

# Assessment of Dental Aesthetic Index and Facial Aesthetic Index Among Tamil and Malayalam Speaking Groups in India- A Cross Sectional Study

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**Abstract:-** The aim of this study is to analyze Dental Aesthetic Index (DAI) and Facial Aesthetic Index (FAI) among the native diverse group distributed over the southern part of India – Malayalam along with Tamil speaking groups. A cross sectional survey was conducted among one hundred and ninety eight individual samples was collected in the study. DAI was evaluated according to 10 occlusal characteristics and the final DAI score which determined severity and treatment needed cases. Chi square test was done to find the association between age, gender, FAI and DAI among Malayali & Tamilian population. The result implies that more than 70 percentage of both population belong to the category where “no treatment need or slight need”. The people belonging to “DAI 26-30” were ranging from 8-12% in both Populations. The present study finding revealed that the people belonging to DAI 31-35 were ranging from 5-10% in both groups. The association between the Malayalam and Tamil speaking population for DAI was recorded and found to be p value of 0.368 which was statistically insignificant. The association between the Malayalam and Tamil speaking population for facial aesthetic index was done and found to obtain a p-value of 0.647 which was statistically insignificant. According to the severity level they were grouped under normal or minor malocclusion (Malayali -78.8%, Tamilian -82.8%). Facial Aesthetic Index was found to have class A type in both Malayalam and Tamil speaking population which was found to be 70.7% and 78%.

**Keywords:-** India, Facial Aesthetic Index, Dental Aesthetic Index.

## I. INTRODUCTION

Tamil and Malayalam speaking group people were seen in southern part of India. Malayalam speaking people originated from Dravidian ethnic group and are identified based on the language Malayalam. The spice trade sector of Kerala with foreign countries created a highly distinct culture among them [1]. Tamil speaking people also known as Tamizhar are also part of Dravidian ethnic group with Tamil as their mother tongue. In modern world Tamilians are considered to be one of the largest and oldest ethnic groups. Tamil language is one of the oldest languages in world [2]. Any abnormality in teeth arrangement is termed as Malocclusion. Lately, increased aesthetic consideration and dental appearance of people gave more importance to the branch of orthodontics. Major benefits of orthodontic treatment were improvement in physical function, prevention of tissue damage, improved aesthetic and psychosocial well-being [3,4]. Malocclusion is divided into different types, according to severity and treatment needs. Dental aesthetic index (DAI) was introduced in the year 1986 by Cons et al. According to DAI a single score is noted on the basis of objective, clinical and subjective esthetic factors reflects to severity and need for treatment [5,6]. Based on the DAI, treatment plan is suggested in many countries [6,7]. It also helps to identify eligible patients for receiving subsidized, publically funded orthodontic treatment and thus allows better use of limited available resources. DAI is evaluated according to 10 occlusal characteristics and the final DAI score determines severity and treatment needed cases. World health organization (WHO) approved DAI as a cross-cultural index [8].

DAI score less than 25 indicate normal or minor malocclusion; no or slight treatment need. DAI score 26-30 indicates definite malocclusion; treatment need. DAI score 31-35 indicates severe malocclusion; treatment highly desirable. DAI score greater than 36 indicates very severe malocclusion; treatment mandatory.

In current society, people prioritize facial aesthetics. [9]. Good aesthetics is an important factor for psychosocial well-being among children, young adult and parents [10-12]. Facial aesthetic index is helpful in the assessment of orthodontic treatment [13]. Brook and Shaw have pointed out that the main benefit of orthodontic treatment may be improved aesthetics and social- psychological well-being. During earlier days, qualitative methods were used to record malocclusion [14]. During the decade 1950s to 1960s quantitative methods were developed [15, 16, 17, 18, 19, 20, 21]. Index of orthodontic treatment need (IOTN) was introduced in 1989[22]. The peer assessment rating (PAR) was introduced in 1992[23], the index complexity outcome and need (ICON) was introduced in 2000[24], and index of orthognathic functional treatment need (IOFTN) was introduced during 2014[25]. IOTN is considered as one of the easiest method [26], unaffected by age[27] and widely used in orthodontic research[28]. The codes ranges from A to H. FAI code A refers to Normal straight profile; no need of treatment. FAI code B refers to bimaxillary retrusion; needs treatment. FAI code C refers to bimaxillary protrusion; shows great need for treatment. FAI code D refers to Class 2 profile with normal maxilla and Retrognathic mandible/prognathic maxilla and normal mandible; shows great need for treatment. FAI code E refers to Class 3 profile with normal maxilla and prognathic mandible/Retrognathic maxilla and normal mandible; shows great need for treatment. FAI code F refers to Severe bimaxillary protrusion; shows very great need for treatment to reduce circumoral convexity and achieve lip competence. FAI code G refers to severe Class 2 profile; shows very great need for treatment. FAI code H refers to Severe Class 3 profile; shows very great need for treatment.

## II. MATERIALS AND METHOD

A cross sectional study was conducted to assess a comparative analysis of Dental Aesthetic Indices [Cons et al in 1986] and Facial aesthetic index among Tamil and Malayalam speaking groups in Indian population. The study was conducted during January 2020. Ethical clearance was obtained from the Department of Public Health Dentistry, SRM dental college, Ramapuram. Convenience sampling was done. The inclusion criteria were Age between 10 to 90 years who speak Tamil and Malayalam in consequent three

generation as they mother tongue, No history of orthodontic treatment, No history of untreated dental caries, No history of poor periodontal health or previous extraction, No chronic medical conditions or craniofacial anomalies. The exclusion criteria were individuals who are not willing to participate in the study and who do not have a consequent three generation as Tamil and Malayalam as they mother tongue. A total of 198 participants including 99 Tamil speaking group people and 99 Malayalam speaking group people were selected and examined with Digital Vernier Calipers [150mm/6 inch].

The study was done with the help of 3 examiners under normal light source. Time taken for each participant's examination was approximately 3 minutes. Dental Aesthetic index (DAI) which was published in WHO guidelines, which includes 10 components determining DAI score. Severity levels of malocclusion and treatment plan were recorded using DAI score. DAI score less than 25, indicated normal or minor malocclusion; no or slight treatment need. DAI score 26-30 indicated definite malocclusion; treatment need. DAI score 31-35 indicated severe malocclusions; treatment is highly desirable. DAI score greater than 36 indicated very severe malocclusion; treatment mandatory.

Facial aesthetic index (FAI) was recorded by means of various codes which indicated various profiles and their descriptions. The codes ranged from A to H. FAI code A refers to Normal straight profile; no treatment is required. FAI code B referred to bimaxillary retrusion; needs treatment. FAI code C referred to bimaxillary protrusion; shows great need for treatment. FAI code D referred to Class 2 profile with normal maxilla and retrognathic mandible/prognathic maxilla and normal mandible; shows great need for treatment. FAI code E referred to Class 3 profile with normal maxilla and prognathic mandible/retrognathic maxilla and normal mandible; shows great need for treatment. FAI code F referred to severe bimaxillary protrusion; shows very great need for treatment to reduce circumoral convexity and achieve lip competence. FAI code G referred to severe Class 2 profile; shows very great need for treatment. FAI code H referred to Severe Class 3 profile; shows very great need for treatment. Kappa statistics was done to assess the Intra examiner reliability and found to obtain a value of 0.89. Statistical analysis was performed using SPSS version 25.0 (SPSS Inc., Illinois, and Chicago, USA). Descriptive statistics were performed for all the variables included in the study. Inferential statistics and chi square test were done to assess the association between the dental aesthetic index and facial aesthetic index which were analyzed among the Tamil and Malayalam speaking population.

**III. RESULTS**

| Age (in years)                        | Malayalam speaking people |            | Tamil speaking people |            |
|---------------------------------------|---------------------------|------------|-----------------------|------------|
|                                       | Number                    | Percentage | Number                | Percentage |
| 10-20                                 | 4                         | 4          | 13                    | 13.1       |
| 21-30                                 | 39                        | 39.3       | 56                    | 56.6       |
| 31-40                                 | 15                        | 15.2       | 13                    | 13.1       |
| 41-50                                 | 10                        | 10.1       | 11                    | 11.1       |
| 51-60                                 | 15                        | 15.2       | 6                     | 6.1        |
| 61-70                                 | 7                         | 7.1        |                       |            |
| 71-80                                 | 8                         | 8.1        |                       |            |
| 81-90                                 | 1                         | 1          |                       |            |
| <b>GENDER</b>                         |                           |            |                       |            |
| MALE                                  | 62                        | 62.6       | 56                    | 56.6       |
| FEMALE                                | 37                        | 37.4       | 43                    | 43.4       |
| <b>Kuppuswamy socioeconomic scale</b> |                           |            |                       |            |
| Upper                                 | 5                         | 5.1        | 26                    | 26.3       |
| Upper middle                          | 17                        | 17.2       | 72                    | 72.7       |
| Lower middle                          | 11                        | 11.1       | 1                     | 1          |
| Upper lower                           | 61                        | 61.6       | -                     | -          |
| Lower                                 | 5                         | 5.1        | -                     | -          |

Table 1:- Demographic characteristics of study population

Table 1 represents most of the people who were screened within the age limit of 21-30 in both Malayalam and Tamil speaking population. Most of the Malayalam speaking

people was upper lower class, whereas most of the Tamil speaking people were upper middle class.

| DAI(score) | Malayalam speaking people |            | Tamil speaking people |            | P value |
|------------|---------------------------|------------|-----------------------|------------|---------|
|            | Number                    | Percentage | Number                | Percentage |         |
| <25        | 78                        | 78.8       | 82                    | 82.8       | 0.368   |
| 26-30      | 8                         | 8.1        | 12                    | 12.1       |         |
| 31-35      | 10                        | 10.1       | 5                     | 5.1        |         |
| >36        | 3                         | 3          | -                     | -          |         |

Table 2:- Dental aesthetic index score among malayalam and tamil speaking groups

The result shown in above table 2 implies that more than 70% of both populations belonging to the category, where “no treatment need” or “slight treatment” is needed. According to the severity level, they were grouped under normal or minor malocclusion. The people belonging to DAI 26-30 were in a percentage ranging from 8-12 in both

Populations. The people belonging to DAI 31-35 were in a percentage ranging from 5-10 in both populations according to the current study. The association between the Malayalam and Tamil speaking population for DAI was recorded and found to be 0.368 which was statistically insignificant. So the null hypothesis was rejected.

| S. No | FAI     | Malayalam speaking people | Tamil speaking people | P value |
|-------|---------|---------------------------|-----------------------|---------|
| 1     | Class A | 70.7                      | 78                    | 0.647   |
| 2     | Class B | 9.1                       | 5                     |         |
| 3     | Class C | 9.1                       | 5                     |         |
| 4     | Class D | 1                         | -                     |         |
| 5     | Class E | 7.1                       | 12                    |         |
| 6     | Class F | 3                         | -                     |         |
| 7     | Class G | -                         | -                     |         |
| 8     | Class H | -                         | -                     |         |

Table 3:- Facial aesthetic index score among malayalam and tamil speaking groups

Table 3 shows the facial aesthetic index recorded among the Malayalam and Tamil speaking groups and found that class A was common among both population. The association between the Malayalam and Tamil speaking groups for facial

aesthetic index was done and found to obtain a p-value of 0.647, which was statistically insignificant. So the null hypothesis was rejected.

#### IV. DISCUSSION

Nowadays, People are more conscious about their aesthetics and Orthodontic treatment plays a key factor for achieving good facial aesthetics to whom so ever concern. The result of the current study shows that the DAI and FAI among the Malayalam and Tamil speaking population were found to be similar obtaining a p-value of 0.368 (DAI) and 0.647 (FAI) which were statistically insignificant. The other studies [29,30] determined whether the sagittal and vertical aberrations in inter-maxillary incisal tooth and jaw relationships 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. In a study, conducted by Masitah et al indicated a correlation between the facial index, cranial index and malocclusion based on Angle's classification and the study concluded that the face and skeletal morphology had a correlation which can be attributed to the germ layer, during growth, development and people with Mesoprosopic facial type were most likely to have class 1 dental malocclusion [31]

The dental aesthetic index results implied that more than 70 percentage of Tamil and Malayalam speaking population, which belonged to the category where there "no treatment need" or "slight need" was necessary. According to the severity level they were grouped under normal or minor malocclusion. The people belonging to DAI 26-30 were in a percentage ranging from 8-12 in Tamil and Malayalam speaking Populations. According to severity level, they were grouped under definite malocclusion and in treatment category they belonging to "treatment elective group". The people belonging to DAI 31-35 were in a percentage ranging from 5-10 in both populations. According to severity level, they had severe malocclusion and in treatment category they belong to "treatment highly desirable group". The association between the Malayalam and Tamil speaking population based on DAI was recorded and found to be 0.368 which was statistically insignificant.

The facial aesthetic index result among, the Malayalam and Tamil speaking population were found to be more than 70% in both of the population belonging to class A which refers to "Normal straight profile"; "no need of treatment". The percentage of people between 7-12 of both populations under the study belongs to class E, which refers to Class 3 profile with "normal maxilla and prognathic mandible/Retrognathic maxilla and normal mandible"; shows "great need for treatment". In both class B & C percentage of population had a range from 5-10%. Class B refers to bimaxillary retrusion; needs treatment. FAI class C refers to "bimaxillary protrusion"; shows "great need for treatment". The association between the Malayalam and Tamil speaking population based on facial aesthetic index was done and found to obtain a p-value of 0.647 which was statistically insignificant. To the best of the author's knowledge, association between facial esthetic index and dental esthetic index has yet recorded among the Tamil and Malayalam speaking groups, which is a major strength of the current study. The only limitation of the current study is that

convenience sampling was used to collect data, consequentially the generalizability of the findings of the present study cannot be extrapolated to the general population.

#### V. CONCLUSION

The study's findings showed that the dental esthetic index and facial esthetic index had no positive association in orthodontic treatment needs in between the Tamil and Malayalam speaking group, as the p value was found to be >0.05. According to dental esthetic index, majority of the individuals belong to normal malocclusion group, which was 82.8% among the Tamil speaking group and 78.8% among the Malayalam speaking group. Facial esthetic index showed that class A type where "no treatment is required" among the Tamil and Malayalam speaking population.

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