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A survey to assess the validity of Kennedy's classification system in the present era

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ARTICLE INFO

Article history:
Available online 23 November 2015

Keywords:
Kennedy classification
Removable partial denture
Survey

ABSTRACT

The present classification system for removable of partial dentures has been proposed by Dr. Edward Kennedy 87 years ago. With the decrease in prevalence of edentulousness, this system of classification is questionable in this modern technologically and scientifically advanced era. This survey is the first of its kind in assessing the validity of Kennedy's classification system. Based on the results obtained from the survey, a new system of classification has been proposed.

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1. Introduction

Effective communication is an essential part of good patient management. In dentistry, it is a must because of involvement of the dentist and the technician. The dentist has to communicate with the technician about the requirements to fabricate the necessary prostheses. In Prosthodontics, varied types of partially edentulous patients are seen, and it is required to establish a good rapport between the dentist and the technician for designing and fabrication of a removable partial denture prosthesis (RPDP).

In removable partial denture prosthodontics, classification of an existing situation helps in (a) visualising the type of partially edentulous arch, (b) differentiating between tooth borne and tissue borne situations, (c) forming a general idea of the design to be used, and (d) determining the general location of the teeth to be replaced.[1] In an attempt in achieving the same, several classification systems have been proposed by Avant,[1] Kennedy,[2] Cummer,[3] Beckett,[4] Miller, Friedman,[5] Swenson,[6] Applegate,[7] and Skinner,[8] etc. However, among the plethora of systems, a classification system proposed by Dr. Edward Kennedy in the year 1925 became more popular and is being widely used till today.[2]

Kennedy's classification includes four major categories represented from Class I to Class IV. This sequence was based on the frequency of occurrence of edentulousness, with class I being more prevalent and class IV being least during the period of the study. Other than the major classification, if there is an additional space existing, he termed it as ''modification space''.

At the present era, after 87 years, with the major research and development that has occurred in the field of material science and technology, salvaging a tooth or a root has become easily achievable. Along with the change in the trend of treatment choices, there is bound to be a change in the prevalence of edentulous status in the society. This necessitates a new outlook towards reconsidering the classification systems that suited the previous era.

There has been an attempt to modify the Kennedy's classification earlier. Applegate,[9] in the year 1960 modified

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http://dx.doi.org/10.1016/j.jpfa.2015.10.001

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the Kennedy's classification based on the amount of support offered by the primary abutments. He added two more classifications (Class V and Class VI) to develop a new classification named "Kennedy–Applegate classification". However, he too concluded that bilateral edentulous ridges are the most frequently occurring situations that too in the mandible.

Due to the ever changing 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. No thought has been ever given so far to revisit the existing classification to determine if it still holds valid for the current situations with new, improved treatment procedures. Realising this lacuna in this field of dentistry, this survey was undertaken with the aim of determining the validity of Kennedy's classification in the present era and to assess the present prevalence of the same in the Southwest coastal region of India.

2. Objectives

(1) To determine the current most prevalent partially edentulous situation.
(2) To determine the most prevalent situation based on the gender
(3) To determine the most prevalent situation based on the arch.
(4) To propose a new classification based on the prevalence.

3. Materials and methods

The survey was conducted in the department of Prosthodontics & Implantology, A B Shetty Memorial Institute of Dental Sciences, Mangalore, Karnataka. About 1002 patients reporting to the department were included in the study. The partially edentulous subjects age ranged from 19 to 65 years.

Selection criteria:
Inclusion criteria:

1. Partially edentulous patients.
2. Age between 19 and 65 years.

Exclusion criteria:

1. Complete dentate patients.
2. Completely edentulous patients.
3. Age less than 19 years and more than 65 years.

All subjects were examined to identify the teeth missing, both in the maxilla and the mandible.

The data were tabulated as follows*:

S.no.	Name/age	Sex	Group I Bilateral edentulous – posterior		Group II Unilateral edentulous – posterior		Group III Bounded edentulous area		Group IV Bilateral edentulous – anterior	
			Maxilla	Mandible	Maxilla	Mandible	Maxilla	Mandible	Maxilla	Mandible
1										
2										
3										
4										
5										

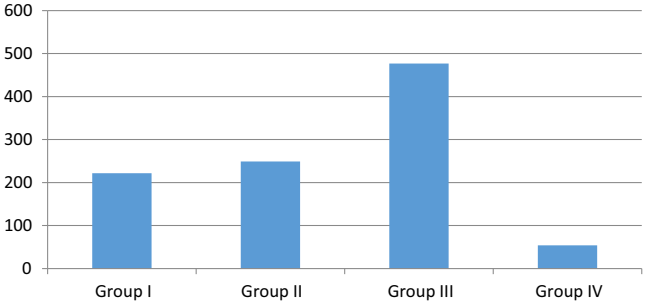
* Original data can be provided if required.

4. Results

Among 1002 patients examined, 222 patients exhibited Group I, 249 patients exhibited Group II, 477 patients exhibited Group III and 54 patients exhibited Group IV edentulous condition.

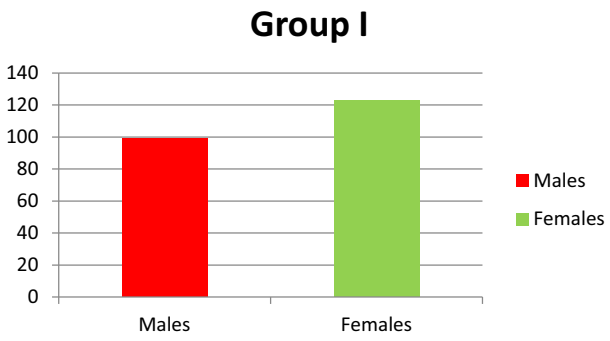
1. Predominant edentulous group

Graph I

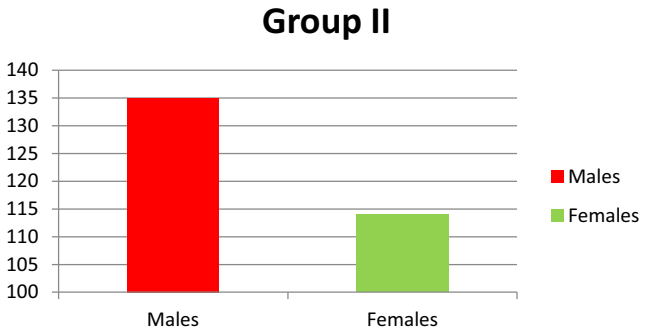


2. Gender based predominance in each group

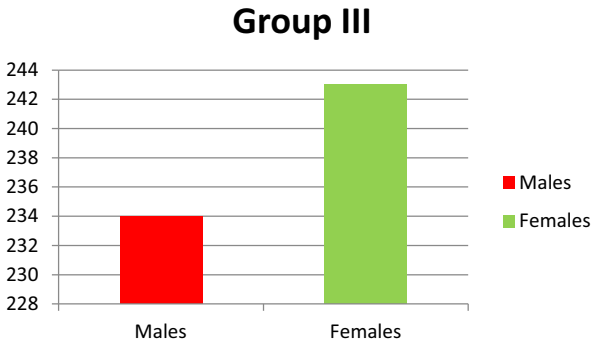
Among 222 group I patients, 99 were males and 123 were females (Graph II).



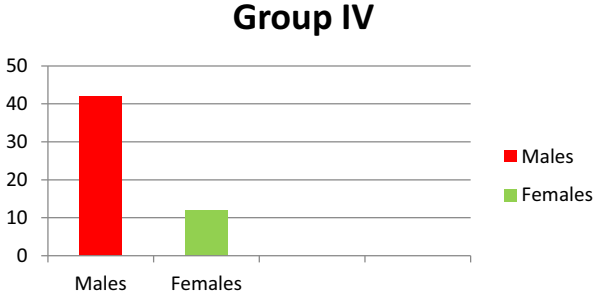
Among 249 Group II patients, 135 were males and 114 were females (Graph III).



Among 477 Group III, patients 234 were males and 243 were females (Graph IV).

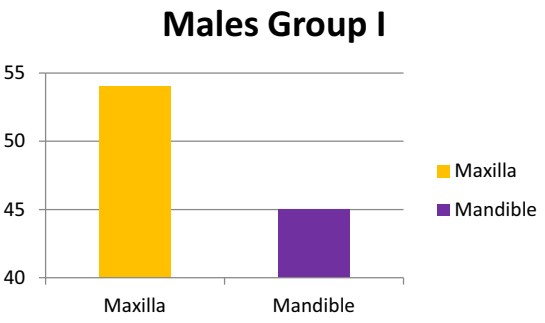


Among 54 Group IV patients, 42 were males and 12 were females (Graph V).

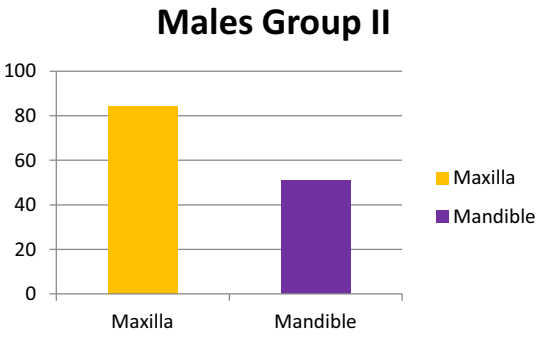


3. (A) Predominant arch – males

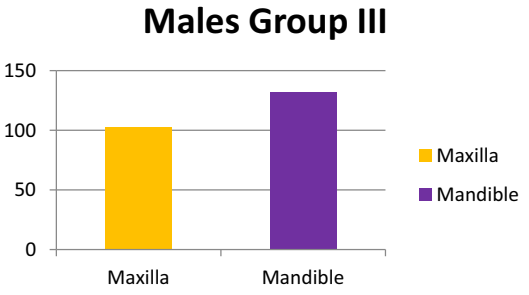
Among 99 male Group I patients, 54 were present in maxilla and 45 in mandible (Graph VI).



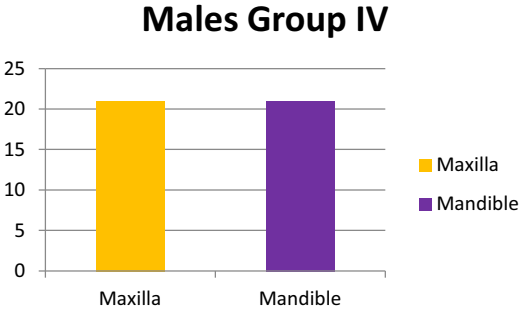
Among 135 male group II patients, 84 were present in maxilla and mandible (Graph VII).



Among Out of the 234 male group III patients, 102 were present in maxilla and 132 in mandible (Graph VIII).

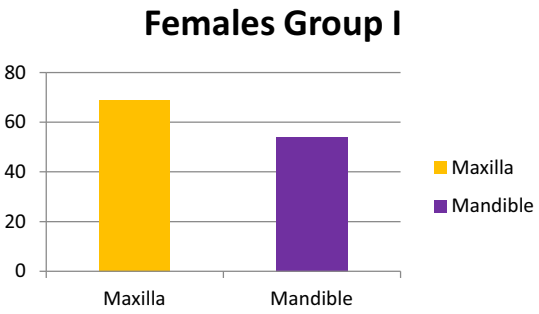


Among the 42 male group IV patients, 21 were present in maxilla and 21 in mandible (Graph IX).

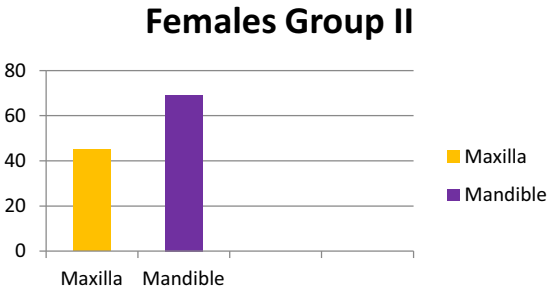


3. (B) Predominant arch – females

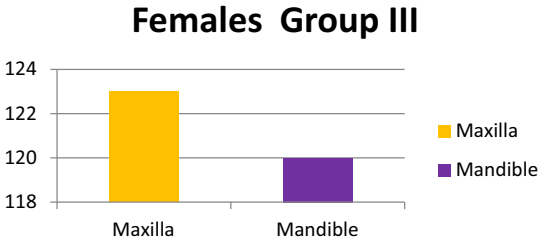
Among 123 female group I patients, 69 were present in maxilla and 54 in mandible (Graph X).



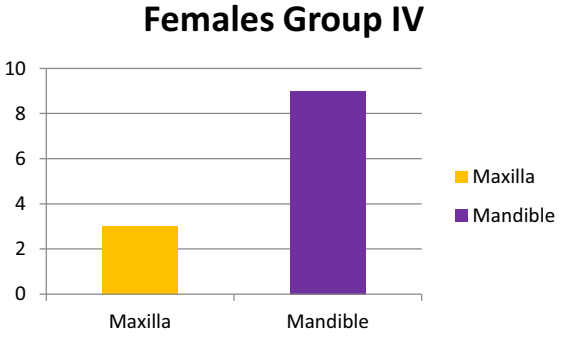
Among 114 female group II patients, 45 were present in maxilla and 69 in mandible (Graph XI).



Among 243 female group III patients, 123 were present in maxilla and 120 in mandible (Graph XII).



Among 12 female group IV patients, 3 were present in maxilla and 9 in mandible (Graph XIII).



5. Clinical interpretation of results

(1) Group III edentulous situation was found to be more prevalent in this population followed by Group II, Group I and Group IV (Graph I).
(2) Group III was seen more in females than males (Graph IV). However, Group III edentulous situation in males was seen more in mandible than maxilla (Graph VIII). In females, group III edentulous situation was seen more in maxilla than in mandible (Graph XII).
(3) Group II edentulous situation was seen more in males than females (Graph III). Group II edentulous situation in males was seen more in maxilla than in mandible (Graph VII). In females, Group II was seen more in mandible than in maxilla (Graph XI).
(4) Group I edentulous situation was seen more in females than males (Graph II). Group I edentulous situation in males was seen more in maxilla than in mandible (Graph VI). In females, Group I was seen more in mandible than in maxilla (Graph X).
(5) Group IV edentulous situation was seen more in Males (Graph V). Group IV edentulous situation in males was equally distributed between maxilla and mandible (Graph IX). In females, Group IV was seen more in mandible than in maxilla (Graph XIII).

6. Discussion

A good classification contributes greatly to the understanding of the designing of the RPDP. The existing Kennedy's classification has been followed universally even though it did not take into consideration, the support given by the abutment teeth. With the tremendous growth that has taken place in material science, there has been a definite shift in the status of edentulousness in the population. A survey was conducted to check the same in the south west coastal population of India.

From the 1002 subjects screened, to our surprise, 47.6% exhibited bounded edentulous situation, 24.8% exhibited unilateral posterior edentulous state, 22.1% exhibited bilateral posterior edentulous state and 55.3% exhibited bilateral anterior edentulous state.

Among 222 group I patients, 44.5% were males, and 55.5% were females. Among 249 group II subjects, 54.2% were males, and 45.7% were females. 49% were males and 51% were females among group III subjects. 77% males and 21 females were there in 54 group IV subjects. So females exhibited more class I and class III edentulous states than males. Male domination was seen in class II and class IV edentulous states.

Maxilla exhibited 55% of group I situation, when compared to mandible 45%. Maxilla exhibited 51% of group II situation, when compared to mandible 49%. Maxilla exhibited 47% of group III situation, when compared to mandible which exhibited 53%. Maxilla exhibited 46% of group IV situation, when compared to mandible 54%. So class I and class II edentulous states are seen more in maxilla, and class III and class IV are seen in mandible.

This study was taken up with the intention of checking the validity of Kennedy's classification in the modern era. With the technological improvements, extraction of teeth has become a rare event. This may alter the frequency of occurrence of edentulous situation as considered by Kennedy in 1925.

The results obtained are quite contradictory to the one proposed by Dr. Edward Kennedy 87 years ago. Due to various advancements in treatment modalities, the prevalence of edentulousness is greatly reduced. Similarly the pattern of edentulousness also changes. The pattern proposed 87 years ago may not be applicable in present era. So measures must be taken to revise the classification according to the needs of the present day and provide a much more valid and reliable system for classification.

From the present population, Group III, i.e., ''bounded edentulous space'' was found to be more frequent. Hence this may be categorised as class I. Group II, i.e., ''unilateral posterior edentulous space'' is class II. Group I, i.e., ''bilateral posterior edentulous space'' can be categorised as class III. Group IV, i.e., ''bilateral anterior edentulous space ''is class IV.

Based on the above survey, the authors propose a new classification for partially edentulous state as follows:



Fig. 1 – Bounded edentulous space.



Fig. 2 – Unilateral edentulous space – posterior.



Fig. 3 – Bilateral edentulous space – posterior.



Fig. 4 – Bilateral edentulous space – anterior.

Class I – Unilateral edentulous area with natural tooth both anterior and posterior to it (Fig. 1).
Class II – Unilateral edentulous area located posterior to the remaining natural teeth (Fig. 2).
Class III – Bilateral edentulous areas located posterior to the remaining natural teeth (Fig. 3).
Class IV – Single, bilateral edentulous area located anterior to the remaining natural teeth, crossing the midline (Fig. 4).

However, caution should be exercised for the global application of this proposal, unless similar studies are initiated and conducted in different demographic regions. The future studies can also include the abutment tooth support as another criterion for classification. Modification spaces can also be included in the study.

7. Summary and conclusion

This study is one of its kind initiated by authors in the field of prosthodontics. Within the limitations of this study, it was concluded that, bounded edentulous situation is more prevalent followed by unilateral posterior edentulous space,

bilateral posterior edentulous space and bilateral anterior edentulous space. More such studies must be carried out for the universal acceptance of this shift in prevalence.

Conflicts of interest

The authors have none to declare.

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Secretary,
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