International Journal of Applied and Advanced Scientific Research (IJAASR)
Impact Factor: 5.655, ISSN (Online): 2456 - 3080
(www.dvpublication.com) Volume 3, Issue 1, 2018

CRANIOFACIAL MEASUREMENTS IN MAHARASHTRA POPULATION - A CEPHALOMETRIC STUDY

Supriya P. Satpute*, Vasudha R. Nikam, Tohid R Mujawar*** & Manjiri Desai******

* Ph.D Student, D.Y Patil Medical College, Kolhapur, Maharashtra
** Professor & Head, Department of Anatomy, D.Y Patil Medical College, Kolhapur, Maharashtra
*** Consultant, MDS (Orthdontics)
**** Statitian, PSM Department, D.Y Patil Medical College, Kolhapur, Maharashtra

Cite This Article: Supriya P. Satpute, Vasudha R. Nikam, Tohid Mujawar & Manjiri Desai, "Craniofacial Measurements in Maharashtra Population - A Cephalometric Study", International Journal of Applied and Advanced Scientific Research, Volume 3, Issue 1, Page Number 257-260, 2018.

Abstract:

The aim of the study was to establish cephalometric standards in adult Maharashtra population. The present study included 100 males (age between 18-25 years) and 100 females (age between 18-25years).All individuals included in the study were residing in Maharashtra since their three to four generations. All subjects had class I malocclusion and normal growth and development. Maxillary and Mandibular arches were well aligned in all participants. Bony landmark used were Nasion(N), Sella(S), Gonion(Go), Pogonion(Po), Gnathion (Gn), Articulare(Ar) and Menton(Me). With the help of these landmarks, Anterior facial height (AFH), Posterior facial height (PFH), Anterior cranial base (ACB), Posterior Cranial Base (PCB), Facial angle, Saddle angle and Facial height ratio (FHR) were studied. The present study showed significant difference in gender dimorphism.

Key Words: Craniofacial, Cephalometry, Maharashtra Population, Gonion, Nasion & Sella

Introduction:

Cephalometry is one of the branch of Anthropometry and it is concerned with measurement of head and face. Measurement of human body are strongly affected by gender, age, race, ethnicity, ecological and geographical factors. The knowledge of cephalometry can be useful in oral surgery, plastic surgery and forensic medicine. A balanced and beautiful face and normal alignment of maxillary and mandibular arches has been encountered as the most important desired result of orthodontic treatment.[1,2] To achieve these desired results, a knowledge of normal craniofacial measurements is essential[1]. Knowledge of the normal craniofacial measurements of adults in various racial and ethnic groups is also important for treatment of various facial deformity, planning of dentomaxillary surgeries and research. According to Hwang et al[3], various research work has been done to examine the difference of the craniofacial parameters among various population, including African Americans[4], Africans[5], Chinese[6], Japanese[7], Koreans[8],Indians[9], Saudi Arabians[10], Mexican Americans[11], Brazilians[12].It has been established from research work of various authors that there are differences in various groups[14]. So it has become necessary to establish standard measurements for various population. Therefore, the present study was undertaken to develop standard norms for cephalometric measurements in Maharashtra population.

Material and Method:

The present study included lateral cephalograms of 100 males and 100 females. The age of all participants ranged between 18 to 25 years. Informed consent was obtained from all participants involved in the study. Ethical approval was obtained from Ethical committee of D.Y. Patil University (Deemed to be University), Kolhapur.

Inclusive Criteria:

- ✓ Participants were living in Maharashtra since their 3-4 generations.
- ✓ Angle's class I molar relationship
- ✓ With permanent dentition

Exclusion Criteria:

- ✓ Congenital facial defects
- ✓ History of major orthodontic treatment
- ✓ Facial asymmetry
- ✓ History of trauma or major/plastic surgery

Lateral cephalograms were obtained from Vasantdada Dental College, Kaulapur, Sangli. All cephalograms were taken on the same cephalostat with teeth in occlusion and head oriented to Frankfort Horizontal plane from a fixed distance of 60 inches with standard procedures used in department of Orthodontics, Vasantdada Dental College, Sangli. Then after tracing the radiographs, various bony landmarks like Nasion (N), Sella (S), Gonion (Go), Pogonion (Po), Gnathion (Gn), Articulare (Ar) and Menton (Me) were marked according to Jarabak's Analysis. Then with the help of these landmarks linear and angular measurements were measured to the nearest of 0.5 mm and 0.5 degree, respectively with the help of a scale and protractor.

The various parameters used for the study were as follows-
Anterior Facial Height (AFH) - The linear distance between Nasion (N) and Menton (Me)
Posterior facial height (PFH) - The linear distance between Sellaturcica (S) and Gonion (Go)
Anterior cranial base (ACB) – The horizontal distance from Sellaturcica to anterior point of frontonasal suture.
Posterior cranial base (PCB) – The horizontal distance from Sellaturcica to Articulare
Facial angle- Angle between S-N and N-Pog
Saddle angle- angle between S-N and S-Ar
Facial Height Ratio (FHR) - PFH/AFH*100

Figure 1: Position of subject in Cephalostat

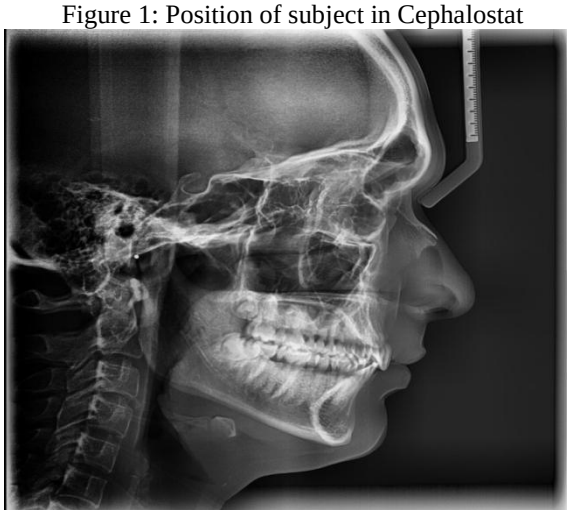

Figure 2: Lateral Cephalogram

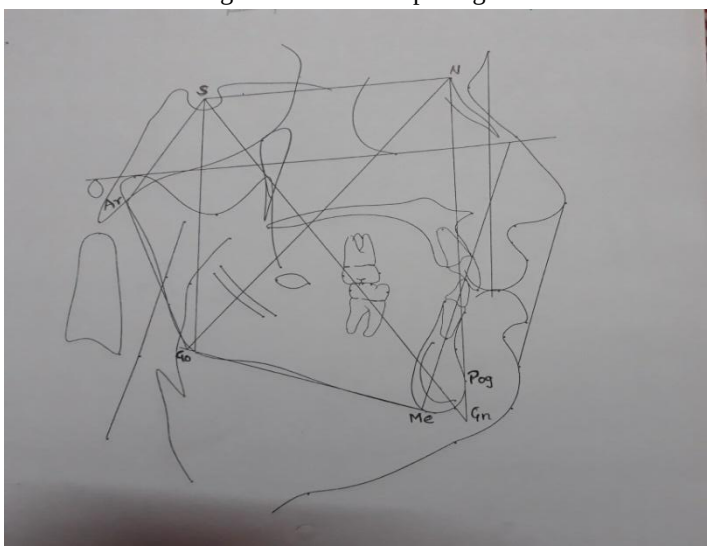

Figure 3: Landmarks and linear measurements

Statistical Analysis:

Data were analyzed statistically. Various vertical skeletal parameters were correlated by means of Pearson Correlation. Correlations among various skeletal parameters were also determined separately for males and females. Master chart and Tables are prepared by using MS Excel- 2007. All quantitative variables are compared by using unpaired 't' test. To determine correlation, Karl Pearson's correlation coefficient is used. Data is analysed by using SPSS (version 23). P<0.05 is considered statistically significant.

Observation:

The findings are presented in the following tables showing mean, SD, p- value and correlation of FHR with other Cephalometric variables.

Table 1

Variable		Mean	SD	p-value	
Ant. Facial height (AFH)	M	120.85	13.32	0.0001**	Highly significant
	F	111.3	16.54		
Post. Facial height (PFH)	M	91.45	12.98	0.0001**	Highly significant
	F	80.77	13.11		
Facial Angle	M	85.36	5.97	0.010*	Significant
	F	82.63	8.74		
Facial Height Ratio (FHR)	M	75.12	6.14	0.0001	Highly significant
	F	71.65	5.52		
Ant. Cranial base (ACB)	M	74.23	6.60	0.0001**	Highly significant
	F	69.75	7.00		
Post. Cranial base (PCB)	M	40.40	5.68	0.0001**	Highly significant
	F	35.99	5.93		
Saddle angle	M	124.04	5.76	0.012*	Significant
	F	120.67	11.84		

*-significant, **-highly significant

Table 1 shows statistically significant difference in gender dimorphism for Maharashtra population. Regarding anterior facial height and posterior facial height were highly significantly (p<0.0001) greater in Maharashtrian males. Facial angle also shows significant difference (p<0.010) between males and females being greater in Maharashtrian males. The facial height ratio is significantly (p<0.0001) increased in males. The present study shows significantly higher values for anterior and posterior cranial base in males. The study also shows significantly greater values for Saddle angle in males. Maharashtrian males have more tendency to be hypodivergent, so they are more prone to horizontal growth of face.

Table 2

Parameters	Male	Female	Total
Anterior Face Height	0.09	0.29*	0.32*
Posterior Face Height	0.37*	0.73*	0.75*
Facial Angle	0.72**	0.42	0.45*
Anterior Cranial Base	0.45**	0.41	0.47
Posterior Cranial Base	0.48**	0.57	0.57

*-significant, **-highly significant

Table 2 shows correlation of FHR with other variables. Anterior Facial Height shows significant positive correlation with FHR in females and in total sample. There is significant positive correlation between Posterior facial height and FHR. Facial angle, Anterior Cranial Base, Posterior Cranial Base shows highly significant correlation with FHR in Maharashtra males.

Discussion:

Previous studies had shown that establishment of facial measurements for different ethnic groups and races is needed to carry out different Dentofacial treatments and surgeries[13]. The present study showed significant gender difference in anterior and posterior facial heights. Males shows high values of anterior and posterior heights and it was similar to Egyptian sample[14], These findings agree with those of Hashim and AlBarakati[15] and Scheidman et al.[16]. Bishara and Fernandez[2] found significantly higher values for males in three bony linear measurements describing the anterior and posterior faces—N-ANS, N-Me, and S-Go. Miyajimaet al.[17] indicated that, in a Japanese population, there were significant bony differences between male and female subjects. Japanese women showed vertically oriented facial angles. The present study shows slightly higher values for anterior facial height when compared to Malaysian Indians[18].Also Maharashtra males showed larger anterior and posterior cranial bases that indicates larger cranial base which is similar to findings of Bishara et al and Huda M Abu[19] who had carried out work in sample of Emirates Adults.

Conclusion:

Dentofacial surgery is becoming more attributable today in the treatment of adult patients with various facial abnormalities. Currently, the cephalometric measurements used for assessment of prognosis, diagnosis and the treatment planning are those for the Caucasian population, and thus, all patients, irrespective of their race, gender and ethnicity, are treated by these already existing standards. The present study establishes surgically useful cephalometric measurements for the diagnosis and treatment planning of Dentofacial surgery in adult Maharashtrian population for its practical implementation in the treatment of the facial abnormality. Thus, the study reveals some of the cephalometric parameters in the Maharashtrian population which are significantly different in male and female. These racial and gender differences are distinct in this study and can be used clinically. The present study supports the view that standard craniofacial parameters of specific population should be used as a guide for successful Dentofacial treatments. Feature of this analysis is to assist anterior and posterior facial height relationship and to predict the direction of growth in the lower face.

References:

1. Bishara SE, Jacobsen JR, Hession TJ, Treder JE. Soft tissue profile changes from 5 to 45 years of age. Am J Orthod Dentofacial Orthop1998; 114:698-706.
2. Bishara SE, Fernandez AG. Cephalometric comparisons of the dentofacial relationships of two adolescent populations from Iowa and Northern Mexico. Am J Orthod1985; 88:314-22.
3. Hwang HS, Kim WS, McNamara JA. Ethnic differences in the soft tissue profile of Korean and European-American adults with normal occlusion and well-balanced faces. Angle Orthod2002; 72:72-80.
4. Fonseca RJ, Klein WD. A cephalometric evaluation of American Negro women. Am J Orthod1978; 73:152-60.
5. Bacon W, Girardin P, Turlot JC. A comparison of cephalometric norms for the African Bantuand a Caucasoid population. Eur J Orthod1983; 5:233-40.
6. Cooke MS, Wei SHY. Cephalometric "standards" for the southern Chinese.Eur J Orthod1988; 10:264-72.
7. Uesato G, Kinoshta Z, Kawamoto T, Koyama I, Nakanishi Y. Steiner cephalometric norms for Japanese and Japanese Americans. Am J Orthod1978; 73:321-7.
8. Park IC, Bowman D, Klapper L. A cephalometric study of Korean adults. Am J Orthod Dentofacial Orthop 1989; 96: 54-9.
9. Nanda R, Nanda RS. Cephalometric study of the dentofacial complex of North Indians. Angle Orthod1969; 39:22-8.
10. Shalbhoub SY, Sahran OA, Shaikh HS. Adult cephalometric norms for Saudi Arabians with a comparison of values for Saudi and North American Caucasians. Br J Orthod 1987; 14:2739.
11. Swlerenga D, Oesterle LJ, Massersmith ML. Cephalometric values for adult Mexican-American. Am J Orthod Dentofacial Orthop1994; 106:146-55.
12. Cerci V, Martins JE, de Oliveira MA. Cephalometric standards for white Brazilians. Int J Adult OrthodOrthognathSurg1993; 8:287-92.
13. Siriwat PP, Jarabak JR. Malocclusion and facial morphology- is there a relationship? An epidemiologic study. Angle Orthod. 1985; 55:127–38.
14. Farkas LG, Katic MJ, Forrest CR, Alt KW, Bagic I, Baltadjiev G, et al. International anthropometric study of facial morphology in various ethnic groups/races. J CraniofacSurg2005; 16:615–46.
15. Hashim, H.A. and Al Barakati, S.F. (2003) Cephalometric soft tissue profile analysis between two different ethnic groups: A comparative study. Journal of Contemporary Dental Practice, 2, 60-73.
16. Scheideman, G.B., Bell, W.H., Legan, H.L., Finn, R.A. and Reisch, J.S. (1980) Cephalometric analysis of dentofacial normals. American Journal of Orthodontics, 78, 404-420.
17. Miyajima, K., McNamara, J.A. Jr, Kimura, T., Murata, S. and Iizuka, T. (1996) Craniofacial structure of Japanese and European-American adults with normal occlusions and well-balanced faces. American Journal of Orthodon-tics & Dentofacial Orthopedics, 110, 431-438.
18. Ngeow WC, Aljunid ST. Craniofacial anthropometric norms of Malaysian Indians. Indian J Dent Res 2009; 20:313-8.
19. Cephalometric norms for a sample of Emirates adults, Huda M. Abu-Tayyem, Amna H. Alshamsi, Sayed Hafez, Scietific Research, PP. 75-83, DOI: 10.4236/ojst.2011.13013
20. Craniofacial characteristics of different growth patterns of Malwa Population, Sandhya Jain, Mragendra Raka. Journal of Pierre Fauchard Academy (India Section), Volume 30, Issues 3–4, September–December 2016, Pages 78-83