

# Dental Arch Measurements

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## Abstract

### Aim:

To study the changes in the dental arch measurements of young adults with normal occlusion.

### Objective:

To qualify and quantify the possible changes in the dental arch based on age, sex and aiming to contribute to increase in knowledge about the development of human occlusion.

### Background :

It is of particular interest for orthodontists to understand occlusal changes during all stages of development. A balanced , healthy and stable occlusion could be considered normal, even if small size-arch length discrepancies are present. The population of India has quite rich ethnic diversity can present different characteristics from those observed through studies. It is even possible that these dental occlusion maturation characteristics could be influenced by this ethnic diversity pattern. Based on the principle that occlusal changes can occur even in patients with normal occlusion, as well as in absence of active growth the development can be studied.

### Reason:

The reason to find changes in dental arch measurements if young adults in increase in age.

**Keywords:** Dental arch, intercanine, intermolar, perimeter, plaster casts.

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## INTRODUCTION

Dental arch studies is of particular interest for orthodontists to understand how occlusion changes during all stages of development<sup>[1]</sup>. The dental arch undergoes various dimensional changes with age, the greatest alterations taking place during the period of growth<sup>[2,3]</sup>. However these changes do not cease with onset of adulthood rather it continues at a slower rate<sup>[4]</sup>. Initially ,an evaluation of adaptive longitudinal changes of occlusion in the individuals with normal occlusion who have not undergone any orthodontic treatment should be done<sup>[5]</sup>. The vertical and horizontal between upper and lower incisors are investigated through all periods of development<sup>[6]</sup>. It is observed that there are some insignificant changes when it is evaluated in individuals from five to fifteen years<sup>[7]</sup>.

On the basis of the supposition that a individual with a normal occlusion that remained stable from complete eruption of permanent dentition to a more advanced adult age and maintained a transversal dimensions of dental arches<sup>[8]</sup>, the maintenance of these of these dimensions during a well conducted orthodontic treatment would be a factor of stability for final occlusal result<sup>[9]</sup>.

The interrelated distance of the maxillary and mandibular canines and molars are found out using the measuring instruments in young adults with normal occlusion<sup>[10]</sup>.

The population in India is quite ethnic diversity. It is possible that these dental occlusions maturation characteristics could be influenced by this ethnic diversity pattern<sup>[11]</sup>. It Based on the principle that occlusal changes can occur even in adults with normal occlusions as well as in absence of active growth<sup>[12]</sup>. The objective of this study is to qualify and quantify the possible changes aiming to contribute to increase knowledge about the development of human occlusion overtime.

## MATERIALS AND METHODS

The study sample was made up of individuals of both the sexes, all of them were from the same place, Chennai. The sample was homogenous and was divided based on the age groups:

- 1) Childrens between age 5- 10 with a mean age of 7years
- 2) Adolescents between age 11-20 with a mean age of 15years
- 3) young adults between age 21-30 with a mean age of 25years

They were recruited from the clinics of saveetha university.

The material used in this study consisted of :

1. Plaster casts.
2. Alginate.
3. Impression trays.
4. Dental stone.
5. Measuring instruments.

The criteria for the study models were :

1. Presence of primary and permanent dentition from first left side molar to first right side molar.

2. Good quality of study models.

Maxillary and mandibular impressions were made with alginate and study models were prepared using dental stone and used for analysis, However some of the patients showed malocclusions. The plaster casts were examined to ensure that there are no dental loss that could have led to the alterations of the values. Each cast were measured on different occasions and the mean value was recorded.

Measurements were taken of intermolar, intercanine and perimeter of the dental arch based on the following criteria:

1. Upper and lower inter molar distance – The linear distance between the central fossa of first molars on either side

2. Upper and lower intercanine distance- The linear distance between the cuspal tips of canines on either side  
 3. Arch perimeter- The line that passes that passes from the mesial and distal contact points of all the teeth from the first molar of one side to the first molar of the other side.

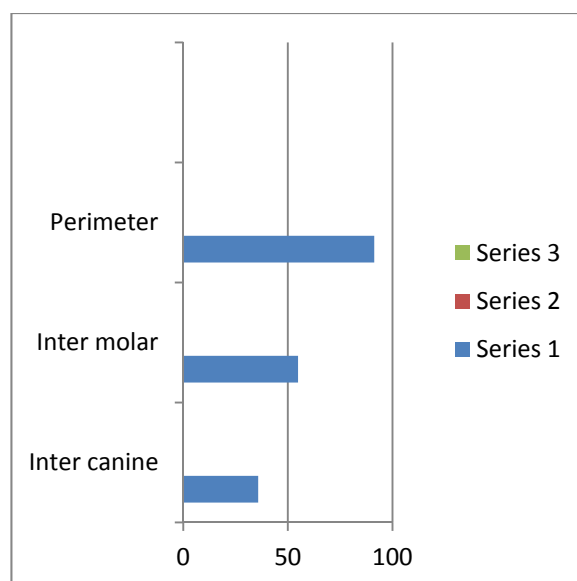
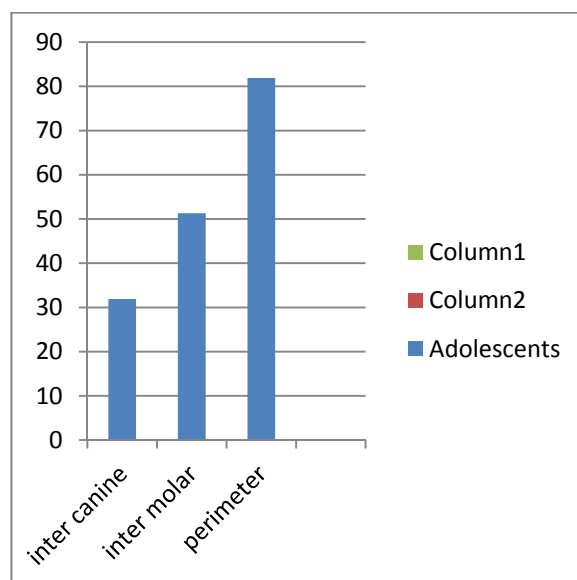
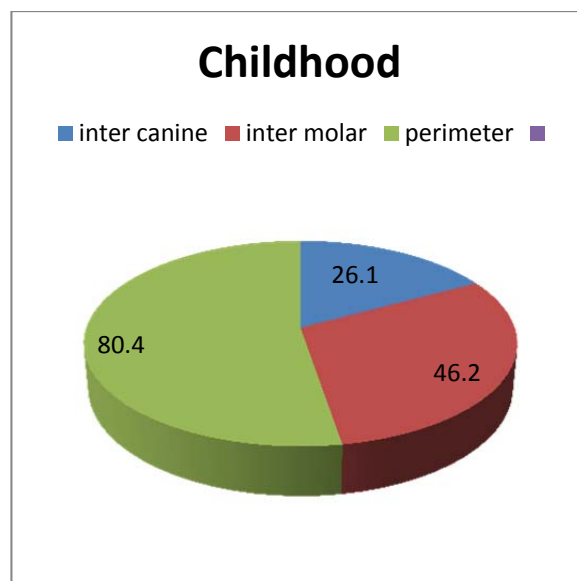
**RESULT:**

Table shows inter canine distance, inter molar distance and perimeter means for childrens, adolscents and young adults of both sexes. The results of these measurements depend on the age and sex and therefore is analysed.

Children's			
	Inter canine	Inter molar	Perimeter
	27	44	75
	25	49	79
	29	47	85
	23	48	83
	28	45	80
	26	48	82
	23	46	77
	28	45	79
	27	46	84
	25	44	80
<b>Total</b>	261	462	804
<b>Mean</b>	26.1	46.2	80.4

Adolescents			
	Inter canine	Inter molar	Perimeter
	29	47	80
	33	49	83
	36	51	79
	32	49	85
	30	55	82
	28	52	84
	33	50	79
	35	53	80
	31	55	83
	32	52	84
<b>Total</b>	319	513	819
<b>Mean</b>	31.9	51.3	81.9

Adults			
	Inter canine	Inter molar	Perimeter
	35	55	87
	33	53	90
	38	57	95
	39	56	93
	35	54	88
	34	52	91
	37	57	97
	38	58	90
	33	54	89
	36	53	93
<b>Total</b>	358	549	913
<b>Mean</b>	35.8	54.9	91.3



**DISCUSSION:**

With regard to the inter-canine distance it can be said that the mean differences between the different age groups was not quite significant but there was a difference in the measurement<sup>[13]</sup>. Initially, three groups were split according to their age. Group 1 consisted of childrens aged between 5-10 years of age. Group 2 consisted of adolescents aged between 11-20 years of age. Group 3 consisted of young adults aged between 21-30 years of age<sup>[14]</sup>. Alginate impressions were taken and plaster cast poured to get a clear replica of their arch<sup>[15]</sup>. Then using measuring instruments the inter canine, inter molar, and the perimeter of the arch was measured and were noted down and the mean was taken as the variability factor to identify the change<sup>[16]</sup>. It was found that there was an increase in the inter canine distance with age between adolescents and young adults<sup>[17]</sup>. The mean for the intercanine distance was found to be 26.1mm for childrens, 31.9mm for adolescents, and 35.8mm for young adults<sup>[18]</sup>.

Regarding the variability of the inter molar distance, it increased from childhood to adulthood and it is also found that the change in the distance occurred continuous to remain the same<sup>[19]</sup>. The mean for the inter molar distance in childrens is 46.2mm and for adolescents is 51.3mm and that of young adults is 54.9mm.

Then the variation in the perimeter was seen and it was found that the perimeter of the arch remained the same between childhood and adolescent age but changed in the adulthood<sup>[20]</sup>. The mean for the perimeter of the dental arch in childrens is 80.4mm and in adolescents is 81.9mm and that of young adults is 91.3mm.

**CONCLUSION**

It can be concluded that the behaviour of the inter canine, intermolar, and the arch perimeter is different with age. The inter molar distance did not undergo significant changes with age after adolescence with the exception of an increase between young adults. Therefore the dental arch changes after the eruption of the permanent dentition.

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