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**Mohammad Arif Lone**  
Lecturer Department of  
Prosthodontics Government  
Dental College Srinagar,  
Jammu and Kashmir, India

**Shabir Ahmad Shah**  
Professor Department of  
Prosthodontics Government  
Dental College Srinagar,  
Jammu and Kashmir, India

**Shazia Mir**  
Associate Professor Department  
of Prosthodontics Government  
Dental College Srinagar,  
Jammu and Kashmir, India

## Pattern of partial edentulism based on Kennedys classification among dental patients in Kashmir: retrospective study

**Mohammad Arif Lone, Shabir Ahmad Shah and Shazia Mir**

### Abstract

**Objective:** The current study aimed to determine the prevalence and pattern of partial edentulism among dental patients in Kashmir

**Patients and Methods:** A total of 142 patients were selected, and the prevalence of partial edentulism among the selected patient was recorded. Patients were grouped into three age groups;

Group I: 21–30 years

Group II: 31–40 years

Group III: 41–50 years

Kennedy's classification was used to determine the pattern of partially edentulous arches. Modification areas were not included in the assessment to avoid complexity. Data was analyzed using the Statistical Package for the Social Sciences for windows.

**Results:** The results showed that the occurrence of Kennedy Class III partial edentulism was 67.2% in the maxillary arch and 64.1% in the mandibular arch. Followed by Class II in both maxillary and mandibular arch with an average of 16.3% in maxillary arch and 14.8% in the mandibular arch. Based on these results, class III has the highest prevalence in group II (31-40 years). Class I and class II have the highest incidence among group III Patients (41–50 years).

**Conclusions:** Among selected patients, Class III dental arch was the most prevalent pattern in maxillary and mandibular arches. Class IV being the least dominant pattern between all classes. There are a rise in Kennedy Class I and Kennedy Class II pattern and a decline in Class III and Class IV with an increase in age.

**Keywords:** Kennedy's classification, partial edentulism pattern, partial denture, and prevalence of partial edentulism

### 1. Introduction

Tooth loss is a process in which one or more teeth become loose and fall out. Losing teeth is undesirable and is the result of injury or disease, such as dental avulsion, tooth decay, and gum disease. The condition of being toothless or missing one or more teeth is called edentulism. As a person ages, their permanent teeth have been exposed to normal mechanical forces, such as chewing, and also more abnormal mechanical forces, such as bruxism (grinding) and traumatic injury. Permanent teeth may also be affected by oral disease. There are many ways in which a person may protect his or her permanent teeth from loss.

The main method of preventing tooth loss is prevention of oral diseases. Tooth decay is caused by increased plaque retention. Bacteria can then invade the plaque and cause dental caries (cavities). If cavities persist untreated for an extended period of time, tooth breakdown occurs. Plaque retention and bacterial presence also affect the gums and bone and their ability to hold the teeth in place. Disease of the gums, known as periodontitis, leads to detachment of the supporting structures from the teeth and their eventual loss. Practicing good oral hygiene and regular check-ups at a dentist's office may prevent tooth loss. Good oral hygiene consists of brushing two times a day with fluoridated toothpaste and flossing.

Tooth loss has a major influence on biologic, social, and psychological levels of the oral health-related quality of life. The prevalence of tooth loss has declined considerably in various countries in last decades [1, 2, 3].

### Correspondence

**Mohammad Arif Lone**  
Lecturer Department of  
Prosthodontics Government  
Dental College Srinagar,  
Jammu and Kashmir, India

Bruce [4] observed tooth loss across all ages; he found that the main reason for tooth loss was dental caries (83%) followed by periodontal disease (17%). Decrease in edentulous patient number is considered to be a reflection of the improvement in the oral health of the population [5, 6]. It is also considered to be a sign of the success of preventive measures by the health care system [1, 7].

With the recent trends in dental health care that favor natural dentition preservation, a decrease in edentulous patient's number is predicted [8]. There are more than 65000 potential combinations of partial edentulism pattern in maxillary and mandibular arches, hence, it is logical to classify partially edentulous arches that have common characteristics and to facilitate communication among different dental professionals [9, 10, 11].

Several classifications have been suggested to classify partially edentulous arches to recognize possible combinations of teeth to ridges. At present, Kennedy's classification is considered the most broadly accepted classification for partially edentulous arches. Kennedy's classification offers immediate visualization, prosthesis support recognition, and assessment of removable partial denture design features [13, 14, 15].

The prime purpose is to enable the dentist to clearly communicate to a listener. A workable classification helps to create order from the many number of possible combinations of missing teeth and edentulous spaces. Classification is an aid of the fundamentals of design. We classify to formulate a good treatment plan, to anticipate the difficulties common to occur in the design, to communicate with the professionals and to design the cast partial according to the occlusal load usually expected. Classification should allow visualization of partially edentulous spaces that are being considered. It should allow differentiation between tooth and tissue supported areas. It should serve as a guide to the type of design to be used and should be universally accepted. There are 18 systems of classification but kennedys is mostly used. Kennedy Class I describes a patient who has bilateral free-end saddles, i.e. they have edentulous posterior areas bilaterally. This is the most common classification. There are no further posterior teeth to the edentulous area. A free-end saddle is where the saddle is not resting on teeth on both sides (i.e. is lacking an abutment tooth). Kennedy Class II this describes a patient who has a unilateral free-end saddle, i.e. they have a one-sided, posterior edentulous area. They have no further teeth behind the edentulous area. As the image below shows, it is like a Class I but just covering one side of the arch. Kennedy Class III this describes a patient who has a unilateral posterior saddle. This means that the edentulous area has teeth located both anteriorly and posteriorly to it, as shown in the image below. As they do not possess free-end saddles, they tend to be far more secure cases when designing. Kennedy Class IV This describes a patient with a single anterior saddle. This is the rarest of the classifications.

A modification refers to multiple edentulous areas present in a case. Modifications can only apply to Kennedy Classes I, II and III. This is because a Kennedy Class IV case with modifications would fall in to one of the other classifications, as these take priorities. The pattern of tooth loss has been assessed in different populations in various countries [14, 15, 16, 17, 18, 19]. Hoover and McDermont [20] found a higher incidence of edentulism in males than females whereas Marcus *et al* [21], reported that the edentulism prevalence had

no relation with gender. The epidemiological information on health care and its related concerns are essential for planning future health care [22]. As epidemiologic studies on edentulism and tooth loss vary considerably in prevalence between countries and between geographic regions within countries [23, 24, 25], and because there are no available studies that have investigated the prevalence of partial edentulism among subjects in Kashmir region, the objective of the current study was conducted to assess the incidence of Kennedy's classification among partially edentulous individuals along with its correlation with age. This would be of valuable information to oral health planners for proposing strategies helping in the development of dental health care management in Kashmir region.

**Patients and Methods**

This study was carried out among dental patients attending the Outpatient Clinics. The inclusion criteria include both genders, aged between 21 years and 50 years with partially edentulous spaces. Patients with an only missing third molar un-erupted or congenitally missing teeth, root tips, and loose teeth that were indicated for extraction were not included in the study. Based on information from previous studies, it was found that 140 cases would be enough for conducting the research [25, 26].

A total of 146 partially edentulous patients were clinically examined after obtaining written consent. Four patients were excluded after panoramic radiograph was obtained.

Selected patients were grouped into three age groups.

**Group I:** 21–30 years.

**Group II:** 31–40 years.

**Group III:** 41–50 years.

Patients were clinically examined intra-orally by two prosthodontists in the outpatient's clinic Department. Kennedy's classification<sup>27</sup> was used to determine the pattern of partially edentulous arches. Modification areas were not included in the assessment to avoid complexity. Data was analyzed using the Statistical Package for the Social Sciences version 20.0 for windows.

**Results**

Prevalence and pattern of partial edentulism among dental patients attending outpatient clinics was done. The mean age of the selected patients was 35.5 years.

The results showed that the occurrence of Kennedy Class III partial edentulism was 67.2% in the maxillary arch and 64.1% in the mandibular arch. Followed by Class II in both the maxillary and mandibular arch with an average of 16.3% in the maxillary arch and 14.8% in the mandibular arch. Based on these results, Kennedy's Class III was the most prevalent partially edentulous pattern 65.4% among the maxillary and the mandibular arch. Table 1 and Figure 1 show the incidence of different patterns according to Kennedy's classification for the maxillary arch and mandibular arch.

**Table 1:** Incidence of different Kennedys classes among the maxillary and mandibular arches

Class arch	Maxillary arch	Mandibular arch	Total
CLASS I	8	11	19
CLASS II	10	12	22
CLASS III	41	52	93
CLASS IV	2	6	8

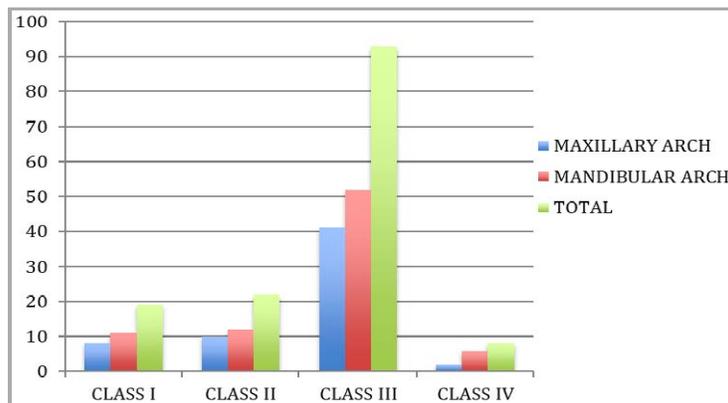


Fig 1: Incidence of different Kennedy classes among the maxillary and mandibular arches

Distribution of different classes in the age groups is shown in Table 2 and Figure 2. The results reveal that class III has the highest prevalence in group II (31–40 years) and group I (21–30 years) patients. With increasing age, a transition of bounded saddles into free end saddles was found. Classes I and II have the highest incidence among group III patients (41–50 years).

Table 2: The age wise distribution of various Kennedy classes

Kennedys class	Group I	Group II	Group III	Total
CLASS I	1	5	13	19
CLASS II	4	7	11	22
CLASS III	42	43	8	93
CLASSIV	2	2	4	8
TOTAL	49	57	36	142

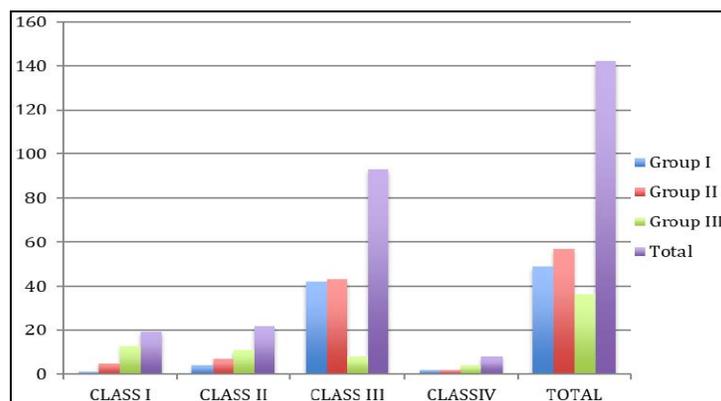


Fig 2: The age wise distribution of various Kennedy classes

**Discussion**

The main aim in using a classification for RPDs is to facilitate the description of partially edentulous cases. In the current study, Kennedy classification was selected because it simplifies the description of partially edentulous cases, permits immediate visualization of the partially edentulous arch, provides a logical way to display the problems of design, and to simplify the application of basic principles of partial denture design [14].

The present study was initiated to assess the prevalence and pattern of partial edentulism. The findings of the present study showed that the frequency of partial edentulism in the mandibular arch was higher than the partial maxillary edentulism among the study population. Curtis *et al.* reported that mandibular removable partial dentures are more common than maxillary removable partial dentures, and that the class I mandibular RPD is the most prevalent type of RPD for either dental arch.

Kennedy Class III was reported to be the most common pattern (57.14%) in a sample of the Iraqi population in a study carried out by Hatim *et al* [28]. In Benin, Ehikhamenor, *et al* [29], found that the most commonly restored edentulous area was Kennedy's class III (57.3%). In this study Kennedy's Class III was found to be the most prevalent pattern of partial

edentulism both in the maxillary arch (67.2%) and the mandibular arch (64.1%). The present study was in accordance to the study of Madhankumar [1] and partially in accordance with Curtis *et al.* [9] who found that the Kennedy's Class III was only common in the maxillary arches, whereas in the mandibular arches, Kennedy's Class I was the most dominant pattern.

Pun *et al.* investigated the patterns of tooth loss in patients receiving removable partial dentures (RPDs) in Eastern Wisconsin, and reported that Kennedy Class I was the most common RPD with a frequency of 38.4% [24].

This variation may be due to difference in the mean of patients' age as the mean age in Curtis' study was 55 years, whereas in the current study, the mean age of the patients was 35.5 years.

The limitation of the present study includes small, nonprobability sample of convenience. The size and homogeneity of the sample limit this study, and hence additional studies are recommended.

**Conclusion**

The present study showed there is an increase in Classes I and II Kennedy classification and a decrease in Classes III and IV with an increase in age, The prevalence of Class III was

predominant among younger population of 21–30 year and 31–40 years, whereas in group III between 41 and 50 years Class I was predominant. It can be stated that the need for prosthodontics care is expected to increase with age, and hence, more efforts should be made for improving dental education and motivation among patients in Kashmir region.

### Recommendation

Further evaluation of long-term dental care outcomes and analysis of the type of prostheses required may clarify more information about partially edentulous patients.

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