The frequency and pattern of partial Edentulism in patients reporting to Prosthodontic Department: A Cross-sectional observational study

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ABSTRACT

Objective: To find out the frequency of various partial edentulism cases among patients attending Prosthodontic Out Patient Department.

Study Design: A cross sectional observational study.

Place and Duration: At Lahore Medical and Dental College, Lahore from 15th November 2019 to 15th January 2020.

Methodology: The patients from both genders with age ranged 20 to 70 years were assessed. Demographic data was recorded and intra-oral examination was done. Kennedy's Classification was used to determine the category of the modification area, for Kennedy's partially edentulous cases. Partially edentulous patients were categorized with respect to age and gender.

Results: Among 200 patients studied, the partial edentulism more common in more female; 56.0% . Age group 41 to 50 years had maximum number of partially edentulous patients (males 26.1%, females 29.5%). Class-III partially edentulous pattern was higher in frequency of examined cases in both arches; mandibular 41.5%. maxilla 40.5% whereas least frequent was Class-IV ; mandible 8.0% and maxillary 12.0%.

Conclusion: The frequency of various classes of partial edentulism not only reflects the pattern of tooth loss, patient demands and affordability of prosthodontic treatments but also reflects the rise in need of prosthodontic care with the increasing age.

Keywords: Partial edentulism; Kennedy's Classification; Dentate, Age correlation, Gender correlation, Tooth loss, partial dentures.

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INTRODUCTION

Oral hygiene has a significant impact on a person's general health and quality of life, but unfortunately it has been one of the most neglected aspects in our society[1]. Neglected oral health can result in to several outcomes and partial edentulism can be considered as one of them[2]. The term partial edentulism is used when there is a gap in a dental arch normally occupied by one or more teeth[3]. Partial edentulism has profound effect on biologic well-being of a person[4]. Tooth loss has a great influence on social and psychological levels of an individual as well[4]. Its prevalence has declined in last decade in developed countries and this decrease number of edentulous patients reflects the improvement of the health care system[5-7].

There are various combinations of partial edentulism pattern in mandible and maxilla and documenting the pattern of tooth loss is important[5,6]. It sounds reasonable to classify partially edentulous arches as classification helps in pointing out the prosthetic care requirement of the community and further assists in planning the education that should be given and therefore design preventive strategies required in the society[6]. It is also an easy way of communication among dental students, professionals and dental technicians[7].

Various classification of partially edentulous arches is documented to find out possible combinations of teeth to ridges[8]. At present the Kennedy's classification[9] is considered to be the most widely accepted one as it is simple, easy to apply and offers quick evaluation and assessment of partial denture design features and recognition of prosthetic support. In Kennedy's Classification,[3,4,9] Class-I is the patient's arch with

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bilateral free end saddle, i.e arch has posterior most missing teeth on both side of maxillary or mandibular arch. Free end saddles means where the saddle or edentulous area is not bounded by tooth posteriorly. Class-II describes unilateral free end saddle, i.e the arch has posterior missing teeth that are not bounded by tooth and is on one side of the arch only. Class-III describes the arch with unilateral posterior saddle but bounded by tooth, i.e the edentulous area has teeth anterior and posterior to it. Class-IV describes the arch, having edentulous area anterior to the posterior teeth. Modifications are the area other than the one determining the class[10,11] Modification areas in this classification besides simplifying the problem also makes it widely accepted[10]. Modifications are for Class I, II and III only as Class-IV has no modification as per classification rules.[9]

We classify to make a good treatment plan and partial denture design according to occlusal load expected[11]. It allows trends of incidence of different partial denture classes, and serves as teaching guidelines[12]. For future health care planning, the epidemiological information on health care and its related concerns are important[13]. It is important to monitor the partial edentulism cases as it indicates the health of people and satisfactoriness of oral health care system[14]. There is less information in literature about properly documented diagnostic criteria for partial edentulism[5].

The assess the frequency of various classes of partial edentulism in patients attending the Prosthodontics department we have conducted this study. This would help in identifying the tooth loss pattern in different age groups of both gender, patients need and will also help oral health planners for making strategies that will help in development of dental health care management in our region. The objective of our study is to find out the frequency of various partial edentulism cases among patients attending Prosthodontic Out Patient Department.

METHODOLOGY

This Cross-sectional observational study was conducted at the Department of Prosthodontics, Lahore Medical and Dental College from 15th November 2019 to 15th January 2020. Non-probability purposive sampling technique was used. The minimum sample size was estimated to be 200, based on the information obtained from previous studies on partial edentulism. Informed verbal consent was taken and ethically approved from institutional ethical committee.

Patients of both genders, within age group 20 to 70 years, with at least 1 missing tooth in both arches were selected. Patients with all missing teeth and unwilling participants were excluded. Patients with missing 3rd molar/ 2nd molar and not to be replaced (following Apple Gate Rule) were excluded.

Two researchers collected patient's demographic data (age and gender) and clinical examination was done with the dental probe and mouth mirror. Data collection was done by experienced doctors and was registered in examination proformas. Kennedy's Classification System[9] and its modifications were used to determine the pattern of partially edentulous arches.

According to Kennedy's classification[9] the patients were assessed in four classes ie, Class I: bilateral free end saddle, Class II: Unilateral free end saddle, Class III: Unilateral bounded saddle, Class IV: saddle area anterior to the remaining natural teeth crossing the mid line. The modification areas in the Kennedy's classification are the edentulous areas other than the edentulous areas classifying the main class[9].

Selected patients were grouped into 5 age groups decade wise, to find out the age and percentage of patients being partially edentulous; (20-30), (31-40), (41-50), (51-60), (61-70). Categorizations of modification area for Kennedy's removable partial modification areas were divided in to 3 categories: anterior modification (edentulous space in anterior segment of maxillary and mandibular arch), posterior modification (edentulous space in posterior segment of maxillary and mandibular arch), and combination (edentulous space in both anterior and posterior segment of maxillary and mandibular arch).

Data Analysis: Data was analyzed by descriptive statistics and Chi square tests by using SPSS Version 20. The percentage of distribution of partially edentulous arches, type of modification areas and the percentage distribution of partially edentulous arches with respect to age and gender was obtained.

RESULTS

A total of 200 patients (male n=88; 44.0%, female n=112; 56.0%) with partially edentulous maxillary and mandibular arches were selected. The age ranged from 20-70 years, mean age 48.47 SD ± 12.93. The percentages and distribution of partially edentulous arches according to Kennedy's classification are shown in table-I and table-II. Class-III partially edentulous class was most common in both arches, mandible (n=83; 41.5%) maxilla (n=81; 40.5%). However, Kennedy's class-IV were the least frequent cases in both arches (mandible 16;8.0 %, maxilla 24;12.0%).The arches without modification areas, the mandibular class III were the most commonly observed cases(31; 15.5%) while class I were the least frequent (14;7.0%) (Table I and II). For the modification areas of each class I, II and III, modification 1 had the higher percentage (Table-I and II), however mod 3 was least.

Table-I: Arch wise distribution of Kennedy's class I &II partial edentulism, (N=200)

Arch	CL.I Total	CL.I Without Modification	CL.I Mod.1	CL.I Mod.2	CL.I Mod.3
Mandible	45 (22.5%)	14 (7.0%)	17 (8.5%)	14 (7.0%)	0 (0.0%)
Maxilla	36 (18.0%)	16 (8.0%)	12 (6.0%)	6 (3.0%)	2 (1.0%)
Arch	**CL.II Total**	**CL.II Without Modification**	**CL.II Mod.1**	**CL.II Mod.2**	**CL.II Mod.3**
Mandible	56 (28.0%)	28 (14.0%)	21 (10.5%)	6 (3.0%)	1 (0.5%)
Maxilla	59 (29.5%)	13 (6.5%)	30 (15.0%)	9 (4.5%)	7 (3.5%)

Table-II: Arch wise distribution of Kennedy's class III &IV partial edentulism, (N=200)

Arch	CL.III Total	CL.III Without Modification	CL.III Mod.1	CL.III Mod.2	CL.III Mod.3
Mandible	83(41.5%)	31(15.5%)	43 (21.5%)	5 (2.5%)	4 (2.0%)
Maxilla	81(40.5%)	23 (11.5%)	39 (19.5%)	13 (6.5%)	6 (3.0%)
Arch	**CL.IV Total**				
Mandible	16 (8.0%)				
Maxilla	24(12.0%)				

Likewise Posterior modification areas were more frequently observed in all the examined cases in both arches, followed by anterior modification areas (Table-III). The least observed were the anterior and posterior modification areas combination. The relationship between the gender, age and distribution of partial edentulous areas indicated high differences in gender, with female patients having high percentage than male patients (Table-IV). Results also depicted maximum partial edentulous case in the age group 41 to 50 years, for both gender (male 26.1%, female 29.5%). The cases least in frequency were found at the age group ranging from 20-30 years for both genders (male9.1%, female 11.6%).

Table-III: Distribution of partially edentulous arches according to modification areas in Kennedy's classification, (N=200)

Kennedy's Classes	Arch	Anterior Modification areas	Posterior Modification areas	Modification area Combination
ClassI	**Mandible**	8(4.0%)	16(8.0%)	7(3.5%)
	Maxilla	4(2.0%)	12(6.0%)	4(2.0 %)
ClassII	**Mandible**	5(2.5%)	17(8.5%)	6(3.0%)
	Maxilla	11(5.5%)	28(14.0%)	7(3.5%)
ClassIII	**Mandible**	18(9.0%)	26(13.0%)	8(4.0%)
	Maxilla	12(6.0%)	39(19.5%)	7(3.5%)

Table-IV: Age and gender distribution of partially edentulous patients (N=200)

Age (years)	Male (Frequency)	Percentage %	Female (Frequency)	Percentage %
20-30	8	9.1	13	11.6
31-40	14	15.9	20	17.9
41-50	23	26.1	33	29.5
51-60	21	23.9	27	24.1
61-70	22	25.0	19	17.0
Total	88	100	112	100

DISCUSSION

The classification of partially edentulous arches tells us about the various combinations of teeth and ridges. Kennedy's classification was selected as it not only immediately gives us an idea about the types of arches but also provides a rational perspective to explain the difficulties of the denture designs[15]. The present study was done to find out the frequency of partially edentulous cases and pattern of edentulism.

The factors like age and gender have been studied in various populations by correlating with partial edentulism[16]. We found high percentage of females as compared to males. This could be due to increase number of females are aware and coming to dental hospitals and taking care of themselves than male patients. Similar results were obtained in a study by Rana[17] et al where male to female percentage showed higher incidence of female patients (female 59.3%, male 40.7%), however in contrast Chaudhary[16] reported more male patients than females.

In the present study we found that the partial edentulism exist more in 41 - 50 years of age. Mehmood[13] et al also reported 4th to 5th decade of life with maximum tooth loss; however in contrast Askari[4] et al reported tooth loss increase prevalence in age group 21-30 years whereas Rana[17] et al reported maximum percentage of partially edentulous cases in 50 to 60 years of life. This can be stated that with increasing age the need of prosthodontic care increases

In the current study, the high frequency of partially edentulous cases was reported in Class-III in both mandible(41.5%) and maxilla(40.5%) and least examined cases were of Class-IV,(mandible 8.0%,, maxilla 12.0%).These findings are close to the finding of Lone[3] et al where class III is maximum in frequency(mandible 64%, maxilla 67.2%). Similar findings were found in a study done on patients visiting Prosthodontic Department of Medical College in Nepal (maxilla 31%, mandible 30%)[17]. Likewise Khaple[18] et al reported Class-III to be the most frequently examined class in both arches(maxillary 59%,mandible 61%) and Class-IV being the least prevalent class (mandible 5%, maxilla 9%). A study carried out in Pakistan reported Class-III as the most prevalent class (maxilla 54%, mandible 53%) whereas Class-IV the least in both arches.(maxilla1%, mandible 6%) which is parallel with the present study[19].

In both arches majority of all classes of Kennedy's were with no modifications. This is in agreement with Araby[20] where majority of Class-III are without modification (maxilla 56, mandible 52). Whereas in contrast this finding contradicts with the study conducted in Nepal, where Modification-I was more prevalent[21]. The results of current study showed higher frequency for posterior modification areas in both the arches as compare to the anterior and combination of anterior and posterior modifications in all the Kennedy's classes. Similarly Judy[22] reported high incidence of posterior modification areas in both mandibular and maxillary arches. This could be due to the increase loss of posterior teeth and due to the patient attitudes as they prefer extractions of posterior teeth more, rather having a restorative treatment due to poverty, lack of knowledge and restore anterior teeth due to aesthetics.

The limitation of the present study includes non-probability sampling, size of the sample limits this study and additional studies are recommended.

CONCLUSION

The frequency of various classes of partial edentulism not only reflects the pattern of tooth loss, patient demands and affordability of prosthodontic treatments but also reflects the rise in need of prosthodontic care with the increasing age.

AUTHOR'S CONTRIBUTION

Shah MU: Conceived idea, Designed research methodology
Qamar K: Data collection, Manuscript writing
Zakir A: Statistical analysis
Azeem SH: Literature review
Aqeel R: Manuscript final reading
Syed S: Data collection

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