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COMPARISION OF PAKISTANI AND CAUCASIAN CEPHALOMETRIC VALUES ACCORDING TO STEINER'S ANALYSIS

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ABSTRACT:

Introduction: Variations between and within different ethnic population exists when it comes to shape, size, color and numbers. This variation also applies to the analysis used to measure Cephalometric norms1,2,3,9.This study was conducted to establish Pakistani norms or standards of young adults for skeletal and dental pattern of cephalometric values and compare it with Caucasian norms using Steiner's analysis

Method: Lateral cephalograms were obtained, traced and measured from 67 Pakistani young adults. Seven linear measurements and five angular measurements were done. Mean of all the values were calculated and compared to Caucasian norms using Steiner's analysis

Results: All the skeletal values of Pakistani young adults are almost same as in Caucasians except in the anterior lower facial region(hard and soft tissue) namely UINA & LINB (angle and distance) S line to upper and lower lip region and inter-incisor angle

Discussion : The result showed that significant differences are present between Pakistani and Caucasian norms in anterior dental and soft tissue region where all the values i.e. UINA angle and distance LINB angle and distance S-line to upper and lower lip are higher in Pakistani population indicating a more prevalence of bimaxillary protrusion and more procumbent lip form.

Implications for practitioners: There are several skeletal and dental differences among different population and ethnicities and those normal measurements of one group cannot be considered normal for other ethnic groups .Pakistani norms established by this study can be used as guidelines for diagnosis and treatment planning in this part of the world instead of using Caucasian norms

Key words: Steiner's analysis comparison between Pakistani and Caucasian cephalometric values

INTRODUCTION:

Cephalometric radiography was first introduced in cephalometric study in 1931 (Broadbent, 1931; Hofrath,. 1931).[1] At first it was used to study growth and development, later on it was used to study facial forms and gradually extended to development of cephalometric norms to define the objectives of orthodontic treatment. Down ,steiner and Tweed all developed cephalometric norms and analyses in an attempt to define the skeletal characteristics of good face and good occlusion.[1,2] Most of the studies conducted were on white Caucasians and with time it was apparent that standard value of one population or ethnic group cannot be applied to the other, i.e. Need for different standard values of all the ethnic groups arose.[1,3] The cephalometric norms for Caucasians for many decades were being applied on the population groups all over the world. But with time many investigators

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concluded that there was variation of the craniofacial morphology between different ethnic groups.[10]

Chan's on Chinese, Garcia [2] on Mexican American[2] ,Drummond's [3] on Negroes and Park's on Korean[4],adults have indicated that normal measurements of one group cannot be considered normal for other ethnic groups .Investigators such as Fujiomiura [5] in japan and Carlos J Garcia in USA6have established their norms on the bases of Steiner's analysis

Following objectives are aimed to be accomplished by this study Establishment of skeletal and dental parameters for Pakistani young adults using Steiner's analysis Pakistani normal occlusion subjects9Comparison of Cephalometric mean values of Pakistani population with the Caucasian norms, all the measurements are computed statistically and the means are compared using SPSS version 1611

MATERIALS AND METHODS:

The material for this study consisted of standardized lateral head cephalograms of 67 Pakistani male and females selected from 500 patient pool of the orthodontic department at DIKIOHS (DOW UNIVERSITY OF HEALTH SCIENCES) Karachi, Pakistan.

Normal acceptable and pleasing profile age 15 onwards, Angle class I molar relationship with minimum crowding /spacing/rotations, full complement of erupted teeth up to 2nd molar teeth in proper intercuspation with no history of orthodontic treatment , gross carious teeth, periodontal disease or facial trauma .Overjet and over bite values within the acceptable values.[8,9,10]

The lateral cephalograms were taken on a standard cephalostat at 5 feet source to object distance at 75 Kvp and 10 mA with exposure time of 1.25 s, trophy radiologic orthopantomography machine (ROTOGRAPH EVO D , VILLA SISTEMI MEDICALI) with a filter wedge.[1]

The films from 10 % patients were then traced manually twice with interval of 4 weeks by same operator to check any errors. The midline of double contour bilateral structures was drawn to minimize error caused by head positioning and facial asymmetry.[1] Angular and linear measurements were taken to the nearest 0.05° or 0.05 mm on lead acetate sheets with extra smooth finish pencil with a diameter of 0.3 mm.13 The films were taken with teeth in centric (habitual) occlusion with lips relaxed13For cephalometric application, the distance between the x-ray source and the mid-sagittal plane is 152.4 cm (60 inches)1. The central ray is directed towards the external auditory meatus and perpendicular to the plane of the film used and the mid-sagittal plane.[1]

Angular measurements [8] taken were SNA, SNB, ANB, UINA, LINB, INTERINCISAL, OCCLUSION TO SN, GoGn TO SN

Linear measurement (mm)[8] taken were UINA, LINB, Pog to NB LINE, UPPER LIP

TO S LINE, LOWER LIP TO S LINE,POG TO NB,HOLDAWAY RATIO

Mean and Standard deviation of all the values are compared using SPSS 16.13

RESULTS:

Significant difference is noted between Pakistani and Caucasian norms [8,9,10] in anterior dental and soft tissue region where all the values i.e. UINA angle and distance LINB angle and distance S-line to upper and lower lip are higher in Pakistani population indicating a more prevalence of bimaxillary protrusion and more procumbent lip form.

Parametres	Caucasian norms	Sample mean	SD
SNA	82.01	81.06	3.26
SNB	79.97	78.14	3.31
ANB	2	2.89	1.25
UINAmm	4	7.61	3.25
UINAangle	22	29.28	7.91
LINBmm	4	6.16	2.24
LINBangle	25	28.98	6.91
Po.Nb.mm	Not established	3.10	2.05
I.I	131	118	1.35
Occ.SN	14	16.25	4.40
GOGN.SN	31.73	30.98	5.42
S.UL	0.00	-0.06	2.38
S.LL	0.00	1.12	2.36

N=67

DISCUSSION:

In human beings, the lower face serves not only in the interest of digestion, speech and respiration, but it also influences to a large extent the social acceptance and psychological well-being of the individual. Appearance therefore is one of the primary functions of the face. Variations between and within different ethnic population was reported previously, which differs with factors such as age, sex and racial origin.[12] Superimposed on these factors are those characteristics that are unique for each individual. Because of such inherent variations, standards developed for any population should be used only as a reference line and not as absolute values.

Orthodontists in Pakistan as in any country use cephalometry as part of the diagnosis for treatment planning the analysis are based on cephalometric norms established for populations of other countries.[4,5.6.7] We think that the norms are not suitable for Pakistani orthodontic patient. Pakistani population originates from different ethnic backgrounds and may differ for white population for which seiner and downs had set their standards.

Researchers all over the world tried to establish cephalometric values for various ethnic groups and their results shows that there are several differences between different ethnicities in several parameters Taylor and Hitchcock's9 study showed that differences are also present among white American population. [5,6,7]

The present study tries to establish a norm or standard for the skeletal and dental pattern of Pakistani young adults according to Steiner's analysis.[8] The results were compared with Steiner's norms of Caucasian samples.[9]

Cephalometrically nine angular and five linear measurements were used by Steiner's.[9] The Steiner's parameters for Caucasians samples have been taken from Cecil .C.Steiners original article "Cephalometric for you and me "published in American journal of orthodontics October 1953.[8] The present study revealed that mean values for the Pakistani sample were significantly different in all measurable values from mean of Steiner's analysis of Caucasians

CONCLUSION:

In view of the current findings of this study it is evident that Pakistani populations with aesthetically and skeletally balanced face or within the normal range have some fundamental variations when compared to Steiner's norms of Caucasians. These should be established to serve in the diagnosis and treatment of Pakistani patients. The result of this study also support the view that single standard of facial aesthetics should not be supplied to all racial and ethnic groups. Difference in result may be due to the collection of sample from the pool of patients coming for orthodontic treatment in DIKIOHS where even the most pleasing and balanced face must have some dental and/or skeletal issue that brought him/her for the orthodontic treatment .

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