CORRELATION BETWEEN SOFT TISSUE AND SKELETAL PROFILE OF DEUTERO-MALAY INDONESIANS

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ABSTRACT

Introduction: The skeletal and soft tissue profile is important in establishing diagnostic and planning an orthodontic treatment. It has been assumed that different ethnic group or race has different facial profiles. The purpose of this cross sectional study was to know the correlation between the convexity degree of skeletal and soft tissue profiles. **Materials & Methods:** A sample of 50 cephalometric radiographs of untreated individuals (31 females, 19 males) was obtained. Criteria for sample selection comprised: absence of interproximal caries / filling, aged over 18 years, never undergone orthodontic treatment, no tooth deformity, had Deutero-Malay Indonesian ethnicity , presence of complete teeth from the left first molar through the right first molar with, both on the upper and lower jaws,. The following angular measurements were performed on lateral cephalograms: skeletal convexity degree was represented by N-A-Pog, and soft tissue profile was determined as n-sn-pog. **Results**: The mean values for skeletal profile convexity were : 167,37^{o} (males), 166,55^{o} (females); and for soft tissue profile convexity were : 159,05^{o} (males) and 162,77^{o} (females). **Correlation:** By using correlation test, it showed there was a strong correlation between skeletal and soft tissue profile both on males and females.

Key words: Cephalometrics, Skeletal profile, Soft tissue profile, Deuteo-Malay Indonesian

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INTRODUCTION

Esthetic is the primary reason why patients seek orthodontic treatment and the result tissue profile is their measures of therapeutic success. To be able to bring about improvement in esthetics, the dentist practicing orthodontics must have a firm grasp of what is considered ideal and abnormal.[1]

It was agreed that one of the primary objectives of orthodontic treatment is that of esthetic facial balance and harmony. However, "balance" and "harmony" should be more clearly defined. The word "balance" implies evenness or proper proportion of parts or elements. The word "harmony" denotes a fitting together or smoothness; a blending, or that which is pleasant.[2]

A harmonious soft tissue profile, an important treatment goal in orthodontic, is sometimes difficult to achieve, partly because the soft tissue overlying the teeth and bones is highly variable in thickness. These variations result not only from imbalance of the dental and skeletal structures but from individual variations in the thickness and tension of the soft tissues.[3,4]

Facial appearance is the most important determinant of physical beauty. It places a unique role in all social interactions and in the establishment of self-image. The study of facial esthetics was, until recently, primarily the subject of artists and philosophers. Today, facial appearance is an essential diagnostic criterion to be considered in comprehensive orthodontic treatment planning. In orthodontic diagnosis and treatment planning it has become conventional to have the analysis of facial features on both frontal and profile representations of the face .[4]

Research over the past years has indicated that it is not realistic to apply the cephalometric norms from one ethnic group to other ethnic groups. Since there are no esthetic normative value standards available for Deutero-Malay Indonesian ethnic today, it is important to have available , as material for comparing these reference norms, to help the orthodontist address more effectively their Deutero-Malay patient's need particularly regarding esthetics.

Proffit said that the use of cephalometrics to compare an individual to his or her population's average values for various measurements must be

established by studying a sample of individuals with the same sex, race and age.[5]

According to Jacobson[6], the soft tissue analysis includes an appraisal of the adaptation of the soft tissue to the bony profile with consideration to the size, the shape and the posture of the head as seen on the lateral head film. It also considers the thickness of the soft tissue over the symphisis of the nasal structures as it relates to the lower face.

Subtelny[5] makes the distinction between convexity of: (a) the skeletal profile, (b) the soft tissue profile, and (c) the full soft tissue profile (including the nose). Skeletal convexity is represented by N-A-Pog, with a mean value of 175 ^{o} at age 12, the mean value to be 177,5^{o}, and it decreases with age. Soft tissue convexity is determined as n-sn-pog. The mean value is 161^{o}, and this does not change. Full soft tissue convexity is based on n-no-pog. The mean is 137^{o} for men and 133^{o} for women. This convexity increases with age. The age-dependent changes in convexity demonstrate that soft tissue changes are not analogous to skeletal profile changes. Increased convexity of the full soft tissue profile may be explained as due to anterior growth of the nose. Mean values for total profile are: 133^{o} (Class I), 133^{o} (Class II), and 139^{o} (Class III).

MATERIAL AND METHODS

The samples of this cross sectional study consisted of the cephalograms of 50 (31 females and 19 males) non-orthodontically treated young adult Deutero-Malay Indonesians who live in Makassar, South Sulawesi, Indonesia. The study was conducted at Orthodontic Department of Faculty of Dentistry, Hasanuddin University, Makassar. The subjects were purposely selected on the basis of Angle's Class I with acceptable esthetics and good facial balance. This was made by evaluating the dental casts. Criteria for sample selection comprised : (a) all permanent teeth mesial to the second molars were present, (b) there should be bilateral neutral (Class I Angle) relationship between the first molars and canines in both dental arches, (c) absence of interproximal caries / filling, (d) never undergone orthodontic treatment, (e) aged over 18 years, (f) there was no tooth deformity., (g) an overjet and overbite of up to 3 mm , and (h) a history of subject ensured that he / she had Deutero-Malay ethnicity.

The subjects were asked to fill in a questionnaire regarding the gender, age, ethnical ancestry, and orthodontically treatment experience. The respondents who answered appropriately were interviewed to be examined clinically to find out if they conform to the criteria of sample selection. The dental casts and facial photographs were taken to further evaluate each case. Then, lateral cephalograms were taken, standardized with the patient's Frankfort Horizontal Plane parallel to the floor. The film was exposed with the subject's teeth in centric occlusion and the lips relaxed. The cephalometric radiographs were traced on transparent matte acetate paper. The tracing of the soft tissue profile and skeletal profile of the subjects were evaluated using Subtelny's analysis.The following angular measurements were performed on lateral cephalograms: skeletal convexity degree was represented by N-A-Pog, and soft tissue profile was determined as n-sn-pog. The data were analyzed by using independent t-test and correlation test.

RESULTS

The cephalometric tracing of each subject was assessed and the mean values as well as the correlation degree between soft tissue- and skeletal profiles were recorded.

The percentage of male subject was 38 % (19 people) and female subject was 62 % (31 people).The data were analyzed by using independent t-test, it showed that there was statistically significant difference of skeletal profile between male and female ($p > 0.05$). However, there was no statistically significant difference of soft tissue profile between male and female ($p< 0.05$). (Table 1)

Table 2 correlated the convexity degree of soft tissue profile with that of skeletal profile by using correlation test The result showed that there was a strong correlation between convexity degree of skeletal profile with that of soft tissue profile on males ($r = 0,658$ and $p < 0.01$). There was a moderate correlation between convexity degree of skeletal profile with that of soft tissue profile ($r = 0,586$ and $p < 0.01$).

Data	Sex	N	Mean	S D	P

Skeletal convexity	Male	19	167,37°	4,946	0,618
	Female	31	166,55°	5,960	
Soft tissue convexity	Male	19	159,05°	4,209	0,005
	Female	31	162,77°	4,417	

Table 1: The mean values of convexity degree of soft tissue – and skeletal profile based on gender

Table 2: Correlation between convexity degree of soft tissue – and skeletal profile based on gender

Data	**Skeletal convexity**			
Soft tissue convexity	Sex	N	P	R
	Male	19	0.002	+ 0,658
	Female	31	0'001	+ 0,586

DISCUSSION

Statistical analysis of the differences between males and females was done with t-test at the level of significance of 5 % was assigned. It revealed that males and females had no different statistically in terms of convexity degree of skeletal profile ($p > 0.05$). (Table 1) The result of the present study was not parallel with Salzman's (1966) who stated that the growth of skeletal tissue was influenced by gender. The growth of hard tissue on male was around 88 % and on female was 92 %, but the anteroposterior direction of growth on female is finished at puberty while it continues until 25 years of age on male [7] Presumably, both the two groups of Deutero-Malayan subjects had a balanced quantity regarding the skeletal growth direction anteroposteriorly and vertically, so the skeletal convexity of the present study was not different statistically. The skeletal profile is determined as N-A-Pog.{Subtelny)[5] The mean is 175°and it decreases with age. In the present study, the mean value for males was 167,3° and for females was 166,86°. It might be due to the difference of race and ethnic. It means that the skeletal profile of Deutero-Malayan is more convex that those of Caucasian.

There was a difference statistically between the soft tissue profile of males and females ($p<0,05$)(Table 1). It was found that the degree of convexity on females (162.77°) was greater than that of males (159,05°). The result supported Down and Ricketts' result although they used different angle, i.e G-Sn-Pg. Yuen and Hiranaka reported their study on Asian adolescent by using the same parameter as Down & Ricketts', the mean value was 162±5° (female) and 161±6° (male)[8], but Subtelny did not make any distinction on gender, with a mean value of 161°.

Table 2 shows that between soft tissue profile and skeletal profile has a strong correlation on males ($p<0.01$ and $r = +0.658$) and moderate correlation on females ($p<0.01$ and $r = +0.586$). Past studies have indicated that although major growth and development of the face is due to an increase in size of underlying skeletal structures, soft tissue growth does play a major role in overall facial esthetics.[9] The relationship between the hard tissue structures and soft tissue profiles are variably. For some variables, hard and soft tissue structure are closely related, but some are independent chiefly because their characteristic of the soft tissues are influenced by the length, thickness, and functional aspects such as tissue tension .[10]

CONCLUSION

On the basis of the findings in this study, the following conclusions were drawn:

1. There was no statistically significant difference between the skeletal convexity on males and females.

2. There was a statistically significant difference between the convexity of soft tissue profile on males and females.
3. There was a positive correlation between the convexity of soft tissue profile and skeletal profile both on Males and females.

REFERENCES

1. Joson CA. The soft tissue profile of selected young adult Filipinos with normal occlusal .PDA Journal 200.; 53 (2)
2. Holdaway RA. A soft tissue cephalometric analysis and orthodontic treatment planning. Am J Orthod. 1983.84 (1).
3. Diamond O. Facial Esthetics and Orthodontics. J of Esthetic Dent. 1998. 8 (3)
4. Lago LC. Profile changes after orthodontic treatment of malocclusion. The DDM Journal. 5 (1).
5. Rakosi T. An Atlas and Manual of Cephalometric Radiography. Wolfe Med Publ. London. 1982. p. 82-3.
6. Kasai K. Soft tissue adaptibility to hard tissue in facial profile. Am J Orthod. 1998.113 (6)
7. Prahl-Andersen; Nanda. Adolescent growth changes in soft tissue profile. Am J. Orthod. 1995. 107 (5)
8. Bass NM. Measurement of the profile angle and the aesthetic analysis of the facial profile. J.Orthod. 2002. 30
9. Park YC; Burstone CJ. Soft tissue profile fallacies of hard tissue standards in treatment planning. Am J Orthod. 1986. 90 (52).
10. Holdaway RA. A soft tissue cephalometric and its use in orthodontic treatment planning. Am J. Orthod. Part II. 1995. 279-291