The Facial Profile Analysis of Adolescents in Medan

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Abstract

One of the principal aims of orthodontic treatment is to improve dental and facial esthetics.Ideal perception of facial appearance is subjective as it is influenced by various factors such as race, ethnic, gender, culture, and age. Medanese which are categorized as a Mongoloid race, has a different facial profile compared to Caucasoid and Negroid individuals which tends to have a straighter facial profile and a more prominent zygomatic arch.

This is a descriptive study with a cross sectional approach using level stratified-cluster sampling method. A sample of 100 Medanese adolescents (50 males and 50 females) between 15-18 years of age participated in this study. The photographic records of the subjects were taken in natural head posture and lateral position. The records obtained were digitized using the Corel Draw X5 software and analyzed using the Image J software.

The results showed that the facial profile of adolescents in Medan were straight 64%, convex 20%, and concave 16%.

There were no significant differences in facial profile of adolescents in Medan based on gender. The facial profile of adolescents in Medan is mostly straight.

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Introduction

The improvement of patients' facial appearance is an objective common to a variety of clinicians including, orthodontists.[1] Facial esthetics is considered as an important factor as it greatly effects people's perception and their social lifestyle.[2] Facial profile represents the variation in facial forms which differs between each individual.[3] Despite its inability to provide complete orthodontic information, determining the facial form enables evaluation of jaw malrelation.[4] Comprehensive facial soft-tissue analysis is vital, as the soft-tissue profile may differ between different age, gender and ethnic groups.[5] facial soft tissue analysis can be done using several methods such as the direct method of soft tissue analysis, lateral cephalometry radiographs, and photometry.[5-7]

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According to Graber there are three forms of facial profile that can be viewed laterally; concave, straight, and convex.[8] In a study conducted by Al-Madani GH, et al. on 75 university students and employees without the habit of snoring, they discovered that 50.7% had a straight facial profile while the remaining 49.3% had a convex profile.[9] In 2014, Leung, et al., did a similar research of measuring the soft tissue facial profile of 514 (259 males and 255 females) in Hong Kong. The profile picture was taken in natural head position and the angulation was calculated using the G-SN-Pog landmark. The results showed that males tend to have a more convex facial profile compared to females.[10] Racial factor plays an important role in the field of orthodontics. Indonesia is a nation comprising of multiple ethnics while medan as one of the largest city in Indonesia is suitable to represent Indonesia's overall population.

In Indonesia, there are only a handful of facial profile studies conducted on high school students, therefore data about facial profiles on the Indonesian population with samples taken from Medan is required. Thus, the authors were interested in researching the facial profile of high school students in Medan.

Materials and methods

This study was a descriptive study with a cross sectional approach to determine the facial profile of adolescents in Medan. The population of this study were adolescents in Medan with a total of 116,038 students from 18 government high schools and 138 private high schools in Medan based on the data obtained from the Sumatera Utara education office for the year of 2006. The sampling method used was level stratified-cluster with a total sample of 100 lateral photometry. The inclusion criteria for this study were subjects with an age range of 15-18 years old, previously and currently undergoing no orthodontic treatment, angle class I molar relationship with normal overjet and overbite (2-4 mm), mild crowded anterior teeth and diastema ≤ 2 mm, wearing no dentures, has a complete permanent dentition (except third molars), competent lips, and possessing no facial asymmetry.the exclusion criteria were adolescents with a history of fracture/trauma, history of plastic or maxillofacial surgery or refusal to participate in the study.

Procedure of study: 1. Ethical clearance and informed consent: Ethical clearance was obtained from the health research ethics committee of the Faculty of Medicine, University of Sumatera Utara. After permission was granted, data of the study were gathered. Informed consent, in the form of handwritten signature, was obtained by providing explanation about the aim and benefits of the study before performing examination and photometry. 2. Sample screening: Subjects were adolescents aged 15-18 years old in Medan. 3. Anamnese, individual data: Subjects were examined intra-orally (with a dental mirror, dental explorer, and tweezers) and questioned according to the inclusion and exclusion criterias. 4. Photographs were taken and software analysis was conducted.

Processing and analyzing data

Data was collected in two steps which were sampling and photography and then, editing each photos by adding the landmark point, lines and angles which were calculated using the software. After the photos were taken, landmark points and lines were added according to Graber and Singh guidelines using the Corel Draw X5 software and the angles were then measured using the Image J software. The landmark points noted on the lateral photographs are the glabella, upper lip contour, lower lip contour and pogonion for Graber's method using the Corel Draw X5 software.

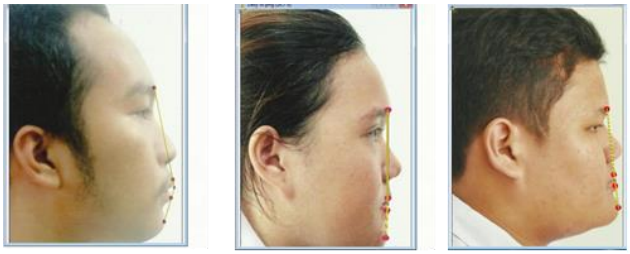

Figure 1. Graber's facial profile A. Convex, B. Straight, C. Concave.

Results

Table 1 shows the mean value of the facial profile angles of adolescents in Medan. Using Graber's method, the mean value of male students facial profile angle was 154.17° with a standard deviation of 9.35° whereas the mean value for female students was 156.25° with a standard deviation of 8.07°.

Gender	N	Mean	Standard Deviations	Min	Max
Males	50	154.17°	9.35°	133.60°	177.82°
Females	50	156.25°	8.07°	137.20°	176.93°

Table 1. Facial Profile Angles of Adolescents in Medan.

Facial Profile	Males		Females		Total	Percentage (%)	P Value
	N	Percentage (%)	N	Percentage (%)			
Straight	34	68,0	30	60,0	64	64,0	0.790
Concave	7	14,0	9	18,0	16	16,0	
Convex	9	18,0	11	22,0	20	20,0	
Total	50	100,0	50	100,0	100	100,0	

Table 2. Facial Profile Distribution of Adolescents in Medan Based on Gender.

Table 2 shows the facial profile distribution based on gender of both male and female students using Graber's method. Straight facial profile had the highest percentage in this study which was 68% on males and 60% on females followed by convex facial profile which was 18% on males and 22% on females. Concave facial profile had the lowest percentage in this study which was 14% on males and 18% on females, p>0,05 showed that there were no significant differences between the facial profiles of males and females using Graber's method.

Discussion

Malocclusion has a high prevalence around the world, including Indonesia.[11] Soft tissue facial profile analysis plays a significant part in orthodontic treatment planning. Orthodontic treatment according to the accepted hard tissue cephalometric criteria does not necessarily ensure that overlying soft tissues will be positioned in a harmonious manner and hence, may not result in a pleasing profile. Facial soft tissues require an independent appraisal in addition to skeletal and dental analysis in order to deduce a comprehensive orthodontic diagnosis and treatment plan. Soft tissue cephalometric norms for esthetic profiles had been established by various researchers using cephalometric radiographs. Nevertheless, many studies had been conducted on the photographic evaluation of soft tissue facial profiles in some racial groups.[12] The perception of an ideal facial appearance is largely subjective as it is influenced by various factors such as ethnicity, gender, culture, personality and age.[13] Due to the differences in perception of an ideal facial form, clinicians should consider the patient's race, gender and ethnicity when deducing an orthodontic diagnosis and planning a treatment regimen.[6,14] Different racial groups must be treated according to their respective characteristics. Therefore, the orthodontist must realize that the patient is unique, and that self-esteem after treatment conclusion is as important as technical outcomes.[15]

Table 1 shows no significant differences between male and female facial profiles of angles of adolescents in Medan. In a facial profile study conducted by Ferdousi AM, et al., on Bangladesh Christian Garo population, the angle of facial convexity was found to be higher in females (169.26±4.43) than males (158.65±12.17), similar to that in the North Indian population and White European population. The higher convexity in females could be explained by the fact that in general the facial contours of females were softer than those of males, especially in the area of the nose, lips and chin.[16] Based on a research conducted on 59 white Brazilian adults, the male subjects were found having a slightly greater nasal projection and larger upper lip protrusion compared to the female subjects.[17] In a study by Hwang HS, et al., unlike the American subjects, the nasal tip angle was smaller in Korean men, indicating that the male nose is pointed. The lower lip to NP angle was found to be larger and the mentolabial angle was smaller in men, indicating that Korean males have a slightly more protrusive lower lip and a deeper mentolabial sulcus than Korean females.[18] In a study conducted in Central Romania, the facial angle (G-Ns-Pg) for males were 168.85±0.7˚ and for females were 170.32±2.09. The bigger values of the angles measured in the study can be explained by the fact that females have a gentler contour of the soft parts than males, especially in the area of the nose, lips and chin.[19] A research done in Mosul city by Obaidi HA, et al., found that the angle of total soft tissue convexity (Gl-Prn-Pgs) showed higher values in males compared to females aged 11-14 years old. This may indicate that males have less convex soft tissue facial profile than females. A similar result by Bishara et al. also proves that females between the ages of 8 to 14 years old have a more convex facial profile than males of the same age range.[20] In a study of the soft tissue facial profile in Assamese population in India, Assamese males possess a tendency to have a more convex facial profile compared to their female counterpart.[12]

Table 2 showed that the overall facial profile distribution of adolescents in Medan was straight 64%, convex 20%, and concave 16%. A study conducted by Uysal T, et al., in Turkey, found that Turkish patients have a more convex soft tissue facial profile compared to European-Americans. From the study, Turkish patients had more retrognathic and thinner soft tissue chins with a more protrusive and shorter upper and lower lips (for males only).[21] Another research by Hwang HS, et al., in Korea and America, found that Koreans showed a lower angle of nasal inclination and a greater degree of lip protrusion compared to the European-American subjects. In the same study, chins of Koreans were less prominent than to that of the European-Americans.[18] In a study in Bhopal city, compared to white men, central Indian men showed thinner soft tissues except the lower lip thickness (insignificantly high) and acute nasolabial angle.[22] A research done by Swlerenga et al. whom in a comparative study between Mexican-American, white American and black American subjects, found that Mexican-American had a more convex facial profile and in white Americans, a straight profile prevailed.[23] In a study conducted in Rio Grande do Sul and Rio

de Janeiro, Brazil, racial and cultural influences do seem to explain the variation in facial convexity. Rio Grande do Sul was colonized by Europeans (81.5% of the population is of European descendants) with great Italian and German influence, therefore displaying straight profiles more often than African populations. On the other hand, Rio de Janeiro has an expressive African background (32% of the population is of African descendants), thus, more convex profiles are observed.[15] In a study on the Assamese population, Assamese males were found to have less prominent noses, less protrusive lips as compared with white American males, causing Assamese males to have a tendency of a more convex profile.[12] A study from Japan by Alcade found a more convex facial profile but with more protruded lips in Japanese adults and a similar study on soft tissue facial profile in Saudi Arabia showed that Arabs had a more convex profile than normal.[24] These studies prove that there are differences in facial profile between different ethnic groups throughout the world.

Accordingly, further clinical studies are recommended to obtain the facial profiles according to all races in Indonesia.

Conclusions

Based on the results, facial profile of adolescents in Medan is concluded as: a). Overall facial profile of adolescents in Medan are straight; b). There are no significant differences in facial profile of adolescents in Medan based on gender; c). The percentage of facial profile of adolescents in Medan for straight, convex and concave are 64%, 20% and 16%, respectively.

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Declaration of Interest

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References

1. Edler RJ, Background considerations to facial aesthetics. Br Orthod Soc. 2001;28(2):159-67.
2. Fortes HNR, Guimaraes TC, Belo IML, Matta ENR. Photometric analysis of esthetically pleasant and unpleasant facial profile. Dent Press J Ort. 2014;19(2):66-75.
3. Bishara SE. Textbook of orthodontics. 1st ed. W.B. Saunders Company Philadephia. 2001;44-52.
4. Samawi S. A Short guide to clinical digital photography in orthodontics. Sdoc: Jordan. 2008:12-6.
5. Vitalis C, Ezeuko, Eboigbe PO. Angular photogrammetric analysis of the facial profile of the adults of Bini ethinicity of Nigeria. Annals Bioanthropol. 2015;3(1):14-7.
6. AlBarakati SF. Soft tissue facial profile of adult Saudis–Lateral cephalometric analysis. Saudi Med J. 2011;32(9):836-42.
7. Reddy M, Ahuja NK, Raghav P, Kundu V, Mishra V. A computer-assisted angular photogrammetric analysis of the soft tissue facial profile of north Indian adults. J Ind Orthod Soc. 2011;45(3):119-23.
8. Graber TM, Vanarsdall RL. Orthodontics current principles and technique. 3rd ed. Mosby St.Louis. 2000:13-16,80,378.
9. Al-Madani GH, Banabih SM, El-Sakhawy MM. Prevalence of snoring and facial profile type, malocclusion class and dental arch morphotology among snorer and nonsnorer university population. J Orthod Sci. 2015;4(4):108-112.
10. Leung CSY, Yang Y, Wong RWK, Hagg U,LoJ, McGrath C. Angular photogrammetric analysis of the soft tissue profile in 12-year-old southern Chinese. Head and Face Medicine. 2014;10(56):1-8.
11. Utari E, Krisnawati, Ismah N. Relationship between orthodontic treatment outcome and patient satisfaction. J Int Dent Med Res. 2017;10:503-14.
12. Yanglem A, Bora M, Singh KS, A photographic analysis of the soft tissue facial profile in Assamese population. Int J Pharm Res Health Sci. 2016;4(1):998-1003.
13. Milosevic SA, Varga ML, Slaj M. Analysis of the soft tissue facial profile by means of angular measurements. Eur J Orthod. 2008;30:135-40.
14. Hamamci N, Arslan SG, Sahin S. Longitudinal profile changes in an Anatolian Turkish population. Eur J Orthod. 2010;32:199-206.
15. De Oliveira MDV, Da Silveira BL, Mattos CT, Marquezan M. Facial profile esthetic preferences: Perception in two Brazilian states. Dental Press J Orthod. 2015;20(3):88-95
16. Ferdousi MA. Al Mamun A. Banu LA. Paul S. Angular photogrammetric analysis of facial profile of the adult Bangladeshi Garo. Adv Anthropol. 2013;3(4):188-92.
17. Scavone H. Zahn-Sliva W. Valle-Corotti KM. Nahas ACR. Soft tissue profile in white Brazilian adults with normal occlusions and well-balanced faces. Angle Orthod. 2008;78(1):58-63.
18. Hwang HS. Kim WS. McNamara JA. Ethnic differences in the soft tissue profile of Korean and European-American adults with normal occlusions and well-balanced faces. Angle Orthod. 2002;72(1):72-80.
19. Manuela C, Anamaria J, Sorana-Maria B, Monica-Cristina M, Mariana P. Facial profile characteristics evaluation in a population of Central Romania region. Acta Medica Marisiensis. 2014;60(2):53-6.
20. Obaidi HA, Abdul-Qadir MY. Facial soft tissue convexity changes. Al-Rafidain Dent J. 2007;7(1):88-95.
21. Uysal T. Baysal A. Yagci A. Sigler LM. McNamara JA. Ethnic differences in the soft tissue profiles of Turkish and European-American young adults with normal occlusions and well-balanced faces. Eur J Orthod. 2011;34(3):296-301.
22. Chhajed S, Kodumuru S, Singh G, Arun AV, Cholleti SK, Kothari S. Facial soft tissue cephalometric norms in a central Indian ethnic population. J Indian Ort Soc. 2014; 48(1):7-13.
23. Traconis LBP. Santana YGK. Ruiz GEC. Carvajal AMS. Correlation of facial profile and dental arches in a population of Yucatan. Rev Mex Ortod. 2016;4(2):81-4
24. Javadpour FG, Khanemasjedi M. Soft tissue facial profile and anteroposterior lip positioning in Iranians. J Dent Sch. 2014;32(2):90-5.