

# Cephalic Circumference and Mesio-Distal Width of Maxillary Central Incisor (A Correlation Analysis)

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## ABSTRACT:

### OBJECTIVE:

The objective of this study is to re-establish the maxillary front teeth in amicability with the facial appearance. Be that as it may, there is minimal logical information in the dental literature to use as a guide for characterising the best possible size and state of front teeth or deciding typical connections for them.

### AIM:

The aim of this study to estimate the maximum circumference of the head in the study subjects. To estimate the mesio-distal width of the maxillary right central incisor in the study subjects. To evaluate the correlation between the head/cephalic circumference and mesio-distal width of the maxillary right central incisor.

### BACKGROUND:

Esthetics is the essential thought for patients looking for prosthetic treatment. The size and type of the maxillary front teeth are vital to dental style as well as to facial esthetic. Many studies have been done to determine the Correlation between the cephalic circumference and mesio-distal width of maxillary right central incisor in other populations using various methods.

### METHODOLOGY:

A cross sectional study involving 100 adult dentate human subjects following the inclusion and exclusion criteria were selected for this study. A total of 100 subjects reporting to Saveetha dental college were screened and 100 subjects (50 males & 50 females) were included for the study.

### RESULTS:

The mean and standard deviation of cephalic index of the head for males =  $52.6078 \pm 1.0784$  The mean and standard deviation of cephalic index of the head for females =  $51.6 \pm 0.9035$  The mean and standard deviation of the maxillary central incisor in males =  $0.862 \pm 0.0696$  The mean and standard deviation of the maxillary central incisor in females =  $0.888 \pm 0.0848$  The variables X and Y were subjected to Karl Pearson's correlational analysis and correlation coefficient r was calculated.

### CONCLUSION:

A strong correlation was observed between the cephalic circumference and the mesio-distal width of maxillary central incisor could be used as a potential tool for facial reconstruction in prosthetic, surgical and forensic specialities.

### INTRODUCTION:

Esthetics is the essential thought for patients looking for prosthetic treatment. The size and type of the maxillary front teeth are vital to dental style as well as to facial esthetic. The objective is to re-establish the maxillary front teeth in amicability with the facial appearance. Be that as it may, there is minimal logical information in the dental literature to use as a guide for characterising the best possible size and state of front teeth or deciding typical connections for them <sup>[1]</sup>. As per Young "it is evident that excellence, congruity, instinctive nature, and distinction are major qualities" of esthetics <sup>[2]</sup>. The causes of dental crowding are still not fully understood, but they may be rooted in an evolutionary trend toward reduced facial volume without a proportional reduction in tooth size <sup>[3]</sup>. Most previous studies conducted among primates have revealed a very low or nonexistent correlation between tooth size and jaw size <sup>[4,5]</sup>. It has been shown that, as human populations transitioned from a hunter-gatherer lifestyle to an agricultural one, there was a consistent shift toward a shorter and broader mandible <sup>[6]</sup>. Thus, dental crowding could occur as a result of the increased processing of modern foods and thus a reduced need for powerful masticatory action <sup>[7]</sup>.

### INCLUSION CRITERIA:

Adults subjects aged between 18 to 25 years, Both the genders, Intact bilateral maxillary central incisor, Class-1 canine occlusion, Willingness to participate in the study.

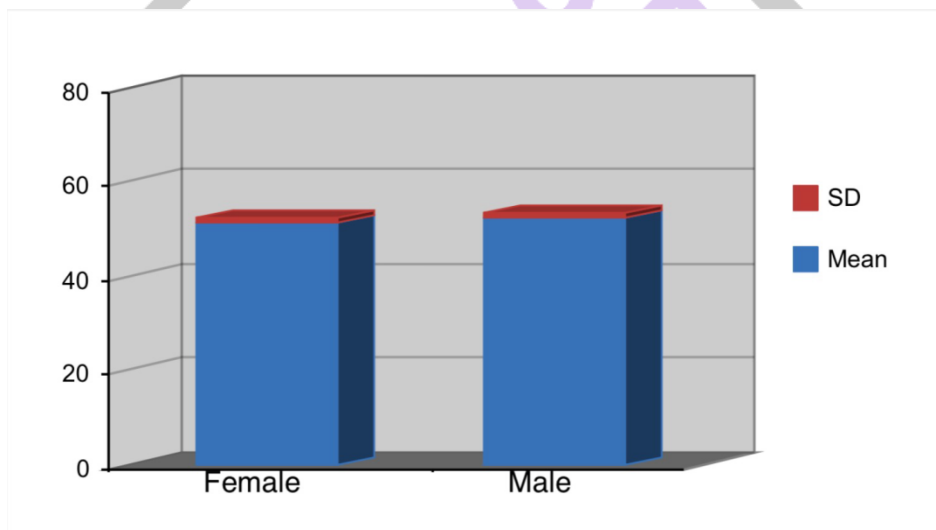
**EXCLUSION CRITERIA:**

Patient with developmental abnormalities involving the Face and Head, Paget's disease, Hormonal abnormalities, Fractured central incisor, Central incisors restored with full crowns, Microdontia of central incisor and patients with diastema.

**RESULTS:**

The mean and standard deviation of cephalic index of the head for males =  $52.6078 \pm 1.0784$  The mean and standard deviation of cephalic index of the head for females =  $51.6 \pm 0.9035$  The mean and standard deviation of the maxillary central incisor in males =  $0.862 \pm 0.0696$  The mean and standard deviation of the maxillary central incisor in females =  $0.888 \pm 0.0848$  The variables X and Y were subjected to Karl Pearson's correlational analysis and correlation coefficient r was calculated. A strong correlation was observed between X and Y in males with a correlation coefficient  $r = 0.99$  and the coefficient of determination  $R^2 = 0.98$ . A strong correlation was observed between X and Y in females with a correlation coefficient  $r = 0.99$  and coefficient of determination  $R^2 = 0.98$ .

Groups	Mean	N	Std. Deviation
1.00	53.9800	100	2.60915
2.00	.8750	100	.07833
Total	27.4275	200	26.68273



Correlations

		Values	Groups	
Values	Pearson Correlation	1	-.998**	
	Sig. (2-tailed)		.000	
	N	200	200	
	Bias		0	.000
		Std. Error	0	.000
	Bootstrap <sup>b</sup>	95% Confidence Interval Lower	1	-.998
		95% Confidence Interval Upper	1	-.997
		Pearson Correlation	-.998**	1
	Sig. (2-tailed)	.000		
	N	200	200	
Groups	Bias	.000	0	
		Std. Error	.000	0
	Bootstrap <sup>b</sup>	95% Confidence Interval Lower	-.998	1
		95% Confidence Interval Upper	-.997	1

**DISCUSSION:**

Rose and Roblee favoured the explanation that reduced chewing stress in childhood produced jaws that were too small for the teeth, despite the ubiquitous trend in tooth size reduction<sup>[8]</sup>. Kelley and Larsen suggested a strong association of alveolar bone growth with the functional stimulation of chewing forces. This work included measurements of bite-force variation between generations of Eskimos and animal studies showing changes in mandibular growth of rats and primates between groups that ate hard or soft diets<sup>[9]</sup>. Diet-associated reduction in chewing stress was found to result in decreased growth of the mandibular and maxillary arches and, in animal studies, in both facial reduction and increased malocclusion in the low-force groups<sup>[9]</sup>.

Dunn and Dobzhansky<sup>[10]</sup> have indicated that all men belong to a single species, but men inhabiting different parts of the world are not alike. As compared to other ethnic groups, no measurements of tooth sizes have been made on the Punjabis. This study was conducted to provide normative data on the mesiodistal crown measurements. The results of this study agree with those of a smaller sample reported by Richardson and Malhotra<sup>[11]</sup> that the first molars were larger than the second molars in both maxillary and mandibular arches in the both the sexes.

The dentist is the only person who can accumulate, correlate, evaluate the biomechanical information and assess the selection of anterior artificial teeth so that it will meet the individual esthetic and functional needs<sup>[12]</sup>. Variations in every individual lead to characteristic appearance as mentioned by Young<sup>[13]</sup>. The tooth size standards based on odontometric investigations can be used in age and sex determination. Most studies done in this area do not include Asia and India even though they form largest population as compared to other ethnic groups, no measurements of tooth sizes have been made on the Rajasthan population. So a study was planned to measure the mesiodistal width of six anterior natural teeth. It also investigates variations in the size of left and right maxillary and mandibular anterior teeth and differences between men and women.

Kumar and Gopichand reported a significant correlation between body height and head length, head width, as well as head circumference. Ilayperuma reported a correlation between stature and cranial dimensions to be statistically significant ( $P < 0.05$ ). In the majority of data, in this present study, the observation is in accordance with the aforementioned previous studies except head circumference in female data among the Ibibio, head width in male and female data among the Ibibio, combined maxillary anterior crown width in male and combined data among the Efik, and female data among the Ibibio. These variations could be ascribed to factors related to population differences, as well as genetic<sup>[14,15]</sup>.

The two ethnic groups, body height, head dimensions, and combined crown width were significantly greater in males than in females, except combined crown width among the Ibibios. These observations are in agreement with Ukoha et al. who carried out a study on stature estimation from the head circumference, length, and width. In contrast, Jervas et al. reported no significant gender difference in head length and head width. Purohit and Khatri reported a significant gender difference in body height, head length, and width. Shah et al. reported males were significantly greater in body heights, head length, and width than females ( $P < 0.05$ ). Ilayperuma in their study of stature prediction reported that males were significantly greater in body height, cranial length, and width than females. The observation regarding the combined mesio-distal width of maxillary anterior teeth in this present study is comparable to some previous studies. The above concordance in the majority of the study confirms that the dimensions of body parts in males are higher than in females.<sup>[16,17]</sup>

**CONCLUSION:**

A strong correlation was observed between the cephalic circumference and the mesio-distal width of maxillary central incisor could be used as a potential tool for facial reconstruction in prosthetic, surgical and forensic specialities. Using the linear regression method it was determined the cephalic circumference divided by 5.88 will give the mesio-distal width of the central incisor,  $54/5.88=9.1836$ .

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