

# Analysis of Age and Type of Partial Edentulism in Upper Arch

**Running title:** Age and Type of Partial Edentulism in Upper Arch.

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**Abstract:** ***Introduction:** Partial edentulousness is a dental arch in which one or more functional dentition is missing. Partially edentulous arches have been classified by various methods. The aim of this literature review was to analyse the prevalence of partial edentulousness and its correlation with age and incidence of various Kennedy's Classes in upper arch. **Materials and Methods:** This retrospective study was conducted among partially edentulous patients in the upper arch in a university teaching hospital in Chennai during the period of December 2020 to May 2021. The collected data was then subjected to statistical analysis using Statistical Package for Social Science (SPSS). Descriptive statistics and Chi square tests were used. **Results:** Partial edentulism was most frequent in the age group 41 - 60 years with 46.6% of the total population. It was noted that Class III was most frequent with 37.9% of total population followed by Class I with 28.7% in the upper arch. It was noticed that in younger age groups Class IV was prevalent whereas in the older population Class I and III was more frequent. **Conclusion:** Within the limits of this study, it was observed that; Partial edentulism was most frequent in the age group of 41 - 60 years. It was noted that Class I was most frequent followed by Class III in the upper arch. It was noticed that in younger age groups Class III and IV was prevalent whereas in the older population Class I situation was more frequently seen.*

**Keywords:** Partial edentulism, Kennedy's classification, tooth loss, upper arch, innovation

## 1. Introduction

Partial edentulousness is a dental arch in which one or more functional dentition is missing. Reasons for partial edentulousness may be due to caries, periodontal problems, traumatic injuries, impactions, supernumerary teeth, neoplastic and cystic lesions (1-4), Literature studies have reported caries as the main causative agent for tooth loss (5-7). Recent studies have documented that age correlates positively with partial edentulism (1, 2, 4)

Partial edentulism leads to several drawbacks like clinical challenges and lifestyle compromises. Clinically, partial edentulism results in supra eruption of opposing teeth, drifting and tilting of adjacent teeth, altered speech, tempero - mandibular disorders and changes in facial appearance (8). Also, the loss and continuing degradation of the alveolar bone and the supporting structures will influence the difficulty to achieve an adequate replacement in a partially edentulous patient. Partial edentulism restricts dietary options, which leads to loss of nutrition (9). Further, it leads to lack of confidence and confined social activities, which may adversely affect the quality of life and lead to psychological dissatisfaction.

Partially edentulous arches have been classified by various methods. The possible combinations of partial edentulism

are more than 65, 000 depending on their incidence in maxillary and mandibular arches (10). The primary objective of a classification is to facilitate the communication about missing teeth and edentulous ridges among students, clinicians and laboratory technicians (11-14). Among the various methods of classification like Kennedy, Applegates, Avant, Neurohar, Eichner, ACP (American College of Prosthodontics) etc, the most widely used is Kennedy's classification and is clinically accepted by Dental Community. According to Kennedy's classification, there are four major types of partially edentulous arches Class I, Class II, Class III and Class IV. Kennedy's classification is widely accepted due to its advantages of visualization and recognition of prosthesis support. The patterns in the incidence of the various classes of removable partial dentures should be reviewed periodically to serve as teaching guidelines (15, 16).

The pattern of partial edentulism has been evaluated in many populations of different countries. Several studies have analysed the correlation between partial edentulism and its influencing factors like socio - economic parameters, gender, age, etc, (17-20). Surveying of patients visiting clinics, clinical records and population in a particular locality have been the common method of evaluation of partial edentulism. However, there is a lack of studies pertaining to the South Indian population. Our team has extensive knowledge and research experience that has translate into

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high quality publications (21–29) , (30–35) , (36–41) . The aim of this literature review was to analyse the prevalence of partial edentulousness and its correlation with age and incidence of various Kennedy's Classes in upper arch.

## 2. Materials and Methods

### Study Setting

This university hospital- based retrospective study was carried out by reviewing the dental records of patients who underwent surgical extraction of impacted premolars who had visited a university teaching hospital in Chennai. Since this was a university hospital setting the large sample size and distribution of population contributed a major advantage for this study. Data collected was reliable and with evidence. The study was conducted after obtaining approval from the Institutional Ethical Review Board.

### Sampling

Data was reviewed and collected from 86, 000 patient records over a six months period from December 2020 to May 2021. Data of those patients who underwent extraction of impacted premolar was collected. 5584 patients who were diagnosed with partial edentulousness, patients in the age group of 10 - 90 years were included in the study while those with complete edentulousness and incomplete hospital records were excluded from the study. Cross verification was done using photographs and radiographs.

### Data Collection

The following patient data were recorded as follows: hospital record number, gender, age, radiographic/dental diagnosis.

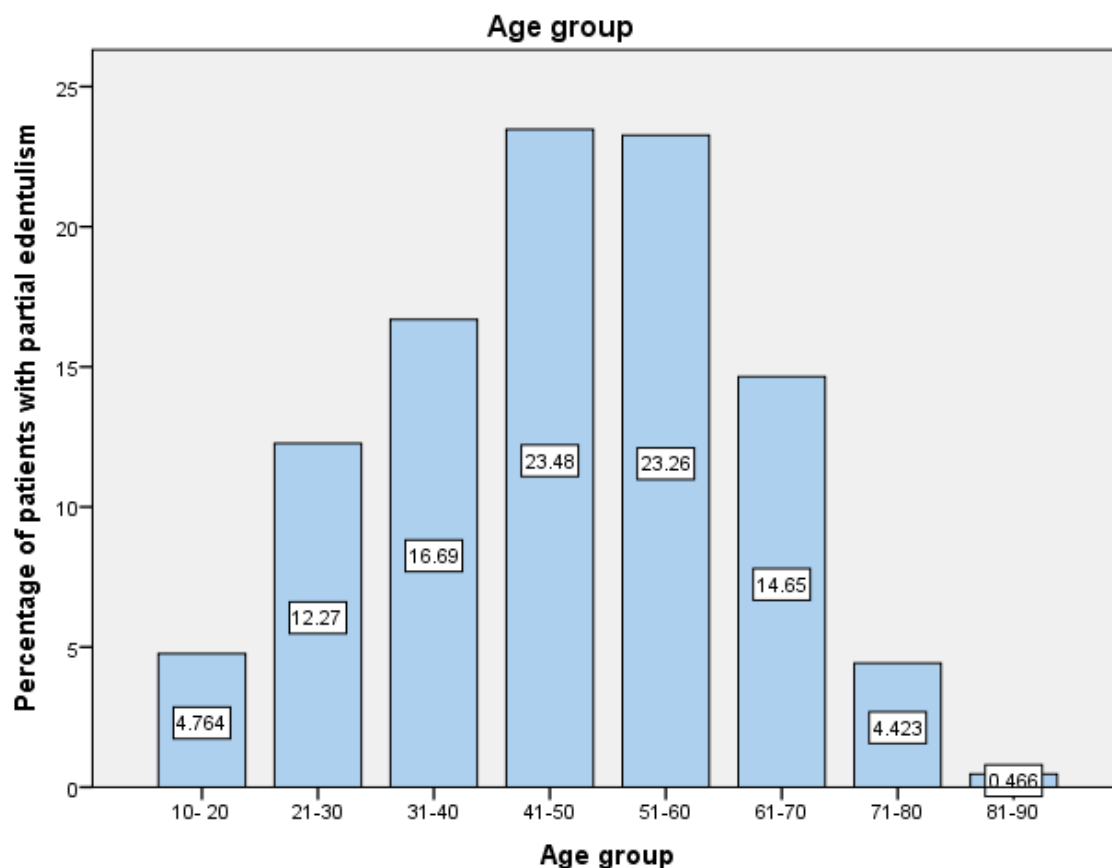
The Total population of patients who were diagnosed with partial edentulousness was 5584. Data collected was then exported to Microsoft Excel 2010.

### Data Analytics

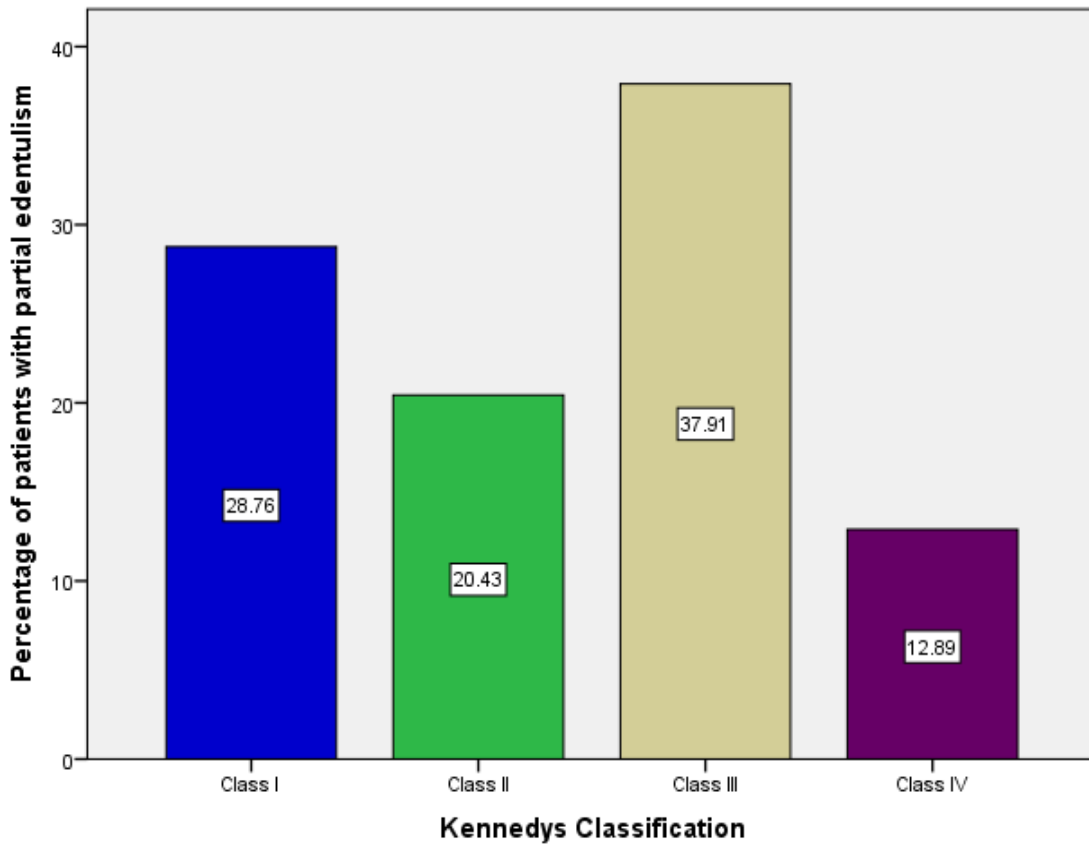
The acquired data was subjected to statistical analysis. Microsoft Excel 2010 data spreadsheet was used for tabulation of parameters and later exported to the Statistical Package for Social Science (SPSS version 20.0) for Windows. Descriptive statistics were applied to the data and chi - square tests were applied at a level of significance of 5% ( $P < 0.05$ ).

## 3. Results

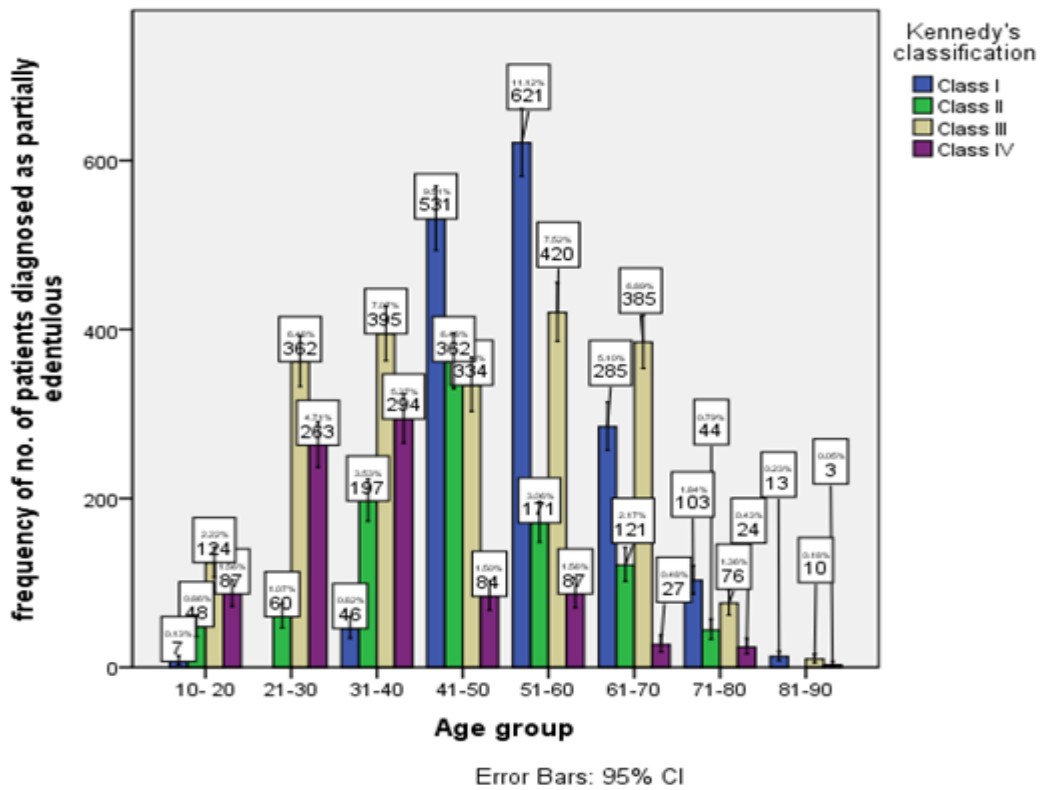
Partial edentulism was most frequent in the age group 41 - 60 years with 46.6% of the total population. It was noted that Class III was most frequent with 37.9% of total population followed by Class I with 28.7% in the upper arch. It was noticed that in younger age groups Class IV was prevalent whereas in the older population Class I and III was more frequent.



**Figure 1:** Age distribution of patients with partial edentulism in the upper arch. It was noted to be 10 - 20 age group: 4.7%, 21 - 30 age group: 12.2%, 31 - 40 age group: 16.7%, 41 - 50 age group: 23.5%, 51 - 60 age group: 23.2%, 61 - 70 age group: 14.5%, 71 - 80 age group: 4.5% and 81 - 90 age group: 0.5%. X - axis represents the age group and the y - axis represents the percentage of patients. Partial edentulism was most frequent in the age group 41 - 60 years with 46.6% of the total population.



**Figure 2:** This bar graph represents the incidence of Kennedy's classification in the upper arch. X - axis represents the classification and the y - axis represents the percentage of patients. It was noted that Class III was the most frequent with 37.9% of total population followed by Class I with 28.7% in the upper arch.



**Figure 3:** Bar graph depicting association between age group and Kennedy's classification. X - axis represents the age group with the classification in the X cluster and Y - axis represents the number of patients with partial edentulism. Blue colour denotes Class I, green colour denotes Class II, brown colour denotes Class III and violet denotes Class IV. Chi - square test was done and the association was found to be statistically significant with p value of 0.04 (<0.05). It was noticed that in younger age groups Class III was prevalent whereas in the older population Class I was more frequently present.

#### 4. Discussion

It is likely that tooth loss, in most cases being a consequence of oral diseases, which affects the oral health - related quality of life. In a large Japanese study, Ide *et al.* found a strong correlation between the number of missing teeth and higher oral health impact profile scores suggesting impairment (42).

The primary purpose of using a classification for partially edentulous cases is to simplify the description of combination of teeth to ridges. In this study, the Kennedy's classification was employed as it can easily visualize a partially edentulous arch and is accepted worldwide. The objective of this study is to correlate partial edentulousness with age and maxillary arch. It was observed from this study that partial edentulism was most frequent in the age group 41 - 60 years with 46.6% of the total population. The present study was in accordance with Curtis *et al.* (13) which reported that the age group of patients with partial edentulousness was averaging 55 years. However this result was contrary to a study by Madhankumar S. which stated that partial edentulousness was prevalent in 36.5 years (43). This disparity in results may be due to the less sample study population taken in Madhankumar's study.

Recent studies by Naveed H *et al.*, Sadig WM *et al.*, Al Dwairi ZN *et al.*, Prabhu N *et al.*, observed that among all the classes, Kennedy's Class III was most common in both the arches maxilla and mandible (5, 10, 12, 19). Findings from this study corroborate with previous findings, it was noted that Class III was most frequent with 37.9% of total population followed by Class I with 28.7% in the upper arch. Prevalence of Class III indicates the dental awareness among patients to replace missing teeth. Pat

Sadig WM *et al.*, found that Younger adults had more Classes III and IV RPDs. Older adults had more distal extension RPDs (Class I and II) (12). Zaigham AM *et al.*, concluded that with an increase in age, there was an increase in Class I & Class II dental arch tendency and a decrease in Class III & Class IV (1). Similar Findings were observed in our study that in younger age groups Class IV was prevalent whereas in the older population Class I and III was more frequent. This may be due to the fact that trauma to maxillary central incisors at early childhood stage and early loss of first molar due to caries may be the reason for higher occurrence of Class III in younger age groups. When age increases, due to further loss of teeth, extension of existing saddle leads to Class I and Class II edentulousness.

#### 5. Conclusion

Within the limits of this study, it was observed that; Partial edentulism was most frequent in the age group 41 - 60 years. It was noted that Class I was most frequent followed by Class III in the upper arch. It was noticed that in younger age groups Class III and IV was prevalent whereas in the older population Class I and III was more frequent.

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#### Conflict of Interest

There was no potential conflict of interest.

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