PREVALENCE OF ALVEOLAR RIDGE DEFECT ACCORDING TO SEIBERT’S CLASSIFICATION IN PATIENT WITH FIXED PARTIAL DENTURES - A RETROSPECTIVE STUDY

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ABSTRACT:
Alveolar ridge defect occurs due to complex extraction of tooth which leads to a certain amount of bone loss and it occurs due to injury, congenital defects, Denture wear, periodontitis and trauma. Alveolar ridge defects were classified by Seibert’s Classification which identified the ridge defect. Alveolar ridge defects can be classified as a loss of labial cortical or medullary bone or sometimes both. Thereby replacing the missing tooth and to restore good esthetics, phonetic, and mastication. To provide a proper treatment plan and treatment options can be assessed for successful outcomes. Hence, the purpose of this study was to assess the prevalence of alveolar ridge defect using the Seibert’s classification in patients with fixed partial dentures. The retrospective study was conducted among patients with Fixed partial dentures. The data were reviewed of 86,000 patient records between 1st June 2019 and March 30th 2020 from which 407 subjects of fixed partial dentures were assessed for alveolar ridge defects using the Seibert’s classification. The collected data was tabulated in the excel sheet which was imported to SPSS software Version 20 for statistical analysis. Out of 407 patients 226 (55.53%) were more prevalent than females 186 (44.47%). Most commonly involved age group among 31-40 years (29.24%). Class III was the most commonly observed type of defect 49.14%, followed by class I 44.96% and Class II 5.90%. Sextant II (36.36%) was most commonly affected followed by Sextant VI (22.11%). Male patients were more commonly affected than the female patients, the most common age group was 31-40 years of age.

KEYWORDS: Alveolar ridge defect, Fixed partial dentures, Seibert’s classification
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INTRODUCTION:
Tooth loss is irreversible, and a final marker of the disease burden of the sequelae of preventable oral diseases. [1] It occurs due to periodontal diseases, dental caries, and trauma. [1,2] Globally, there is a 10% decline in the prevalence
of tooth loss among the general population over the past 30 years [3]. The loss of natural teeth can affect the functional and psychosocial aspects of an individual [4]. Dental caries is the most common factor in the causation of tooth loss, [5] while periodontal diseases remained the primary causative factor for tooth loss and was associated with risk factors such as age, male predilection, smoking and the presence of other systemic diseases. [6]

Alveolar ridge defect refers to the loss of labial or buccal cortical and medullary bone or sometimes both. It can be a volumetric deficit of a limited area of soft tissue and bone within the alveolar process which causes soft tissue to disintegrate into the bone during healing and creates contours. [7] It is difficult to produce an esthetic prosthesis which may lead to food impaction and difficulty in speech. [8], [9] Mastication is a sequel of tooth loss and loss of posterior teeth which can cause impaired chewing and nutrition deficiency thus incurring health risk. [10], [11], [12] In such cases, require replacement of the missing teeth and closure of the defect in order to restore esthetics, phonetics and mastication.

To assess the certain element such as type and amount of destruction of the residual ridge, systemic condition, and economic status which may result in better treatment planning, clinical outcome and prognosis? [13] The selection of pontic is important and an indication for the patient to undergo surgical intervention to contour the ridge. A variety of different types of classifications of the alveolar ridge deficiencies have been proposed by Lekholm and Zarb (1985), Misch and Judy (1985), Allen (1985). Alveolar ridge defects have been classified both quantitatively and qualitatively and Seibert is the most common widely used classification for ridge defects [14].

Seibert has classified the alveolar ridge defects into three categories: Class I - buccolingual defect; Class II - apicocoronal defect; Class III - a combination of both. [15], [16], [17]. Alveolar ridge defects can be treated with conventional removable or fixed partial denture but success rate is very minimal which may fail to replace the lost soft tissue structures. [18] In such cases replacement of missing teeth along with soft tissue structures can be achieved by “Andrew’s Bridge” and introduced by Dr. James Andrews of Amite, Louisiana in 1975. [19] It comprises two fixed retainers attached to their abutments and joined by a rectangular bar that follows the curve of the ridge and indicated in cases with excessive residual ridge defect. [20].

In the field of dentistry, aloe vera has various uses, such as in the treatment of periodontal diseases, such as bleeding of gums. [21], and most commonly pregnant women were more susceptible to periodontal diseases than other adults. [22]. In patients with removable partial dentures, periodontal health is more affected than in patients with fixed partial dentures. [23]. The prevalence of alveolar ridge defects are common in the Indian population and the fixed partial dentures are commonly used to treat such defects. [24]. Previously multiple original studies were carried out by our team, [25], [26], [27], [28], [29], [30][31], [32],[33], [34], [35]. The idea for this retrospective study, stemmed due to the piqued interest in the community. Several studies were conducted on the case reports on various treatments of ridge defect patients and very few studies have been done on the prevalence of alveolar ridge defect using Siebert’s classification on fixed partial dentures. Hence, the aim of the study is to determine the prevalence of alveolar ridge defects on fixed partial dentures patients.
MATERIALS AND METHODS:

Study setting
A university-based, retrospective study was conducted among patients who have done fixed partial denture. The ethical board clearance was obtained from the Institutional Ethical Committee, IEC approval number: SDC/SIHEC/2020/DIASDATA/0619-0320.

Study subjects
A total of 407 subjects participated in this study, of which 181 were females and 226 were males.

Data collection
The data was obtained by reviewing 86,000 patient records between 01st June 2019 and 31st March 2020 based on data availability from Dental Information Archiving Software (DIAS). Informed consents were obtained from the patients. All the case sheets of patients with fixed partial dentures were taken into account in order to prevent sampling bias. The alveolar ridge of the patient was clinically examined based on the Seibert's Classification and cross verified intraoral photographs by another examiner.

Inclusion Criteria
Patient age between 21 and 60 years were included in this study; cases with single partially edentulous site, multiple partial edentulous site, excessive ridge defect, and anterior or posterior ridge defect. Patients were randomly divided into five groups based on age groups, Group 1: 21-30 years; Group 2: 31-40 years; Group 3: 41-50 years; Group 4: 51-60 years Group 5: above 60 years

Exclusion Criteria
Patients who are completely edentulous and incomplete data were excluded from the study.

Statistical Analysis
The data were recorded and tabulated using computerized spreadsheet (Microsoft Excel sheet 2010) and were imported to SPSS Statistics software for Windows, Version 20.0. Chicago (IBM Corporation) for statistical analysis. Descriptive statistics and Chi-square test was used to determine the association between the subgroups, where p value <0.05 is considered statistically significant with a confidence interval of 95%.
RESULTS AND DISCUSSION:

In the present study, out of 407 subjects, 181 (44.47%) were females and 226 (55.53%) were males which may show that male predilection (Figure 1). Alveolar ridge defects were more common in the age group among 31-40 years of age (29.24%) and least prevalent among above 60 years (4.91%) of age (Figure 2). Based on Seibert's Classification, the most common alveolar ridge was Class III defect (49.14%) followed by Class I defect (44.96%) and least prevalent was Class II (5.90%) (Figure 3). Sextant II (36.36%) was most commonly involved in alveolar ridge defect and least sextant IV 6.4%. (Figure 4). For alveolar ridge defect on fixed partial denture patients, the parameters were assessed included age groups (21-30, 31-40, 41-50, 51-59 and above 60 years), number of patients with alveolar ridge defect, gender (male and female), Sextants. Using these parameters, six comparisons were done using Chi-square tests and revealed that all the four comparisons were statistically significant (p > 0.05) and other two comparisons were statistically not significant (p < 0.05) (Figure 5,6,7,8,9 and 10).

Amongst all the classifications for the alveolar ridge defects, the Seibert’s classification was chosen for this study as it’s the most commonly used due to its ease of classification in the clinical practice. In the present study, among 407 subjects of alveolar ridge defect on fixed partial denture patients were examined which 226 (55.53%) were males and 181 (44.47%) were females. Most common prevalent type of Seibert’s classification of alveolar ridge defect was Class III type (49.14%) and both results were similar with the previous study of Shahroom et al, [36].

Alveolar ridge defect was more in the age groups among 31-40 years of age (29.24%) and least prevalent among above 60 years (4.91%) of age. Different findings were seen with previous study by Shahroom et al, [36]. Sextant II (36.36% ) was higher prevalent and least prevalent was sextant IV (6.14%) in alveolar ridge defect. Alveolar ridge defects of male subjects were more in the age group among 21-30 years, while female subjects were more in the age groups among 41-50 years of age. Sextant II was the most commonly involved site in the age group among 21-30 and 31-40 years of age. Subsequently, Sextant II was more prevalent in males than females. Class III defect was the most commonly involved site in sextant II with male predilection and in the age groups among 21-30 and 31-40 years of age.

Parameters were assessed such as age groups (21-30, 31-40, 41-50,51-59 and above 60 years), number of patients with alveolar ridge defect, gender (male and female), Sextants. Chi-square tests were done using these parameters and revealed that all the four comparisons were statistically significant (p > 0.05) and other two comparisons were statistically not significant (p < 0.05). However, there is no study done on the association of alveolar ridge defects such as age, gender, Seibert’s Classification and Sextants.

The limitations of the present study are that the limited sample size and geographically restricted. Though all the samples were included in the study the data samples belong to a single university with similar to ethnic origins. In the future, further studies can be done on a large population incorporating the data from different universities within the state and country, as multi-centred study.
Figure 1: This bar chart depicts the gender-wise distribution. X-axis denotes gender and Y-axis denotes the number of patients. The blue colour represents the female patients, while the red colour represents the male patients. Male patients were more commonly affected 55.53% (226) than the female patients 44.47% (181).

Figure 2: This bar chart depicts the age-wise distribution of the study population. The X-axis represents the age groups while the Y-axis represents the number of patients with alveolar ridge defects. 21-30 years represented by blue colour, 31-40 years represented by red colour, 41-50 years represented by green colour, 51-60 years represented by orange colour and >60 years represented by yellow colour. 31-40 years (29.24%) of the age group most commonly affected followed by 21-30 years of age (25.80%), 41-50 years (22.85%) of age, 51 to 60 years (17.20%) of age and least prevalence among 60 years (4.91%).
Figure 3: This bar chart depicts the distribution of Seibert’s classification among the study population. The X axis represents the Seibert’s classification, while the Y axis represents the number of patients with alveolar ridge defects. Class I is represented by blue colour, Class II is represented by red colour and Class III is represented by green colour. Class III was the most commonly observed type of Seibert’s classification (49.14%) followed by Class I (44.96%) and least prevalent was Class II (5.90%).

Figure 4: This bar chart depicts the site distribution of the alveolar ridge defect. The X axis represents the partially edentulous site, while the Y axis represents the number of patients with alveolar ridge defects. Sextant 1 is represented by blue colour, Sextant 2 represented by red colour, Sextant 3 represented by green colour, sextant 4 represented by orange colour, Sextant 5 represented by yellow colour and the Sextant 6 represented by violet colour. Sextant 2 was most commonly involved, 148 (36.36%), followed by Sextant 6, 90 (22.11%) and least sextant 4 25 (6.4%).
Figure 5: This graph compares the distribution of age groups among gender. X axis denotes the age groups, while Y axis denotes the number of patients with alveolar ridge defects. Blue colour represents female patients while the red colour represents the male patients. In this graph, we infer that the male population was commonly affected in the 21-30 years, 31-40 years and >60 years of age groups. While female patients were commonly affected in the 41-50 and 51-60 years of age group. Chi-square test was performed and was found to be statistically significant (p value = 0.000 (p<0.05)).

Figure 6: This bar chart depicts the distribution between age groups and different sites of partial edentulousness. X axis denotes the age groups, while Y axis represents the number of patients with alveolar ridge defects. In this graph we infer, Sextant 2 (red) was the most commonly affected among all age groups except the >60 years age group, in which sextant 4 was the most commonly affected. Chi-square test was performed and was found to be statistically significant [p value = 0.008, (p<0.05)].
Figure 7: This bar chart depicts the association between gender and different sites of partial edentulousness. X axis denotes the gender, while the Y axis denotes the number of patients with alveolar ridge defects. Sextant 2 (Red) was most commonly observed in all genders, followed by sextant 6. Pearson’s Chi-square test showing p value = 0.002, p<0.05 which indicates statistically significant.

Figure 8: This graph compares the distribution of Seibert’s classification among different sites of partial edentulousness. The X axis represents the site of partially edentulous site, while the Y axis represents the number of patients with alveolar ridge defects. Class III defect (Green) was most commonly in sextant II, while class I alveolar defect (Blue) was more commonly observed in sextant VI. Pearson’s Chi-square test showing p value = 0.000, (p<0.05) which indicates statistically significant.
Figure 9: This bar chart depicts the association between Seibert’s classification and gender. X axis denotes the gender, while Y axis denotes the number of patients with alveolar ridge defects. Class III (Green) Seibert's classification was found to be more prevalent among male patients, than female patients. However, there is no significant difference between Seibert’s classification and gender. Pearson’s Chi-square test showing p value = 0.168 (p> 0.05) Hence, statistically not significant.

Figure 10: This bar chart depicts between Seibert’s classification and different age groups. X axis denotes the age groups, while Y axis denotes the number of patients with alveolar ridge defects. Class III (Green) Seibert's classification was found to be more prevalent among 21-30 years and 31-40 years than other age groups. However, it was statistically not significant. Pearson’s Chi-square test showing p value = 0.321, (p> 0.05). Hence, statistically not significant.
CONCLUSION:
Within the limits of the study, it can be concluded that the Class III where there is both apico coronal and buccolingual defect was the most commonly observed type of alveolar ridge defect followed by Class I, and the least prevalent was Class II. The most commonly affected age group was the 31-40 years of age, followed by the 21-30 years of age group. The male patients were more commonly affected than the female patients. In male patients, the prevalence of Class III defect was more common while in female patients Class I defect was more prevalent. Sextant 2 was most commonly affected followed by sextant 6.

AUTHOR CONTRIBUTIONS:
Author 1 (P. Deeksheetha), carried out the study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Dr. Kiran Kumar) aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. Author 3 (Dr. Nashra Kareem) has coordinated in developing the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

CONFLICT OF INTERESTS: None declared

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