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THE PREVALENCE OF PARTIAL EDENTULISM AND PATIENT PREFERENCES IN PROSTHODONTIC CARE IN THE POPULATION RESIDING AT KHEDA DISTRICT, GUJARAT- A CROSS-SECTIONAL STUDY

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ABSTRACT:
Aim: To evaluate the prevalence of partial edentulism according to Kennedy's classification and Applegate's modification, and the type of prosthetic rehabilitation most preferred by the participants.
Materials and Method: The study included 500 patients seeking prosthodontic treatment at the Department of Prosthodontics, Dharmsinh Desai University, Nadiad. In the first phase, clinical examination and intraoral photographs were used to classify partial edentulism based on Kennedy's classification and Applegate's modification. The second phase assessed the type of prosthetic rehabilitation most commonly preferred by the participants.
Statistical analysis used: Mann-Whitney U test. Categorical variables were analysed using chi-square test or Fisher's exact test
Results: Class III in maxilla was 33.09% and in mandible was 24.42%, across all age groups, reaching 100% prevalence in individuals above 80 years, with no significant gender difference ($p>0.05$).
Conclusion: Kennedy's Class III was the most common partial edentulism in both arches and all age groups, with higher prevalence in females. Removable partial dentures were the most preferred treatment.

KEYWORDS: Kennedy's classification, Partial edentulism, Removable partial denture.

INTRODUCTION

Edentulism is a key indicator of the oral health of a population. Partial edentulism can result from various factors, including tooth decay, periodontal disease, trauma or congenital issue[1].The impact of missing teeth extends beyond aesthetics, it can lead to drifting/tilting of adjacent teeth, occlusal problems and difficulty in chewing, which may affect nutrition and overall health[2]. Therefore, it is essential for prosthetic dentist to be acquainted with most common patterns of partial edentulism to provide the best treatment option for each[2].Treatment for partial edentulism can be Removable partial denture (RPDs), Fixed partial dentures (FPDs) and dental implant supported prosthetic constructions[1].The most widely used method for classification of partially edentulous dental arches was proposed by Dr. Edward Kennedy of New York in 1925, composed of four major categories Class I: Bilateral edentulous areas located posterior to the remaining natural teeth Class II: A unilateral edentulous area located posterior to the remaining natural teeth Class III: A unilateral edentulous area with natural teeth remaining both anterior and posterior to it. Class IV: A single, but bilateral (crossing the midline), edentulous area located anterior to the remaining natural teeth. The sequence of the classification was based on the frequency of the occurrence, with class I arches being most common and class IV edentulous arches, least common. Dr. Kennedy included additional edentulous area as a modification area in the classification based on Applegate's rule[3]. Due to the everchanging treatment procedures and enhanced chance to retain the teeth in the mouth, there may be a shift in the prevalence of edentulous state in the human population[4]. This study was conducted in order to ascertain whether the classification still applies to present circumstances involving new, enhanced treatment approaches[4].

METHODS

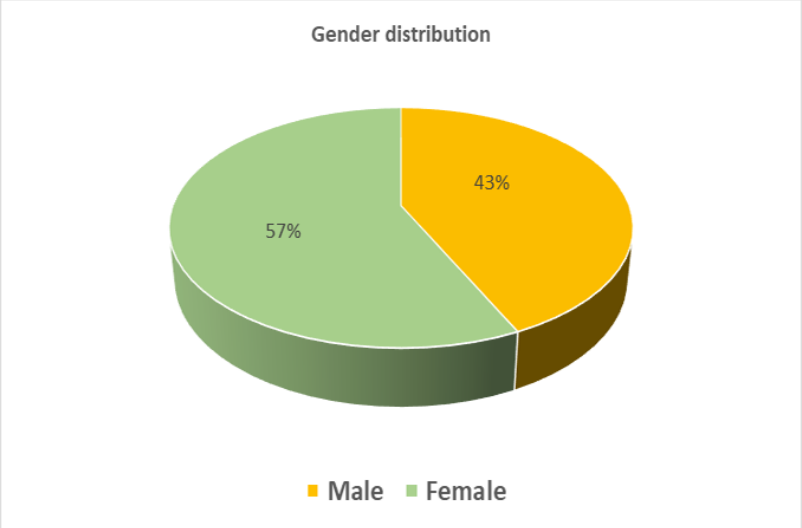
The study involved the individuals seeking prosthodontic treatment at the Department of Prosthodontics, Crown & Bridgework and Implantology, Faculty of Dental Science, Dharmsinh Desai University, Nadiad. The first part of the study involved clinical examination and intraoral photography of 500 patients to document the type of partial edentulous patient and then classify them according to Kennedy's classification and Applegate's modification. The second part of the study involved determining the type of prosthetic rehabilitation most frequently preferred by the participants.

Statistical Analysis:
Normally distributed continuous variables were compared using the t-test, while non-normally distributed variables were analysed using the Mann-Whitney U test. Categorical variables were analysed using either the chi-square test or Fisher's exact test. Diagnostic tests such as sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were used to evaluate diagnostic efficiency.

RESULTS
Kennedy's Class III was the most common type of partial edentulism in both the maxillary (33.09%) and mandibular (24.42%) arches, especially among patients over 80 years. Class III modification 1 followed in prevalence, while Class IV and modified classes were least common. Gender distribution showed no significant association with Kennedy's classification in either arch ($p > 0.05$). Across all age groups, Class III remained dominant, with Class II peaking in younger adults and Classes I and IV being consistently rare.

Table 1: Distribution Of The Study Participants Based On Gender

Gender distribution	N	%
Male	215	43
Female	285	57
Total	500	100



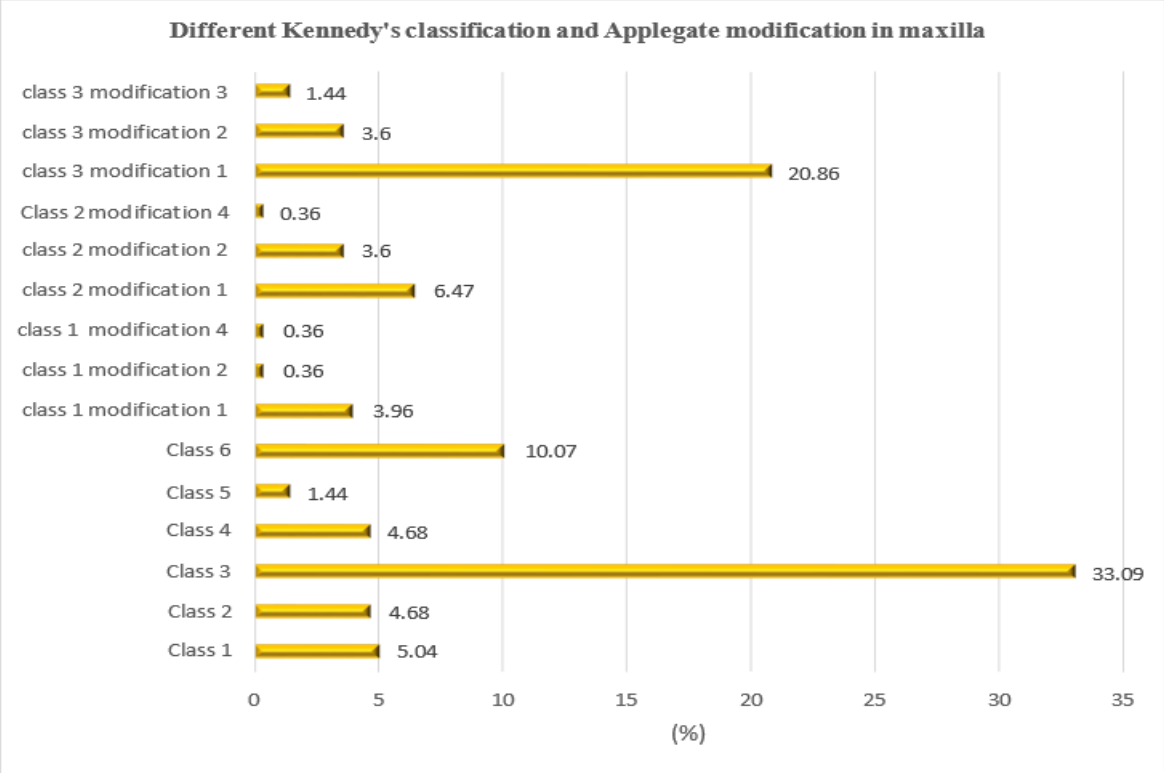
Graph 1: Distribution Of The Study Participants Based On Gender

Graph 1 illustrates the distribution of study participants based on the gender. Among the 500 participants, 43% were male and 57% were female.

Table 2: Distribution Of Different Kennedy's Classification And Applegate's Modification In Maxilla

	N	%
Class 1	14	5.04
Class 2	13	4.68
Class 3	92	33.09
Class 4	13	4.68
Class 5	4	1.44
Class 6	28	10.07
class 1 modification 1	11	3.96
class 1 modification 2	1	0.36
class 1 modification 4	1	0.36
class 2 modification 1	18	6.47
class 2 modification 2	10	3.6
class 2 modification 4	1	0.36
class 3 modification 1	58	20.86
class 3 modification 2	10	3.6
class 3 modification 3	4	1.44
Total	278	100

Graph 2: Distribution Of Various Kennedy's Classification And Applegate's Modification In Maxilla

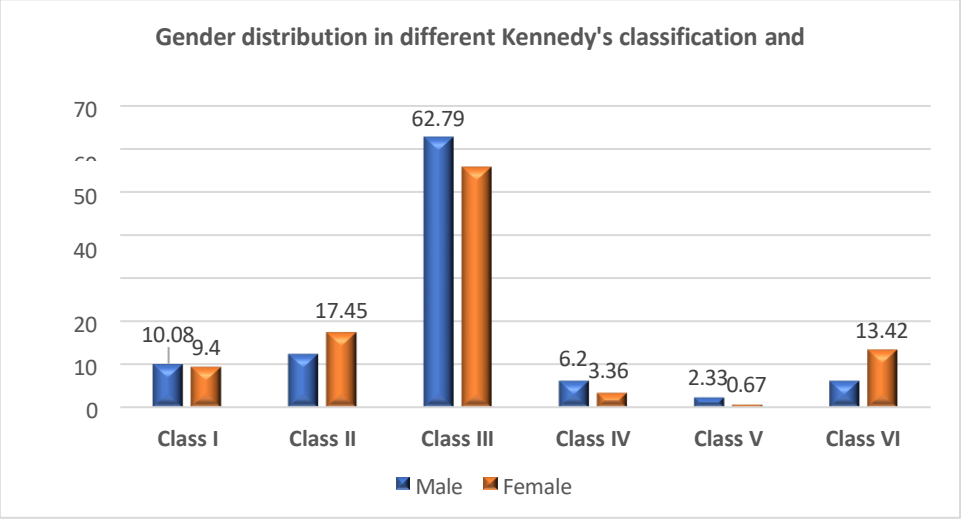


Graph 2: Bar chart showing distribution of Kennedy's classification in maxillary arch among patients with missing teeth. X axis shows the number of patients in percentage. Y axis shows missing teeth based on various Kennedy's classes. Most of the Patients have Kennedy's class 3 (33.09%), followed by class 3 modification 1 (20.86%), class 1 (5.04%), class 4 and class 2 (4.68%), class 6 (10%), class 2 modification 1 (6.47 %),class 1 (5.04%) , class 2 and class 4 (4.68%) and the least class 2 modification 4 , class 1 modification 4 , class 1 modification 2 (0.36 %).

Table 3: Distribution Of Various Kennedy's Classes And Applegate's Modification Based On Gender In Maxilla

Gender distribution	Gender distribution in different Kennedy's classification and Applegate modification in maxilla						
	Class I	Class II	Class III	Class IV	Class V	Class VI	Total
Male	13(10.08%)	16(12.4%)	81(62.79%)	8(6.2%)	3(2.33%)	8(6.2%)	129(100%)
Female	14(9.4%)	26(17.45%)	83(55.7%)	5(3.36%)	1(0.67%)	20(13.42%)	149(100%)
	Chi square value=7.88 p=0.16 NS						

NS * Not significant

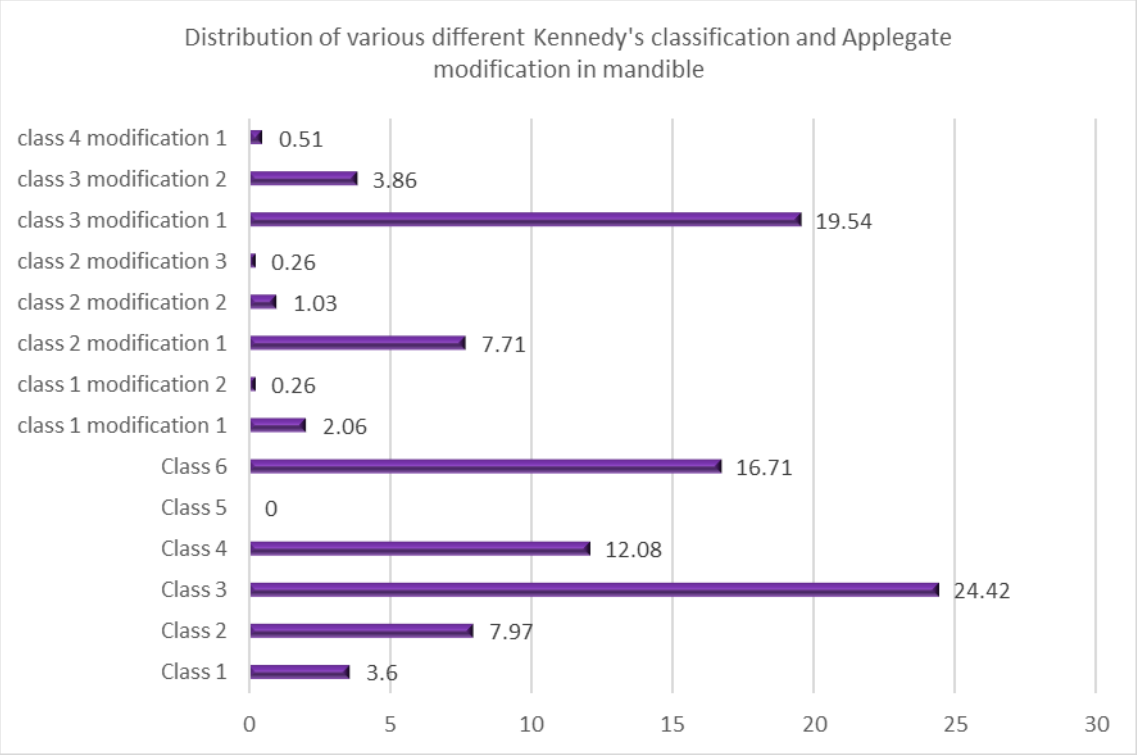


Graph 3: Distribution Of Various Kennedy's Classes And Applegate's Modification Based On Gender In Maxilla

Figure 3: Bar chart showing gender distribution in different Kennedy's classes in Maxilla. X-axis represents distribution of various Kennedy's classes among gender. Y-axis represents the percentage of patients with missing teeth. Kennedy's class 3 was more prevalent among Males and Females. However, the association between gender and missing teeth based on various Kennedy's classes in maxillary arch was found to be statistically not significant on chi-square analysis. (Pearson Chi-Square value = 7.88 ;p=0.16; p>0.05).

Table 4: Distribution Of Various Kennedy's Classification And Applegate's Modification In Mandible

	N	%
Class 1	14	3.6
Class 2	31	7.97
Class 3	95	24.42
Class 4	47	12.08
Class 5	0	0
Class 6	65	16.71
class 1 modification 1	8	2.06
class 1 modification 2	1	0.26
class 2 modification 1	30	7.71
class 2 modification 2	4	1.03
class 2 modification 3	1	0.26
class 3 modification 1	76	19.54
class 3 modification 2	15	3.86
class 4 modification 1	2	0.51
Total	389	100



Graph 4: Distribution Of Various Kennedy's Classification And Applegate's Modification In Mandible

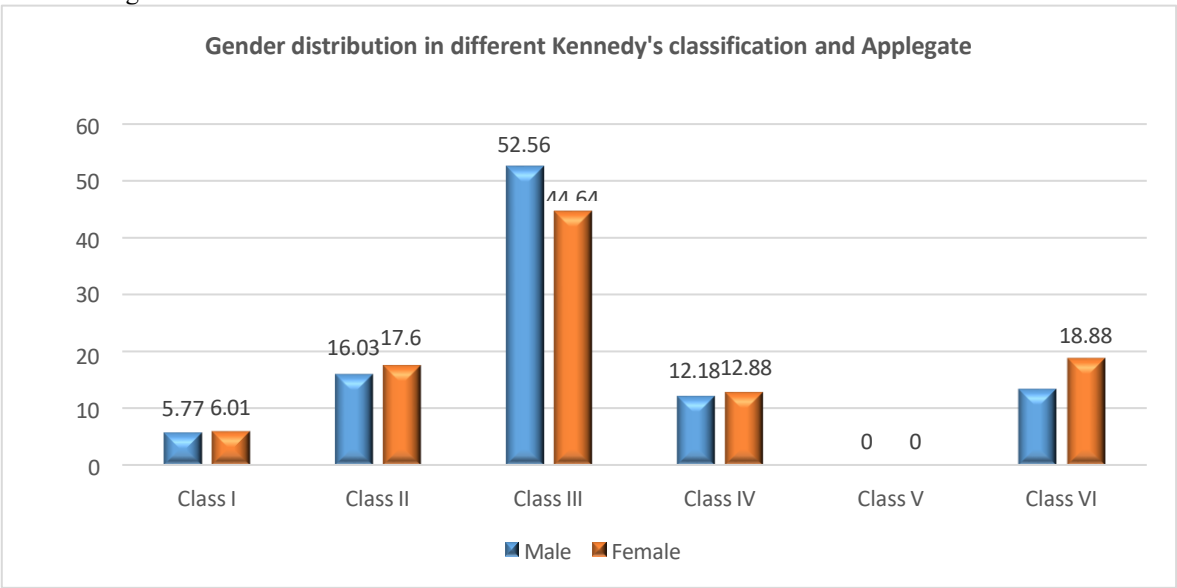
Figure 3: Bar chart showing distribution of Kennedy's classification in mandibular arch among patients with missing teeth. X axis shows the number of patients. Y axis shows missing teeth based on various Kennedy's classes. Most of the Patients have Kennedy's class 3 (24.42%), followed by class 3 modification 1 (19.54%), class 6 (16.71%),class 4 (12.08%), class 2 (7.97%), class 2 modification 1(7.71%), class 1 (3.6 %) and the least class 1 modification 2 (0.26%), class 2 modification (0.26%) and class 5

Table 5: Distribution Of Various Kennedy's Classes And Applegate's Modification Based On Gender In Mandible

Gender distribution	Gender distribution in different Kennedy's classification and Applegate modification in mandible						
	Class I	Class II	Class III	Class IV	Class V	Class VI	Total

Male	9(5.77%)	25(16.03%)	82(52.56%)	19(12.18%)		21(13.46%)	156(100%)
Female	14(6.01%)	41(17.6%)	104(44.64%)	30(12.88%)		44(18.88%)	233(100%)
	Chi square value=3.05 p=0.69 NS						

NS * Not significant

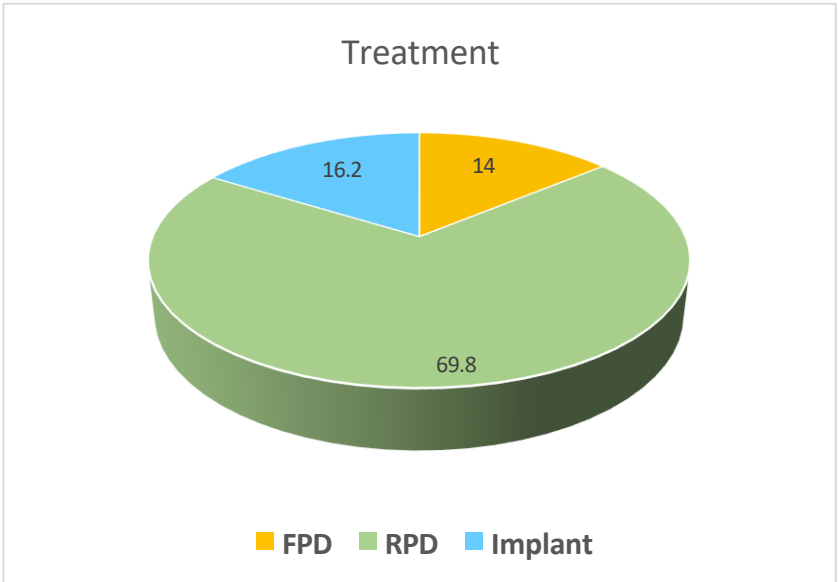


Graph 5: Distribution Of Various Kennedy's Classes And Applegate's Modification Based On Gender

Figure 3: Bar chart showing gender distribution in different Kennedy's classes in Mandible. X-axis represents distribution of various Kennedy's classes among gender. Y -axis represents the number of patients with missing teeth. Kennedy's class 3 was more prevalent among Males and Females. However, the association between gender and missing teeth based on various Kennedy's classes in mandibular arch was found to be statistically not significant on chi-square analysis. (Pearson Chi-Square value = 3.05 ;p=0.69; p>0.05).

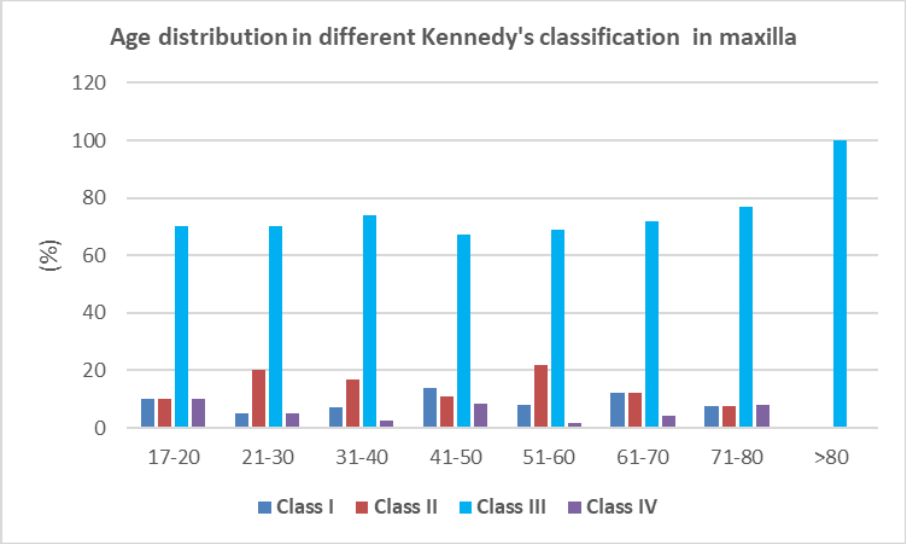
Table 7: Prevalence Of Different Types Of Prosthetic Restoration

Treatment	N	%
FPD	70	14
RPD	349	69.8
Implant	81	16.2
Total	500	100



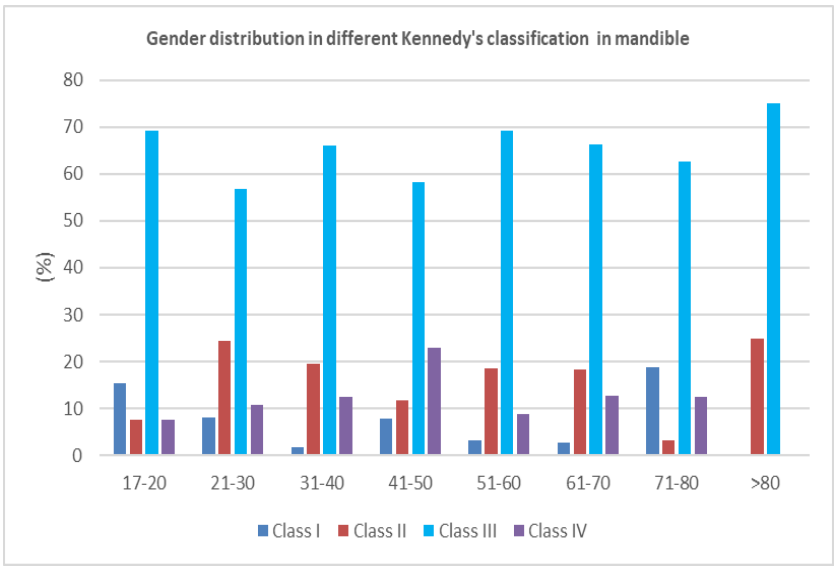
Graph 7: Prevalence Of Different Types Of Prosthetic Restoration

PI chart showing percentage distribution of different types of Prosthetic Restoration.



Graph 8: Age Distribution In Different Kennedy's Classification In Maxilla

Figure 8: Class III was the most frequent type of partial edentulism in maxilla among all age groups, consistently representing over 60% and increasing to 100% in age group above 80 years. Class II showed some minor peaks in the 21-30 and 51-60 age groups. Class IV was the least common in all age groups.



Graph 9 : Age Distribution In Different Kennedy's Classification In Mandible

Figure 9: Class III was the most common pattern in all age groups, especially in the age group >80 years. It remains above 50% for all age groups. Class II was the highest in the 21-30 and 31-40 age groups. Class I and Class IV were less prevalent among all age groups.

DISCUSSION

The common patterns of partial edentulism within a population are essential for evaluating their comprehensive prosthodontic treatment requirements. This research utilised Kennedy's classification system, as it offers a clear visual representation of edentulous areas and facilitates identification of the relationship between remaining teeth and the alveolar ridge[23]. The study aimed to analyse the prevalence of different partial edentulism configurations, based on Kennedy's classification and Applegate's modifications, in the local population.[23]

In the present study, it was seen that out of the 500 patients, the number of partially edentulous females were 285 as compared to males, that is, 215. This is in accordance with the study carried out by Nayana Prabhu et al[24], Rana SB et al[22], R.A Devishree et al[19]. The percentage of replacement was higher in females. This could be because women had better health-seeking behaviour and were more conscious of their appearance.[24]

Some earlier studies showed gender differences in edentulism, with more males becoming edentulous than females. These authors attributed it to the fact that males are more active than females and do not pay much attention to oral care[14].The findings of this study showed that partial edentulism occurred more frequently in the mandible than in the maxilla. This is in accordance with the study carried out by Curtis et al, at the University of California, School of Dentistry[8], which examined the types of removable partial dentures (RPDs) produced in a regional dental laboratory. Their results similarly indicated a higher frequency of mandibular removable partial dentures (RPDs) than maxillary ones.

It was found that Kennedy's Class III (54 %) was the most common type of partial edentulism in this study. Kennedy Class III edentulism was found to be the most prevalent in both the mandible (24.8%) and maxilla (32.2%). Multiple studies, including those by Rana SB[22] and Nayana Prabhu[24], have identified Class III as the most common form of partial edentulism. However, these findings were in contrast with other research, such as studies by Curtis et al. (1992)[8] and Keyf (2001)[26] which reported Kennedy Class I as the most frequent. Additional investigations done by Enoki K (2007)[25], Keyf et al. (2001)[26], and Cummer WE (1920)[11] further supported the predominance of Class I and II patterns.
The findings of this study indicated that Removable Partial Dentures were the most frequently chosen treatment among the patient group examined. Several factors contributed to their widespread use, including their affordability relative to implant-supported prostheses and the extent of the patient's awareness regarding available prosthetic options.

LIMITATIONS

This study was based on a relatively small sample, and may not reflect the general population, future research involving a larger population may yield different outcomes. In addition, the relationship between age groups and patterns of edentulism was not evaluated.

CONCLUSION

Within the limitations of this study, it was concluded that:
1.Kennedy's class III was the most prevalent type of partial edentulism in both the arches.
2.Females were more partially edentulous than males, both shows prevalence of Kennedy's class III type of partial edentulism.
3.Removable Partial Dentures (RPDs) emerged as the most frequently chosen treatment, whereas Implant treatment was the least chosen prosthetic option.
This knowledge enables dentists to identify the current needs and attitudes of the target population toward dental care, as well as understand the current scenario about dental treatments. Such insight would allow dentists to design targeted prevention plans and provide prosthodontic treatments that align with the population's requirements.

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