Type of Research : **Retrospective Study.**

Prevalence of Ridge Defects According To Sieberts Classification in Patients Undergoing Fixed Partial Denture - A Retrospective Analysis

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Abstract

In prosthetic dentistry, dentists may face challenges in treating patients with alveolar ridge defects in edentulous areas. Alveolar ridge defect may occur due to injury, trauma, denture wear and periodontitis. Based on Sieberts classification, it can be classified into three classes. class I- buccolingual loss of tissue , class II - apicoronal loss of tissue and class III - both loss of tissue. It is important to close the ridge defect by replacing the tooth loss and achieve good esthetic, phonetic and mastication . According to classification, a proper treatment plan and alternative can be determined for successful outcomes.The aim of this study is to assess the association of sieberts classification for edentulous ridges in selecting the pontic design in FPD.

This study was conducted in saveetha dental college. A total number 778 patients with alveolar ridge defects was selected. The data was collected using patient treatment details used in SIMATS and data was analysed using SPSS software. Based on results, class I ridge defect was more common among all age groups and also in all 6 sextrants . Class III ridge defect was more common in males compared to females. The $p<0.005$ which is statistically significant . As age increases the ridge defects vary. It was concluded that the prevalence of Sieberts classification helps in suggesting various management techniques or treatment planning to ensure that the prognosis and treatment outcomes can be better and successful.

Keywords: *Alveolar ridge defect; Pontic design; ridge augmentation; Siberts classification.*

Introduction

An alveolar ridge deficiency or ridge collapse may occur , when tooth is extracted, or due to injury , trauma , denture wear. Ridge deformities can create esthetic and functional dilemmas for the patient and restorative dentist[1]. Recently fixed prosthesis is more popular than removable prosthesis due to comfort, function and aesthetics[2]. Ridge deformities have both soft tissue (papilla and attached gingiva) and bony alveolus components. Soft tissue deformities can occur when surgical incision is made in delicate areas. MRSA (Methicillin-Resistant Staphylococcus aureus) in particular, has become the leading cause of skin and soft tissue infections[3]. Deformities of bone can occur following extractions of a tooth that has a thin dentoalveolar previous endodontic surgery, endodontic failure, and iatrogenic bone removal, intentional bone removal to gain a purchase, root fracture or periodontal bone loss[4]. With the increasing incidence of periodontal diseases and development of antibiotic resistance, there is a global need for alternative treatment modalities that is safe, effective and economical[5]. Blood investigations do not appear to be clinically useful for diagnosis[6]. Proper dental care during pregnancy is very important, since pregnancy causes various hormonal changes in the body that can actually increase the risk of developing dental diseases[7].

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Selection of teeth has been a major concern during replacement of teeth for completely edentulous conditions[8]. It is recommended to keep the dentures well relieved from the gingival margin wherever possible[9]. The mean microgap at the implant-abutment interface at the platform level at the external, middle, and internal points for both original abutments and non original abutments was found to be within clinically acceptable limits[10]. Marginal fit can be influenced by several factors like the type of finish lines, thickness of the die spacers, preference of restorative materials, processing techniques for fabrication and the choice of luting agents[11]. Veneers fabricated using leucite reinforced lithium disilicate exhibited the least marginal discrepancy followed by lithium disilicate ceramic, aluminous porcelain, and zirconia-based ceramics[12]. Furthermore it is also essential for the selection of pontic for the patient and indication for the patient to undergo surgical interventions to relapse the ridges[13]. The internal surface of the implant undergoes a series of changes with fabrication of restoration[14]. Masticatory forces cause fatigue to the dental luting agents, adversely affecting the retention of these cement-retained crowns[15].

Siebert has classified residual ridges into three categories based on the amount of ridge destruction. Class I - buccolingual loss of alveolar tissue with normal apicoronal height. Class II- apicoronal loss of alveolar tissue with normal buccolingual width. Class III- both apicoronal height and buccolingual width loss of tissue. Prosthetic rehabilitation is done to regain function, speech and esthetics[16]. The height and width of the residual ridges at the edentulous site decides the type of pontic that will be seated on the ridge and in all probability should maintain and mimic the appearance of its neighbouring teeth to the possible extent[17]. For teeth requiring crowns or replacement in the form of fixed dental prosthesis, gingival retraction becomes a mandatory procedure which aids in recording the prepared and unprepared surfaces of the abutment tooth[18]. The magnetically retained maxillofacial prosthesis provides an esthetically acceptable facial contour, functionally prevents food spill over from the oral cavity and boosts a patient's psychology to present themselves socially[19]. Interproximal embrasures should be left open to permit easy cleaning.

The aim of this study is to assess the association of sieberts classification for edentulous ridges in selecting the pontic design in FPD in Private dental college, Chennai.

Materials and Method

It is a single centered retrospective study conducted at Saveetha dental college and hospitals, Chennai. A total 778 patients, predominantly South Indians were included in the study. Ethical clearance was obtained from the International review board. The study was conducted from june 2019 to march 2020. Validation to the study was done by undergraduate, postgraduates and all faculty members of Saveetha dental college.

Data collection was done by using patient management software which has all patients records . It is a recording system of all patients of all data related to the medical and dental history of patients and treatment done in Saveetha dental college. The collected data was tabulated under following parameters - name, age, gender, region, Sieberts classification and pontic design . The main variables include Ridge classification and pontic design.

The data analysis was performed using SPSS software (version 19). The chi square test and pearson correlation was done. The chi square test was used to compare the data and checked for the distributions at 0.05 level of significance for effect of statistical significance.

Result and Discussion

A total of 778 patients with alveolar ridge defects were selected in this study.Out of 3 classes, in this study it was found that class I ridge defect (51.8%) was more common among all age groups irrespective of gender. And it was also observed the class IV type was more common in males compared to females.

Based on the results, the prevalence of ridge defects were more in males than females. Seibert class III defect was most common in males (38%) and class II defect was most common in females (31%). (Graph 1) The correlation between gender and type of sieberts classification showed the chi square value 0.000 which is statistically significant. According to the study by shahroom et al., also, male gender has high prevalence in having alveolar ridge deformities with 54.5%[1].

Class I ridge defect was seen in all 6 sextant. Class II ridge defect (23.5%) was seen in sextant 5 that is from 33-43. Class III was mostly seen in sextant II that is from 13-23 (34.2%).7.9% of class IV defect was observed in sextant 6 that is from 44-47. (Graph 2) The correlation between sextant and Sieberts classification was 0.067 which is not significant.

Class I defect was most common in patients above 60 years (58.1%). 21.1% of patients of age 18- 25 had class II ridge defect in common . Class III defect (31.2%) was most common in the 18 -25 age group. Around 14.3% class IV defect was seen in patients above 60 years.(graph 3) The correlation between age and sieberts classification, the chi square was 0.008 which is statistically not significant. In the study by shahroom et al., patients in the age within 40–49 years old have a high incidence of alveolar ridge defect with 50.9%[1].

Besides, the study of prevalence in Sieberts classification was intended to give a clear image on treatment choices and alternatives. The primary goal of closing the defect and replacing the tooth are to restore the loss of function, esthetic and natural appearance, but the goal can only be achieved if the final prosthesis is modified according to the prevalent situation[20].

In a study done by Tanka et al., a segmental osteotomy procedure with an interpositional graft is done on a patient with class II alveolar ridge defect[21]. Most of the studies have shown that this technique is practical and a predictable procedure with low incidence of complications and high probability of successful treatment outcomes [22].

According to sieberts classification, the quantification of the magnitude of the ridge deficiencies was not included by Siebert. The integrity of soft tissue also depends on the type of prosthesis given[22]. Therefore modification of siberts classification was introduced by allen in 1985 [1].

The need for the study is to determine the type of design fabrication based on the prevalence of ridge defect and also for knowledge and practise of pontic design selection by general practitioners and to evaluate the different pontic design and their complication among people.

The limitations of the current study are, it is a single centered study with small population size and does not include any ethic groups or races.

This study can be used for further study for a larger population and to create awareness in selecting the pontic design for FPD based on ridge defect and for better and successful treatment outcomes.

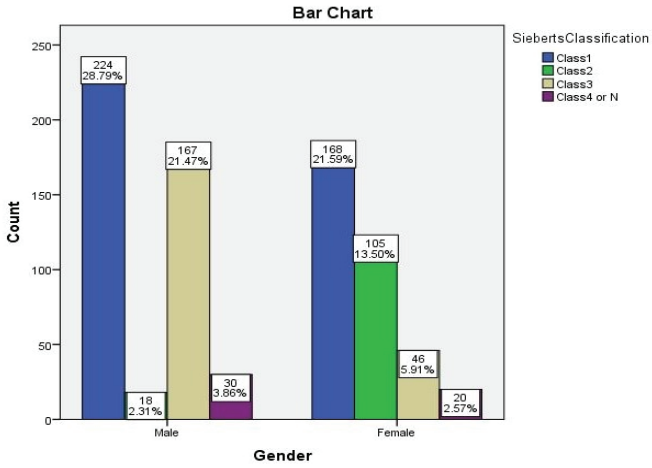

Fig 1 - Bar graph depicting the association between gender and sieberts classification. X-axis denotes gender and y-axis denotes number of patients. Blue colour denotes Class 1, green denotes class 2, yellow denotes class 3 and purple denotes class 4 or N. Chi square test was done and the association was found to be statistically significant. Pearson chi square value:129.561; df : 3; p value : 0.00 (<0.05) hence statistically significant, proving males have more ridge defects than females.

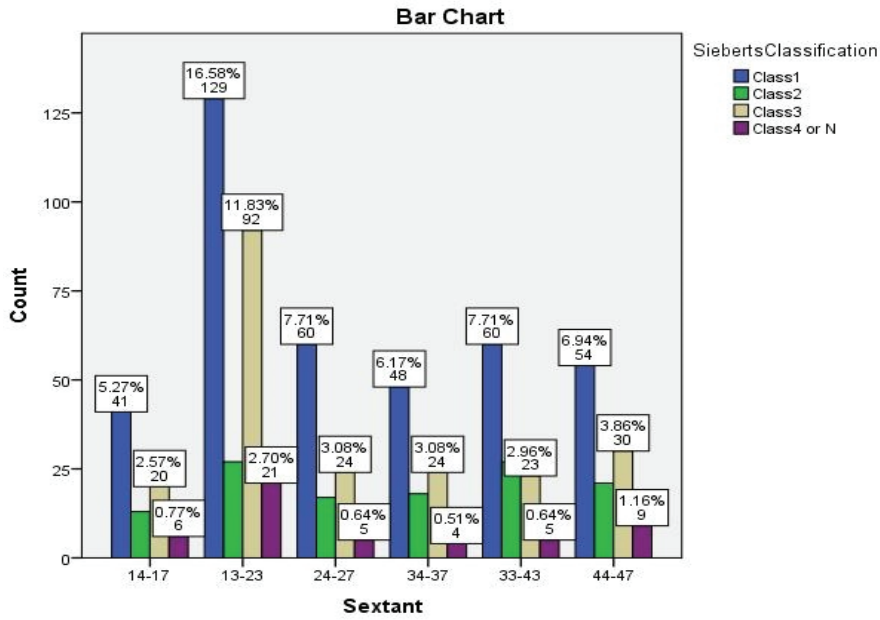

Fig 2 - Bar graph depicting the association between sextant and siebert classification. The x-axis denotes sextant and y- axis denotes the number of types of ridge defects.The colours of Graph 2 represent Sieberts classification where blue represents Class 1, green represents class 2, yellow represents class 3 and purple represents class 4 or N. Class I ridge defect was more common in all sextants, however Chi square test was done and association was not statistically significant. Pearson chi square value : 23.869; df : 15; p value : 0.67 (> 0.05).

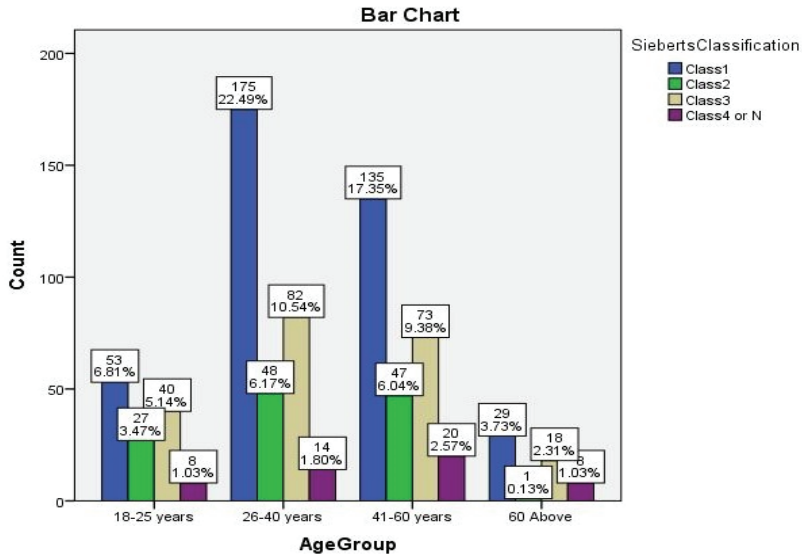

Fig 3 - Graph depicting the association between age and sieberts classification. The x-axis denotes the age group and y-axis denotes the number of patients with ridge defects. The colours of Graph 3 represent Sieberts classification where blue represents Class 1, green represents class 2, yellow represents class 3 and purple represents class 4 or N. The Chi square test was performed and association was found to be statistically significant. Pearson chi square value : 22.375; df : 9; p value : 0.008 (< 0.05) which is statistically significant proving that class I, II, III, IV ridge defect is more common in the age group of 26-40 years.

Conclusion

The prevalence of Seibert's classification helps to provide various management techniques and plans for better treatment outcomes for the patient. Within the limitation of the study, it was found that males have more alveolar ridge defects compared to females. In association with sextant; class I ridge defect was more common in all the sextant. However within the age group between 26-40 years had class I,II,III,IV ridge defects in common.

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Ethical Clearance: It is taken from "Saveetha Institute Human Ethical Committee" (Ethical Approval Number- SDC/SIHEC/2020/DIASDATA/0619-0320)

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