**Prevalence of Partial Edentulism among The Patients Reporting to the Prosthodontics Department for Replacement at Sri Ramachandra University, Chennai, India.** - **An Epidemiological Study.**

 **Abstract**

 **Aims and Objectives**:

 To determine the occurrence of various missing teeth pattern among the partial edentulous patients residing in Chennai who are undergoing treatment for the replacement of missing teeth in the department of prosthodontics at Sri Ramachandra University,Chennai, India.

**Settings and Design**: study was undertaken from June 2009 to October 2009 and the design was descriptive cross-sectional study.

**Materials and method**: Five hundred and sixty one persons aged between 13-87 years (267 Males and 294 Females) were selected, intra-oral examination was done visually and results were recorded on specially designed clinical examination forms.

**Statistical analysis:** Data was analysed by using IBM.SPSS 19.0 version to investigate the relationship between quantitative variables.

**Results**: The results showed the patients with Kennedy’s class III were found to be the most prevalent among all the groups (55%). The most common modification in all the groups was class III modification I (26%). It was also found that Kennedy’s class III was founded more in the age group of 31-40 with 54.4% in the maxillary arch and 47.2% in the mandibular arch.

**Conclusion**: The findings of this study show that the Kennedy’s class III were most commonly occurring and were found to be more predominant in younger group of population.

**Key words**

Partial Edentulousness, Gender, Kennedy’s classification, missing tooth.

**Introduction**

Tooth loss has an impact on an individual’s oral health related quality of life at biologic, psychological and social levels. The prevalence and extent of tooth loss have decreased significantly in many countries during recent decades1-3.There still remains a significant variation in tooth loss distribution4. These disparity may be attributed partly to the increased availability and accessibility to oral diseases prevention and control programs, as well as to the increase in the awareness of importance in oral health. The study of trends in tooth loss, comparing rate of occurrence between different populations, may provide important information about risk factors for tooth loss, potential changes in oral health status, and possible causes of these changes.

Tooth loss is identified by an edentulous space, which is a gap in the dental arch normally occupied by one tooth or more. It could be partial or complete. A person may lack a few teeth (Partially edentulous) or all the teeth in one or both upper and lower jaws (completely edentulous) for various reasons. Bruce observed that the major reason for tooth loss across all the ages were due to dental caries (83%) followed by periodontal disease (17%).5 A simple estimate of the percentage of partially edentulous persons is a rough indication of the frequency of dental diseases and the success or failure of dental care. Observance of pattern of tooth loss determines the treatment requirement among the population. The design of the prosthesis depends upon the type of saddle area. A classification of partially edentulous arches helps to identify relation of remaining teeth to edentulous ridges; and facilitates communication, discussion, and comprehension of the suggested prosthetic treatment among dentists, students and technicians.

 Pattern of tooth loss is a clear indicator of levels of oral hygiene, dental health awareness, magnitude of dental problems and the management. Epidemiological studies related to status of pattern of tooth loss are scarce in India especially in south India. Owing to the large Indian population, a nationwide survey cannot be done. However, the epidemiological features of partial edentulousness of one community can be assessed on the basis of a cross-sectional study. The present study was done in order to provide complete reflection of dental status and treatment needs which would be of valuable information to the National Oral Health Planners for laying out strategies to develop dental health care management in the country. Learning the truth that tooth loss and its effects are so detrimental, our study aimed to find

1. The incidence of Kennedy’s classification among the partially edentulous subjects based on gender ratio and age- wise distributions..

2. Predominance of which type of kennedy’s classification among the patients attending the department of prosthodontics, Sri Ramachandra dental college for replacement of their missing teeth.

**Materials and Method**.

This study was carried out from June 2009 to October 2009 among patients reporting to the department of prosthodontics in the dental college for replacement of their missing teeth at Sri Ramachandra University, Chennai, India. Convenience sampling technique was utilized for data collection and 561 patients were selected. The inclusion criteria involved both the genders, aged between 13 years and 87 years having partially edentulous areas in either or both the jaws. Completely edentulous patient and those with only missing maxillary and mandibular third molars were excluded from the study. The study population were divided into two clusters, comprised of 267 men and 294 women. The selected patients were grouped according to their age (table 1). Pre- tested proforma was used, which includes name, age, gender and details of missing permanent teeth.

Clinical examination of each patient was carried out after obtaining consent and intra oral examination was done using a mouth mirror, probe in satisfactory lighting and direct visual examination. No diagnostic aids such as study models or radiographs were used in this survey. The patterns of missing teeth were identified according to the Kennedy’s classification. The number of teeth were defined as healthy, carious, or treated teeth (including crowned, inlay, and abutment teeth for fixed partial prosthesis), inclusive of completely erupted third molars. Un-erupted or congenitally missing teeth, root tips and very loose teeth that were indicated for extraction were not included as remaining teeth and were excluded from the study. Data analysis was carried out by using IBM SPSS 19.0 version, to estimate the percentage of predominately occurring Kennedy’s classification within the genders and also according to the age.

**Results**

Data were analysed by using IBM SPSS 19.0 version, the Pearson chi square analysis test was conducted and P value < 0.05 was considered to be statistically significant. The survey included 561 patients, of 267(47.5%) male patients and 294(52.5%) female patients aged between 13years and 87 years having partially edentulous areas in either or both the jaws. Table 2 and table 3 show the incidence of different patterns of partial edentulism according to Kennedy’s classification for male and female respectively. The results showed occurrence of class III partial edentulism with 56.57% in maxillary and 46.96% in mandibular arch for male patient. Similarly, class III type of partial edentulism was also found in female patient with 52.40% in maxillary and 47.23% in mandibular arch. This was followed by class III modification 1 in both the genders with an average of 30.83% in male patient and 27.01% in female patient. On the basis of these results, patients with Kennedy’s class III were found to be the most prevalent among both the genders (54.41%) in the maxillary arch and (47.11%) in the mandibular arch, and the most common modification was class III modification I among both the genders(25.96%) in the maxillary arch and (31.17%) in the mandibular arch.

Table 4 and 5 shows kennedy classification for age wise variation for maxillary and mandibular arch. The result showed class III predominance between 13 to 69 years in both arches while class II modification 1 was found in maxillary arch of age group 70 to 85 years. The next predominant classification was class III modification 1 for all ages in both the arch except for 50-59 years age group had class II modification 1 in mandibular arch. Among the different age group, predominance of class III was found in 31- 40 years. In this regard chi-squared test was conducted to analyse whether there is any correlation when compared between the genders and also the age with respect to Kennedy’s classifications in maxillary and the mandibular arch, and it was found that there is no association when compared between the male and female patients for maxillary arch and mandibular arch(table 6). It was also found that there is a significant difference in the age wise comparison of group in both in the maxillary arch and the mandibular arch (table 7).

**Discussion:**

## It is increasingly recognized that the impact of disease on quality of life should be taken into account when assessing health status. It is likely that tooth loss, in most cases being a consequence of oral diseases, which affects Oral Health-Related Quality of Life (OHRQoL).6 In a large Japanese study, Ide et al found a strong correlation between the number of missing teeth and higher OHIP scores suggesting impairment of OHRQoL. 9 Edentulism falls into a special category among the various disease of dental origin. Tooth loss is the dental equivalent to mortality. A simple estimation of proportion of the partial edentulous case is a rough indication of the prevalence of dental diseases and the success or failure of dental care7.

## The prevalence of the partial edentulous adults in Iasi was 66.5% and was estimated that the rate of tooth loss was higher in the rural area and more number of missing teeth were found in male population, 8. In contrary to the above statement, the present study showed that more number of missing teeth was seen in the female population.

## The results of the present study indicate that the frequency of mandibular edentulism was higher than maxillary edentulism among the study population. Kennedy’s Class III was found to be the most common pattern of partial edentulism among all the age groups both in the maxillary arch and the mandibular arch except in 70-87 years in which class II modification 1 was predominant in mandibular arch. The present study was partially in accordance with Curtis et al 10 where in Kennedy’s Class III was predominant only in the maxillary arches, while in mandibular arches the most prevalent pattern in the previous study was Kennedy’s Class I. A major disparity between the two studies is that of the age factor, as the age group of Curtis’ study was averaging 55 years whereas in this study the average age of the patients was 36.5 years.

Al-Dwairi11 in a study, investigated the frequency of different patterns of partial edentulism of 200 patients in Jordanand found that 150 had both maxillary and mandibular partial edentulism. In the present study, 9 different patterns were identified, in which Kennedy class III pattern of edentulism was the most commonly encountered in both the maxilla (54.5%) and mandible (47%) arches, and Kennedy class III modification was the next most found from the result. This study also correlates with the study carried out on a Saudi population conducted by Sadig and Idowa4 examining 422 partially dentate arches; Kennedy’s Class III was the most commonly encountered pattern of partial edentulism in both the upper and lower arches and Kennedy’s Class IV was the least common pattern encountered.

The findings of the present study suggesting a predominance of Class III pattern of partial edentulism may be due to the fact that a higher frequency of younger age groups was encountered whereas higher frequency of older population was seen in previous studies. The present study also shows increased awareness among younger population with large number of younger groups reporting to the prosthodontics department for replacing the missing tooth. The higher frequency of partial edentulism in these younger age group patients, as depicted by the results, might pertain to their low socio-economic status; poor oral hygiene and less conservative treatment approach, relating to lack of time, leading to early tooth loss.

The data obtained from present study on the frequency and distribution of tooth loss are very important to provide the practitioners with the information needed to address various factors implicated in tooth loss, to reduce its mortality and also to educate and to motivate patients on the importance of saving tooth. At the national level, these data also suggest that, preventive strategies aimed at reducing tooth loss need to be reinforced. Peterson and Yamamoto12 reported that oral diseases and chronic diseases share common risk factors . Hence the National Health Programs should incorporate disease prevention and health promotion measures using a common risk factor approach in combination with the strategies to prevent tooth loss which need an urgent attention by the policy makers for old people.

**Conclusion**

The present epidemiological study reported the prevalence of missing tooth in different age group and gender which showed existence of class III followed by class III modification 1 which were predominant among younger population of 31 to 40 years , while in geriatric population between 70 to 85 years class II modification 1 was present. Comprehensive information on tooth loss is required to form a generalized database for the partial edentulism patterns, which will help us in identification of the causes of such tooth loss and its prevention. There are possible limitations in this study as the following factors were not evaluated. The cause of the tooth loss, the literacy level and the socioeconomic status were not evaluated to identify the reason for tooth loss, chronology for tooth loss and radiographs were not used to identify congenitally missing and impacted teeth.

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Table 1- Grouping of selected subjects

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| AGE | 13-20 | 21-30 | 31-40 | 41-49 | 50-59 | 60-69 | 70-87 |
| GROUP | A | B | C | D | E | F | G |

Table 2: Partial edentulous male subjects classified according to Kennedy’s classification for the maxillary arch and the mandibular arch

|  |  |  |  |
| --- | --- | --- | --- |
| **Kennedy’s class** | **Maxillary Arch (%)** | **Mandibular Arch (%)** | **Total (%)** |
| Class I | 4 (2.2) | 5 (2.52) | 9 (2.41) |
| Class II | 6 (3.42) | 9 (5.14) | 15(4.02) |
| Class III | 99 (56.57) | 93 (46.96) | 192 (51.47) |
| Class IV | 2 (1.1) | 1 (0.5) | 3 (0.8) |
| Class I Mod I | 2 (1.1) | 1 (0.5) | 3 (0.8) |
| Class II Mod I | 5 (2.85) | 8 (4.04) | 13 (3.48) |
| Class III Mod I | 50 (28.57) | 65 (32.82) | 115 (30.83) |
| Class I Mod II | 1(0.5) | Nil | 1 (0.26) |
| Class II Mod II | 2 (1.1) | 7 (3.5) | 9 (2.41) |
| Class III Mod II | 2 (1.1) | 9 (5.14) | 11( 2.94) |
| Class II Mod III | 1 (0.5) | Nil | 1 (0.26) |
| Class III Mod III | 1 (0.5) | Nil | 1 (0.26) |
| Total | 175 | 198 | 373\* |

\*Total number is 373 (more than 267) as some subjects had both maxillary and mandibular teeth missing.

Table 3: Partial edentulous female subjects classified according to Kennedy’s classification for the maxillary arch and the mandibular arch.

|  |  |  |  |
| --- | --- | --- | --- |
| **Kennedy’s class** | **Maxillary Arch (%)** | **Mandibular Arch (%)** | **Total (%)** |
| Class I |  4 (2.13) | 7 (2.97) |  11 (0.02) |
| Class II |  7 (3.74) |  3(1.27) | 10 (2.36) |
| Class III |  98 (52.40) |  111(47.23) |  209 (49.52) |
| Class IV |  5 (2.67) |  8(3.40) |  13 (3.08) |
| Class I Mod I |  5(2.67) |  6(2.55) | 11 (2.60) |
| Class II Mod I | 2 (1.06) |  10(4.20) | 12 (2.84) |
| Class III Mod I | 44 (23.52) |  70(29.78) | 114 (27.01) |
| Class II Mod II |  Nil |  4(1.70) |  4 (0.94) |
| Class III Mod II | 18 (9.62) |  16(6.8) | 34( 8.05) |
| Class II Mod III | 1 (0.53) | Nil | 1 (0.26) |
| Class III Mod III |  2 (1.06) | Nil |  2 (0.26) |
| Class I Mod I | 1 (0.53) | Nil | 1(0.53) |
| Total | 187 | 235 | 422\* |

\*Total number is 422 (more than 294) as some subjects had both maxillary and mandibular teeth missing

Table- 4: Shows the age-wise distribution of the various classes Kennedy’s classifications in the maxillary arch.

|  |  |
| --- | --- |
| Age | Maxilary arch |
| Class1 | Class 2 | Class 3 | Class 4 | Class 1 Mod 1 | Class 2 Mod 1 | Class 3 Mod 1 | Class 1 Mod 2 | Class 2 Mod 2 | Class 3 Mod 2 | Class 2 Mod 3 |
| 13 to 20 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 to 30 | 0 | 0 | 46 | 1 | 0 | 0 | 8 | 0 | 0 | 1 | 0 |
| 31 to 40 | 0 | 0 | 62 | 2 | 0 | 0 | 25 | 0 | 0 | 3 | 1 |
| 41 to 49 | 0 | 0 | 33 | 1 | 0 | 0 | 36 | 0 | 0 | 11 | 0 |
| 50 to 59 | 7 | 10 | 28 | 3 | 6 | 2 | 21 | 0 | 2 | 3 | 1 |
| 60 to 69 | 1 | 3 | 13 | 0 | 1 | 1 | 4 | 1 | 0 | 1 | 0 |
| 70 to 85 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 |
| Total | 8 | 13 | 197 | 7 | 7 | 7 | 94 | 1 | 2 | 20 | 2 |

Table-5: Shows the age-wise distribution of various classes Kennedy’s classifications in the mandibular arch.

|  |  |  |
| --- | --- | --- |
| Age  | Mandibular arch | Total |
| Class1 | Class 2 | Class 3 | Class 4 | Class 1 Mod 1 | Class 2 Mod 1 | Class 3 Mod 1 | Class 2 Mod 2 | Class 3 Mod 2 |
| 13 to 20 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 12 |
| 21 to 30 | 0 | 0 | 55 | 1 | 0 | 0 | 26 | 0 | 1 | 83 |
| 31 to 40 | 0 | 0 | 58 | 5 | 2 | 0 | 41 | 0 | 10 | 116 |
| 41 to 49 | 0 | 2 | 46 | 0 | 0 | 0 | 42 | 3 | 10 | 103 |
| 50 to 59 | 11 | 4 | 29 | 2 | 3 | 17 | 14 | 6 | 3 | 89 |
| 60 to 69 | 1 | 6 | 7 | 0 | 2 | 1 | 5 | 2 | 0 | 24 |
| 70 to 85 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 1 | 6 |
|  Total | 12 | 12 | 205 | 9 | 7 | 18 | 134 | 11 | 25 | 433 |

Table 6: Association between the genders and various classes of partial edentulousness in the maxillary and mandibular arch.

|  |  |  |
| --- | --- | --- |
|   | **MAXILLA** | **MANDIBLE** |
|   | Value | df | Asymp. Sig. (2-sided) | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 21.419a | 13 | 0.065 | 16.748a | 9 | 0.053 |
| Likelihood Ratio | 24.968 | 13 | 0.023 | 18.031 | 9 | 0.035 |
| Linear-by-Linear Association | 0.347 | 1 | 0.556 | 1.448 | 1 | 0.229 |
| N of Valid Cases | 556 |   |   | 556 |   |   |
|   | a. 18 cells (64.3%) have expected count less than 5. The minimum expected count is 0 .47. | 4 cells (20.0%) have expected count less than 5. The minimum expected count is 3.32. |

Table 7: Association between the age and various classes of partial edentulousness in

in the maxillary and mandibular arch.

|  |  |  |
| --- | --- | --- |
|   | **Maxilla**  | **Mandible**  |
|   | Value | df | Asymp. Sig. (2-sided) | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 365.142a | 78 | 0 | 245.259a | 54 | 0 |
| Likelihood Ratio | 206.712 | 78 | 0 | 211.583 | 54 | 0 |
| Linear-by-Linear Association | 24.818 | 1 | 0 | 1.952 | 1 | 0.162 |
| N of Valid Cases | 556 |   |   | 556 |   |   |
|   | a. 80 cells (81.6%) have expected count less than 5. The minimum expected count is .01. | a. 49 cells (70.0%) have expected count less than 5. The minimum expected count is .09. |