as a key determinant of a patient's ultimate facial profile.[8,9]

To effectively plan orthodontic or orthognathic surgical interventions, a comprehensive cephalometric analysis of both hard and soft tissues is essential. This analysis plays a significant role in diagnosing and strategizing orthodontic or surgical treatments.[10] Nevertheless, advancements in cephalometric techniques have revealed that there are variations in facial soft tissue thickness (FSTT) across different ethnic populations, suggesting that a singular standard for facial aesthetics may not be universally applicable to all ethnic groups.[11]

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Kalha AS et al[12] conducted a study to establish soft tissue cephalometric norms for a South Indian ethnic population. The sample comprised lateral cephalograms taken in natural head position of 60 normal subjects (30 men, 30 women). The

cephalograms were analyzed with a soft-tissue cephalometric analysis for orthodontic diagnosis and treatment planning, and the Student 't' test was used to compare the means of the 2 groups. Statistically significant differences were found between South Indian men and women in certain key parameters. Men have thicker soft-tissue structures and a more acute nasolabial angle than women. Men have longer face, and women have greater interlabial gap and maxillary incisor exposure. Men have more deep-set facial structures than women. Compared with established norms for white people, South Indian subjects have more deep-set midfacial structures and more protrusive dentitions. Statistically significant differences were found between South Indian men and women in certain key parameters. Differences were also noted between white and South Indian faces. Uysal T et al[13] carried out a study to establish standards for Arnett soft tissue cephalometric analysis of Anatolian Turkish young adults and to identify possible gender differences between males and females. After analysing the cephalometric radiographs of 350 individuals, 133 subjects with normal antero-posterior and vertical skeletal relationships were selected. The true vertical line was established. The landmarks were marked and soft tissue facial analysis was performed. The lower lip thickness of the Turkish population was lower and menton thickness was greater than Arnett's norms. Turkish subjects have depressed orbital rims, cheek bones, subpupils, upright and thin upper and lower lips, retruded incisors, and pogonion and point B. Most of the Turkish mean harmony values were within the range of Arnett's harmony standards. Soft tissue thicknesses were greater and facial lengths, except upper incisor exposure, were longer in Turkish males than females.

5. CONCLUSION

From the findings of this study, it can be concluded that patients had a significantly greater facial soft tissue thickness in A-SN, PR-SLS and J-LS areas as compared to females.

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