

Comparative Analysis of Prevalence of Malocclusion, Facial Type, Orthodontic Variation Along with the Facial Aesthetic Index Among the Dravidian and Aryan Ethnic Population in India

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Abstract: *Aim:* This study aims to analyze the malocclusion, facial type, and dental aesthetics index among the native diverse groups which are distributed all over the incredible India-Aryans and Dravidians. *Materials and Method:* The study is a cross-sectional survey. One hundred and sixty-two individual samples were collected in this study. The prevalence of malocclusion was assessed as normal occlusion, class 1, class 2, class 3 occlusion, orthodontic variation, and facial type was recorded along with facial aesthetic index. Descriptive statistics were performed for all the variables collected. Chi-square test was done to find the association between the age of the Aryan and Dravidian population, the association between the gender of Aryan and Dravidian population and the association between facial type and facial aesthetic index of Aryan and Dravidian population. *Results:* Among the Aryan and Dravidian race, 34.2% of the Dravidian population and 33.7% of the Aryan population had a normal occlusion and found to obtain a p value of 0.043 which found an association between both the populations. *Conclusion:* The growth of the human may vary from different races. Here in the survey conducted they found a statistically significant similar result among the occlusal variation, facial type and facial aesthetic index among the Dravidian and Aryan population and a statistically insignificant result was obtained among the orthodontic variation among the population.

Keywords: Aryans, Dravidians, malocclusion, facial type, facial aesthetic index.

1. Introduction

The facial growth and development of the body are different in every individual. Hence, it is a significant part of the orthodontist to diagnose the orthodontic abnormalities [1]. The growth in the size of the jaw according to the individual's age determines the malocclusion that might occur to the person in permanent dentition. Each individual has a unique facial type;

hence they were generally classified into three major types namely Euryprosopic, Mesoprosopic, leptoprosopic based on the values obtained by using the formula given William et al. The cephalic and facial indices can be very important evidence towards the identity of unknown person. The presence of malocclusion such as crowding, deep-bite, spacing, overbite and under bite is commonly seen in a population. Malocclusion causes undesirable, unaesthetic appearance in individuals, which might affect them psychologically, such as low self-esteem, career insight, and self-confidence.

In some cases, it might be an aiding factor for dental caries and other infection [2]. For instance, crowding causes accumulation of food in the oral cavity which might later transform into caries. Hence, malocclusion must be analyzed and orthodontic treatment must be provided as soon as possible. Malocclusion is caused due to various factors such as genetics. It might also be based upon the facial type. Euryprosopic means having a short or broad face or both. Mesoprosopic means having a face of average width. Leptoprosopic means having a long, a narrow or a long narrow face. The malocclusion treatment has a better prognosis when it is started at an early age during the transition period that is 10-12 years. Malocclusion can be classified into class 1, class 2 division 1 class 2 division 2 and class 3. It is known as Angle's classification which was given by Edward H. Angle in the year 1899. Previous studies delineated the correlation between cephalic index and type of malocclusion present such as an individual with mesocephalic form usually has a straight profile, and dolichofacial is associated with long and narrow face that the mandibular commonly is Retrognathic [3]. Researches and investigation are on a process for finding the close relationship between facial type and malocclusion among

varied populations (4). The need for this study is to determine a patient's malocclusion just by visually analyzing his facial index, therefore minimizing the use of complex diagnostic aids and making the expense of treatment affordable.

India's is the second largest population in the world with different races and ethnicity. According to the literature, the prevalence of dental abnormalities in the Dravidian population was 31.5% in which 6.6% of people had microdontia [5]. The dental disease more common among the Dravidian population was malocclusion [6] and periodontitis [7]. There was not enough literature in the field of dentistry to support the same among the Aryan population. The gene most predominant in the Aryan population was R1A1 and the gene predominant in the Dravidian population is still in question. Since the north Indians are descendants of Aryan population and the south Indians are descendants of Dravidian population, previous studies of comparison between the hyoid bone position and orientation in class 1 and class 3 malocclusion facial morphology and malocclusions were conducted among general populations [8]. There are various orthodontic treatment options for appropriate malocclusion present in the individual. These orthodontic variants enable a person to rectify the malocclusion seen in the teeth which almost in every case changes the structural architecture of the face. Every orthodontic treatment has an unconventional influence on the facial morphology. Hence, it is important to know if a person has undergone any orthodontic treatments. The study aims to evaluate the association between facial type, facial aesthetics index, occlusal variation, orthodontic variation among the Aryan and Dravidian population.

2. Materials and Method

A cross analytical study was conducted in the month of January 2020 among Aryan and Dravidian population in the city of Chennai to find the prevalence of malocclusion and the type of facial orientation. Ethical clearance approval was given by the department of public health dentistry, with the approval of SRMDC. Convenience sampling was done. The Aryan and Dravidian population in Chennai were selected and examined with the exclusion criteria that persons with any missing molars and any systemic disease were not included in the study. Along with the exclusion criteria of the individual whose parents or grandparents had a history of inter-caste marriage were excluded from the study. Individuals who were willing to

participate in the study were included. The total individual examined was 184 and among them 162 met the inclusion criteria which taken into study. The classification used to determine the occlusion by using the first permanent molar as classified by Angle et al. 1890 [8] which was classified as normal, class1, class2 division 1, class 2 division 2, class 3 and facial symmetry as symmetrical and asymmetrical.

To determine the occlusal relationships and orthodontic variation the subjects were told to swallow and then bite the teeth together to evaluate the centric occlusal. To obtain the direct lateral view of the occlusion, the cheeks were fully retracted. The facial type was recorded by asking the subject to sit in relax position with the subject looking straight to the investigator. The facial aesthetic index consists of eight components and was examined for all the subjects included in the study. Kappa statistics was done to calculate the Intra reliability and was found to be 0.89. Descriptive statistics were performed to the variables included in the study and association between the Dravidian and Aryan population was recorded for all the variables included in the study. Statistical analysis was performed using SPSS version 25.0 (SPSS Inc., Illinois, Chicago, USA).

3. Results

Table 1 shows the occlusal variation among the Dravidian and Aryan population and found that 34.2% of the Dravidian population were having a normal occlusion and 33.7% of Dravidian had a normal occlusion which was highest and among the population they were having class 2, division 2 was the least occlusion seen in both the Dravidian and Aryan population. Association between the occlusal variation among the Dravidian and Aryan population was done and found to obtain a p-value of <0.05 which was statistically significant.

Table 2 shows the prevalence of facial type among the Dravidian and Aryan population and found that the highest was leptoprosopic facial type among the Dravidian population which was 27.1%. Highest among the Dravidian population was leptoprosopic which was 24%. Lowest facial type seen among the Dravidian and Aryan population is Euryprosopic facial type which was 6.7% in the Dravidian population and 3.7% among the Aryan population. Association between the facial type among the Dravidian and Aryan population was done and found to obtain a p-value of <0.05 which was statistically significant.

Table 1
Occlusal variations among the Aryan and Dravidian population

Occlusal classification	Dravidian population (%)	Aryan population (%)	P value
Normal occlusion	34.2	33.7	0.043*
Class I	28.9	32.5	
Class II division I	13.4	15.7	
Class II division II	7.8	9.7	
Class III	15.7	8.4	

Table 2
Prevalence of facial type among Aryan and Dravidian population

S. No.	Facial type	Dravidians population		Aryans population		P value
		Number	Percentage	Number	Percentage	
1	Euryprosopic	11	6.7%	6	3.7%	0.036*
2	Mesoprosopic	39	24.0%	23	14.2%	
3	Leptoprosopic	44	27.1%	39	24.0%	

Table 3

A comparison between the number of people who have undergone orthodontic treatment among the Aryan and Dravidian population

S. No.	Dravidians (Orthodontic treatment)	n	%	Aryans	n	%	P value
1	Yes	38	23.4%	Yes	25	15.4%	0.038*
2	No	57	35.1%	No	42	25.9%	

Table 4

Characteristics of orthodontic variation among the Aryan and Dravidian population

S. No.	Orthodontic variation	Dravidian population	Aryan population	P value
		Percentage	Percentage	
1	Spacing(diastema)	.6%	-	0.071
2	Abnormal eruption	1.9%	.6%	
3	abnormal eruption with Deepbite	.6%	.6%	
4	Crossbite	7.4%	3.7%	
5	Crossbite with prognathic maxilla	.6%	-	
6	Crowding	18.5%	9.3%	
7	Deepbite	16%	4.3%	
8	Lateral missing with spacing	.6%	-	
9	Mild spacing	6.2%	3.7%	
10	Overbite	.6%	-	
11	Overjet	3.1%	.6%	
12	Protrusion (overjet)	1.9%	1.2%	
13	Retrognathic mandible	.6%	-	
14	Moderate spacing	17.9%	10.5%	
15	Underbite	3.1%	1.9%	
16	Spacing-mild	.6%	-	
17	Crossbite	.6%	.6%	

Table 5

Facial aesthetic index among the Aryan and Dravidian population

S. No.	(Facial aesthetic index)	Dravidian (%)	Aryan%	P-value
1	Class A	21.6%	20.05%	0.012*
2	Class B	8.95%	-	
3	Class C	9.25%	9.25%	
4	Class D	1.54%	7.4%	
5	Class E	1.85%	5.2%	
6	Class F	0.3%	5.55%	
7	Class G	-	-	
8	Class H	6.45%	2.45%	

Table 3 shows the prevalence of people undergone orthodontic treatment and found that 23.4% of the Dravidian population has undergone orthodontic treatment and 15.4% in the Aryan population has undergone orthodontic treatment. Association between the people undergone orthodontic treatment among the Dravidian and Aryan population was done and found to obtain a p-value of <0.05 which was statistically significant.

Table 4 shows the other orthodontic abnormality in the dentition among the Aryan and Dravidian population and found that crowding was found maximum that is 18.5% in Dravidian population moderate spacing that is 10.5% was found in Aryan population among the Dravidian population no spacing was recorded and among the Aryan population no overbite was recorded. Association between the orthodontic variation among the Dravidian and Aryan population was done and found to obtain a p-value of >0.05 which was statistically insignificant.

Table 5 shows the facial aesthetic index recorded among the Aryan and Dravidian population and found that class A was common among both the Aryan and Dravidian population. The association between the Dravidian and Aryan population for the dental aesthetic index was recorded and found to be <0.05 which was statistically significant. Association between the facial aesthetic index among the Dravidian and Aryan population was done and p-value of <0.05 which was

statistically significant.

4. Discussion

These days' people are very conscious about their appearance. A perfect occlusion of the tooth which renders a beautiful smile is one of the major desires that every individual aspires. Hence people rely on orthodontists to have an aesthetic facial appearance which can be corrected by various methods. This study has revealed a tentative correlation between the facial type and malocclusion among the Dravidian and Aryan population

The other studies determined whether the sagittal and vertical aberrations in inter-maxillary incisal tooth and jaw relationships were reflected in facial morphology which was done by Christian Bittner and Hans Pancherz among children (172 in number; 79 girls 93 boys), 12 to 14 years of age were selected from the orthodontic department in university of Giessen, west Germany (9,10). A study done by masitah et al also provided a correlation between the facial index, cranial index and malocclusion based on angle's classification in which they concluded that the face and skeletal morphology does have a correlation which can be attributed to the germ layer during growth development and people with Mesoprosopic facial type are most likely to have class I dental malocclusion [11].

These results of this study showed that occlusal variation among the Dravidian and Aryan population was found to be similar obtaining a P-value of 0.043 which was statistically significant was found that both in Dravidian and Aryan population among individuals were having normal occlusion which was 34.2% and 33.7% and least was found in class 2 division 2 type among the both Dravidian and Aryan population. Prevalence of facial type was found to also contain a similar result between Dravidian and Aryan population with leptoprosopic facial type being common with 27.1% and 24.0% and least common was also similar among both the population which was Euryprosopic with 6.7% and 3.7%. P value obtained was 0.036 which was statistically significant while analysing the orthodontic variation using their molar relationship. In Dravidian population, .6% of people had spacing with diastema, 1.9% had abnormal eruption, .6% had abnormal eruption with Deepbite, 17.9% had spacing, 18.5% of people had crowding, 7.4% of population had Crossbite, 16.0% had Deepbite, 17.3% had normal occlusion, 6.2% of the population had a very mild spacing (no orthodontic treatment needed), 3.1% of under bite and other malocclusions like combination of Crossbite and prognathic maxilla, overjet (protrusion), Retrognathic mandible were there in a very small percentages of the race. In the Aryan population, 0.6% of the samples had abnormal eruption, 3.7% had Crossbite, 9.3% had crowding, 4.3 % of people had Deepbite, 3.7% had mild spacing, 10.5% had spacing and other orthodontic variation was found to be seen in lesser percentage to individuals. The highest population in the Dravidian population was having crowding found to be with 18.5% followed by moderate spacing with 17.9% and least common was found to be spacing, lateral missing with spacing, Retrognathic mandible and spacing with mild Crossbite which was 0.6%. Association between the orthodontic variations was obtained and found to be having a p value of 0.071 which was found to be statistically insignificant. The statistical data also provides the facial aesthetic index which is predominantly present in the population. In the Dravidian population, 43.2% had class A facial aesthetic index, 17.9% had class B, 18.5% had class C, 3.08% had class D, 3.7% had class E, 0.6% had class F and 12.9% had class H. In the Aryan race, 40.1% had class A aesthetic index, they reportedly did not have any class B, 18.5% people were class C, 14.8% had class D, 10.4% of the population had class E, 11.1% had class F, and 4.9% had class H. In both the population, majority of the population had class A facial aesthetic index which was found to be 21.6% and 20.05% and least common was found with no individual having class G facial aesthetic index. Association between both the populations was obtained with facial aesthetic index and found to obtain a p value of 0.012 which was statistically significant. The limitation of the study was that the sample size was not

calculated according to confidence interval, so the study's reflection cannot be applied to the generalised population.

5. Conclusion

The finding of the study concludes that 34.2% of the Dravidian population and 33.7% of the Aryan population had a normal occlusion. Among the Dravidian and Aryan population, leptoprosopic facial type was more common with 27.1% and 24%. The orthodontic variation results showed that crowding was seen highest among the Dravidian population with 18.5% and moderate spacing was found among the Aryan population as 10.5%. Facial aesthetic index was found to have class A type in both Dravidian and Aryan population which was 21.6% and 20%. There was association between the occlusal variation, facial type and facial aesthetic index among Aryan and Dravidian ethnic population but there was no association between orthodontic variation. As we can clearly analyse, the Aryan and Dravidian culture, practices and customs are poles apart and different from one another. As a matter of fact, this study focuses on the prevalence of the particular facial type and malocclusion among different ethnicities.

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