Short Communication

Sex- and Age-based Differences in Single Tooth Loss in Adults

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Abstract

The aim of this study was to investigate sex- and age-based differences in single tooth loss in adults. The data were obtained from the results of a periodontal disease examination carried out under a health promotion law in a city in Japan in 2005. Baseline data from a total of 3,872 participants aged 40 or 60 years comprising 1,302 men and 2,570 women were available. Only participants with 27 present teeth were eligible for inclusion in the analysis, giving a total of 218 men and 428 women. Third molars were excluded from the study. The bilateral total of each type of tooth was obtained. The mandibular first molar was missing in 26.7% of the men and 36.2% of the women among 40-year-olds and 35.3% of the men and 29.8% of the women among 60-year-olds. The mandibular second molar was missing in 14.7% of the men and 12.5% of the women among 40-year-olds, and 17.6% of the men and 18.4% of the women among 60-year-olds. Significant differences were observed between men and women in the mandibular second premolars and first molars among 40-year-olds. These results suggest that we need to pay more attention to individual teeth which are at particularly high risk for tooth loss, namely the mandibular first and second molars, and especially the mandibular first molars in middle-aged women.

Key words: One missing tooth — Age — Tooth type — Adults

Introduction

The number of present teeth (PT) is used as a measure for goals to be achieved through instruction in oral health maintenance and improvement. In Japan the 8020 campaign,

which encourages the elderly to retain at least 20 teeth until the age of 80, has been in place since 1991⁵⁾. In 1992, the World Health Organization stated that the retention of a functional, aesthetically pleasing, and natural dentition comprising at least 20 teeth and no

Table 1 Distribution of number of present teeth (PT)

Age	Number of PT							
	Men				Women			
	27 PT	0–26 PT	28 PT	Total	27 PT	0–26 PT	28 PT	Total
40	150	248	381	779	287	491	772	1,550
60	68	372	83	523	141	699	180	1,020
Total	218	620	464	1,302	428	1,190	952	2,570

prostheses should be the treatment goal in maintaining oral health throughout life¹¹⁾. In order to maintain 20 teeth, it is important to prevent the first tooth from being lost. The Survey of Dental Diseases in Japan^{7,9)} and the National Health Nutrition Examination Survey¹⁰⁾ provide important data concerning oral health status, but they do not include any data on first tooth loss. In fact, to the best of our knowledge, ours is the first group to look at which type of tooth is likely to be lost first, investigating this issue in our previous study¹³⁾. There, we found that the mandibular first molar was missing more often than any other tooth. The data used in that study were obtained from the results of a dental examination conducted at a company in 1992, and no data regarding differences related to sex or age were contained in that report. Previous research⁶⁾ has reported that tooth extraction due to caries was higher in women than in men, and that extraction of molars due to periodontal disease increased with age, indicating the likelihood that differences do occur due to sex or age. With this in mind, we have conducted a new analysis of first tooth loss, this time using data from the results of a periodontal disease examination. The purpose of the present study was to investigate sex- and age-based differences in single tooth loss in adults.

Methods

Data were collected from the results of a periodontal disease examination conducted

in a city located northeast of Tokyo, Japan, in 2005. This examination targeted people aged 40, 50, or 60 years, and was based on a health promotion law. Data obtained from 3,872 participants (1,302 men and 2,570 women) aged 40 or 60 years were available. The number of PT was obtained from individual dental charts. Completely and partially erupted permanent teeth were defined as “present teeth” (*i.e.*, existing teeth). Supernumerary teeth, the pontics of bridge prostheses, and implant-supported superstructures were not counted as PT. All participants with 27 PT were considered as having one missing tooth, even if there was a vacant space or the 28th tooth was not originally present in the dentition.

Statistical Methods

Differences in the percentage of each tooth type missing were analyzed by using the Chi-squared or Fisher’s exact test (in cases where the cells of a contingency table were below ⁵⁾. A p-value of less than 0.05 was regarded as signifying statistical significance.

Results

A total of 218 men and 428 women with 27 PT were included in the final analysis (Table 1).

Figure 1 shows the percentage of participants based on type of missing tooth. The tooth type missing most often was the mandibular left first molar (16.9%). The man-

Fig. 1 Percentage of participants with one missing tooth by tooth type (n = 646)

*FDI tooth numbering system used.

Table 2 Percentage of participants with one missing tooth by type, age, and sex

		Age	40		60		
Tooth type*		n	Men 150 % (n)	Women 287 % (n)	Men 68 % (n)	Women 141 % (n)	Total 646 % (n)
Upper	Incisor		3.3 (5)	3.8 (11)	2.9 (2)	2.8 (4)	3.4 (22)
	Lateral incisor		2.7 (4)	2.8 (8)	1.5 (1)	0 (0)	2.0 (13)
	Canine		2.7 (4)	0.7 (2)	0 (0)	0.7 (1)	1.1 (7)
	First premolar		2.7 (4)	3.8 (11)	5.9 (4)	4.3 (6)	3.9 (25)
	Second premolar		7.3 (11)	6.6 (19)	4.4 (3)	5.7 (8)	6.3 (41)
	First molar		10.7 (16)	7.3 (21)	14.7 (10)	11.3 (16)	9.8 (63)
	Second molar		12.7 (19)	13.6 (39)	14.7 (10)	14.2 (20)	13.6 (88)
Lower	Incisor		2.0 (3)	0.7 (2)	0 (0)	1.4 (2)	1.1 (7)
	Lateral incisor		1.3 (2)	3.5 (10)	0 (0)	2.1 (3)	2.3 (15)
	Canine		0 (0)	0.3 (1)	0 (0)	0 (0)	0.2 (1)
	First premolar		0.7 (1)	1.4 (4)	1.5 (1)	3.5 (5)	1.7 (11)
	Second premolar		12.7 (19)	6.6 (19)	1.5 (1)	5.7 (8)	7.3 (47)
	First molar		26.7 (40)	36.2 (104)	35.3 (24)	29.8 (42)	32.5 (210)
	Second molar		14.7 (22)	12.5 (36)	17.6 (12)	18.4 (26)	14.9 (96)
Total			100 (150)	100 (287)	100 (68)	100 (141)	100 (646)

*The bilateral total of each type of tooth was obtained.

Significant differences were observed between 40-year-old men and women in mandibular second premolars and first molars.

dibular right first molar was missing in 15.6%, and the maxillary left second molar in 8.0%. The mandibular left second molar was missing in 7.6%; the mandibular right second

molar in 7.3%; and the maxillary left second molar in 7.3%.

Table 2 shows the percentage of participants according to each type of missing tooth

in relation to age and sex. The bilateral total of each type of tooth was obtained. The mandibular first molar was missing in 26.7% of men and 36.2% of women among 40-year-olds, and 35.3% of men and 29.8% of women among 60-year-olds. The mandibular second molar was missing in 14.7% of men and 12.5% of women among 40-year-olds, and 17.6% of men and 18.4% of women among 60-year-olds. Significant differences were observed between 40-year-old men and women in the mandibular second premolars and first molars. However, no significant differences were observed between 40- and 60-year-olds of either sex.

Discussion

In this report, we investigated age- and sex-related differences in single tooth loss in adults. The results have to be interpreted with care, however: they may not accurately reflect the real picture with regard to single tooth loss, as some of the teeth may have been missing due to congenital deficiencies, extraction for orthodontic purposes, or impaction.

In our previous report¹³⁾, the mandibular first molar was missing in 27.1% of men and 24.4% of women. In this study, however, the total percentage for loss of the mandibular first molar (32.5%) was higher than that in our previous study¹³⁾. This may have been due to differences in socioeconomic status and the high mean age of the participants in the present study. In our previous study¹³⁾, the age groups with the highest number of people with one missing tooth were the 35–39-year age group in men and 25–29-year age group in women. Furthermore, the participants were all employees of a bank. Data concerning reason for tooth loss were not available in either of these studies, but other studies have reported^{1,4)} that first molars tend to be extracted due to caries. The results of the present study confirm the importance of developing prevention strategies which target mandibular first molars.

The results of the current study are in line

with those of our previous study showing that the mandibular second molar was missing in 14.3% of men and 14.8% of women¹³⁾. Some studies^{1,4)} have suggested that mandibular second molars are lost due to periodontal disease more often than mandibular first molars. Maxillary second premolars are at high risk for caries¹²⁾. Mandibular second molars require more attention in terms of prevention of caries and periodontal disease.

Significant differences were observed between men and women in the mandibular second premolar and first molar among 40-year-olds. For mandibular first molars, the percentage of women was higher than that of men. In Japan, mandibular first molars erupt earlier in women than in men⁸⁾, and the percentage of women who eat between meals is higher than that of men³⁾. These factors may be related to the development of dental caries; in fact, Morita *et al.*⁶⁾ reported that the percentage of mandibular molars extracted due to caries was higher in women than in men. Furthermore, Barnett *et al.*²⁾ reported that the female-to-male ratio in juvenile periodontitis patients was approximately 2:1. The mandibular first molar region is often involved in the onset of aggressive periodontitis. These factors may be related to the sex-based differences observed in the present study. Further research is needed, however, to determine why such differences were found in the mandibular second premolars.

The present results suggest that we need to pay more attention to individual teeth which are at risk for tooth loss, namely the mandibular first and second molars, and especially the mandibular first molars in middle-aged women.

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