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Prevalence of class 2 malocclusion and edentulism in a known population and its treatment using various appliances and Implant prosthesis and Fixed prosthesis

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Abstract
Background: This study was conducted to assess the prevalence of class 2 malocclusion and edentulism in a known population and its treatment using various appliances and Implant and Fixed prosthesis.
Material and methods: This study was conducted to assess the prevalence of class 2 malocclusion and edentulism in a known population and its treatment using various appliances and Implant and Fixed prosthesis. There were total 100 participants in this study. the subjects had been informed about the procedure and were asked for consent. All the subjects agreed to give consent and hence all of them were included in the study. All the subjects underwent oral clinical examination and were checked for edentulism and class 2 malocclusion. The findings had been tabulated. Various myofunctional appliances were fabricated for class 2 malocclusion participants and for the ones with edentulism, implant prosthesis and fixed prosthesis were planned. Statistical analysis was conducted using SPSS software.
Results: In this study there were 100 subjects of which 45 were male and 55 were female. The prevalence of class II malocclusion was 63%. The prevalence of edentulism was 18%. Activator was fabricated for 25 subjects, Herbst appliance was given in 21 subjects, Jasper Jumper appliance was made for 10 subjects and Frankel II appliance was made for 7 subjects. Implant prosthesis was made for 11 subjects and fixed prosthesis was made for 8 subjects.
Conclusion: The prevalence of class II malocclusion was 63%. The prevalence of edentulism was 18%. Most of the subjects were female. Appliances like activator, Herbst appliance, Jasper jumper appliance and Frankel II appliance were fabricated for subjects with class II malocclusion and implant prostheses and fixed prostheses were planned for edentulism subjects.

Keywords: Prevalence, Treatment, Edentulism, Malocclusion

Introduction

The WHO considers malocclusion one of the most important oral health problem, after caries and periodontal disease.[1] Its prevalence is highly variable and is estimated to be between 39% and 93% in children and adolescents.[2-4] This prevalence range is very wide and heterogeneous. This inhomogeneity may be due to ethnic and age differences of patients considered in studies, assessing the prevalence of malocclusion.[5,6]

Malocclusions can occur in three different spatial planes: sagittal, transverse and vertical. It is possible to identify three different types of skeletal relationship in the sagittal plane, defined from the analysis of the ANB angle, which represents the antero-posterior intermaxillary relationship.

This study was conducted to assess the prevalence of class 2 malocclusion and edentulism in a known population and its treatment using various appliances and Implant and Fixed prosthesis.

Material and methods

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Results

Table 1: Gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Male	45	45
Female	55	55
Total	100	100

In this study there were 100 subjects of which 45 were male and 55 were female.

Table 2: Prevalence of class II malocclusion

Prevalence	Number of subjects	Percentage
Absent	47	47
Present	63	63
Total	100	100

The prevalence of class II malocclusion was 63%.

Table 3: Prevalence of edentulism

Prevalence	Number of subjects	Percentage
Absent	82	82
Present	18	18
Total	100	100

The prevalence of edentulism was 18%.

Table 4: Treatment of class II malocclusion

Treatment	Number of subjects
Activator	25
Herbst appliance	21
Jasper jumper	10
Frankel II appliance	07
Total	63

Activator was fabricated for 25 subjects, Herbst appliance was given in 21 subjects, Jasper Jumper appliance was made for 10 subjects and Frankel II appliance was made for 7 subjects.

Table 5: Treatment of edentulism

Treatment	Number of subjects
Implant prosthesis	11
Fixed partial denture	07
Total	18

Implant prosthesis was made for 11 subjects and fixed prosthesis was made for 8 subjects.

Discussion

Edentulism is the state of being edentulous, or without natural teeth.[7] Complete edentulism is an oral cavity without any teeth. Adequate dentition is quite essential for well-being and life

quality. Edentulism is one of the public health burdens for elderly people and effects clearly the practice of primary care. Edentulism is a devastating and irreversible condition and is described as the "final marker of disease burden for oral health.[8] "Patients who are suffering from edentulism exhibit a wide range of physical variations and health conditions. Teeth loss affects mastication, speech, and may result in poor esthetics which in turn affect the quality of life.[9]

In the United States, according to Slade *et al.*[10] surveyed 432,519 adults; among adults over 15 years of age and above, the prevalence of edentulism was 4.9%. In Canada, the overall rate of edentulism in 2010 was 6.4% - 21.7% among adults between 60 and 79 years of age.[11] The rate of edentulism tends to be different from a region to another region within a country. A wide variation has been found between provinces in Canada, from 14% (Quebec) to 5% (Northwest Regions) due to related factors such as access to fluoridated water and smoking.[12] In Brazil, the more industrialized states and wealthier places tend to have lower rates than other parts of the country.[13]

This study was conducted to assess the prevalence of class 2 malocclusion and edentulism in a known population and its treatment using various appliances and Implant and Fixed prosthesis.

In this study there were 100 subjects of which 45 were male and 55 were female. The prevalence of class II malocclusion was 63%. The prevalence of edentulism was 18%. Activator was fabricated for 25 subjects, Herbst appliance was given in 21 subjects, Jasper Jumper appliance was made for 10 subjects and Frankel II appliance was made for 7 subjects. Implant prosthesis was made for 11 subjects and fixed prosthesis was made for 8 subjects.

Balachandran P et al[14] assessed the prevalence of malocclusion among 8–15 years old Indian children. The review protocol was registered in PROSPERO data with register number CRD42020214211. They employed the standard methodological procedures according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. Electronic search was done in PubMed database and other sources in 2020 to identify studies. Only studies published in English after January 1, 2000 that assessed prevalence of malocclusion using Dental aesthetic Index (DAI) or Angle's classification of malocclusion were considered for screening. Selection of articles, data extraction and validity assessment were done independently by the two reviewers. Pooled prevalence of malocclusion is 35.40% (CI:35.37–35.43, 54 studies, 97959 participants). Males had higher proportion of

malocclusion (36.20%, CI: 36.12–36.28,33 studies, 40456 participants). 13 years had higher prevalence of malocclusion (33.50%, CI:33.34–33.66, 11 studies, 3366 participants). Prevalence of malocclusion was higher among urban population (32.78%, CI:32.71 32.85,11 studies, 18313 participants). South India showed higher prevalence of malocclusion (39.58%, CI:39.54–39.62, 41 studies, 58645 participants). Prevalence of malocclusion as assessed by mean DAI score was 21.23 (CI:21.14–21.33,11 studies, 12345 participants). The pooled prevalence of malocclusion among 8–15 years children in India is 35.40% (CI:35.37–35.43,54 studies, 97959 participants). Included studies were heterogeneous in their methods of assessment of malocclusion.

The purpose of the study conducted by De Ridder L et al[15] was to systematically review the literature regarding the prevalence of malocclusion and different orthodontic features in children and adolescents. The digital databases PubMed, Cochrane, Embase, Open Grey, and Web of Science were searched from inception to November 2021. Epidemiological studies, randomized controlled trials, clinical trials, and comparative studies involving subjects ≤ 18 years old and focusing on the prevalence of malocclusion and different orthodontic features were selected. Articles written in English, Dutch, French, German, Spanish, and Portuguese were included. Three authors independently assessed the eligibility, extracted the data from, and ascertained the quality of the studies. Since all of the included articles were non-randomized, the MINORS tool was used to score the risk of bias. The initial electronic database search identified a total of 6775 articles. After the removal of duplicates, 4646 articles were screened using the title and abstract. A total of 415 full-text articles were assessed, and 123 articles were finally included for qualitative analysis. The range of prevalence of Angle Class I, Class II, and Class III malocclusion was very large, with a mean prevalence of 51.9% (SD 20.7), 23.8% (SD 14.6), and 6.5% (SD 6.5), respectively. As for the prevalence of overjet, reversed overjet, overbite, and open bite, no means were calculated due to the large variation in the definitions, measurements, methodologies, and cut-off points among the studies. The prevalence of anterior crossbite, posterior crossbite, and crossbite with functional shift were 7.8% (SD 6.5), 9.0% (SD 7.34), and 12.2% (SD 7.8), respectively. The prevalence of hypodontia and hyperdontia were reported to be 6.8% (SD 4.2) and 1.8% (SD 1.3), respectively. For impacted teeth, ectopic eruption, and transposition, means of 4.9% (SD 3.7), 5.4% (SD 3.8), and 0.5% (SD 0.5) were found, respectively. There is an urgent need to clearly define orthodontic features and malocclusion traits as well as to reach consensus on

the protocols used to quantify them. The large variety in methodological approaches found in the literature makes the data regarding prevalence of malocclusion unreliable.

The aim of the study conducted by Borg-Bartolo R et al[16] was to analyze data collected from studies worldwide on the prevalence of edentulism and dental caries, in community-dwellers aged ≥ 45 years. Inclusion criteria; participants aged ≥ 45 years, community-dwellers. Exclusion criteria; participants aged < 45 years, in nursing homes, data obtained from dental clinics or pre-2005. The quality assessment tool by The National Heart, Lung and Blood Institute for Observational Cohort and Cross-sectional studies was used. Meta-analysis using the random-effects model (95% confidence interval) was done with data on participants who were edentulous and/or had active dental caries and stratified by regions of the world, age and Gross National Income per capita. Limitations in the data arose from several factors such as design of the studies included differences in socioeconomic status and access to health care among different countries. Experts from different countries were contacted to identify National oral health surveys (NOHS) conducted from 2010 onwards. Eighty-six papers and seventeen NOHS were selected for data extraction. Majority of the studies (n = 69) were cross-sectional and of fair quality. 1.1%-70%, 4.9% - 98% prevalence of edentulism and dental caries, respectively. 22%, 45% estimated random-effects pooled prevalence of edentulism and dental caries, respectively. Within the limitations of this study, the findings indicate that untreated dental caries and tooth loss are prevalent on a global level with wide variations among different countries, age groups and socioeconomic status.

Conclusion

The prevalence of class II malocclusion was 63%. The prevalence of edentulism was 18%. Most of the subjects were female. Appliances like activator, Herbst appliance, Jasper jumper appliance and Frankel II appliance were fabricated for subjects with class II malocclusion and implant prostheses and fixed prostheses were planned for edentulism subjects.

References

1. Dos Santos R.R., Nayme J.G., Garbin A.J., Saliba N., Garbin C.A., Moimaz S.A. Prevalence of malocclusion and related oral habits in 5-to 6-year-old children. Oral Health Prev. Dent. 2012;10:311–318.
2. Mtaya M., Brudvik P., Astrøm A.N. Prevalence of malocclusion and its relationship with socio- demographic factors, dental caries, and oral hygiene in 12- to 14-year-old Tanzanian schoolchildren. Eur. J. Orthod. 2009;31:467–476.

3. Khan M., Fida M. Assessment of psychosocial impact of dental aesthetics. J. Coll. Physicians Surg. Pak. 2008;18:559–564.

4. Lew K.K., Foong W.C., Loh E. Malocclusion prevalence in an ethnic Chinese population. Aust. Dent. J. 1993;38:442–449.

5. Gelgör I.E., Karaman A.I., Ercan E. Prevalence of malocclusion among adolescents in central anatolia. Eur. J. Dent. 2007;1:125–131.

6. Garbin A.J.Í., Perin P.C.P., Garbin C.A.S., Lolli L.F. Malocclusion prevalence and comparison between the Angle classification and the Dental Aesthetic Index in scholars in the interior of São Paulo state Brazil. Dent. Press J. Orthod. 2010;15:94–102.

7. Adam RZ. Do Complete Dentures Improve the Quality of Life of Patients? University of the Western Cape; 2006.

8. Cunha-Cruz J, Hujoel PP, Nadanovsky P. Secular trends in socio-economic disparities in edentulism. J Dent Res. 2007;86:131–6.

9. McGarry TJ, Nimmo A, Skiba JF, Ahlstrom RH, Smith CR, Koumjian JH. Classification system for complete edentulism. J Prosthodont. 1999;8:27–39.

10. Slade GD, Akinkugbe AA, Sanders AE. Projections of US edentulism prevalence following 5 decades of decline. J Dent Res. 2014;93:959–65.

11. Canada CH. Summary Report on the Findings of the Oral Health Component of the Canadian Health Measures Survey, 2007-2009 Health Canada. 2010.

12. Millar WJ, Locker D. Edentulism and denture use. Heal Rep. 2005;17:55–8.

13. Moreira R. Ph D thesis. SaoPaulo, Brazil: Fac Saude Publica, Univ Sao Paulo; 2009. Tooth-loss in adults and the elderly in Brazil: The influence of individual, contextual and geographical features.

14. Balachandran P, Janakiram C. Prevalence of malocclusion among 8-15 years old children, India - A systematic review and meta-analysis. J Oral Biol Craniofac Res. 2021 Apr-Jun;11(2):192-199.

15. De Ridder L, Aleksieva A, Willems G, Declerck D, Cadenas de Llano-Pérula M. Prevalence of Orthodontic Malocclusions in Healthy Children and Adolescents: A Systematic Review. Int J Environ Res Public Health. 2022 Jun 17;19(12):7446.

16. Borg-Bartolo R, Roccuzzo A, Molinero-Mourelle P, Schimmel M, Gambetta-Tessini K, Chaurasia A, Koca-Ünsal RB, Tennert C, Giacaman R, Campus G. Global prevalence of edentulism and dental caries in middle-aged and elderly persons: A systematic review and meta-analysis. J Dent. 2022 Dec;127:104335.