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Patterns of partial edentulism based on Kennedy's classification among patients reporting to Nepal Medical College and Teaching Hospital

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Abstract

Background: Edentulism is a sequel of tooth loss which leads to impairment of normal function, comfort, aesthetics and speech. It also leads to various undesirable consequences like occlusal discrepancies, migration and spacing of surrounding teeth, supra eruption, loss of space, temporomandibular disorders and other unwanted changes. Little is known about the prevalence of patterns of edentulism in Nepal.

Objectives: To assess the prevalence of Kennedy's classification on partially edentulous patients.

Methodology: A prospective cross-sectional study was carried out among 300 patients within the age of 18-80 years visiting the Department of Oral Medicine and Radiology, College of Dental Science and Hospital -Nepal Medical College with at least one missing tooth from Jan 2018-March 2018.

Results: Out of 300 patients enrolled, a majority were female (178; 59.3%). The patients mostly affected by partially edentulous condition were among the age group of 51 to 60 years (78; 26%). The distribution of partially edentulous areas were similar in maxillary (80; 26%) and mandibular (85; 28.3%) arches and 45% of the patients (n=135) had one or more missing tooth/teeth on both arches. Kennedy's class III was found in more than 31% of the patients (n=94) in the maxillary arch and 30% (n=91) in the mandibular arch. Likewise, Kennedy's class III with modification 1 was seen in 21% (n=62) cases in the maxillary and 24% (n=72) cases in the mandibular arch.

Conclusion: Kennedy's class III and Kennedy's class III with modification1 were the most common type of pattern of partially edentulous area on both arches.

Key words: Applegate rule; Kennedy's class; Partial edentulism

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INTRODUCTION

Edentulism is the state of being edentulous without natural tooth/teeth. Edentulism not only leads to impairment of normal function, comfort, aesthetics and speech, but also leads to various undesirable sequela like occlusal discrepancies, migration and spacing of surrounding teeth, supra eruption, loss of space, temporomandibular joint disorders, and other unfavorable conditions [(1-3)].

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Documenting the pattern of partial tooth loss is very important for identifying the prosthetic needs of the studied community as well as aiding the provision of educational and preventive materials suitable for this population[2]. Several methods of classification of partially edentulous arches have been proposed and are in use e.g. by Beckett, Godfrey, Swenson, Friedman, Wilson, Skinner, Applegate, Avant, Miller and others[3]. At present, Kennedy's classification is the most widely used and accepted because of its simplicity, ease of application, immediate visualization of the type of partially edentulous arch being considered and differentiation between tooth borne and tooth tissue borne partial dentures[4]. Monitoring the occurrence of partial edentulism is important because it is an indicator of both population health and adequacy of a country's oral

health care system[5].The absence of organized diagnostic criteria for partial edentulism has been a longstanding impediment[6].

The patterns of tooth loss have been evaluated in many selected populations in different countries and the frequency of partial edentulousness seems to vary widely between different countries. The prevalence and patterns of tooth loss have been studied to a certain extent in other countries but little is known in Nepal[7]. We conducted this cross-sectional study among Nepalese patients visiting Nepal Medical College to estimate the prevalence of the pattern of edentulism.

METHODOLOGY

The study was conducted at the Department of Oral Medicine and Radiology, Nepal Medical College and Hospital (College of Dental Sciences and Hospital). A single researcher collected patients' socio-demographic data and conducted clinical examination with the help of diagnostic instruments (mouth mirror and probe) to record Kennedy's classification system and Applegate modifications. Age and gender were obtained from patients' hospital record card. Data was collected in a three month period from 1st January to 30th March; 2018. The minimum sample size of this study was estimated to be two hundred, based on the prevalence of awareness regarding partial edentulism from a prior study. We enrolled 300 patients in this study within the age group of 18-80 years with at least one missing tooth. Patients who were completely edentulous and those unwilling to participate were excluded.

Ethical Consideration: Ethical approval was taken from the Research and Ethical Sub-Committee; Nepal Medical College (NMC-RESC) dated 15th December 2017 with reference number: 32-074/075.

RESULTS

Out of 300 patients, 40.7% were male and 59.3% were female (Table 1). When categorized by age groups, most patients with partial edentulism belonged in the range of51 to 60 years (78; 26.0%) (Table 2).

Nearly half of the patients had partial edentulism on both arches (135; 45.0%), while 26.7% had partial edentulism on the maxillary arch only (n=80) and 28.3% on the mandibular arch only (n=85) (Table 3). In the maxillary arch, Kennedy's class III was the most common pattern of partial edentulism (94; 31.3%), followed by Kennedy's class III with modification 1 (62; 20.7%) (Table 4). Similarly in the mandibular arch, Kennedy's class III was the most prevalent (91; 30.3%) followed by Kennedy's class III with modification 1 (72; 24.0%) patients (Table 5). Among all age groups in both arches, Kennedy's class III and Kennedy's class III with modification 1 were the two most common pattern of partial edentulism (Tables 6 and 7).

Table 1: Gender Distribution of partially edentulous patients

Gender	Frequency	Percent
Male	122	40.7
Female	178	59.3
Total	**300**	**100**

Table 2: Age Distribution of partially edentulous patients

Age	Frequency	Percent
18-30 years	50	16.7
31-40 years	49	16.3
41-50 years	61	20.3
51-60 years	78	26.0
61-70 years	47	15.7
71-80 years	15	5.0
Total	**300**	**100.0**

Table 3: Arch wise distribution of partial edentulism

Arch	Frequency	Percent
Maxillary only	80	26.7
Mandibular only	85	28.3
Both arches	135	45.0
Total	**300**	**100.0**

Table 4: Distribution of partial edentulism according to Kennedy's classification and Applegate's rule in maxillary arch

Kennedy's class with modification	Frequency	Percent
I	10	3.3
II	8	2.7
III	94	31.3
IV	11	3.7
I 1	4	1.3
I 3	3	1.0
II 1	1	.3
II 2	4	1.3
III 1	62	20.7
III 2	12	4.0
III 3	3	1.0
III 4	3	1.0
None	85	28.3
Total	**300**	**100.0**

Table 5: Distribution of partial edentulism according to Kennedy's classification an Applegate's rule in mandibular arch

Kennedy's class with modification	Frequency	Percent
I	10	3.3
II	1	.3
III	91	30.3
IV	22	7.3
I 1	2	.7
I 3	1	.3
II 1	5	1.7
II 2	2	.7
III 1	72	24.0
III 2	12	4.0
III 3	2	.7
none	80	26.7
Total	**300**	**100.0**

Table 6: Pattern of partial edentulism in relation to age in maxillary arch

Age group	Maxillary													Total
	I	II	III	IV	I 1	I 3	II 1	II 2	III 1	III 2	III 3	III 4	None	
18-30 years	0	0	19	0	0	0	0	0	8	0	0	0	23	50
31-40 years	0	2	13	0	0	1	0	0	5	1	0	1	26	49
41-50 years	1	1	31	2	0	1	0	0	11	2	0	0	12	61
51-60 years	5	2	14	6	2	0	1	2	24	2	0	2	18	78
61-70 years	4	2	11	2	2	1	0	2	9	6	2	0	6	47
71-80 years	0	1	6	1	0	0	0	0	5	1	1	0	0	15
Total	**10**	**8**	**94**	**11**	**4**	**3**	**1**	**4**	**62**	**12**	**3**	**3**	**85**	**300**

Table 7: Pattern of partial edentulism in relation to age in mandibular arch

Age group	Mandibular												Total
	I	II	III	IV	I 1	I 3	II 1	II 2	III 1	III 2	III 3	none	
18-30 years	0	0	14	4	0	1	0	0	8	3	0	20	50
31-40 years	0	0	23	1	0	0	0	1	17	0	0	7	49
41-50 years	0	0	17	3	1	0	1	0	15	2	1	21	61
51-60 years	5	1	23	10	0	0	4	0	16	3	0	16	78
61-70 years	5	0	9	2	1	0	0	1	16	1	1	11	47
71-80 years	0	0	5	2	0	0	0	0	0	3	0	5	15
Total	**10**	**1**	**91**	**22**	**2**	**1**	**5**	**2**	**72**	**12**	**2**	**80**	**300**

DISCUSSION

In this study, we found that Kennedy's class III and its modification 1 were the two most prevalent types of partial edentulism among Nepalese patients visiting Nepal Medical College, Kathmandu. Documenting the pattern of partial tooth loss among Nepalese patients can be beneficial in recognizing the prosthetic rehabilitative needs and in estimating the requirements for educational and preventive materials.

We found that a higher proportion of females were edentulous compared to male. Our finding is in alignment with the results of a previous study by Sapkota B et al. among Nepalese patients in Dhulikhel Hospital, Kathmandu University[8]. However, some earlier studies showed more males being edentulous than females[9]. This contradiction may be in part due to more females visiting the dental hospital and could also be attributed to the different socio-economic background

and mal-habits like smoking and consumption of high sugar-containing diets among males than previous studies[10]. We also found that partial edentulism was most common in age group of 51 to 60 years, similar to a finding of Mehmood BA et al which showed that the peak age group for tooth loss was in 4th and 5th decade of life[11].

Similar study performed by Rahman H et al among 963 patients in Prosthodontics Department at the College of Dentistry, Hawler Medical University, Erbil, Iraq showed that distribution of partial edentulism as compared to maxilla and mandible were almost in equal ratio, maxilla 49.63% and mandible 50.36%, supporting our study findings[12].

In a study of partial edentulism based on Kennedy's classification conducted by Naveed H et al at Armed Forces Institute of Dentistry, Pakistan on 1000 partially edentulous patients, Kennedy's class III was most common in maxilla (60.9%) and mandible (46.8%)[13]. This study is in agreement with our study, as our study also reveals maximum number of cases with Kennedy's class III on both the maxillary and the mandibular arches with 31.3% and 30.3% consecutively. In another study carried out by Al-Dawairi among 200 patients in Jordan observed Kennedy's class III pattern of partial edentulism was most commonly encountered in both maxilla (47%) and mandible (45%)[14]. Also in a study by Sadig and Idowu in Saudi population on 422 partially edentulous patients concluded that Kennedy's classes III in both arches were more common with 20.3%. Kennedy's Class III was found to be the most common pattern of partial edentulism in this study[15]. Also, in a study by Patel YJet conducted among the patients of Thiruvallur district, Tamil Nadu, India, Kennedy Class III pattern of edentulism was most commonly encountered in both maxilla (56%) and mandible (58%)[16].

In contrast to our study, result of a study conducted by Khalil A et al. in the Department of Prosthodontics at Khyber College of Dentistry, Peshawar, Pakistan, showed that Kennedy's class IV was mostly seen in maxillary arch and Kennedy's class II modification 1 was dominant in mandibular arch[17].

CONCLUSION

From the results of this study, we observed that Kennedy's class III was most common in both maxillary and mandibular arches followed by Kennedy's class III modification 1. According to gender, more number of female patients reported with partial edentulism whereas patients with age 51 to 60 were mostly affected.

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