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Evaluation of Facial Profile and Dental Caries Among Patients Attending Private Dental College in Chennai- Observational Study

S.SUSHANTHI[1], SS RAJ[2*], ARTHI BALASUBRAMANIAM[3]

[1]Saveetha Dental College and Hospitals,Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha university,Chennai, India
[2]Reader, Department of Public Health Dentistry,Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha university,Chennai, India
[3]Senior Lecturer, Department of Public Health Dentistry,Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha university,Chennai, India
*Corresponding Author:
Email id: 151912001.sdc@saveetha.com[1], samuelrajs.sdc@saveetha.com[2], arthib.sdc@saveetha.com[3]

Abstract: There are conflicting opinions about the contribution of malocclusion and facial forms to the development of dental caries. This study aims to determine the association between facial profile and dental caries among patients attending private dental college. A retrospective study was conducted using 4645 case records of patients attending private dental college from July 2019- March 2020 .Facial profile was estimated by lateral view of photographs taken during diagnostic examination. Dental caries were assessed using DMFT index(decayed, missing, filling) and count of decayed teeth(dt) alone separately taken for analysis. Data analysis was done. Descriptive statistics and chi-square association was done. About 74.45% of participants have straight profiles followed by 16.34% and 8.93% have convex and concave profile respectively. 48% have a medium score of DMFT(7-15) followed by 47.16% have a low score of DMFT(0-6). No statistically significant association between facial profile and dental caries ($p = 0.170$) on chi-square association was found. In conclusion, no relationship between facial profile and dental status is found among the patients attending private dental college in Chennai.

Keywords: Facial profile; malocclusion; dental caries; dental status; decayed teeth

INTRODUCTION

There is a dearth of literature regarding the association between association between facial profile and dental caries prevalence in South India. In orthodontics, it is very important for every clinician to have a proper identification of facial profile, form and development of dental occlusion which helps in the assessment to diagnose any orthodontic abnormalities(Narayanan, Jeseem and Kumar, 2016). A malocclusion happens when there is misalignment between occluding maxillary and mandibular teeth. Profile plays an important role in the treatment plan as it shows the anteroposterior position of jaws, lip posture, lip,prominence, vertical facial proportions and mandibular plane angle. Hence the technique of facial profile analysis called poor man's cephalometric analysis(Moyers, 1988). Facial profile is determined in the sagittal plane and may be assessed as straight, concave or convex depending on the spatial relationship or harmony between mandible and maxilla(Bhatia, Winnier and Mehta, 2016). Soft tissue facial profile is an important asset for diagnosis and treatment. Each facial profile has particular features regarding dental arches. Straight profile-spatial relations of bony structures in harmony. Convex profiles may be associated with narrow arches and high palatal vaults. Concave profile- dental arch relatively with wide and square shaped(Twigge et al., 2016).

Evidence on contribution of malocclusion which occur due to narrow arches and skeletal malocclusion(facial profile) to dental caries and periodontal health is conflicting(Cokakoglu et al., 2016; Twigge et al., 2016). Some researchers reported that facial profile due to skeletal malocclusion which causes crowding and leads to improper contacts between neighboring teeth, making effective oral hygiene difficult ultimately leading to decayed teeth. This difficulty with cleaning of crowded teeth increases plaque accumulation and predisposes to development of dental caries(Prabakar, John and Srisakthi, 2016),(Samuel, Acharya and Rao, 2020). Sealing pit and fissure sealant can prevent formation of dental caries(Prabakar, John, Arumugham, Kumar and Sakthi, 2018a),(Prabakar, John, Arumugham, Kumar and Srisakthi, 2018), however severe crowding can limit the effectiveness of sealant placement and retention. Chlorhexidine mouthwash and dentifrices(Mohapatra et al., 2019) will reduce plaque(Pratha, Ashwatha Pratha and Prabakar, 2019) accumulation and it can prevent dental caries and periodontal diseases(Prabakar, John, Arumugham, Kumar and Sakthi, 2018b). Higher concentration of fluoride in water causes stains and also enamel chipping(Kumar, Pradeep Kumar and Vijayalakshmi, 2017),(Kumar, Pradeep Kumar and Preethi, 2017). Nutrition(Neralla et al., 2019) also plays an important role in

dental caries and periodontal infections.Periodontal infections are prone to dental malocclusion patients which is mainly due to many risk factors like microorganisms, plaque retention(Kumar, Pradeep Kumar and Preethi, 2017; Mebin George Mathew et al., 2020)-(Khatri et al., 2019). Sometimes nicotine(Harini and Leelavathi, 2019) stains are misunderstood for fluoride stains and dental caries too.

The relationship between dental caries, oral health(Pavithra, Preethi Pavithra and Jayashri, 2019) and facial profile has not yet been investigated in Southern india. Knowledge concerning the distribution of skeletal malocclusion (facial profile) in the population and the identification of predisposing factors and associated conditions might help in understanding its occurrence and assist public health policy makers improve interventions. Para1. Our team has rich experience in research and we have collaborated with numerous authors over various topics in the past decade (Deogade, Gupta and Ariga, 2018; Ezhilarasan, 2018; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; J et al., 2018; Menon et al., 2018; Prabakar, John, Arumugham, Kumar and Srisakthi, 2018; Rajeshkumar et al., 2018, 2019; Vishnu Prasad et al., 2018; Wahab et al., 2018; Dua et al., 2019; Duraisamy et al., 2019; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Gheena and Ezhilarasan, 2019; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Panchal, Jeevanandan and Subramanian, 2019; Rajendran et al., 2019; Ramakrishnan, Dhanalakshmi and Subramanian, 2019; Sharma et al., 2019; Varghese, Ramesh and Veeraiyan, 2019; Gomathi et al., 2020; Samuel, Acharya and Rao, 2020) Thus, this study aimed to assess the relationship between facial profile and dental caries among patients attending private dental college in Chennai(Kannan et al., 2017).

MATERIALS AND METHODS

Study setting and sample collection

The present retrospective cross- sectional study was conducted among 4645 patients of 18-75 years by retrieving the data from case records of patients visiting Saveetha dental college and hospital in Chennai from July 2019 - March 2020.

Ethical approval

Ethical clearance was obtained from the Institutional Review Board(IRB) of the University to use the data from case records (SDC/SIHEC/2020/DIASDATA/0619-0320). Informed consent was obtained from the patient at the time of screening procedure. Case sheets with informed consent were included in the study.

Screening

The screening for each subject included a detailed record of patients demographic details such as name, age, gender, mobile number, residential location, oral health status and oral health practice

Inclusion and exclusion criteria

All patients who had DMFT index (Decayed, Missing, Filling index) were taken for the study purpose. Any patients with chronic systemic disease that affect oral health were excluded.

Examiner calibration

Each patient was examined by each single well trained examiner (Interns / postgraduate student) at the time of screening.Records which contained written informed consent were only included in the study.

Categorization and assessment

Patients were categorized as 18-35 years, 36-55 years and >55 years. Participants who had a DMFT score between 0-6 (low) are categorized as group I, 7-15(medium) , 16-25(high) , 26-32(very high) as group II, III, IV respectively. Their facial profile was also assessed using digital lateral photographs uploaded during case sheet entry in DIAS which is categorized as straight, convex and concave.Management of incomplete data can be done by excluding them. The facial profile was assessed by a trained orthodontist and DMFT index were assessed by trained examiners (Interns, postgraduate and residents)

Statistical analysis

The collected data was entered in MS excel sheet and imported in IBM SPSS software version 23.0. The independent variables were age, sex and facial profile. Dependent variable is the DMFT score. Descriptive statistics were used for data summarization and presentation, Chi-square association was used to find association between facial profile and DMFT score.

RESULTS AND DISCUSSION

Among 4645 participants, straight profile (74.73%)` was predominant which is in accordance with the study conducted by Swlerrenga et al, who in a comparative study between Mexican American subjects, White Americans found that straight profile prevailed demonstrating that there are no universal standards for

determining facial profile. 48% of the participants in our study have medium scores in DMFT followed by low scores which is in accordance with study conducted by Western studies and it has a contrast finding too.Figure 1 pie chart represents the distribution of study population based on facial profile. Most of the participants have a straight profile(74.7%) followed by convex profile(16.34%) then concave profile(8.93%). Figure 2 bar graph represents distribution of study subjects based on age. Among 4645 participants, most of the subjects were between 18-35 years (47.25%), 42.3% were between 36-55 years and the remaining 10.4% were above 55 years of age. Figure 3 bar graph represents distribution of study subjects based on gender. 55.845 were males and only 44.15% were females.

From the study results, it is understood in both straight and convex profiles, there is a higher prevalence of DFMT between 7-15 scores compared to lower scores. This is in accordance with study by Szyska-sommerfeld(Szyszka-Sommerfeld et al., 2018). Figure 4 bar graph represents distribution of study subjects based on their DMFT score. Most of the participants (48%) have a 7-15 score followed by 47.16%(0-6scores), 4.56% of 16-25 scores(high) and remaining 0.25% of 26-32 (very high) scores. Figure 5 presents the association between DMFT scores and facial profile. Participants with straight profiles and convex profiles have more prevalence of medium DMFT scores(group II) and patients with concave profiles had lower prevalence of DMFT scores(group I).

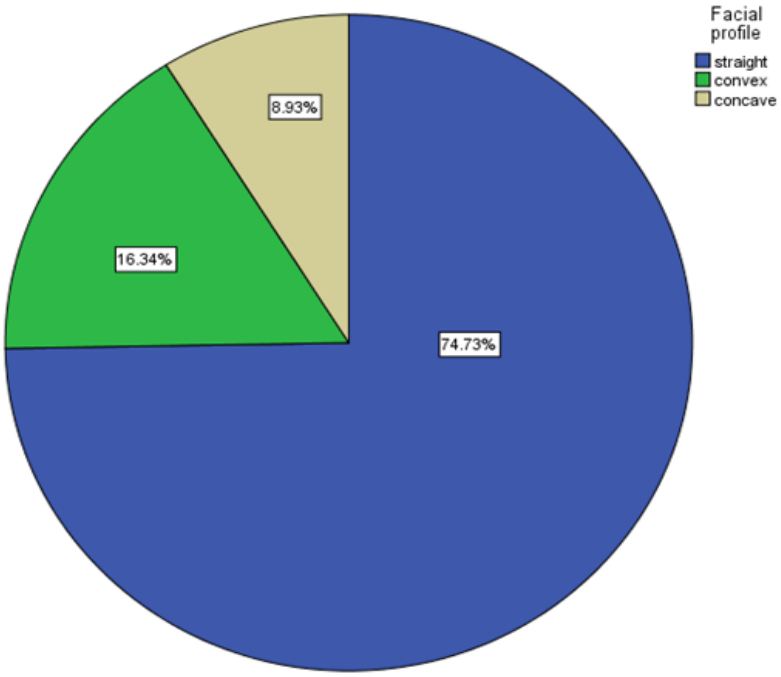

Fig.1: Pie chart depicting the distribution of study subjects based on facial profile. Most of the participants (74.73%) had straight profiles, followed by convex profiles (16.34%) of participants and concave profiles. Straight facial profile was most commonly seen.

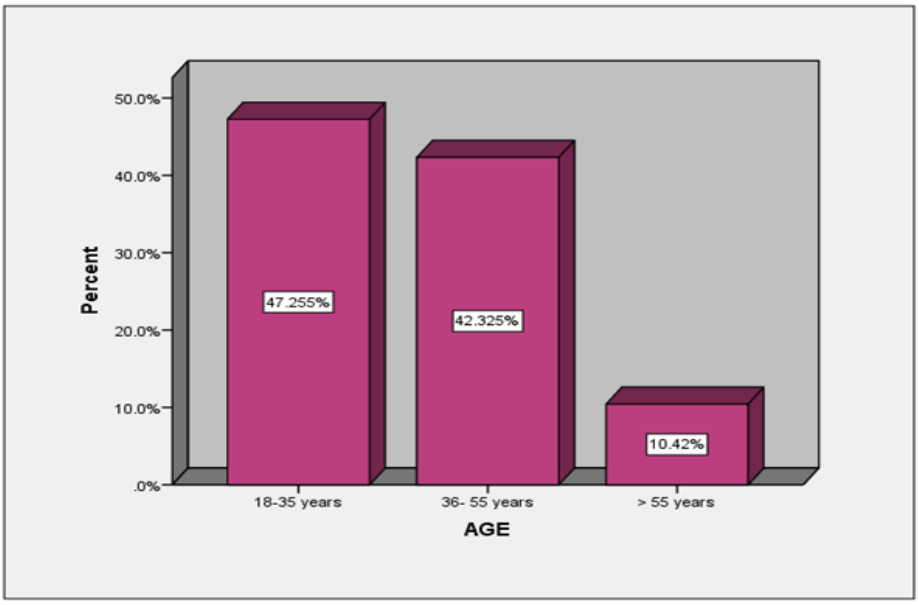

Fig.2: Simple bar chart presenting the distribution of study subjects based on age. X axis represents the age groups. Y axis represents the percentage of participants in each age group. Most of the participants (47.25%) were in the age group 18-35 years.

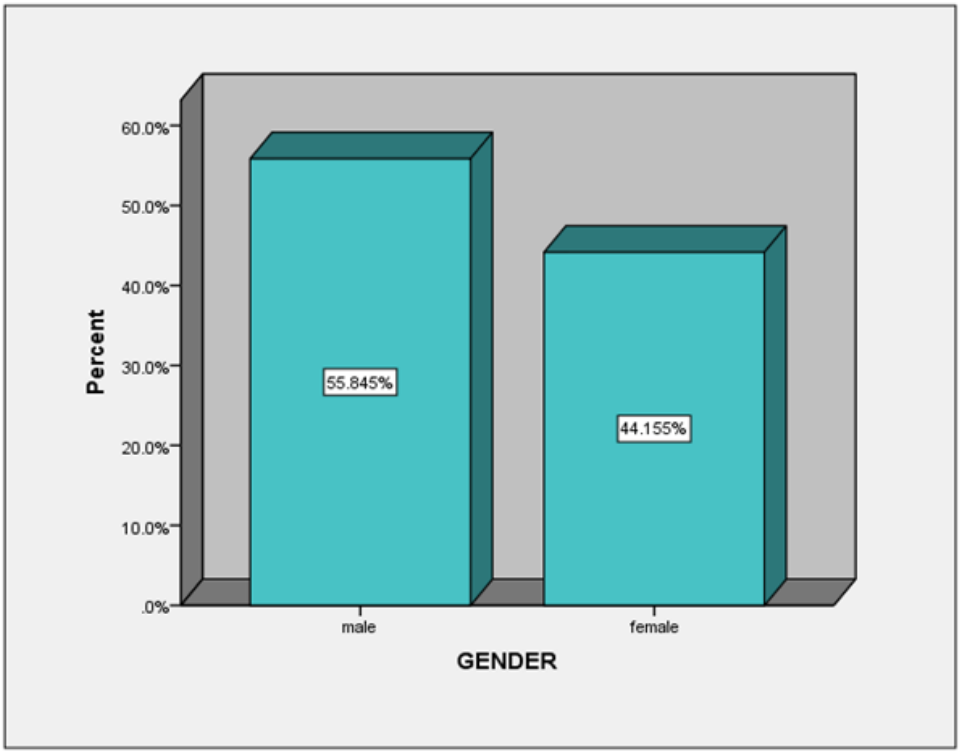

Fig.3: Simple bar chart showing distribution of study subjects based on gender. X axis represents the gender of the participants. Y axis represents the percentage of males and females. Most of the participants were males (55.84%).

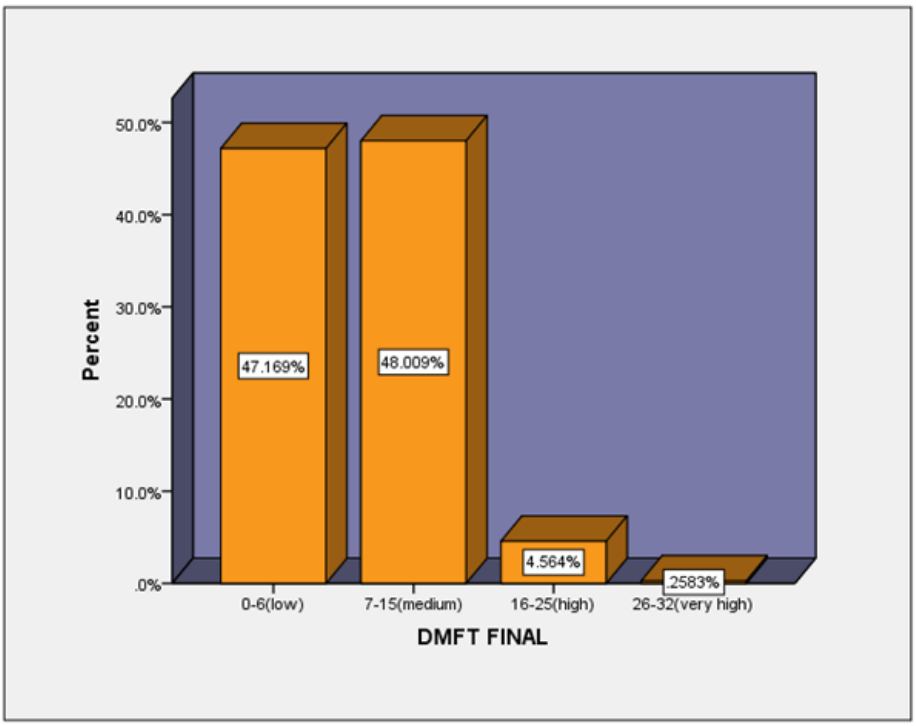

Fig.4: Simple bar chart showing distribution of study subjects based on DMFT score.X axis represents the dental status (DMFT INDEX) and Y axis represents the percentage of the DMFT score of the participants. Most of the participants (48%) had medium DMFT scores followed by 41.17% with low DMFT scores.

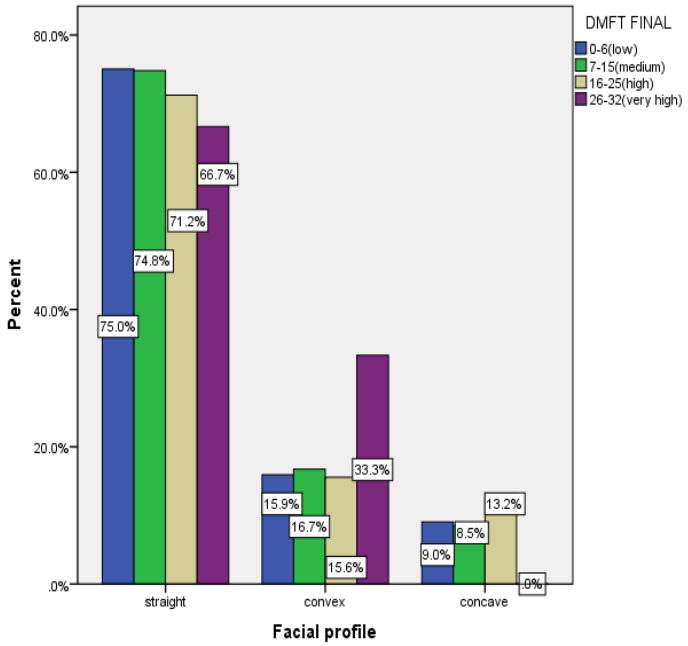

Fig.5: Cluster bar chart showing association between facial profile and DMFT scores. X axis represents the facial profile of the participants and Y axis represents the DMFT scores of the participants. Very high DMFT scores were predominantly seen in patients with convex profiles. Low DMFT scores were elucidated among patients with straight profiles. The association was not statistically significant between facial profile and DMFT scores using Chi-square test (Chi-square value - 9.067; p value - 0.170).

Table 1

FACIAL PROFILE	DECAYED TEETH(dt)				CHI SQUARE VALUE	P VALUE
	0-5(LOW) N(%)	6-12(MEDIUM) N(%)	13-18(HIGH) N(%)	19-22VERY HIGH) N(%)		
STRAIGHT	2573(74.15%)	869(25%)	27(0.8%)	2(0.1%)	4.144	0.657
CONVEX	577(76%)	176(23.2%)	6(0.8%)	0(0%)		
CONCAVE	322(77.6%)	89(21.4%)	4(1%)	0(0%)		

TABLE 1 represents the association between decayed teeth(dt) and facial profile of the participants. Most of the participants with straight profile(74.15%), convex profile(76%) and concave profile(77.6%) had only low scores of decayed teeth(dt). No statistically significant difference was found between DMFT final scores and facial profile using Chi-square test (Chi-square value - 4.144; p value - 0.657).

Prior studies have identified an association between skeletal malocclusion and dental caries due to food accumulation and plaque retention areas. Skeletal malocclusion which has a convex profile often leads to dental caries due to difficulty in cleaning(Agbaje et al., 2016; Kolawole and Folayan, 2019)-(Sardenberg et al., 2013). In contrast to that of skeletal class III malocclusion which has definite concave profile and has tooth spacing which would also be a plaque retention factor and increase the risk for caries, although no such association was found in our study(Sidlauskas, Svalkauskiene and Sidlauskas, 2006).

A distinguishing feature of this study was investigating the correlation between facial profile and dental caries, as previous epidemiological studies have only assessed the dental aspects of malocclusion. Profile was investigated using photographs, which enhanced reliability in the diagnosis of skeletal pattern. No statistically significant association was found between facial profile and caries prevalence (DMFT) patients (0.170) and decayed teeth (p = 0.657) (Table 1). Which is in accordance with study conducted by Mtaya et al (Mtaya, Astrom and Brudvik, 2008)). In contrast to our finding, skeletal profiles of the patients have association with dental status of the patients in many studies(Milacic and Markovic, 1983). Our institution is passionate about high quality evidence based research and has excelled in various fields ((Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; M. G. Mathew et al., 2020)

Our study has a few limitations. Reliability of the data collected is questionable since the data was recorded by the student trainees. Further longitudinal prospective studies have to be conducted to provide definite evidence towards the association between facial profile and DMFT.

CONCLUSION

The face and skeletal morphology like facial profile, facial type, inter-arch relationships does correspond to a type of dental malocclusion which can increase the dental caries prevalence. From the study results, more prevalence of dental caries was found in convex profile participants than concave profile participants and no significant association was found between facial profile and dental caries of the participants in our study sample. Furthermore, in the realm of literature, many studies have proven the statistical probabilities of facial profile with dental malocclusion which can be used for future longitudinal prospective studies.

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