

ASSOCIATION BETWEEN OCCLUSAL PARAMETERS AND FACIAL MORPHOLOGY IN A PRIVATE DENTAL INSTITUTION

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ABSTRACT

Introduction: Dentofacial abnormalities and its relation to facial morphology, adds specific attention to personality, social appearance and confidence of the individual. The ability to analyse the patient's facial growth early in life would enable the orthodontist to intercept and give the required treatment as soon as possible. This study aims to assess the association of the occlusal parameters and facial morphology in a private dental institution.

Materials and Methods: Subjects were obtained from the patient record management system. Patients demographic details included age and gender. The Clinical examination records includes the shape of head, shape of face, shape of arch, the inter arch relation, the nasolabial angle, palatal vault and dental malocclusion. Data obtained was then exported to (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) for further analysis of the statistics, With the obtained data descriptive tests, frequency tests, and One way ANOVA were done.

Results: The study population included 50% males and 50% females ensuring equal gender ratio. Mesocephalic shape is the most predominant shape in both males 21% and females 40%. Dolichocephalic shaped showed predominance in males 27%. Mesocephalic shape is the most predominant shape in class 1 malocclusion 53%, followed by Dolichocephalic shape 26.50% which is predominant in class 2 malocclusion lastly Brachycephalic which is observed only in class 3 malocclusion 8%. Scissor bite is majorly observed in Dolichocephalic head shape 21.50% followed by 14% mesocephalic. Normal palatal vault is predominantly observed in class 1 malocclusion patients 25.50%.

Conclusion: This study concludes that occlusal parameters strongly correlated with the morphology of the head

Keywords: cephalometrics; headshape; innovative study; interceptive orthodontics; malocclusion; novel study.

INTRODUCTION

Physical appearance especially concerning the esthetics of the facial form shape and appearance has been of utmost importance since the development of civilizations. [1]

Dentofacial abnormalities and its relation to facial morphology, adds specific attention to personality, social appearance and confidence of the individual. The morphological features of the face has always been the reference of ideal beauty. [2,3] Of which a person's smile is given the most importance when it comes to aesthetics. Smiling has been one of the most significant factors in developing one's self confidence and social relationships [4]. Smile can be defined as "a change of facial expression involving an upward curving of the corners of the mouth, brightening of the eyes, with no sound and less muscular distortion of the features than in a laugh that may express amusement, pleasure, tender affection, approval, restrained mirth, irony, derision or any of various other emotions." by Webster [5]. Smile is said to develop when a sensation of happiness, pleasure, and humour is felt. The harmony of the smile involves not only the teeth but the golden proportion of facial lines, shape, contour and other factors as such. One such important factor is the dental occlusion of the person. [6-8] There have been various attempts in studies in the past with different methodologies to characterize and establish the association between the facial morphology and the dental malocclusion. [9-11] Studies state that the established spatial relationship between the dental arches are typically unchanged during the growth period, the same applies to the sagittal relationship and the patterns of the dental and facial features can be determined at an early stage. [12-15]

Orthodontics play a vital role in establishing the harmony of the smile, correction of facial deformities. The role of the orthodontist is to analyse the patient's facial growth early in life would enable the orthodontist to intercept and give the required treatment as soon as possible. Due to the lack of consensus in the previous literatures where there is no characteristic association between the occlusal parameters and the facial morphology this study aims to assess the association of the occlusal parameters and facial morphology in a private dental institution.

MATERIALS & METHODS

Study Design & Study Setting

This study was planned as a cross sectional pilot study, conducted amongst the subjects who visited as out patients in a university dental hospital. This cross sectional Study was carried out after obtaining approval from the institutional ethical

review board, the study was conducted in the month of January 2021. Patients were included in the study based on the inclusion and exclusion criteria. Patients' demographic details include age and gender. The Clinical examination records include Shape of head, shape of face, shape of arch, inter arch relation, nasolabial angle, palatal vault and dental malocclusion. Extra Oral examination was done by making the patient stand erect and relaxed in their natural position followed by intra oral examination was done in the dental chairs with the dental chair light. Occlusion was classified as a group function and not just a canine guided function. 20 participants from each age group and the study had equal male to female ratio. Patients were selected based on simple random sampling to prevent bias. Completely edentulous patients were excluded from the study. The obtained data was transferred to Google Spreadsheets which were examined by 2 internal reviewers and 1 external reviewer.

Statistical Analysis

Data obtained was later exported to (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.) for further statistical analysis, The obtained data was then subjected to frequency tests, descriptive tests and chi square tests were done.

RESULTS

The study population included 50% males and 50% females ensuring equal gender ratio. Patients from each group were selected 20% in percent to have equal age wise distribution; they were classified into 18-25 age group, 26-33 age group, 34-41 age group, 42-49 age group and 50-57 age group. The occlusal parameters include Nasolabial angle, palatal vault, dental malocclusion, head shape. Mesocephalic shape is the most predominant shape in both males 21% and females 40% followed by Dolichocephalic which showed predominance in male 27% and females 9% and lastly Brachycephalic 2% in males and 1% in Females. Mesocephalic shape is the most predominant shape in class 1 malocclusion 53%, followed by Dolichocephalic shape 26.50% which is predominant in class 2 malocclusion lastly Brachycephalic which is observed only in class 3 malocclusion 8%. Mesocephalic head shape showed predominance of no abnormalities 42% however Scissor bite is majorly observed in Dolichocephalic head shape 21.50% followed by 14% mesocephalic. The palatal vault is shallow in most of the patients with class 1 malocclusion 35.00% followed by patients with class 2 malocclusion 26.50%. Normal palatal vault is predominantly observed in class 1 malocclusion patients 25.50%.

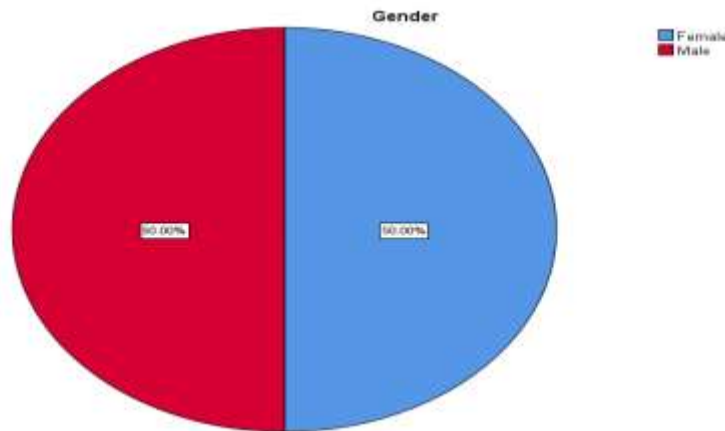


Figure 1: Pie chart showing gender wise distribution of our study population. Red represents Male and Blue represents Female. Equal Male to Female Population ratio is observed 50% in both gender categories.

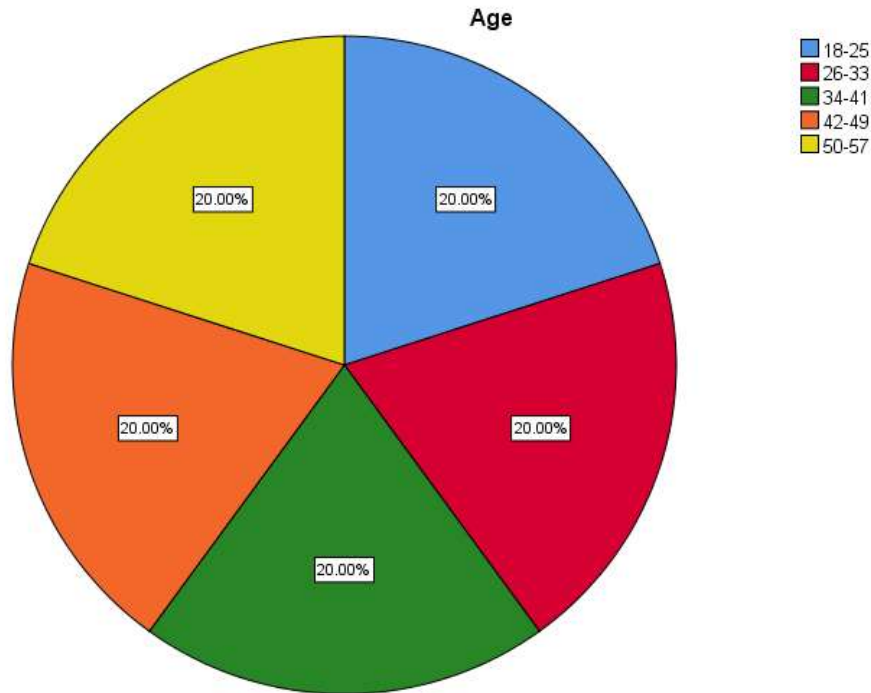


Figure 2: Pie chart representing the age wise distribution of our study population . Each of the population is of equal percentage. Blue represents 18-25 years age group, Red represents 26-33 age group, green represents 34-41 age group, Orange represents 42-49 age group, yellow represents 50-57 age group

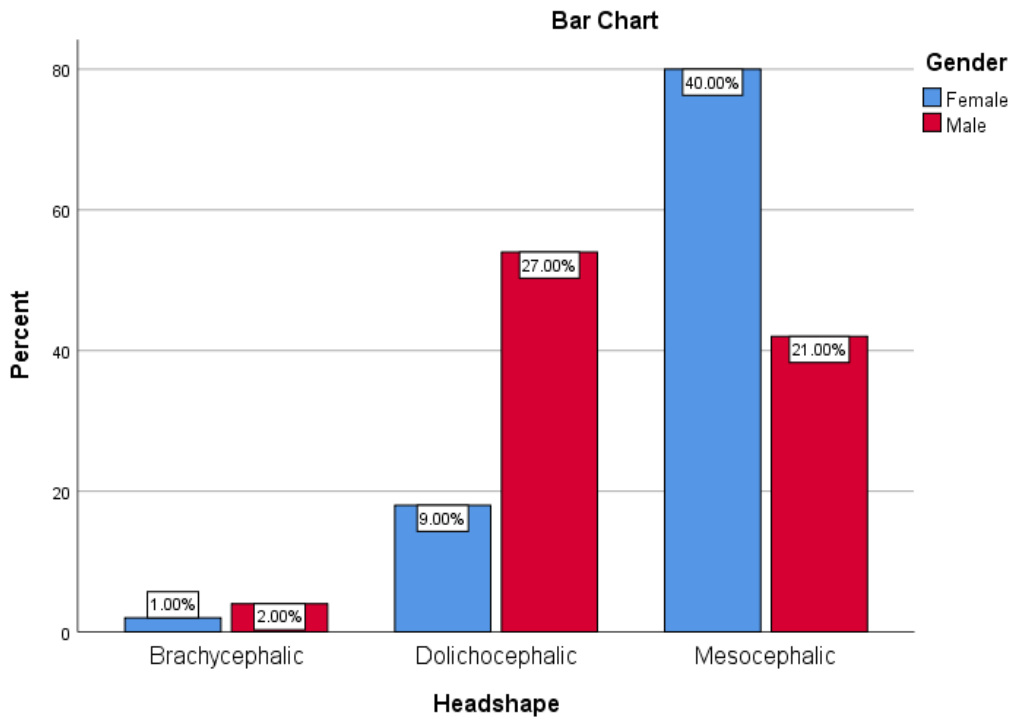


Figure 3: Bar chart shows the association of gender and the corresponding shape of head. Y axis represents the corresponding gender , Blue denotes female gender and red denotes Male gender, . X axis represents the corresponding shape of head. Chi- square analysis was performed and the association was found to be statistically significant. Pearson chi-square value-30.5.3; DF-2, p-value<0.005. It is evident that Mesocephalic shape is the most predominant shape in both

males 21% and females 40% followed by Dolichocephalic which showed predominance in male 27% and females 9% and lastly Brachycephalic 2% in males and 1% in Females

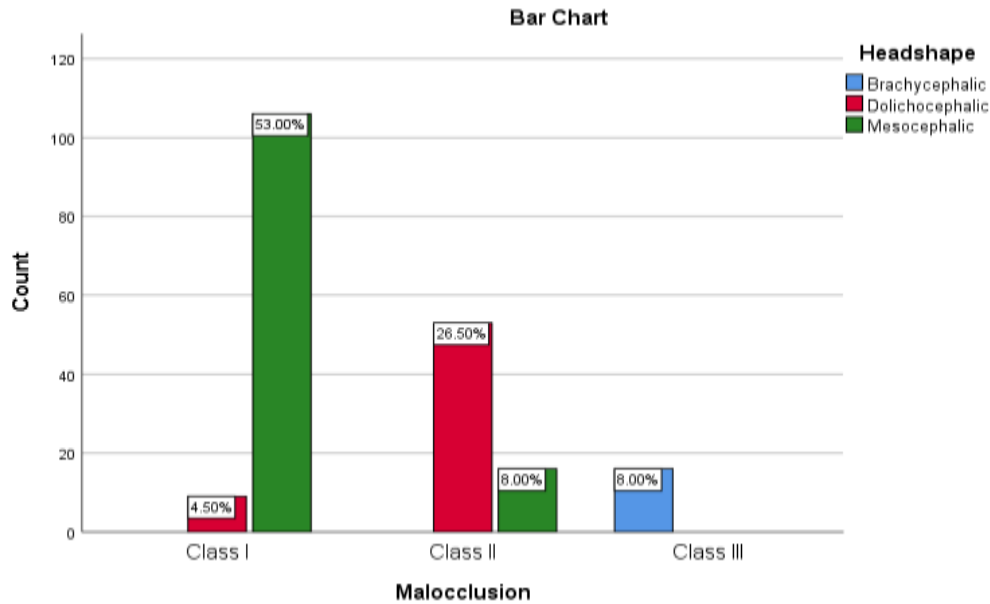


Figure 4: Bar chart shows the association of Malocclusion and the corresponding shape of head. Y axis represents the corresponding head shape Green denotes Mesocephalic, Red Denotes Dolichocephalic and Blue denotes Brachycephalic. X axis represents the corresponding malocclusion. Chi- square analysis was performed and the association was found to be statistically significant. Pearson chi-square value-299.848; DF-2, p-value<0.005. It is evident that Mesocephalic shape is the most predominant shape in class 1 malocclusion 53% , followed Dolichocephalic shape 26.50% which is predominant in class 2 malocclusion lastly Brachycephalic which is observed only in class 3 malocclusion 8%.

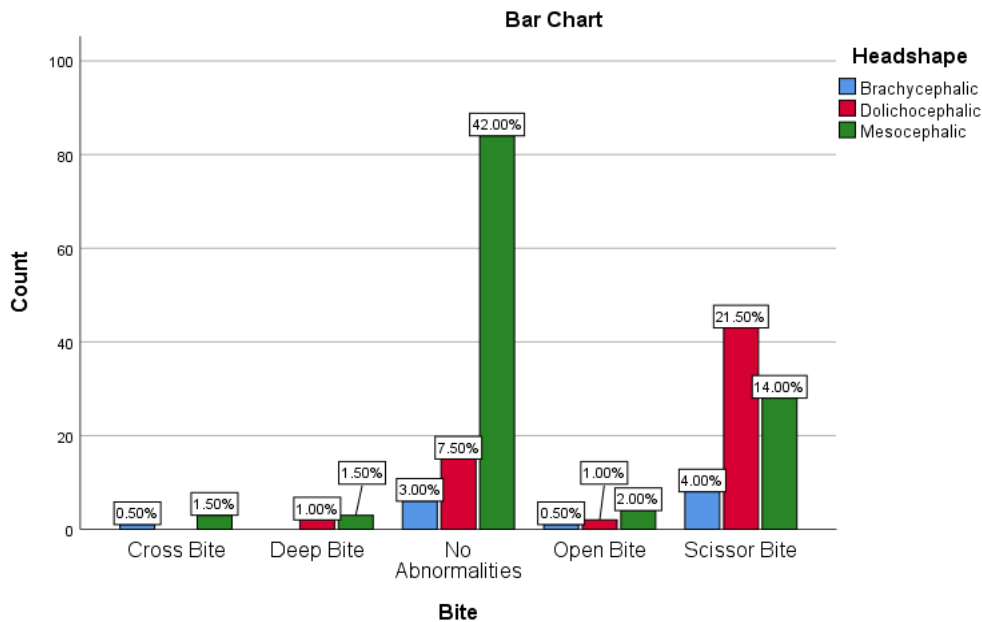


Figure 5 : Bar chart shows the association of the type of bite and the corresponding shape of head. Y axis represents the corresponding head shape Green denotes Mesocephalic, Red Denotes Dolichocephalic and Blue denotes Brachycephalic. X axis represents the corresponding type of bite. Chi- square analysis was performed and the association was found to be statistically significant. Pearson chi-square value-42.979; DF-2, p-value<0.005. It is evident that Mesocephalic head shape

showed predominance of no abnormalities 42% however Scissor bite is majorly observed in Dolichocephalic head shape 21.50% followed by 14% mesocephalic.

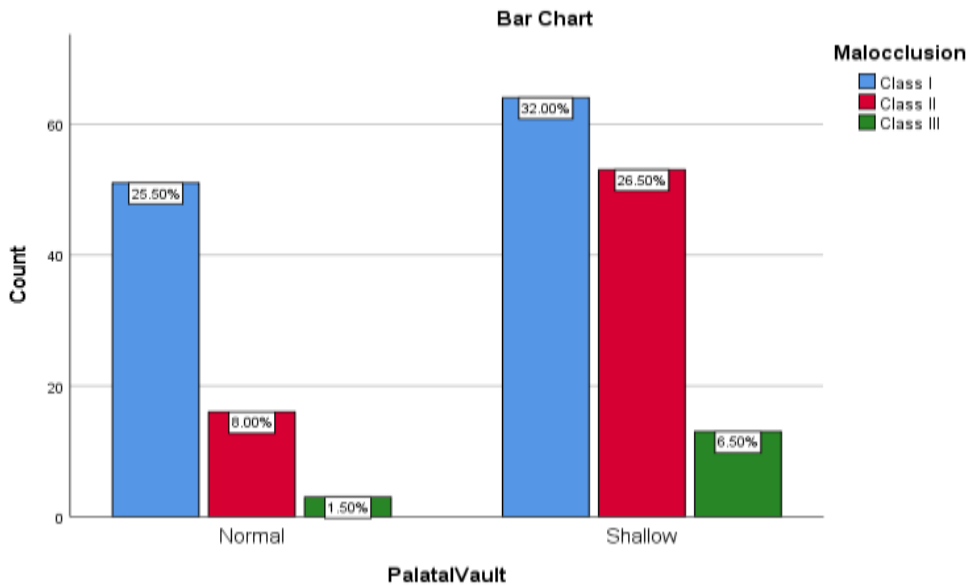


Figure 6: Bar chart shows the association of the type of malocclusion and the corresponding palatal vault .Y axis represents the corresponding Malocclusion .Blue Denotes Class 1 malocclusion, Red denotes Class 2 malocclusion and green denotes Class 3 malocclusion .X axis represents the corresponding Palatal vault. Chi- square analysis was done and the association was found to be statistically significant. Pearson chi-square value-10.506; DF-2, p-value<0.005.It is evident that palatal vault is shallow in most of the patients with class 1 malocclusion 35.00% followed by patients with class 2 malocclusion 26.50%. Normal palatal vault is predominantly observed in class 1 malocclusion patients 25.50%.

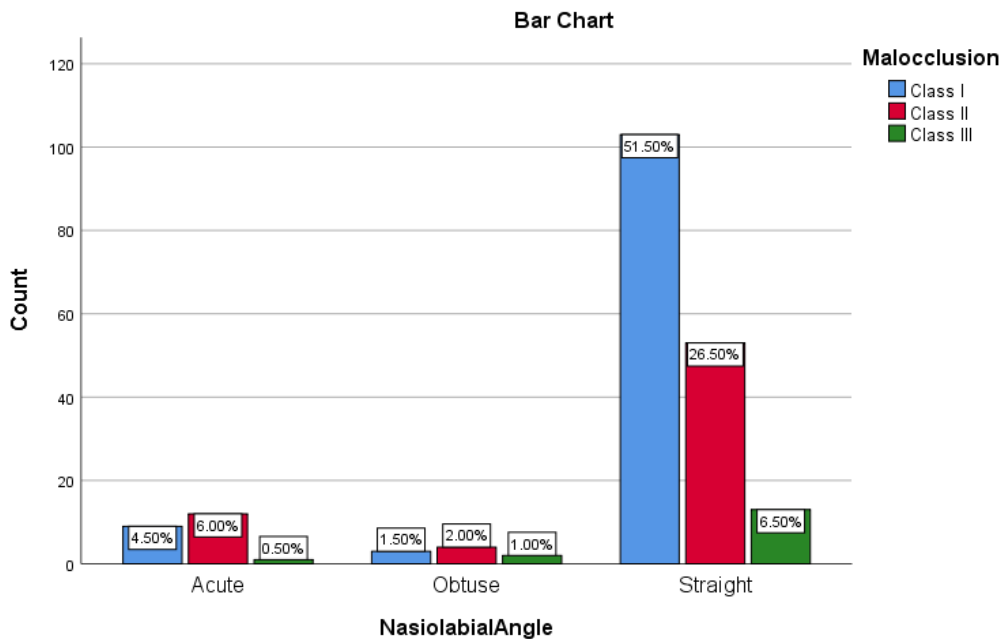


FIGURE 7:Bar chart shows the association of the type of malocclusion and the corresponding nasolabial angle .Y axis represents the corresponding Malocclusion .Blue Denotes Class 1 malocclusion, Red denotes Class 2 malocclusion and green denotes Class 3 malocclusion .X axis represents the corresponding Nasolabialangle.Chi- square analysis was performed and the association was found to be statistically significant. Pearson chi-square value-10.506; DF-2, p-value<0.005.It is evident that nasolabial angle is predominantly straight in almost all the classification class 1 51.50%, class

2 26.50% followed by class 3 6.50%. It is predominantly acute in class 2 malocclusion 6.% followed by class 1 malocclusion 4.50%

DISCUSSION

Facial form and shape contribute mainly to the facial aesthetics as well as the self perception of the individual thus increasing their confidence. The ideal shape of face and arrangement of teeth is a prerequisite not only for biological and functional rehabilitation but also for harmony of the smile and an aesthetic face.

The current study had an equal male to female ratio to prevent any bias, Refer Fig:1. 20 percent of participants were taken from each specific age group. They were classified into 18-25 age group, 26-33 age group, 34-41 age group, 42-49 age group and 50-57 age group (Fig:2).

When the comparison between the gender group and head shape were analysed it showed that the mesocephalic shape is the most predominant shape in females 40% and 21% in males followed by Dolichocephalic which showed predominance in males 27% and females 9% and lastly Brachycephalic 2% in males and 1% in Females. This is in accordance with the study done by Singh p [16] where mesocephalic head shapes were predominant in both males and females. The predominance of males in dolichocephalic head shape was also observed in another study done by Sami Ahmed. [17] (Fig 3).

Mesocephalic shape is the most predominant shape in class 1 malocclusion 53% , followed by Dolichocephalic shape 26.50% which is predominant in class 2 malocclusion lastly Brachycephalic which is observed only in class 3 malocclusion 8%. This is in accordance with various studies done all over the world the as mesocephalic head shape is often associated with class 1 malocclusion, dolichocephalic head shape is often associated with class 2 malocclusion and brachycephalic head shape is often associated with class 3 malocclusion. [18–22] (Fig:4)

When head shape was compared with the type of bite ,Mesocephalic head shape showed predominance of no abnormalities 42% however Scissor bite is majorly observed in Dolichocephalic head shape 21.50% followed by 14% in mesocephalic head shape. There has been studies done by various authors denoting the shape of head could deliver alternatives and variations in forces of occlusion, this could be one of the reason why scissor bite is predominant in patients with dolichocephalic head. [23,24] (Fig:5)

It was observed that palatal vault is shallow in most of the patients with class 1 malocclusion 35.00% followed by patients with class 2 malocclusion 26.50%. Normal palatal vault is predominantly observed in class 1 malocclusion patients 25.50%. Palatal vault varies from person to person due to their oral habits such as mouth breathing or thumbsucking and has been demonstrated by other authors and maybe also lead to other syndromes such as airway obstruction and a study done by V Palaoni evaluated the association between the palatal vault and the malocclusion which is in accordance with the study. [25,26] (Fig:6)

It was observed that the nasolabial angle is predominantly straight in almost all the classification class 1 51.50%, class 2 26.50% followed by class 3 6.50%. It is predominantly acute in class 2 malocclusion 6.% followed by class 1 malocclusion 4.50% and there seems to be a strong correlation between the nasolabial angle and the occlusion which is supported by studies done by few other authors. [27,28]

The data of the current study demonstrated that there is significant association between the occlusal parameter the morphology of the head.

CONCLUSION

The study concludes stating there is significant association between the occlusal parameters such as the dental occlusion, nasolabial angle, palatal vault and the morphology of the head. This study prevented bias by having equal male to female ratio. Thus assessing the morphology of the head or the occlusal parameters at an early stage could aid the orthodontists in re-establishing the proper occlusion ,designing the smile harmony restoring the facial features, thus enabling proper form, function and aesthetics which improves the quality of life for the patients.

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