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Prevalence Of Skeletal Malocclusion Among Children - An Institution Based Study

Research Article

J. Chandra Pooja[1], Naveen Kumar[2*], Ganesh Jeevanandan[3]

[1] Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Chennai – 600 077, TN, India.
[2] Senior Lecturer, Department Of Orthodontics and Dentofacial Orthopaedics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, 162, Poonamallee High Road, Chennai - 600077, Tamil Nadu, India.
[3] Reader, Department of Pedodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS) Saveetha University, Chennai, India.

Abstract

Balanced facial features are much more pleasing and appealing in the majority of races and sexes rather than irregular or protruding teeth which also give a reflection of negative status. Malocclusion greatly affects the psychological and social well-being of the children.The knowledge of prevalence of skeletal malocclusion in children provides the clinician a helpful tool to handle such patients in their clinic with clarity and ease.The aim of the study is to evaluate the prevalence of skeletal malocclusion among children in Saveetha Dental College.A retrospective study was carried out using case records of 7679 patients who reported to the Department of Orthodontics from June 2019 to March 2020.The prevalence of skeletal malocclusion in children among gender and age group were observed from the digital records and tabulated on a spreadsheet. The collected data was analysed by computer software SPSS version 21 using Chi square test with the level of significance with age and gender. The percentage of children with skeletal malocclusion was 4.02% and the percentage of children without skeletal malocclusion was 95.98%. The prevalence of skeletal malocclusion in children was statistically significant with age but was not significant with gender of the child and was most prevalent in male children above the age group 10 years[>10].

Keywords: Facial Profile; Skeletal Malocclusion; Maxilla; Mandible.

Introduction

Skeletal discrepancy is occurs due to deficient in proper and development of jaws that will have a huge impact on the positioning, alignment and general health of teeth [1, 2]. Skeletal malocclusion is caused due to distortion of proper mandibular and /or maxillary growth during pre/post natal development. patients with skeletal malocclusion may suffer from dental deformities, bruxism, teeth crowding, TMJ difficulty and mastication difficulties [3]. In this study the prevalence of class I,II,III of malocclusion in different ethic groups and discussed the most frequent medical disorders associated with skeletal malocclusion upper lip and palate is one of the most common birth defects with the highest prevalence of 1 in 500 live births in Asian population [4].

Hereditary factors were found to be responsible for only 40% of the skeletal and dent variations resulting in malocclusion and genetic component was higher for skeletal pattern than dental features [5]. The development of skeletal structures is partly under environmental control and partly under genetic control. The genetic basis plays an important role in malocclusion [6, 7]. Evidence from population studies, especially family and twin studies have shown the genetic factors play an important role in etiology of malocclusion [8]. In craniometric and cephalometric studies of facial similarities the evidence has supported the concept that facial form was mostly a product of the person's genotype [9].

In India, the prevalence of malocclusion varies from 20% to 43% [10]. Many cross-sectional studies have been attempted previously to examine the malocclusion in different populations representing

***Corresponding Author**:
Naveen Kumar,
Senior Lecturer, Department Of Orthodontics and Dentofacial Orthopaedics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, 162, Poonamallee High Road, Chennai - 600077, Tamil Nadu, India.
Tel: 9791217568
E-mail: naveenkumarm.sdc@saveetha.com

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the Indian population [11]. Hence, the aim and objective of the present study were to determine the prevalence of skeletal malocclusion among 0-18 years old children in the South Indian population. Among the various types of malocclusion found in human population, class II division 1 is one of the most common.The treatment of class II division 1 depends upon the age of the patient, growth potential, severity of malocclusion, and compliance of patient for treatment [12, 13]. In growing individuals, growth modification procedures can be carried out to correct the skeletal class II malocclusion, during mixed or early permanent dentition before the cessation of active growth.In such condition, underlying skeletal discrepancy can be camouflaged by orthodontic tooth movement with extraction or without extraction (depending upon the severity of malocclusion)[14-18].

Class III malocclusion with skeletal disharmony requires orthognathic surgery complemented by orthodontics [19, 20]. Treating such cases becomes much more challenging when the patient rejects surgery due to fear, cost, or esthetic concerns, but continues to expect a good result.Several treatment options have been proposed for these types of cases [21, 22], including extraction (usually premolars in the lower or both arches) [23-26], extraoral traction (horizontal traction of the mandibular arch, or vertical traction in an open-bite case), and distalization of lower molars with devices such as lip bumpers [15, 17, 27, 28]. Previously our team has a rich experience in working on various research projects across multiple disciplines [29, 42]. The aim of the study was to evaluate the prevalence of skeletal malocclusion in children in the South Indian population.

Materials And Method

Study design

In this retrospective study, data from patients records within the institution were revised and the data of children who had skeletal malocclusion were collected.At data extraction,all information was anonymized and tabulated onto a spreadsheet. The study was commenced after approval from the Institutional Review Board. Children who had skeletal malocclusion were reviewed to check the prevalence among gender and age.

Subjects and procedures

Data were collected from June 2019 to March 2020 for 7679 children who had skeletal malocclusion. The following data were retrieved from the dental records: patient age and gender.

Statistical Analysis

The statistical analysis was done using SPSS software version 21.0 (SPSS Inc., Chicago, IL, USA). The data was verified by the institutional ethical committee and by 2 examiners. All retrospective studies arising from the Data set between 01 June 2019 and 31 march 2020 will be covered by the following ethical approval number. SDC/SIHEC/2020/DIASDATA/0619-0320. The dependent variables were age and gender and independent variables were the patient's willingness, socio economic status.Chi-square test was used to compare the study subject with age and gender.

Result And Discussion

A total of 7679 patients with a mean age of 1.42 years were included in the present study. Skeletal malocclusion was prevalent among 7.11% of children among the total population. Chi-square test was done between skeletal malocclusion and age and gender. Below the age group of 5 years 0.04% of children showed skeletal malocclusion, between 6-10 years of age 0.29% of children had skeletal malocclusion and above the age of 10 years 3.70% of children had skeletal malocclusion. This relation was statistically significant(P=0.001). Regarding the gender, skeletal malocclusion was 2.10% in male patients and 1.93% in female patients. This relation was statistically not significant(0.329).

Our study results show(Figure 2) statistical significance between age and occurrence of skeletal malocclusion and the prevalence increased above the age of 10 years.The results were similar to the results of a study by Buschang PH et al which stated that skeletal malocclusion in children was seen above the age of 10. This can be explained by the growth of the jaw around the age of 12.2 years in females and 14 years in males [43]. And a study by Ghiy MA et al that stated that the difference between the lengths of mandibular and maxillary arches in males and females was not significant at younger ages. However the difference becomes more prominent at the age of 12 years or older [44].

Our study results show (Figure 3) that there is no statistical significance between gender and skeletal malocclusion, the difference was negligible but slightly prevalent in male children. The results of the study was similar to that of Sivareddy et al which shows that there exists no variation of the angle SN-FH, NFH, SFH, and between males and females and in the different skeletal relationship of jaws and there is no statistical difference between different skeletal classes of malocclusion in southindian popula-

Figure 1. Bar chart represents prevalence of skeletal malocclusion among children. X-axis represents the skeletal malocclusion and Y-axis represents the percentage distribution of patients. Green colour shows the percentage of children with skeletal malocclusion were 7.11% and blue colour shows the percentage of children without skeletal malocclusion was 92.88%.

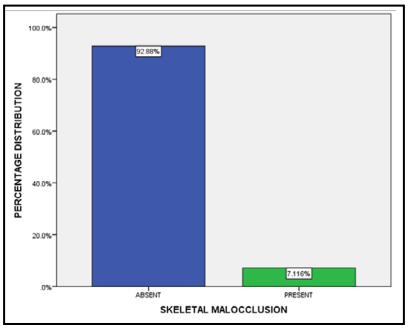


Figure 2. Bar chart depicting association between age of patients with skeletal malocclusion. The age of the child was categorised into three groups namely group 1(<5 years), group 2(6-10 years), group 3(>10 years). X axis represents age of patients and Y axis represents skeletal malocclusion in children. Significant association was found between skeletal malocclusion and age of the patient (Pearson's chi square value 201.6, df-2, p value = 0.001).Skeletal discrepancy in age more than 10 years is greater than other age(3.70%).

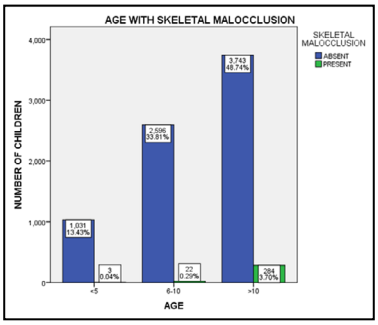
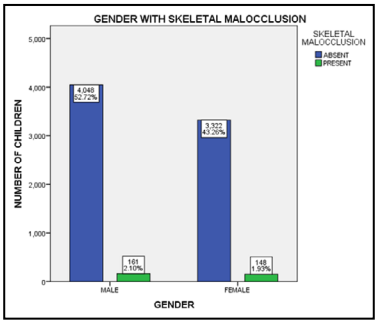


Figure 3. Bar chart depicting association between gender of patients with prevalence of skeletal malocclusion. X axis represents gender of patients and Y axis represents the prevalence of skeletal malocclusion. No significant association was found between skeletal malocclusion and age of the patient (Pearson's chi square value 0.953, df-1, p value = 0.329). Gender distribution of skeletal malocclusion is almost equivalent between the genders but is slightly more in male children (2.10%).



tion [45]. And to that of Clarissa chrustin et al., [46] which says in relation to sex, some reports suggest no statistically significant difference between males and females in the prevelance of dental anomalies [47, 48]. Kathariya et al found significant sex differences only for tooths agencies, microdontia and accessory wisp [49]. The prevalence of dental anomalies was greater. The conflicting finding may be due to ethinic variations and sample sizes. Our institution is passionate about high quality evidence based research and has excelled in various fields [50-60].

Limitations of the study include a small sample size and limited demographic area of coverage. Future scope of the study could include a multi centred study with different geographical areas and ethnicities with a wide range of population to ascertain better results and consider more number of clinical factors.

Conclusion

Within the limitation of the study, it can be concluded that the prevalence of skeletal malocclusion was statistically significant with age and had no statistical significance with gender of the child. It was more slightly prevalent in male children than female and among children over 10 years of age. Knowledge of the prevalence of skeletal malocclusion will help the clinician to focus on the children's growth at a particular age group for planning an effective treatment.

Author Contribution

Author 1(J.Chandrapooja) carried out the retrospective study by collecting data and drafted manuscripts performing the necessary statistical analysis. Author 2(Dr.Naveen Kumar) aided in the conception of the topic, participated in the study design, statistical analysis and coordinated in developing the manuscript author 3(Dr.Ganesh Jeevanandhan) aided in coordinating and developing the manuscript. All the authors have contributed in developing the manuscript.

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