ORIGINAL ARTICLE POJ 2020:12(1) 42-48

Evaluation of perception of profile aesthetics by patients

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Abstract

Introduction The perception of attractiveness of one's own face and dentition are of great importance in the decision making of orthodontic cases. The aesthetic judgements of the patients are entirely subjective and are a matter of individual taste and there are differences in how each patient recognizes different facial features. The Orthodontists perceptions are considered as gold standard when formulating plans but in order to achieve patient centered treatment goals, the preferred facial profile of their patients must be given due importance. Therefore, the purpose of this study was to establish patient centered facial profile preference and aligning orthodontic treatment with it. Moreover, reporting patients were assessed for the most prevalent profile on the basis of angle of convexity.

Material and Methods: A sample of 190 patients was selected through Non-Probability Consecutive Sampling technique. Each patient was given a questionnaire to fill and a lateral cephalogram and lateral photograph was obtained. The questionnaire had lateral facial silhouettes for convex, straight and concave profiles. Each patient was asked to choose the most preferred profile and the least preferred profile. The lateral cephalogram and the photograph were taken in the same environment for every patient. The hard tissue angle of convexity was measured by Nasion (N)-Point A- Pogonion (Pg) on the lateral cephalogram while the angle of facial convexity including the nose, soft tissue Nasion-Pronasale-Soft tissue Pogonion (N-Prn-Pg) and facial angle of convexity excluding the nose, soft tissue Glabella-Subnasale-Soft Tissue Pogonion (G-Sn-Pg) measured on the photographs.

Results: Data was explored through SPSS version 10. Descriptive statistics, Mean ± S.D was calculated for all variables. Ideal and non-ideal profiles were ascertained. 73.7% of the patients chose straight profile to be ideal, 25.3% of the patients chose convex profile to be ideal and only 1.1 % preferred the concave profile. Most commonly reporting profile was convex as based on the findings of the angle of convexity measurement.

Conclusions: Patient centric treatment goals are a rule rather than exception. According to this study straight profile was the most preferred one as determined by patients.

Keywords: Orthognathic profile; smile aesthetics; macro-aesthetics

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Introduction

Aesthetics is an art form; it is as old as written history. It is human nature to desire physical attractiveness.[1] For centuries all societies have given importance to facial attractiveness and even now in modern age there is a strong emphasis on desiring and achieving optimal facial esthetics.[2,3] Exposure to global media and international influences are not only bringing

awareness but the perception of a pleasing facial profile is now changing.[4]

A persons development is influenced by his body image and the face is an important predictor of overall attractiveness of the body.[5,6] Face is the most apparent characteristic in the development of self-image, self-esteem and self-confidence.[7] It is proven that attractive faces are regarded as more competent, successful and likeable.[8,9,10] Unconsciously we all judge character ability and positive social behaviour on facial esthetics.[11,12] Unacceptable appearance has been associated with negative effect on self-confidence, career progress and social group acceptance.[13] With age there is an increasing desire to achieve an attractive face and better aesthetics[14,15,16] and it is this desire which becomes a reason to seek Orthodontic treatment[17,18] and the needed motivation to undergo Orthognathic surgery.[19,20]

The famous saying 'beauty lies in the eyes of the beholder' means that beauty is our own interpretation of what is seen. This shows that aesthetic judgements are a matter of individual taste and are entirely subjective. The perception of attractiveness of one's own face and dentition are of great importance for decision making in regards to facial change.[21,22] It is seen that there are differences in how each patient recognizes different facial features and perception of facial profile evaluated by the patients varies a lot.[23] Interpretations are based on each person's own unique life experiences and hence they differ. What one finds attractive and beautiful is basically a person's own individual perception and it's not necessary that other people must also perceive it the same way making it more subjective.[24,25] The concept of beauty differs in friends, siblings, families and even in identical twins. Social and cultural norms may influence one's perception.

This concept can vary between orthodontists and their patients. It differs between Orthodontists and Oral surgeons during formulation of a combined Orthognathic-Orthodontic treatment plan albeit their goals being the same. Having said that, it is very important for them to know what their patients prefer since now the treatment must be patient centric.[26]

Orthodontic treatment plans are based on judgement of Orthodontist's concepts of aesthetics being considered as gold standard and formulated according to his perceptions and not on how the patient prefers to look which might differ.[27,28]

To achieve patient cantered treatment goals, it is most important for orthodontists to know the preferred facial profile of their patients. If patient's desires are not achieved, satisfaction of the patient may be lost.[29]

To assess perceptions of facial profile attractiveness, many methods have been used. These include profile silhouettes, line drawings, photographs, artist sketches and photographic transparencies.[30] Digital imaging gives a more realistic representation of facial aesthetics than silhouettes and line drawings.[31]The disadvantage is that certain facial traits like skin colour, hair colour and size of the nose other than the profile can influence one's judgement. The use of digital imaging processor overcomes some of these problems by enabling the researcher to artificially create a homogenous group on which to assign random profile variations. Amongst all these methods the present study was based on facial silhouettes. They were chosen for rating facial profiles, rather than facial photographs to avoid subjective considerations.[32,33]

Hence the purpose of this study was to establish patient cantered facial profile preference and aligning orthodontic treatment with it.

Material and Methods

After taking permission from Hospitals' Ethical Committee, the sample was collected at the Department of Orthodontics, KRL Hospital, Islamabad. A sample of 190 patients was selected through Non-Probability Consecutive Sampling technique. This cross

sectional study included individuals of both genders seeking orthodontic treatment for all types of malocclusions. Patients of ages 12 and above were selected. Patients with facial asymmetries, craniofacial deformities including cleft lip and palate, those having psychological disorders, patients who had undergone orthodontic treatment and orthognathic surgery were excluded from the sample.

Informed written consent was taken from the individuals matching the criteria and to control bias, every measurement was verified by a senior colleague. Each patient was given a questionnaire to fill and a lateral cephalogram and lateral photograph was obtained.

The questionnaire given to every patient had lateral facial silhouettes (Figure 1). These profile silhouettes represented Skeletal Class I (straight profile), Skeletal Class II (convex profile) and Skeletal Class III (concave profile). These silhouettes were arranged in a random order to minimise bias. Patients were asked to choose the most favoured profile and mark it as 3 and then the others in a decreasing order so that the least favoured profile was marked as 1.

Lateral cephalogram were taken with the patients Frankfurt Horizontal plane parallel to the floor, with unstrained lips and teeth are in centric occlusion. Radiographs were traced on 8*10 inch standard translucent acetate tracing paper, over a standard illuminated view box with a lead pencil (# $2^{1/2}$ HB). The hard tissue angle of convexity was measured by Nasion (N)-Point A- Pogonion (Pg) and was recorded (Figure 2).

Pictures were taken in the same environment for every patient with the same lighting conditions keeping a distance of 90 cm from the camera constant, in natural head position, using Sony DSC W55, Effective 7.2 mega pixels, 3x zoom lens. The camera was fixed in position with a tripod and all photographs were taken in colour. The pictures were then transferred to the computer software (Adobe Photoshop version 7, Adobe system, San Jose, California) and editing was done to standardize all. The pictures were cropped to include the lateral head posture to 4*3 inches, with 1000-pixel resolution.

The angle of facial convexity including the nose, soft tissue Nasion-Pronasale-Soft tissue Pogonion (N-Prn-Pg) and facial angle of convexity excluding the nose, soft tissue Glabella-Subnasale-Soft Tissue Pogonion (G-Sn-Pg) measured for each patient was recorded (Figure 3).

Data was explored through SPSS version 10. Descriptive statistics, Mean ± S.D was calculated for all variables. Frequencies and percentages were calculated for gender, convex, concave and straight profiles. The frequency of the most preferred and least favoured profile was also determined.

Results

The study was conducted on 190 participants, in which there were 69 (36.7%) males and 121 (63.7%) females. The mean age of the participants was 16.05±3.1, with maximum and minimum ages of 26years and 12 years respectively. Figure 4 shows that the best perceived profile in our sample. It shows that 73.7% (n 140) of the patients chose straight profile to be ideal, 25.3% (n 48) of the patients chose convex profile to be ideal and only 1.1 % (n 2) preferred the concave profile.

94.7% patients chose concave profile to be least preferred (n 180, Figure 5), while 5.3% (n 10) selected the convex profile to be the worst. None of the patients disliked straight profile. Amongst the male patients, 73.9 % (n 51) chose straight profile to be the best, and 26.1 % (n 18) of the patients liked the convex profile. None of them chose concave profile. Amongst the females, most preferred was the straight profile, while 24.8% (n 30) liked the convex profile, whereas only 1.7% (n 2) chose concave profile.

The mean of total angle of convexity for the sample was found to be 8.16° with a standard deviation of 6.9°. The minimum and maximum were found to be -13° and

32°respectively. The total facial angle or facial convexity including the nose has a mean value of 110°±12 in males while in females it is 126.9°±7.74. The mean for the facial angle or angle of convexity excluding the nose is 160°±13 in males and in females it is 156°±21 (Table I).

Out of our sample of 190 patients, 119 (62.6%) had a convex, 52 (27.4%) had straight and 19 (10%) had concave profiles. In males, the percentage of convex profile was 56.5%, straight profiles were 31.9% and concave were 11.6%. Similarly, in females the convex profile was 66.1%, straight was 24.8% and concave profiles were 9.1% (Figure 6).

(A) (B) (C)

Figure 1. Lateral facial silhouettes

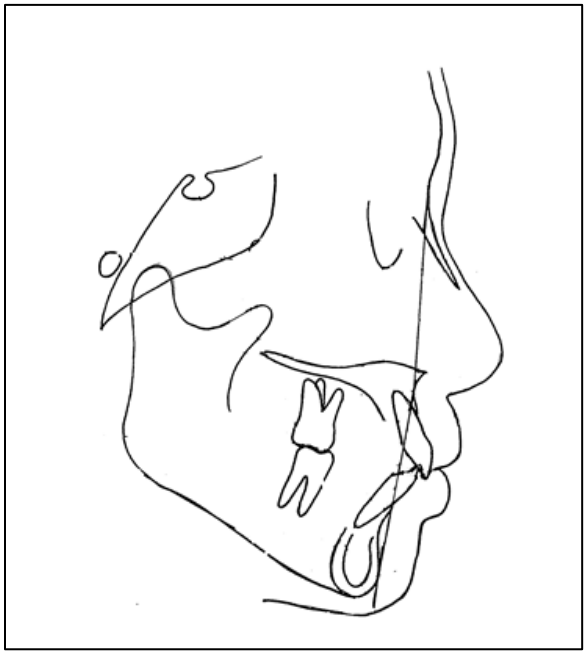


Figure 2: Hard tissue angle of convexity measured by Nasion (N) – Point A – Pogonion (Pg)

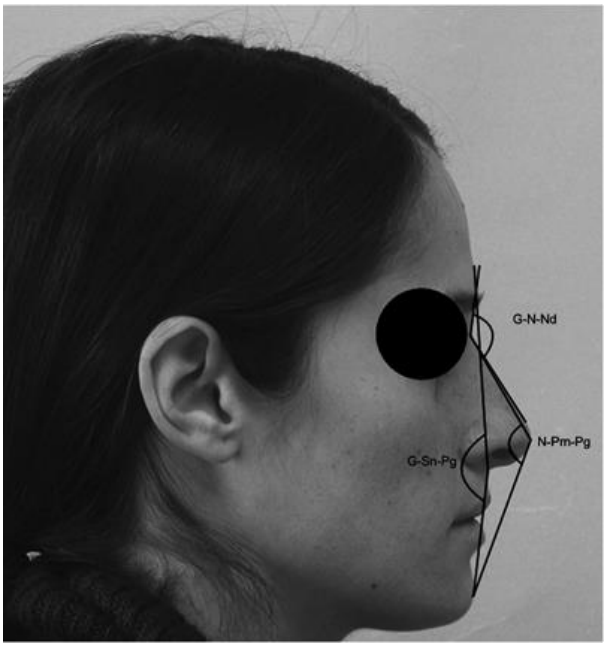
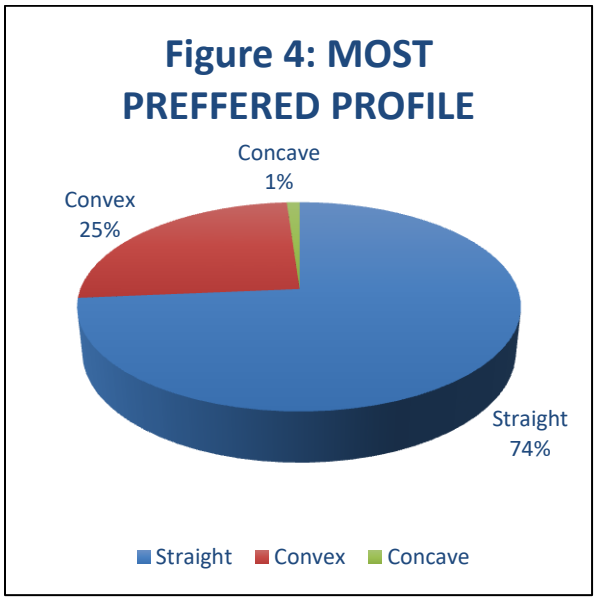
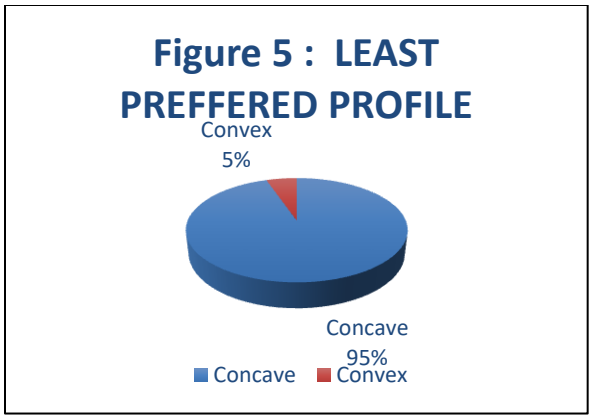


Figure 3. The angle of facial convexity including the nosesoft tissue Nasion-Pronasale-Soft tissue Pogonion (N-Prn-Pg)**Facial angle of convexity excluding the nose**soft tissue Glabella-Subnasale-Soft Tissue Pogonion (G-Sn-Pg)





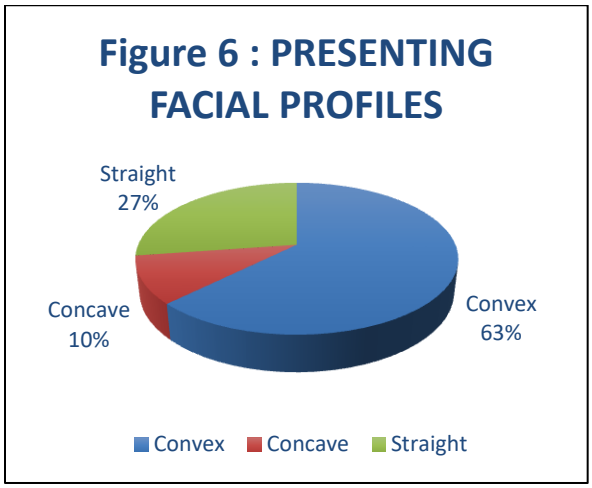


Table I

	Total angle of convexity N-A-Pg	**Facial angle of convexity including the nose** N-Prn-Pg	**Facial angle of convexity excluding the nose** G-Sn-Pg
Males			
Mean	7.36 ± 7	110±12	160±13
Minimum	-13	110	119
Maximum	26	179	180
Females			
Mean	8.61±7	126.9±7	156±21
Minimum	-10	109	-3.0
Maximum	32	177	180

Discussion

The sample consisted of patients aged 12 years and above being a safe age group as patients usually present to the orthodontist at this stage with a complete set of dentition. It is usually an appropriate time to start functional orthopaedics along with orthodontics if the need arises.

The subjects varied greatly and provided us with different facial profiles and also a wide range of angle of convexities were observed. Their perceptions of a favoured facial profile varied and it therefore determined the profile our sample presented with the most and the profile they choose to be the most aesthetic.

In the study more female subjects were present even though the sample was not selected on the basis of gender, but this suggests that more female patients report for orthodontic treatment than males. Our study included the selection of the most favoured profile by our patients to achieve 'patient centered treatment goals' thus to have happier and more satisfied patients at the end of treatment. Previously many studies have been undertaken to determine the perception of an aesthetic facial profile by orthodontic patients and many also included the perceptions of orthodontists, general dentists and lay persons.

Eser Tufekia, Arousha Jahangirib, Steven J. Lindauerc in 2007 found convex and concave profiles to be as attractive as straight profiles. This varied from the results of the present study which showed that the majority of patients preferred straight profile over convex and concave profiles. Jen Soh, Ming Tak Chew and Hwww Bee Wong in 2005 compared the perceptions of an aesthetic facial profile between dentists, laypersons and dental students. According to them, straight profile was considered most attractive. The concave profile with protruded mandible was considered as least preferred of all facial profiles concurring to our study.

Esthetic evaluation of Asian- Chinese profiles by Eugene K.M. Chan, Jen Soh, Peter Petocz and M. Ali Darendelilerd in 2006 compared the perceptions of profiles between orthodontists, lay persons and dental students. The results of their study were also similar to our results, according to which straight profile was the most attractive and concave profile being the least liked among tested profiles. Jen Soh, Ming Tak Chew and Hw Bee performed another study to obtain

the professional assessment of facial profile attractiveness and their results were similar to the results of the present study.

Luka Cala, Stephan Spalj and Martina Slaj in 2010 studied the facial profile preferences in children with and without history of orthodontic treatment and the results of their study were consistent with our study. They concluded that straight profile was preferred in both genders regardless of previous orthodontic history.

Paega Jarungidanan, Kanok Sorathesn in 2008 determined acceptable facial profiles in Thai population and the most favoured was straight profile whereas convex profile was more acceptable then concave profiles. Another study concludes in concurrence to the present study (Sarah H, Abu Arqoub, Susan N. Al-Khateeb in 2001) in which straight profile was ranked as most attractive whereas the convex profiles were considered least favoured.

Our study also calculated the means of the total angle of convexity, the angle of convexity including the nose and the angle of convexity excluding the nose. A similar study was conducted in 2010 in Pakistan where Abida Ijaz, Junaid Israr Khan and Arshad Hameed measured the full profile angle in degrees between the points N-Prn-Pog and their value was 126°±7 in Class I and 125°±4 in Class II individuals, which is comparable to the mean values calculated for our sample being 110°±12 in males and 126°±7 in females.

Siddik Malkoc, Abdullah Demir, Tancan Usal and Naci Canbuldu measured the Gl-Sn-Pg angle and mean values found were 170° ± 6 in males and 168° ± 5 in females. They also measured the angles between points G-Prn-Pg 142°±5 in males and 142.5°±5 in females.

Ali Hassan in 2005 in measured hard tissue angle of convexity by calculating angle between points N-A-Pog in children. His results came to be 7.7° ± 7 (mean = 5° ± 3). This was comparable to our study where mean of this angle was 8.16° ± 6. In males this value was 7.36°± 6 and females found to be 8.61°± 7.

The importance of patient's perceptions of facial profiles cannot be over emphasized because it is the patients who receive treatment and needs to gain satisfaction from improved aesthetics and function. Thus with the help of the results of this study, treatment plans can be based on the patients' needs and in accordance to how patient prefer profiles rather than how orthodontists perceive the said aesthetics.

Conclusions

It was concluded from this study that best perceived profile by patients was straight whereas the least liked profile was concave profile. Majority of males chose straight profile to be the most aesthetic and only a few found convex profile to be the best. It was the same for the female patients. However, few of them also chose concave profile. The least liked profile by the majority of both male and female patients was the concave profile. The most prevalent reporting profile was convex which is in disapproval to the desire of patients.

References

1. Soh J, Chew MK and Wong HB. Professional assessment of facial profile attractiveness. Am J Orthod Dentofacial Orthop 2005;128:201-5
2. Khan M, Fida M. Assesment of Psychosocial Impact of Dental Aesthetics, J Coll Physicians Surg Pak 2008;18:559-64
3. Godt A, Muller A, Kalwitzki M and Goz G. Angles of facial convexity in different skeletal Classes. Eur J Orthod 2007;29:648-53
4. Loi H, Nakata S, Nakasima A and Counts AL. Anteroposterior lip positons of the most favoured Japenese facial profiles. Am J Orthod Dentofacial Orthop 2005;128:206-11
5. Eisenthal Y, Dror G, Ruppin E. Facial attractiveness: beauty and the machine. Neural Comput. 2006;18:119-142
6. Alcalde R, Jinno T, Orsini G, Sasaki A, Sugiyama RM, Matsumura T. Soft Tissue Cephalometric norms in Japanese adults. Am J Orthod Dentofacial Orthop 2000;118:84-9.
7. Hwang HS, Kim WS, McNamara JA Jr. Ethnic differences in the soft tissue profile of Korean and European- American adults with normal occlusions and well-balanced faces. Angl Orthod 2002; 72:72-80

8. Tufekcis E, Jahangiri A, Limdauerc SJ. Perception of Profiles mong Laypeople, Dental Students and Orthodontic Patients. Angle Orthod 2008;78:983-7
9. Langliois JH, Kalakanis L, Rubenstein AJ, Larson A, Hallam M, Smoot M. Maxims or myths of beauty? A meta analytic and theoretical review. Psyhcol Bull 2000;126:290-423
10. Hwang HS, Kim WS, Mc Namara JA Jr. Ethnic differences in the soft tissue profile of Korean and European- American adults with normal occlusions and well balanced faces. Angle Orthod 2002;72:72-80
11. Soh J. Chew MT and Wong HB, Singapore. A Comparative assessment of the perception of Chinese facial profile esthetics. Am J Orthod Dentofacial Orthop 2005; 127:692-9
12. Rivera SM, Hatch JP, Dolce C, Bays RA, Van Sickels JE, Rugh D. Patient's own reasons and patient-percieved recommendations for Orthognathic surgery. Am J Orthod Dentofacial Orthop 2000;118:134-40
13. Bos A, Hoogstraten J, Prahl-Andersen B. Expectations of treatment and satisfaction with dentofacial appearance in orthodontic patients. Am J Orthod Dentofacial Orthop 2003;123:127-32
14. Maganzini AL, Tseng JYK, Epstein J.Z. Perception of facial esthetics by native Chinese participants by using manipulated digital imagery techniques. Angle Orthod 2000;70:393-9
15. Spyropoulos MN, Halazonetis DJ. Significance of the soft tissue profile on facial esthetics. Am J Orthod Dentofacial Orthop 2001;119:464-71
16. Klages U, Bruckner A, Zentner A. Dental Esthetics, self awareness and oral health-related quality of life in young adults. Eur J Orthod 2004;26:507-14
17. Bernabe E, Kresevic VD, Cabrejs SC, Flores-Mir C. Dental esthetic self-perception in young adults with and without previous orthodontic treatment. Angle Orthod 2006;76:412-6
18. Firestone AR, Beck FM, Beglin FM, Vig KW. Validity of the Index of Complexity, come and need (ICON) in determining orthodontic treatment need. Angle Orthod 2002; 72:15-20
19. Shelly AD, Southard TE, Southard KA, Casko JS, Jakobsen JR, Fridrich KL et all. Evaluation of profile esthetic change with mandibular advancement surgery. Am J Orthod Dentofacial Orthop 2000;117:630-7
20. Hunt O, Hepper P, Johnston C, Stevenson M, Burden D. The anestheitc component of the index of orthodontic treatment need validated against lay opinion. Eur J Orthod 2002;24:53-9
21. Grzywacz I. The value of the aesthetic component of the index of orthodontic treatment need in the assessment of subjective orthodontic treatment need. Eur J Orthod 2003; 25:57-63
22. Baker BW, Woods MG. The role of the divine proportion in the esthetic improvement of patients undergoing combined Orthodontic/Orthognathic surgical treatment. Int J Adult Orthognath Surg 2001;16:108-20
23. Lui Y, Kom EL, Oh HS, Pearson H, Xu TM, Baumrind S. Comparison of Chinese and US orthodontists' averaged evaluations of "facial attractiveness" from end of facial treatment facial photographs. Am J Orthod Dentofacial Orthop 2009;135:621-34
24. Elder RJ. Background considerations to facial aesthetics. J Orthod 2001;28:159-68
25. Matoula S, Pancherz H. Skeletal morphology of attractive and non-attractive faces. Angle Orthod 2006;76:204-10
26. Chan E.K.M, Soh J, Petocz P and Darendeliler MA. Esthetic evaluations of Asian-Chinese profiles from a white perspective. Am J Orthod Dentofacial Orthop 2008;133:532-8
27. Onyeaso CO, Sanu OO. Perception of personal dental appearance in Nigerian adolescents. Am J Othod Dentofacial Orthop 2005;127:700-6
28. Yeh M, Koochek A, Vlaskalic V, Bod R, Richmond S. The relationship of two professional and occlusal indexes with patient's perceptions of aesthetics, function, speech and orthodontic treatment need Am J Orthod Dentofacial Orthop 2000;118:421-8
29. Chi JY, Harness EM, Crowther P. A longitudinal study of orthodontic treatment need in Dunedin school children. NZ Dent J 2000;96:4-9
30. W Norman, Orthodontists in 3 millennia. Chapter 8. The cephalometer takes its place in the orthodontic armamentarium. Am J Orthod Dentofacial Orthop 2006;129:574-80
31. Bail HS, Jeon JM, Lee HJ. Facial soft tissue analysis of Korean adults with normal occlusion using a 3 dimensional laser scanner. Am J Othod Dentofacial Orthop 2007;131(6): 759-66
32. Ioia H, Nakatab S, Nakasimac, Countsd A, Effect of facial convexity on Antero-posterior Lip positions of the most favoured Japanese Facial Profiles. Angle Ortod 2005;75:326-32
33. Schlosser JB, Preston CB, Lampasso J. The effects of computer aided anteroposterior maxillary incisor movement on ratings of facial attractiveness. Am J Orthod Dentofacial Orthop 2005;127:17-24