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Comparison of Posterior Dental Heights and Lower Anterior Facial Height In Skeletal Class I With Different Growth Patterns: A Cephalometric Study.

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ABSTRACT

Measurements and geometry are used to establish the facial beauty and harmony. Vertical measurements in cephalometric analysis have been involved directly to facial esthetics that would enable a person to distinguish which dimension of face and teeth are responsible primarily for a pleasant or un pleasant face. The upper and the lower posterior dental heights greatly influences the lower anterior facial height. The aim of the study was to compare the upper and lower posterior dental heights and lower anterior facial heights in skeletal class I with different growth patterns. A sample of 60 lateral cephalograms were obtained from the Department of Orthodontics, Saveetha dental college, Chennai. The samples consists of 20 each of horizontal, average and vertical growth pattern of skeletal class I. The age of the patient ranged from 16- 32 years. Landmarks and planes used in this study are from cephalometrics for orthognathic surgery analysis. Results showed that the posterior dentoalveolar heights are significantly different between horizontal, average and vertical growth patterns and are significantly larger in male subjects than in females.

Keywords: Growth patterns, lower anterior facial height, upper posterior dental height, lower posterior dental height

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INTRODUCTION

Since ancient time, researchers have sought to solve the riddle of facial beauty and harmony through measurements and geometry[4]. The artists of the renaissance period, primarily da Vinci and Durer, established the proportions that should be used in drawing anatomically correct human faces. They concluded that the distance from the hairline to the base of the Nose, base of Nose to bottom of Nose, and Nose to chin should be the same. (William R Proffit) [1]. Facial height of adult subjects influences the facial type to a major extent. Tsunori et al.[2] reported that, facial type (short, average and long faces) in relation to morphological characteristics is an important factor to be considered in orthodontic treatment. Wylie and Johnson [3], in a 1952 study, reported that in well-balanced individuals, total facial height (nasion-menton) is divided into 45% of nasal height or upper facial height (nasion-anterior nasal spine) and 55% of dental height or lower facial height (anterior nasal spine-menton). Vertical measurements in cephalometric analysis have been involved directly to facial esthetics that would enable a person to distinguish which dimension of face and teeth are responsible primarily for a pleasant or un pleasant face. [4]

The upper and the lower posterior dental heights greatly influences the lower anterior facial height[11]. Excessive lower anterior face height (LAFH) is a frequent characteristic of many patients presenting with anterior open bite. However, not all long-faced patients have open bites and not all open bite patients are long faced[5]. The maxillary and mandibular molar dentoalveolar heights are found to be significantly greater than normal in long LAFH[5, 16-18]. In short LAFH, it is reported that the molar heights are smaller than normal in both jaws[6,19]. The maxillary molars contribute to the increase or decrease in vertical proportions. [4]

Therefore, it is of great importance to control the height of the posterior dento alveolar regions for the correction of vertical discrepancies. The proper diagnosis and classification of individual patients is of paramount importance for successful treatment planning in orthodontics.

The aim of the study was to compare the upper and lower posterior dental heights and lower anterior facial heights in skeletal class I with different growth patterns.

MATERIALS AND METHODS

A sample of 60 lateral cephalograms were obtained from the Department of Orthodontics, Saveetha dental college, Chennai. The samples consists of 20 each of horizontal, average and vertical growth pattern of skeletal class I. The age of the patient ranged from 16- 32 years.

Landmarks and planes used in this study are from COGS analysis. (Diag 1)

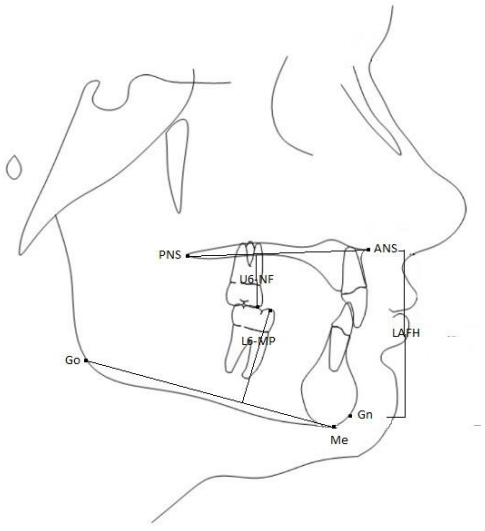

Diagram 1: Landmarks and planes used in this study are from COGS analysis

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LANDMARKS FOR MEASURING POSTERIOR DENTAL HEIGHTS:

Upper posterior dental height(UPDH):
Upper to NF – perpendicular line through the mesiobuccal cusp tip of the maxillary first molar to the nasal floor (NF)
Lower posterior dental height(LPDH):
Lower 6 to MP - perpendicular line through the mesiobuccal cusp tip of the mandibular first molar to the mandibular plane (MP)

LANDMARKS FOR MEASURING LOWER ANTERIOR FACIAL HEIGHT:

ANS- anterior nasal spine
Gn- Gnathion

Frankfort mandibular angle (angle between Frankfort horizontal plane and tangent to mandible) from Tweed's analysis is taken for measuring different growth patterns.

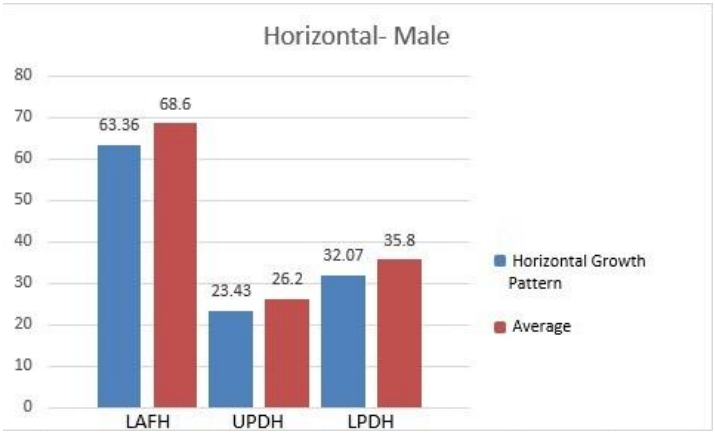
Mean and standard deviation were calculated for horizontal, average and vertical growth pattern groups, both male and females separately.

RESULT

Following results have been drawn from the comparison of posterior dental heights and lower anterior facial height(LAFH) in skeletal class I malocclusion.

Graph 1 shows reduced LAFH in horizontal growth pattern (male) with decreased upper posterior dental height and average lower posterior dental height
Graph 2 shows reduced LAFH in horizontal growth pattern (female) with average upper posterior dental height and reduced lower posterior dental height
Graph 3 shows average LAFH in average growth pattern (male) with average upper and lower posterior dental heights
Graph 4 shows average LAFH in average growth pattern (female) with average upper and lower posterior dental heights
Graph 5 shows increased LAFH in vertical growth pattern (male) with increased upper posterior dental height and average lower posterior dental height
Graph 6 shows increased LAFH in vertical growth pattern (female) with increased upper posterior dental height and average lower posterior dental height

GRAPH 1



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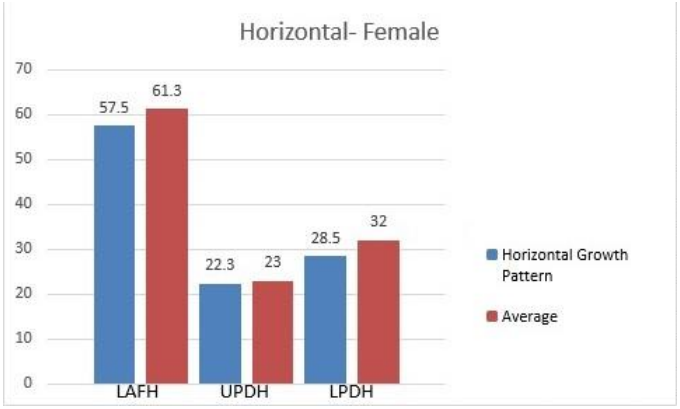
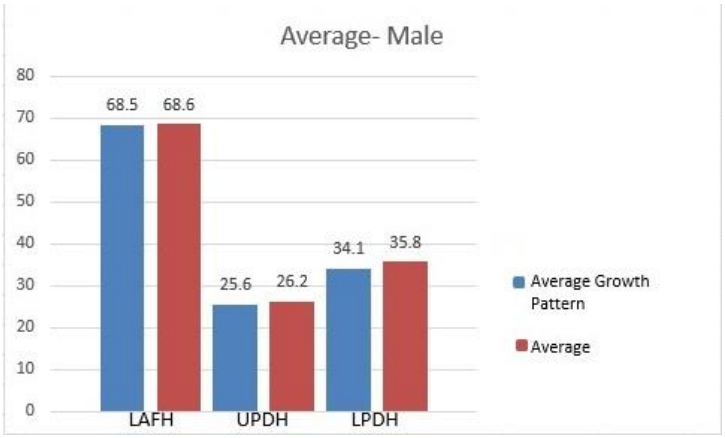
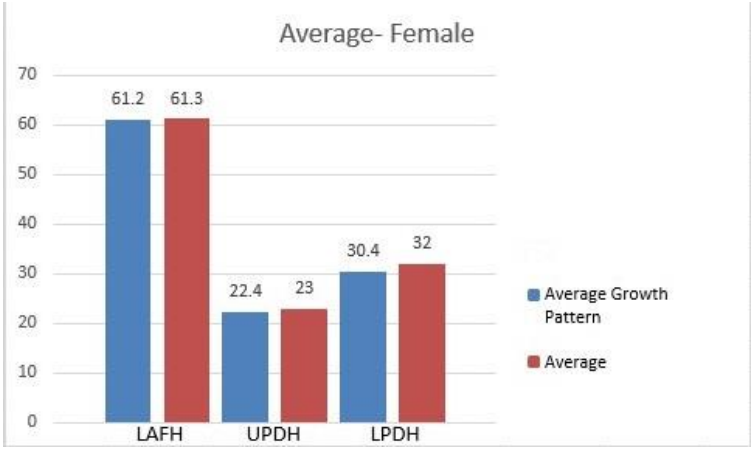
GRAPH 2



GRAPH 3



GRAPH 4



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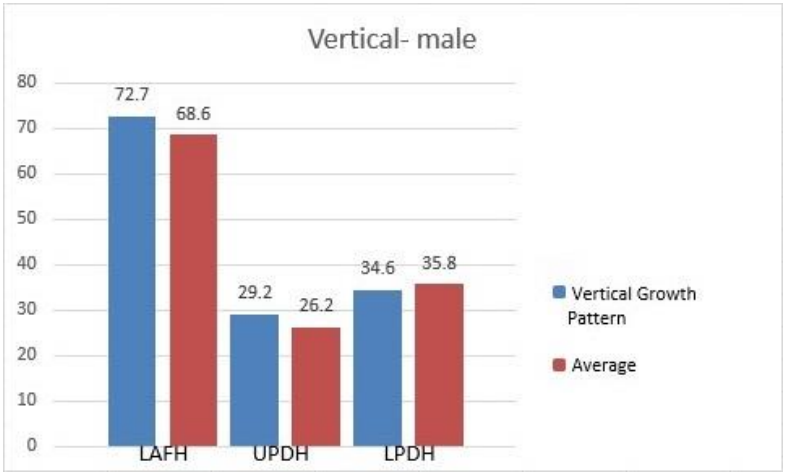
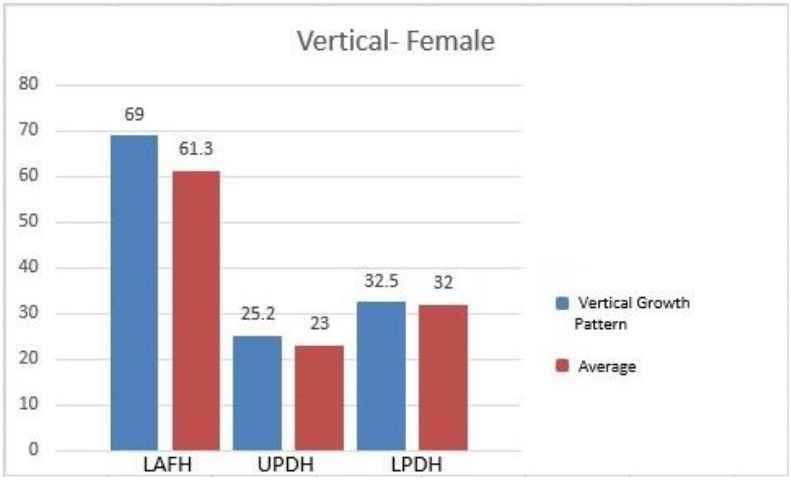
GRAPH 5



GRAPH 6



DISCUSSION

The description of the dentofacial relationship of people with normal and abnormal facial morphology is one of the most common subjects in orthodontic literature. [3,5-8] The vertical proportions of face are of importance from diagnosis and treatment planning point of view, Herzberg[9] and Herbert[10] have stressed the importance of facial proportions in the vertical plane. Isaacson et al[11], stated that the maxillary posterior alveolar process was found to be much more important than the posterior mandibular alveolar process in contributing to vertical development. In both low and average mandibular plane angle groups the mean mandibular height in the first molar area was essentially the same. In high angle cases, the mean mandibular molar height was increased by 3mm over the other groups. Although mandibular height does contribute to the increased vertical development of the high angle case, it is relatively less important. The results obtained in this study is similar to that of our study. Fields et al[7] observed that posterior dental heights were larger in the long face type and smaller in the short face type. All dentoalveolar heights were significantly greater in excess LAFH persons than in normal LAFH persons, confirming the results of previous work[5,7]. In the short LAFH group, all dentoalveolar heights were significantly shorter than in the normal LAFH group, with the exception of the LPDH. This is in agreement with Opdebeek and Bell[6].

In this study, the values of LAFH, UPDH & LPDH are compared with the mean values obtained by a study done by Charles.J.Burstone[13] (1978). UPDH were significantly greater in vertical growing persons with excess LAFH than in average growth pattern. In the horizontal growth pattern group, UPDH were reduced with normal LPDH in male groups and the female group showed normal UPDH with reduced LPDH. In average growth pattern,

the values of LAFH, UPDH, LPDH for both male and female coincides with the mean value of study done by Burstone for orthognathic surgery. The overall values for the lower anterior facial height(LAFH), upper posterior dental heights(UPDH) lower posterior dental height (LPDH), in the male subjects were significantly larger than that for the female subjects. This is similar to the study done by Ann Arbor and Burlington.

CLINICAL IMPLICATIONS

The findings of this study concludes a correlation between LAFH and dento-alveolar height. Since in the vertical relationships the proportions of the face are more important than absolute measurements, consideration should be directed to the LAFH and to the dento-alveolar height when planning treatment. Thus, in cases with increased LAFH, the dento-alveolar height will usually be increased as well, consequently extruding forces on the dentition should be avoided. Evaluation of environmental influences, such as airway obstruction, should also be performed because there is evidence that a severely obstructed airway is in some instances related to increased or increasing LAFH[12,14] On the other hand, cases with short lower anterior face height usually present a clear airway passage.[15] In these cases, the dentoalveolar height is also decreased and extrusive forces can and sometimes have to be used to improve the vertical relationships, provided a differential diagnosis of the cause of the short lower face height indicates that the causative factor can be eliminated or modified.

CONCLUSIONS

- The posterior dentoalveolar heights are significantly different between horizontal, average and vertical growth patterns
- Dentoalveolar heights, are significantly larger in male subjects than in females
- In horizontal growth pattern, reduced LAFH is more influenced by decreased UPDH in male subjects. Whereas in female, LPDH seems to be influenced for the reduction in LAFH
- In average growth pattern groups, both male and female subjects shows average values of LAFH, UPDH, LPDH
- In vertical growth pattern, increased LAFH is more influenced by increased UPDH in both male and female subjects.

REFERENCES

[1] William R.Proffit ,Contemporary orthodontics 4th edition
[2] Tsunori M, Mashita M, Kasai K. Relationship between facial types and tooth and bone characteristics of the mandible obtained by CT scanning. Angle Orthod 1998;68:557-562.
[3] Wylie WL, Johnson EL. Rapid evaluation of facial dysplasia in the vertical plane. Angle Orthod 1952;22:165-182.
[4] AM Deoghare, Pankaj Akhare, Rohit Patil, Amanish Singh Shinh. Comparison of Incisor, Molar and Anterior facial height in Normal, Angle class II Division 1 and Class III malocclusion: A Cephalometric study. The journal of indian orthodontic society, October- December 2012;46(4):304-307
[5] Schendel SA, Eisenfeld J, Bell WH, Epker BN, Mishelevich DJ. The long face syndrome: vertical maxillary excess. Am J Orthod 1976;70:398-408.
[6] Opdebeeck H, Bell WH. The short face syndrome. Am J Orthod 1978;73:499-511.
[7] Fields HW, Proffit WR, Nixon WL, Phillips C, Stanek E. Facial pattern differences in long-faced children and adults. Am J Orthod 1984;85:217-223.
[8] Scheidman GB, Bell WH, Legan HL, Finn RA, Reisch JS. Cephalometric analysis of dentofacial normals. Am J Orthod 1980;78:404-420.
[9] Herzberg F, Holic R. An anthropological study of face height. Am J Oral Surgery 1943;29:90-100
[10] Herbert AL. A cephalometric radiographic evaluation of face height in adult males with excellent occlusion of teeth. Am J Orthod 1956;42:794
[11] John R. Isaacson, Robert J. Isaacson, T.Michael Speidel, Frank W. Worms, Extreme variation in vertical facial growth and associated variation in skeletal and dental relations. The Angle Orthodontist: July 1971, Vol. 41, No. 3, pp. 219-229.
[12] Woodside DG, Linder-Aronson S. The channelization of upper and lower anterior face heights compared to population standard in males between ages 6 to 20 years. Eur J Orthod 1979;1:25- 41.
[13] Charles J Burstone et al. cephalometrics for orthognathic surgery; J Oral Surgery Vol 36, April 1978

[14] Woodside DG, Linder-Aronson S. Progressive increase in lower face height and the use of posterior occlusal bite-block in its management. In: Graber, LW, ed. Orthodontics--state of the art, essence of the science. St Louis: CV Mosby, 1986:200-21.
[15] Linder-Aronson S, Woodside DG. Some craniofacial variables related to small or diminishing lower anterior face height. Swed Dent J (Suppl) 1982;15:131-46.
[16] Bell WH, Creekmore TD, Alexander RG. Surgical correction of the long face syndrome. AM J Orthod 1977;71(I):40-67.
[17] Epker BN, Fish LC. Surgical-orthodontic correction of open bite deformity. AM J Orthod 1977;71(3):278-99.
[18] Fish LC, Wolford LM, Epker BN. Surgical-orthodontic correction of vertical maxillary excess. Am J Orthod 1978;73(3):241- 57.
[19] Bell WH. Correction of the short-face syndrome vertical maxillary deficiency: a preliminary report. J Oral Maxillofac Surg 1977;35:110-20.