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Original Article

Prevalence and Pattern of Partial Edentulism among Dental Patients Attending College of Dentistry, Qassim University, Saudi Arabia

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ABSTRACT

Background: With patterns determined by gender and arch placement, partial edentulism is a common disorder that impacts prosthodontic planning and oral function. With an emphasis on edentulism patterns and gender, this study used panoramic radiographs of patients at a dental school in Qassim, Saudi Arabia, to assess the prevalence of partial edentulism and examine its distribution and location.

Methods: This 3 months cross-sectional study comprised 721 partly edentulous patients, ages 15–60, who attended the dental clinics at Qassim University and satisfied certain clinical and radiological requirements. Data were gathered with orthopantomograms and analyzed using Pearson's Chi-Square test and descriptive statistics in the Statistical Package for the Social Sciences (Version 27).

Results: Class II Kennedy was the most prevalent (40.1%), followed by Class III (31.5%) and Class I (26.9%) among 721 partly edentulous patients (51.5% females, 48.5% males); Class IV was uncommon (1.5%). There was a greater frequency of Class I in the lower arch and Class III in the upper arch ($P < 0.001$). Males displayed more Class III and females more Class I, with gender differences being significant ($P = 0.008$).

Conclusion: Our study highlighted that the most common types of partial edentulism were Kennedy Classes II and III, which were found to differ significantly by gender and to be more common in the mandibular arch. These results highlight the significance of demographic and anatomical factors in preventive care and prosthodontic planning.

Keywords: Kennedy's classification, Mandibular arch, Partial denture, Prosthodontic planning

Introduction

Removable partial dentures (RPDs) restore oral function and esthetics by replacing missing teeth and tissues.[1] Kennedy's classification, the most widely used system for partially edentulous arches, categorizes cases based on the location of edentulous areas relative to remaining teeth.[2] It aids in treatment planning and communication among dental professionals.[3] Numerous research efforts conducted in Saudi Arabia have highlighted the differences in patterns and prevalence of partial edentulism in various regions. A study conducted in Riyadh found that nearly 69% of adults aged 35–74 had lost one or more teeth, indicating a high prevalence of tooth loss in this population.[4] Similarly, a study conducted by Fayad *et al.* in Al-Jouf found that Kennedy Class III was the predominant type of partial edentulism observed.[5] These local variations could indicate differences in demographic factors, oral health practices, and the availability of dental care services. In Qassim, Almutairy and Mohan found that 62.5% of young women experienced partial edentulism; however, thorough data that include both sexes and various age demographics are still scarce.[6] As a result, carrying out this research in Qassim is crucial for gaining insights tailored to this region and for comparing the results with those obtained from other areas of Saudi Arabia. This study aims to determine the prevalence of partial edentulism and analyze its distribution and position on panoramic radiographs of patients at a dental school in Qassim, Saudi Arabia and also aims to correlate edentulism patterns with gender to inform prosthodontic education and clinical decision-making.

Materials and Methods

Study design and duration

This 3 months cross-sectional study focused on patients who visited the dental clinics at Qassim University's College of Dentistry and was partially edentulous.

Selection and description of participants

Using a 95% confidence level, an estimated population proportion of 15%, and an absolute precision of 0.05, the sample size was determined to be 278. The sampling method used was non-probability.

Patients with partially edentulous areas in one or both jaws, a panoramic radiograph (orthopantomogram), and attendance at the dental clinics between January 2020 and December 2024 were among the inclusion criteria, which also included patients of both genders and ages 15–60. Patients with short-span edentulism recommended for fixed dental prosthesis, those who were completely edentulous, or those who were missing only the maxillary or mandibular third molars, were not included in the study.

Data collection and analysis

Radiographic assessment employing orthopantomograms (OPGs) was used to acquire data. Microsoft Excel was used for the revision and organization of the data, and IBM Statistical Package for the Social Sciences Statistics software (Version 27, IBM Corp., NY, USA) was used for the analysis. Data presentation was done using descriptive statistics. Reports for categorical variables included valid percentages and frequencies. To determine the impact of variables including gender, arch type, and Kennedy classification, Pearson's Chi-square test was used. When $P < 0.05$, statistical significance was declared.

Ethical considerations

This was a cross-sectional retrospective study analyzing archived patient data that had been collected as part of routine clinical care between January 2020 and December 2024. The ethical approval was obtained (Approval No. 25-38-29) specifically for the research phase, which involved the access, abstraction, and analysis of these existing, de-identified clinical records (OPGs and patient files). No prospective patient interaction, intervention, or data generation occurred after the approval date. The informed consent was obtained from the patients at the time of their original clinical visit (between 2020 and 2024), covering both their treatment and the potential for their de-identified clinical records to be used for research, as outlined in the institutional policy.

Results

The study included 721 edentulous dental patients at Qassim University. The most prevalent Kennedy classification was Class II (n = 289 patients, 40.1%), followed by Class III, indicating a predominance of posterior edentulous patterns. Class IV was notably rare. Lower arches were more frequently affected by partial edentulism (n = 408, 56.6%) than upper arches, suggesting a higher prosthodontic burden in the mandibular region. Gender distribution was nearly balanced, with a slight predominance of female patients (n = 371, 51.5%). These findings highlight the clinical relevance of posterior mandibular edentulism and support the need for targeted prosthodontic planning in this population, as shown in Table 1.

Statistically significant associations were found between the Kennedy classification and arch type, as well as between the Kennedy classification and gender, among Qassim University dentistry patients. With a significant gender-based distribution, Class I edentulism was significantly more common in females and Class III in males ($P = 0.008$). While Classes III and IV were more evenly distributed across both arches, Classes I and II were more commonly found in the lower arch. A significant association was observed between arch type and classification pattern ($P < 0.001$). The pattern of partial edentulism in this group may be influenced by both biological and anatomical variables, according to these data, as shown in Table 2.

Class II was the most common Kennedy classification (female n = 144, male n = 145), highlighting a predominance of unilateral posterior edentulism. The rarity of Class IV suggests that anterior tooth loss is uncommon in this population (female n = 6, male n = 5), which may influence prosthodontic planning and resource allocation, as shown in Figure 1.

Figure 2 illustrates how the incidence of Kennedy classification types among dental patients varies by gender (female n = 371, male n = 350). Females were more likely to have Class I (n = 119), but males were more likely to have Class III (n = 125). Class II was almost evenly split between the sexes (female n = 144, male n = 145), while Class IV was uncommon in both groups and slightly more common in women (n = 6).

The distribution of Kennedy categories for upper and lower arches is seen in Figure 3. In the lower arch, Class I was significantly more common (n = 132), whereas in the higher arch, Class III was more common (n = 121). Class II was equally prevalent in both arches (upper n = 123, lower n = 166), whereas Class IV was still rare (upper n = 7, lower n = 4), though it was slightly more common in the upper arch.

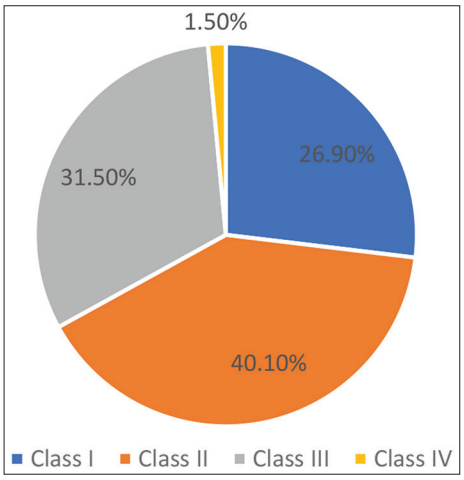

Figure 1: Prevalence of Kennedy classification among dental patients

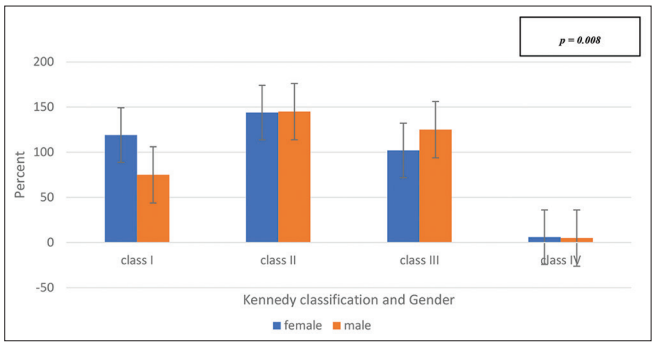

Figure 2: Percentage distribution of Kennedy classification by gender

Table 1: Demographic and prosthodontic distribution of partial edentulism among dental patients attending the College of Dentistry, Qassim University, Saudi Arabia. (n=721)

Factor	Category	Number	Frequency
Gender	Female	371	51.5
	Male	350	48.5
Kennedy classification	Class I	194	26.9
	Class II	289	40.1
	Class III	227	31.5
	Class IV	11	1.5
Arch type	Upper	313	43.4
	Lower	408	56.6

Table 3 shows that the lower arch had somewhat more partial edentulism than the higher arch for both sexes, although this difference was not statistically significant (P = 0.362). It does not seem that gender affects which arch is impacted.

Discussion

The purpose of this study was to determine the frequency of Kennedy classifications by gender among patients undergoing RPD therapy in clinics at Qassim University's College of Dentistry. Our study indicates that Kennedy Class II emerged as the most prevalent classification (40.1%). These results differ from those of several regional studies. Kennedy Class III was the most prevalent categorization among a sample of Saudis, followed by Class II and Class I, with Class IV being the least common, according to Almusallam *et al*.[4] Similarly, Class III was found to be prevalent, particularly in the mandibular arch, in a study at King Saud bin Abdulaziz University.[8] This discrepancy could be explained by changes in clinical settings, oral health awareness, and access to preventative care, as well as demographic variables.

Curiously, our findings are more in line with those of a CBCT-based study conducted at Qassim University on Kennedy Class I and II patients. The study found that posterior edentulism was a common condition linked to temporomandibular joint degeneration.[9] This implies that the loss of posterior teeth may have wider functional repercussions in addition to being more prevalent in this group.

Worldwide, studies from Pakistan have also revealed variations in the Kennedy class distribution.[7] Class III was the most common, according to a Cairo University study, but Class IV was still uncommon.[10] On the other

Table 2: The prevalence of Kennedy classification among dental patients attending the College of Dentistry, Qassim University, Saudi Arabia

Factor	Category	Kennedy classification n (%)				P-value
		Class I	Class II	Class III	Class IV	
Gender	Female	119 (61.3)	144 (49.8)	102 (44.9)	6 (54.5)	0.008
	Male	75 (38.7)	145 (50.2)	125 (55.1)	5 (45.5)	
Arch type	Upper	62 (19.8)	123 (39.3)	121 (38.7)	7 (2.2)	>0.001
	Lower	132 (32.4)	166 (40.7)	106 (26.0)	4 (1.0)	

Chi-square test

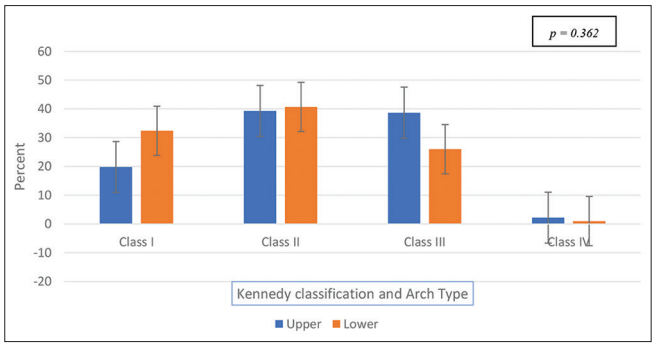

Figure 3: Comparative prevalence of Kennedy classes in upper and lower dental arches

Table 3:The association between arch type and demographic characteristics

Factor	Category	Arch type *n* (%)		*P*-value
		Upper	Lower	
Gender	Female	155 (41.8)	216 (58.2)	0.362
	Male	158 (45.1)	192 (54.9)	

hand, studies conducted in Pakistan and Jordan showed that Class II was less prevalent and that Class I and III were distributed evenly.[10,11] These differences highlight how social, cultural, and regional factors affect patterns of edentulism.

Our study highlighted that most of the patients were female, which indicates that females predominated. This may be because, compared to men, women visit the dentist more frequently to get treatment for their unattractive and deficient dentition.[12] However, according to another study, men are more likely than women to have partial edentulism, which may be related to their bad brushing practices brought on by their hectic schedules.[13,14]

Our research indicates that there is a slightly increased occurrence of Kennedy Classes I and II partial edentulism among women compared to men. This discrepancy between genders may stem from a mix of biological and sociocultural influences. On a biological level, variations in hormones and bone density may affect the timing and pattern of tooth loss. From a sociocultural perspective, women tend to be more proactive in pursuing dental treatment, allowing for earlier identification and management of tooth loss, while men may postpone dental visits due to work commitments or a lower perception of need. Collectively, these elements may explain the gender variations seen in partial edentulism, but additional research is required to clarify the significance of each factor.

The mandibular arch (lower) was shown to have a higher prevalence of partial edentulism, which could be caused by the mandibular teeth erupting earlier than the maxillary teeth.[15-17] According to Mady *et al.*, Class II patients were the most common; this increase in Class II patient frequency may be attributed to increased efforts to raise awareness of tooth loss prevention.[10] In contrast, Classes III and IV patient frequencies were lower than those of Class I and Class II patients due to the fixed prosthodontic approach.[18]

In our study, Class I was significantly more common in the lower arch and Class III in the upper arch ($P < 0.001$). This pattern aligns with broader trends indicating mandibular arch predisposition to distal extension edentulism (Classes I and II) due to biting forces and tooth loss patterns.[13] The demographic linkage between age and Kennedy class, commonly seen in other studies, where older individuals trend toward Classes I and II, could also influence our findings, even though age-specific data were not dissected here.[19,20] The mandibular dominance of Classes I and II, which is most likely caused by early posterior tooth loss in the lower arch, is one aspect of our study results that is consistent with previous research. This anatomical tendency is supported by substantial statistical significance ($P < 0.001$).[5,21] Class I was most prevalent in the mandible, and Class III in the maxilla, which is in line with our study distribution of arch types. It also highlighted how prosthesis design is affected clinically.[22,23]

According to our study, posterior edentulism more commonly affects mandibular arches, and Kennedy Class II and III configurations predominate. These findings are in line with Jeyapalan and Krishnan analysis of the literature, which found a substantial association between distal extension instances (Classes I and II) and advancing age, as well as a higher prevalence of partial edentulism in the mandibular arch.[24] Our results indicate a little gender influence, with females showing a slightly greater prevalence of Classes I and II cases, despite their review finding no significant gender-based differences. That was aligned with another study that found Kennedy Classes II and III partial edentulism which is more common, especially in the mandibular arch, according to recent epidemiological studies. A study has emphasized the clinical intricacies associated with distal extension cases, revealing that Classes I and II configurations are the most frequently constructed detachable partial dentures, especially among the elderly population.[25]

The present study was based on radiographic evaluation, which provides reliable data on arch classification. However, further studies incorporating comprehensive clinical examinations and exploring the underlying reasons for partial edentulism are recommended to gain deeper insights into the etiology and clinical presentation of these patterns. Our results point to the necessity of incorporating Kennedy categorization into public health screening and providing targeted preventive care, particularly in the mandible. Future studies ought to support individualized prosthodontic instruction and incorporate age-based analysis.

Limitations

This research has several limitations worth noting. First, its retrospective design, conducted at a single center, which is not population-based, limit the generalizability of the findings, relying exclusively on radiographic data, may hinder the applicability of our results and prevent the establishment of causal links. In addition, the employment of non-probability sampling can introduce selection bias, affecting the study's representativeness of the wider population. Furthermore, significant clinical and contextual factors, including periodontal condition, assessment of caries, history of prosthetic use, and socioeconomic variables, were omitted, which restricts the ability to comprehensively analyze the observed trends in partial edentulism. Finally, depending solely on radiographic evidence without corresponding clinical evaluations may result in inaccuracies in estimating certain conditions. Future research should prioritize multicenter, prospective approaches using probability sampling and comprehensive clinical evaluations to affirm and broaden these findings.

Conclusion

Our study highlighted that Kennedy Classes II and III partial edentulism predominated, that distal extension instances were more common in female patients, and that mandibular arches were more commonly impacted, especially in the posterior portions. In light of these findings, we advise focused oral health education for populations at risk, early clinical intervention to stop the development of difficult distal extension cases, and the incorporation of demographic factors into prosthetic treatment planning. For wider epidemiological use, more research is encouraged to examine longitudinal patterns and confirm culturally appropriate diagnostic instruments.

Author's Contributions

The author solely conceived, designed, collected, analyzed, and interpreted the data, and wrote the manuscript.

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Conflicts of Interest

The author declares no conflicts of interest.

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