



Relation between Inter alar width and inter canine distance in aid for the replacement of artificial maxillary anterior teeth

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Abstract

Background: Selection and arrangement of the maxillary anterior teeth has always been most important as well as challenging for the edentulous patients. It demands rehabilitation of the functions with the aesthetics as priority.

Objective: The aim of this study was to assess the relation between interalar widths and inter canine distance in aid for the replacement of artificial maxillary anterior teeth. This study also assessed the relation of inter alar distance and inter canine distance in different population such as Aryans and Mongoloids.

Materials and Methods: To study the relation between interalarwidth and inter canine distance, measurements were taken from 228 subjects. Inter alar width was recorded by digital vernier caliper while the patient made seated on dental chair in a relaxed posture. Inter canine width was measured in the cast with digital vernier caliper.

Result: out of 228 participants Gender distribution was 118 males and 110 females where 84 were Mongoloids and 144 were Aryans whose age ranged from 25 to 45 years. This result showed that the males have greater interalar width and inter canine width in compared to females (male: 32.64 ± 4.3 , female: 30.64 ± 3.55) and is statistically significant ($p < 0.05$). The mean value of inter alar width and intercanine width was also determined. Mongoloids have wider nose and increased intercanine width than Aryan but not statistically significant. The Pearsons coefficient index "r" showed a large positive correlation between interalar distance and intercanine width and was statistically significant. ($r=0.642$, $p < 0.01$)

Conclusion: The study concluded that inter alar width can be a very useful guideline for the selection and replacement of anterior teeth for edentulous patients in Mongoloid and Aryan population.

Keywords: Anterior teeth selection, Inter alar width, Inter canine distance, Maxillary anterior teeth.

Introduction

Replacing the missing teeth restoring all the functions as well as the aesthetic expectations which would be in close resemblance to the persons previous natural dentition has always been a great importance and also the challenge in case of completely edentulous patient .Complete dentures are also essential to prevent the muscle atrophy and to regain other functions such as mastication, phonetics and aesthetics.^[1] The overall appearance of a complete denture mostly depends on the selection of the anterior teeth and its arrangement. Thus it is a great challenge to select and arrange maxillary anterior teeth in the most natural and aesthetically pleasing form easily acceptable by the patient and the dentist as well.^[2]

Patient's pre extraction records and information are always the best guides so they should be collected with all efforts.^[3] if no records are available selecting the proper anterior teeth for edentulous patients could be a difficult and confusing work.^[4,5] These records could be facial photographs, radiographs, casts and even previous dentures available if any. In absence of the records there are various guidelines such as interalar width^[6] bizygomatic width^[7] inter pupillary width.^[8] canthus distance^[9]. Out of all these guide lines nasal index is the popular guide for the selection and arrangement of anterior teeth where the inter alar width is taken as a guide to determine the space for the anterior teeth arrangement.^[10] As canine plays a major role in the tissue support at the corner of the mouth the positioning of the canines is of great importance.^[11] The inter alar width is believed to determine the canine cusp tips very closely and to study the relation of interalar width to the canine is essential for the purpose of planning and to prepare excellent complete dentures.

There has been very less studies done to find the relation between inter alar width and inter canine distance in Nepalese population and the challenge is always there depending on the different races. Hence this study was conducted to evaluate the relation between the inter alar width and inter

canine distance which would be helpful for planning and replacement of the maxillary anterior teeth, and also to compare or study the difference between the gender among the Aryan and Mongoloid groups for these parameters.

Materials and Methodology

This crosssectional study was conducted in 228 individuals who voluntarily participated in the study. The inclusive criteria were the presence of complete dentition with intact contact points between six maxillary anterior, no crowding with normal occlusion, good periodontal health, normal symmetrical face with no abnormality or altered nose. Exclusion criteria were any history of orthodontic or prosthodontic treatment, congenital facial defects, history of facial trauma, facial asymmetry, history of maxillofacial surgery, history of cosmetic surgery or any alteration of maxillary anterior teeth. An informed consent was obtained from the individuals for this study. Here the two parameters inter alar width and inter canine distance were measured. This study was designed and performed to study the relation between inter alar width and inter canine distance for the selection of the maxillary anterior teeth.

To measure inter alar width, participant was seated in an upright comfortable position and asked to stop breathing while the measurement was taken as to avoid any changes in the readings. Digital vernier caliper was used to measure the outer border of the ala at the widest point where the inner borders of the lower jaws of the vernier caliper just touched the outer surface of the nose. For the recording of inter canine distance impressions were taken by irreversible hydrocolloids and the stone casts were obtained. Again digital vernier caliper was used to measure the distance between the canines. The central point of the canine cusp tips were identified and the pointed ends of the lower jaws of digital vernier caliper were used to record inter canine distance. All the readings were repeated 3 times for the standardization and the mean was recorded in one tenth of millimeter for both the readings.

All the data were collected and for all the subjects in the study, mean standard deviation, maximum and minimum values were calculated. Statistical analysis was determined using the t-test Pearsons Correlation Coefficient and p value were also calculated to know the correlation between inter alar width and inter canine width. The data were analyzed in SPSS (Version 24, Inc, Chicago)

Result

Out of total participants there were 118 male and 110 female where 84 were of mongoloid origin and 144 of aryan origin and the age range was from 25 to 45 years. In this study the measurements obtained from the 228 individuals were tabulated.

The minimum value of alla is 21.08 and maximum is 43.82 with mean and standard deviation 31.68 ±4.07 whereas the minimum value of anterior teeth width is 22.44 and maximum is 45.32 with mean and standard deviation 34.58 ±3.25. (Table 1)

There was a statistically significant difference in the values of the measured parameters between

the male and female individuals for ala and inter canine width. The present samples revealed increased values of inter alar width and inter canine width values for males than females. The mean value of inter alla width (male: 32.64 ±4.31, female: 30.64± 3.55) and inter canine width (male: 35.02 ± 3.49), female 34.12 ± 2.92) was greater in male than in female. Men have wider noses and greater intercanine distances than women. The parameters when compared between the gender groups were found to be statistically significant (P <0.05). (Table 2) The mean value of inter alla width was greater in Mongoloid than in Aryan (mongoloid: 32.02 ±4.36, Aryan: 31.48± 3.90) and also the mean value of anterior teeth width was greater in Mongoloid than in Aryan (mongoloid: 35.10 ± 3.27, Aryan 34.28 ±3.21). Mongoloid have wider noses and greater intercanine distances than Aryan but there was no statistical significant difference found. (Table 3) In this study population, a large positive correlation between interalar distance and inter canine width was found and was statistically significant. (r=0.642, p<0.01) (Table 4)

Table 1: Showing the alla and inter canine width with 95% CI

	Min	Max	Mean	S.D	95% CI
Ala	21.08	43.82	31.6837	4.07996	31.1513 - 32.2162
Inter canine width	22.44	45.32	34.5886	3.25584	34.1637- 35.0135

Table 2: Comparison of the mean differences using Student’s t test in males and females

	Gender	N	Mean	S.D	T value	P value
Alla	Male	118	32.6488	4.31327	2.097	.037
	Female	110	30.6485	3.55063		
Inter canine width	Male	118	35.0219	3.49495	3.808	.000
	Female	110	34.1237	2.92297		

Table 3: Comparison of the mean differences using Student’s t test in Aryan and Mongoloid

	Gender	N	Mean	S.D	T value	P value
Alla	Aryan	144	31.4831	3.90627	-0.972	.332
	Mongoloid	84	32.0276	4.36430		
Inter canine width	Aryan	144	34.2848	3.21633	-1.855	.065
	Mongoloid	84	35.1094	3.27631		

Table 4: Pearson Correlation of interalar distance and inter canine width

Parameters	Mean	r	P value
Alla	31.68 ±4.07	.642	.000
Anterior teeth width	34.58 ±3.25		

Discussion

The values showed that the interalar width and inter canine width was greater in males than females and this finding was in agreement with researches done by Keng,^[12] Dharap and Tanuseputro,^[13] Fisher and Smith,^[14] and Ahn et al.^[15]

There has been suggested different landmarks for proper teeth selection in missing teeth but it has been proven that these landmarks changes with different race and ethnic origin.^[16] In this research, Mongoloids have greater interalar width and inter canine width than Aryans but statistically non significant. Therefore there is no such standard approach as a guideline to be followed while determining intercanine width for the artificial teeth replacement for all ethnic groups.

The Pearson's correlation coefficient "r" measures the degree of association or strength of linear association between two variables.^[17] There was a large positive correlation between inter alar width and inter canine distance which were statistically significant. ($r=0.642$, $p<0.01$). Sellen et al also showed a strong positive correlation between the parameters.^[18] But according to Deogade et al, no correlation between interalar width and inter canine distance was found.^[19] When pre extraction records are unavailable it is very much difficult to select the anterior teeth.^[20]

Inter alar width can be helpful in prosthodontic treatment of edentulous patients for placement of anterior teeth. As this study was done in the mongoloid and Aryan population, the results of this study may not be applicable to all the ethnic groups and there is scope of further studies in different ethnic groups of Nepalese population.

Conclusion

This study concluded that inter alar width and inter canine distance was greater in males than in females and Mongoloids have wider nose. The inter alar width can be a very useful guideline for the selection and replacement of anterior teeth for edentulous patients in Mongoloid and Aryan population.

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