ORIGINAL ARTICLE POJ 2024:16(1) 7-11

Effect of Lower Anterior Facial Height on Facial Attractiveness in Layman`s Perspective

Ayesha Ashraf[a], Ammara Asif[b], Samina Qadir[c], Maimoona Batool[d], Sara Mahmood[e], Atif Riaz[f]

Abstract

Introduction: Orthodontic patients are primarily concerned regarding improvement in their facial appearance and attractiveness because of orthodontic treatment and this requirement is gaining importance day by day especially among young females. Nose lip chin balance in three planes of spaces is one of the prime post treatment requirement now a days in addition to improvement in anterior dental transition. Lower facial height plays a pivotal role in having attractive appearance. Thus, aim of this study is to evaluate the effect of lower anterior facial height on the facial attractiveness in layman`s perspective.

Methodology: Photo of a girl with normal facial measurements was taken after the consent to be used in the research. It was then modified for lower anterior facial height (LAFH) in vertical plane 1mm ranging from +6mm to -6mm. The set of 13 pictures were then subjected for evaluation of attractiveness based upon lower anterior facial height change to 100 layperson. Scores were recorded through visual analogue scale (VAS) for facial attractiveness.

Results: Unaltered ±1mm and ±2mm were considered more aesthetically pleasing. VAS score was lower as discrepancy from normal range surpassed 2mm.

Conclusion: The final outcome of study was lower facial height has noteworthy effect on facial attractiveness.

Keywords: Lower anterior facial height, Facial aesthetics, Orthodontics.

Introduction

Patients who seek orthodontics care are primarily concerned regarding improvement in their facial appearance and attractiveness as a result of orthodontic treatment and this requirement is gaining importance day by day especially among young females.[1] At the commencement of orthodontic treatment one of the most asked question is whether he/she will look attractive at the end of the treatment. Patients /parents normally remain in doubt regarding aesthetic outcome of the study.[2] This question seems difficult to answer by most of the orthodontists as they primarily deal with the mid-facial region until and unless growth modification, surgical camouflage and surgical orthodontics are included in the management. Artificial intelligence though have come into place and facial improvement through orthodontics can be predicted little better, but failing to achieve the shown digitized appearance gets annoying on the part of both patient and orthodontist as we approach near to treatment completion.[3] Lip prominence, Lip incompetence, nasal contours and morphology and chin dimension have been reported among few others as the contributors to facial attractiveness. Facial appearance do impact the self-perception, motivation and acceptibilty.[4] Shoukat Ali U et al in one of their studies on Asian population found

[a] Corresponding Author: BDS, FCPS Orthodontics, Assistant Professor Orthodontics, University of Child Health Sciences & Children Hospital, Lahore.
E-mail: ashrafayesha985@gmail.com
[b,d,e,f] BDS, PGR Orthodontics, University of Child Health Sciences & Children Hospital, Lahore
[c] BDS, MDS Orthodontics, Consultant Orthodontist.

LAFH/TAFH in normal ratio being one of the key facial attractiveness determinant.[5,6]

It has been questioned in various studies that assessment of facial attractiveness may vary among layperson, dentist and orthodontists.[1] Westfall et al. showed that in order to measure attractiveness both attractiveness measured by oneself and aesthetic judged by others are both important factors. Additionally, attractiveness judged by other people has more significant effect on quality of life and confidence of a person.[7] Person who is more attractive will tend to inspire more people and is expected to succeed in different forms of life.[8] The most important component of facial attractiveness is face. Attractive face will make one look successful and inspiring.[9] Unattractive people tend to feel discriminated.[10]

Face is composed of various regions of which teeth are only a tiny component. All of them are important to make a person attractive. Normal occlusion is as important part of facial attractiveness as others and will make a person look attractive, agreeable, and extraverted.[11] Facial height is the leading component of facial attractiveness. Orthodontics treatment has to be continuous with normal growth so that it can be stable and remove any unpleasant effects.[12,13] Through orthodontic care, lower facial height (LFH) can be changed and vertical discrepancy is considered one of the major causes for patients opting for orthodontic-surgical treatment.[14,15]

There is only a small amount of scientific literature available regarding the outcomes of alteration in vertical dimension. In a study conducted by Godinho J et al and Michiels et al, increased vertical height was found to be aesthetically unpleasing.[16,17] Similarly, Johnston et al. found out that people with a Class I profile with decreased facial height were found to be less pleasing and thus seeking treatment.[18] In a research done by Cochrane et al in Class I profiles with increased facial height were considered to be more aesthetically pleasing than Class II and class III images.[19] Maple et al found out that Class II or class III profiles with utmost deviation from normal vertical dimensions were judged to be less attractive by both laypeople and clinicians.[20]

Although the patient judges facial aesthetics from a frontal view and also judged by others from frontal view during routine communication, most orthodontic studies of facial aesthetics judge attractiveness from the profile view.[21-23] Given the importance of the vertical proportions of the face in facial aesthetics and the position of frontal vision in the usual mode of communication, the main idea behind this study is assess whether alteration in facial height will have any effect on facial aesthetics.

Methodology

Sample size (Participants-Layman) calculated using Raosoft® sample size calculator was 93. However, in order to have equal distribution of both gender it was round off to 100. Consent was taken from family members of patients reporting at University of Child Health Sciences & Children Hospital, Lahore. Subject (01) with attractive profile (Straight Profile, Competent Lips, Class I Occlusion, ANB 0-4^0, normal ranged incisor inclination and normal lower anterior facial height) was selected. Coloured facial photograph was obtained in natural head position with the help of digital camera (Nikon D 5300, Tokyo, Japan) after informed consent. Photograph was transcribed in actual-size proportion, and clinically recorded data of lower anterior facial height was premeasured and verified. Adobe Photoshop 7.0 ME was used to scan photograph with the resolution being at 600 dpi. LAFH (subnasal-menton) was altered with range from +6 to -6 mm. 13 photographs (one unaltered, six pictures with raised LAFH, similarly six with reduced LAFH score) were obtained as shown in fig 1. Participants / laymen were then asked to

score through VAS the 13 pictures for facial attractiveness.

Fig. 1: Set of pictures modified 1 mm (+6 to -6mm) for LAFH.

For laymen only those were included who were family members of patients reporting at Department of Orthodontics Children's Hospital, Lahore and consented. Those who reported time constrain were excluded.

Data Analysis:

VAS of all the participants were recorded in a standardized proforma, and SPSS Version 25 was used to analyse data. Arithmetic means and standard deviations were measured for each variable which is quantifiable.

Result

Sample size of 100 was used with equal distribution between both genders i-e 50 males and 50 females. Mean value of upper lip length and thickness was 25.58 ±3.10 and 23.66±2.31in males respectively. Females showed the mean upper lip length of 15.06 ±1.66 and thickness was found to be 10.93±1.99. Table I descriptive statistics.

Adjusted Pictures	N	Mean	S.D ±
-6	100	21.40	0.96
-5	100	23.40	0.82
-4	100	27.38	0.82
-3	100	39.44	0.88
-2	100	32.28	0.53
-1	100	47.36	0.16
0	100	65.92	0.19
1	100	67.70	0.27
2	100	34.94	0.16
3	100	31.14	0.94
4	100	26.06	0.72
5	100	40.04	0.32
6	100	43.50	0.59

Table I: Facial Attractiveness judged for altered LAFH

The unaltered and +1 images were most likable. Scores were found to be lower when the value changed by more than 2mm. Pictures with increased LAFH value, +5-mm and +6-mm images were found to be least likeable; and similarly pictures with decreased LAFH, -4mm -5mm -6mm images yielded the lowest scores as shown in table 1.

Discussion

This study and other studies used VAS to assess the Laymen perception of change in LAFH. VAS use has been widely accepted and especially in the era of artificial intelligence it has become quite helpful strategy.[3,19,23,24] However few studies have reported VAS results as subjective.[25,26]

Arnett and McLaughlin in their study related lower third of the facial height with facial attractiveness in both males and females This study also refers to the fact that people with or close to normal values of LAFH are considered to be most attractive. [27] Shoukat Ali U et al in one of their studies concluded that General dentists found decreased facial height unappealing. Orthodontic residents and laypersons considered increased LAFH/TAFH to be most unattractive.[5] Ali US et al in another study concluded that General dentists and orthodontic residents found normal LAFH to be the most attractive among Asian male.[6] Parul P et al in one of their studies concluded that Chin in addition to other facial determinants have a significant role in the attractiveness of face in skeletal Class I, II and III patients, their my stressing LAFH importance in pleasing faces.[1] Ren H et al in their study on facial attractiveness determinants found that laypersons evaluate, the chin as primary contributor to facial attractiveness.[2] These results are in line with results of this study where by normal LAFH is found be the most attractive in the eyes of laymen.

When LAFH increased by 2 mm, VAS values decreased significantly. When they were

increased by 3 mm and 4 mm, the difference in the VAS scores was not statistically significant. These results can be helpful in clinical practices to modify LAFH without effecting or decreasing facial attractiveness.

In a research done by Johnston et al.[17] people with decreased LAFH were considered to be more aesthetically pleasing. A study by Maple et al[19] described that altering LAFH has no effect on facial attractiveness. These outcomes are contrary to the results of this study.

Variables such as gender, age, education level[18,28], self-rated attractiveness, skills[13,26,27] and personal profile influence attractiveness scores.

Conclusion

The final outcome of study was lower facial height has a noteworthy effect on facial attractiveness.

Ethical Approval

The study was approved by the Institutional Ethical Review committee of Children Hospital Lahore, University of Child Health Sciences. (No. 25107/UCHS-CH)

Disclaimer

No external funding.

Conflict of Interest

It is declared that the authors don't have any conflict of interest.

Authors' Contribution

AA: Supervisor, Review and Editing, Proof Writing
AA: Data Collection and Data Entry
SQ: Data Analysis,
MB: Study Design and Methodology
SM: Data Interpretation
AR: Critical Evaluation

References

1. Parul P, Kumar M, Goyal M, Mishra S, Shaha K, Abrar M. Impact of facial components on the attractiveness of face: A perception-based study. Am J Orthod Dentofacial Orthop. 2022 Nov;162(5):e218-e229. doi: 10.1016/j.ajodo.2022.07.012. Epub 2022 Aug 26. PMID: 36031510.
2. Ren H, Chen X, Zhang Y. Correlation between facial attractiveness and facial components assessed by laypersons and orthodontists. J Dent Sci. 2021 Jan;16(1):431-436. doi: 10.1016/j.jds.2020.07.012. Epub 2020 Aug 13. PMID: 33384831; PMCID: PMC7770325.
3. Khanagar SB, Al-Ehaideb A, Vishwanathaiah S, Maganur PC, Patil S, Naik S, Baeshen HA, Sarode SS. Scope and performance of artificial intelligence technology in orthodontic diagnosis, treatment planning, and clinical decision-making - A systematic review. J Dent Sci. 2021 Jan;16(1):482-492. doi: 10.1016/j.jds.2020.05.022. Epub 2020 Jun 5. PMID: 33384838; PMCID: PMC7770284.
4. Kanavakis G, Halazonetis D, Katsaros C, Gkantidis N. Facial shape affects self-perceived facial attractiveness. PLoS One. 2021 Feb 3;16(2):e0245557. doi: 10.1371/journal.pone.0245557. PMID: 33534847; PMCID: PMC7857636.
5. Shoukat Ali U, Sukhia RH, Fida M, Kamal AT, Abbas A. The influence of incisor inclination and anterior vertical facial height on facial attractiveness in an Asian woman. Am J Orthod Dentofacial Orthop. 2021 Aug;160(2):283-291. doi: 10.1016/j.ajodo.2020.04.030. Epub 2021 May 15. PMID: 34006423.
6. Ali US, Sukhia RH, Fida M, Kamal AT, Abbas A. Influence of incisor inclination and anterior vertical facial height on facial attractiveness in an adult Asian male. Am J Orthod Dentofacial Orthop. 2022 Mar;161(3):381-389. doi: 10.1016/j.ajodo.2020.09.030. Epub 2021 Oct 9. PMID: 34635397.
7. Westfall RS, Millar MG, Lovitt A. The Influence of Physical Attractiveness on Belief in a Just World. Psychol Rep. 2019 Apr;122(2):536-549. doi: 10.1177/0033294118763172. Epub 2018 Mar 8. PMID: 29516778.
8. Urbatsch R. Things are looking up: Physical beauty, social mobility, and optimistic dispositions. Soc Sci Res. 2018 Mar;71:19-36. doi: 10.1016/j.ssresearch.2018.01.006. Epub 2018 Jan 31. PMID: 29514757.
9. Nellis JC, Ishii M, Papel ID, Kontis TC, Byrne PJ, Boahene KDO, Bater KL, Ishii LE. Association of Face-lift Surgery With Social Perception, Age, Attractiveness, Health, and Success. JAMA Facial Plast Surg. 2017 Jul 1;19(4):311-317. doi: 10.1001/jamafacial.2016.2206. PMID: 28301645; PMCID: PMC5519425.
10. Maxfield CM, Thorpe MP, Desser TS, Heitkamp DE, Hull NC, Johnson KS, Koontz NA, Mlady GW, Welch TJ, Grimm LJ. Bias in Radiology Resident Selection: Do We Discriminate Against the Obese

and Unattractive? Acad Med. 2019 Nov;94(11):1774-1780. doi: 10.1097/ACM.0000000000002813. PMID: 31149924.

11. Olsen JA, Inglehart MR. Malocclusions and perceptions of attractiveness, intelligence, and personality, and behavioral intentions. Am J Orthod Dentofacial Orthop. 2011 Nov;140(5):669-79. doi: 10.1016/j.ajodo.2011.02.025. PMID: 22051487
12. Parhad SM, Mhaske AR, Mahamuni A, Manerikar R, Fafat KK, Tekale PD. The Perceptions of Dental Professionals and Laypeople to Facial Aesthetics and Mal-Occlusion in Central India Population. J Pharm Bioallied Sci. 2023 Jul;15(Suppl 2):S927-S930. doi: 10.4103/jpbs.jpbs_286_23. Epub 2023 Apr 28. PMID: 37694049; PMCID: PMC10485541.
13. de Freitas LM, Pinzan A, Janson G, Freitas KM, de Freitas MR, Henriques JF. Facial height comparison in young white and black Brazilian subjects with normal occlusion. Am J Orthod Dentofacial Orthop. 2007 Jun;131(6):706.e1-6. doi: 10.1016/j.ajodo.2006.10.013. PMID: 17561045.
14. Ma Y, Jin Z. Orthodontic program design based on aesthetic. Hua Xi Kou Qiang Yi Xue Za Zhi. 2023 Dec 1;41(6):628-634. English, Chinese. doi: 10.7518/hxkq.2023.2023231. PMID: 38597026; PMCID: PMC10722447.
15. Godinho J, Gonçalves RP, Jardim L. Contribution of facial components to the attractiveness of the smiling face in male and female patients: A cross-sectional correlation study. Am J Orthod Dentofacial Orthop. 2020 Jan;157(1):98-104. doi: 10.1016/j.ajodo.2019.01.022. PMID: 31901288.
16. Cassetta M, Guarnieri R, Mezio M, Altieri F, Brandetti G, Padalino G, Di Giorgio R, Barbato E. Comparision of profile macro-estethic perception among orthodontists, dentistry students, orthodontic patients and surgical orthodontic patients. J Clin Exp Dent. 2020 Dec 1;12(12):e1109-e1116. doi: 10.4317/jced.57593. PMID: 33282130; PMCID: PMC7700782.
17. Johnston DJ, Hunt O, Johnston CD, Burden DJ, Stevenson M, Hepper P. The influence of lower face vertical proportion on facial attractiveness. Eur J Orthod. 2005 Aug;27(4):349-54. doi: 10.1093/ejo/cji023. Epub 2005 Jun 16. PMID: 15961569.
18. Cochrane SM, Cunningham SJ, Hunt NP. A comparison of the perception of facial profile by the general public and 3 groups of clinicians. Int J Adult Orthodon Orthognath Surg. 1999;14(4):291-5. PMID: 10895644.
19. Maple JR, Vig KW, Beck FM, Larsen PE, Shanker S. A comparison of providers' and consumers' perceptions of facial-profile attractiveness. Am J Orthod Dentofacial Orthop. 2005 Dec;128(6):690-6; quiz 801. doi: 10.1016/j.ajodo.2004.09.030. PMID: 16360907
20. Oh JH, Park JH, Cho HJ, Seo HY, Chae JM. A CBCT Evaluation of Esthetic Preference Regarding the Perceived Facial Attractiveness of Young Korean Female Adults with a Normal Skeletal Pattern. Sensors (Basel). 2022 Sep 25;22(19):7258. doi: 10.3390/s22197258. PMID: 36236357; PMCID: PMC9571629.
21. Milutinovic J, Aleksic E, Avramov S, Kalevski K, Gajic M, Pejanovic D, Milic J. Esthetic preferences of orthodontists, dentists, and plastic surgeons for balanced facial profiles. J Oral Sci. 2023 Mar 30;65(2):73-76. doi: 10.2334/josnusd.22-0396. Epub 2023 Mar 22. PMID: 36823034.
22. Van der Geld P, Oosterveld P, Kuijpers-Jagtman AM. Age-related changes of the dental aesthetic zone at rest and during spontaneous smiling and speech. Eur J Orthod. 2008 Aug;30(4):366-73. doi: 10.1093/ejo/cjn009. Epub 2008 Jul 16. PMID: 18632836.
23. P de Miranda BM, Gonçalez Miguel PT, Gonçalves FM, Costa DL, Bronholo TPM, Guariza-Filho O, Stechman-Neto J, Santos RS, Zeigelboim BS, de Araujo CM. Impact of dentofacial deformity on the chance of being hired for a job. Front Psychol. 2023 Dec 1;14:1037167. doi: 10.3389/fpsyg.2023.1037167. PMID: 38106396; PMCID: PMC10722433.
24. Naini FB, Donaldson AN, McDonald F, Cobourne MT. How does variation in lower anterior face height influence perceived attractiveness? A quantitative investigation. J Orthod. 2013 Sep;40(3):206-17. doi: 10.1179/1465313313Y.0000000051. PMID: 24009320.
25. Obwegeser D, Timofte R, Mayer C, Eliades T, Bornstein MM, Schätzle MA, Patcas R. Using artificial intelligence to determine the influence of dental aesthetics on facial attractiveness in comparison to other facial modifications. Eur J Orthod. 2022 Aug 16;44(4):445-451. doi: 10.1093/ejo/cjac016. PMID: 35532375.
26. Pereira D, Machado V, Botelho J, Lemos C, Mendes JJ, Delgado AS. Vertical Dentofacial Skeletal Divergency Is Not Linked with Oral Health-Related Quality of Life. J Clin Med. 2024 Jan 24;13(3):665. doi: 10.3390/jcm13030665. PMID: 38337358; PMCID: PMC10856730.
27. Arnett WG, McLauglin RP. *Facial and Dental Planning for Orthodontists and Oral Surgeons*. St Louis, Mo: Mosby; 2004:150–174.
28. Türkkahraman H, Gökalp H. Facial profile preferences among various layers of Turkish population. Angle Orthod. 2004 Oct;74(5):640-7. doi: 10.1043/0003-3219(2004)074<0640:FPPAVL>2.0.CO;2. PMID: 15529499.