Journal of Oral Rehabilitation 1997 **24**; 895–898

Remaining mandibular third molars in an adult population

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SUMMARY **Although tooth loss with age has been extensively investigated, there appears to be no literature on the relationship of age to remaining mandibular third molars. The study showed that as age increases so does the frequency of absent vertically erupted mandibular third molars. However, no correlation was found between age and loss of mandibular impacted third molars in men of 71 years of age or older. The evidence presented here suggests that impacted mandibular third molars, which have not been infected, may be more likely to remain compared with other teeth at potential risk.**

Introduction

A nearly linear relation between decrease in the number of teeth and age is a common finding (Halse, Molven & Riordan, 1985). Tooth loss increases significantly from the age of 60, and is attributed mainly to periodontal disease, but its progression differs for the incisors, canines, premolars and molars (Anagnon-Verelzides *et al.*, 1986). However, we have been unable to locate any report in the literature concerning the direct relation between age and remaining third molars. The following study was designed to investigate this relationship.

Materials and methods

The subject population comprised 1560 patients aged 31 and older, who sought consultation and care at the Matsumoto Dental College between April 1984 and September 1994. The sample comprised 807 women ranging in age from 31 to 97 years (average 47·6 years) and 753 men of age range 31–89 years (average 48·4 years) at the time of the initial appointment (Table 1). Panoramic radiographs* were obtained for all the patients and the films processed by automatic development†. All of the radiographs were evaluated by the same examiner. The dental condition was recorded for all the teeth remaining in the mandible. The number and frequency distribution were studied for the canines, second and third molars in the mandible. The remaining third molars present, as shown on the radiographs, were subclassified as being fully erupted in the vertical position without or with bone defect at the anterior border of the ramus, or showing impaction covered completely or not by bone or root fragment. Patients with a history of birth defects, trauma or pathology were not included in the study.

Table 1. Distribution of patients by sex and age; numbers of patients are shown

	Age (years)					
	31–40	41–50	51–60	61–70	≥71	Total
Men	199	273	181	73	27	753
Women	271	220	169	113	34	807
All patients	470	493	350	186	61	1560

*Panoramax Auto I; 20mA,80–84 KVP, Asahi, Kyoto, Japan.

†Konica SRX 501, Konica, Tokyo, Japan.

Table 2. Distribution of patients with remaining teeth on the right side; values are numbers (percentage)

	Age (years)					
	31–40	41–50	51–60	61–70	≥71	All
Canine						
Men	199 (100)	272 (99)	177 (97)	71 (97)	27 (100)	746 (99)
Women	271 (100)	217 (98)	167 (98)	108 (95)	31 (91)	794 (98)
All	470 (100)	489 (99)	344 (98)	179 (96)	58 (95)	1540 (98)
Second molar						
Men	184 (92)	209 (76)	113 (62)	37 (52)	8 (29)	551 (73)
Women	235 (86)	161 (73)	107 (63)	52 (46)	12 (35)	567 (70)
All	419 (89)	370 (75)	220 (62)	89 (47)	20 (32)	1118 (71)
Third molar (vertical position)						
Men	59 (29)	88 (32)	47 (25)	14 (19)	4 (14)	212 (28)
Women	60 (22)	37 (16)	27 (15)	19 (16)	1 (2)*	144 (17)
All	119 (25)	125 (25)	74 (21)	33 (17)	5 (8)	356 (22)
Third molar (impaction)						
Men	36 (18)	31 (11)	11 (6)	5 (6)	4 (14)	87 (11)
Women	27 (9)	19 (8)	5 (2)#	7 (6)	2 (5)	60 (7)
All	63 (13)	50 (10)	16 (4)	12 (6)	6 (9)	147 (9)
Third molar (root fragment)						
Men	3 (1)	6 (2)	2 (1)	0 (0)	1 (3)	12 (1)
Women	3 (1)	2 (0)	2 (1)	0 (0)	2 (5)*	9 (1)
All	6 (1)	8 (1)	4 (1)	0 (0)	3 (4)	21 (1)
Third molar (others)						
Men	9 (4)	7 (2)	5 (2)	4 (5)	1 (3)	26 (3)
Women	8 (2)	5 (2)	0 (0)	0 (0)	0 (0)	13 (1)
All	17 (3)	12 (2)	5 (1)	4 (2)	1 (1)	39 (2)

*$P < 0.05$ *vs* women of 61–70 years of age.
#$P < 0.05$ *vs* women of 41–50 years of age.
Vertical position: fully erupted vertical dentition without any bone defect at the anterior border of the ramus; others: vertical dentition with bone defect at the anterior border of ramus, or horizontal dentition.

Statistical analysis

Differences in proportions between pairs of age groups were calculated using chi-square analysis.

Results

The percentage of patients with a remaining canine was significantly higher that that with a vertical third molar on both the right side (Table 2) and left side (Table 3) for men (both $P < 0{\cdot}001$) and women (both $P < 0{\cdot}001$). These findings indicate that the loss of the canine occurred later than that of vertically erupted third molars or impacted third molars.

The difference between groups was evident even in the subjects in their 30s. Of the 199 men in this age group, only one had an absent canine on the left side, whereas vertically erupted third molars were present on the right side in 59 ($P < 0{\cdot}001$) and on the left in 58 ($P < 0{\cdot}001$). The findings were similar in the 271 women in this age group.

The decrease in the number of subjects with the second molar was not significantly different between any pairs of age groups on the right or left side in either sex. The same pattern was seen for right third molars in men when including vertically erupted and impacted teeth. There was no significant difference between pairs of age groups in the number of men with a left vertically erupted third molar. A significant difference was seen between men in their 30s and those in their 40s for the left impacted third molar ($P < 0{\cdot}05$) but

Table 3. Distribution of patients with remaining teeth on the left side; values are numbers (percentage)

	Age (years)					
	31–40	41–50	51–60	61–70	≥71	All
Canine						
Men	198 (99)	269 (98)	179 (98)	72 (98)	25 (92)	743 (98)
Women	270 (99)	217 (98)	167 (98)	111 (98)	33 (97)	798 (98)
All	468 (99)	486 (98)	346 (98)	183 (98)	58 (95)	1541 (98)
Second molar						
Men	180 (90)	201 (73)	113 (62)	40 (54)	9 (33)	543 (72)
Women	238 (87)	168 (76)	103 (60)	49 (43)	7 (20)	565 (70)
All	418 (88)	369 (74)	216 (61)	89 (47)	16 (26)	1108 (71)
Third molar (vertical position)						
Men	58 (29)	81 (29)	51 (28)	12 (16)	3 (11)	205 (27)
Women	56 (20)	30 (13)	25 (14)	15 (13)	1 (2)	127 (15)
All	114 (24)	111 (22)	76 (21)	27 (14)	4 (6)	332 (21)
Third molar (impaction)						
Men	47 (23)	39 (14)*	16 (8)	3 (4)	5 (18)#	110 (14)
Women	33 (12)	18 (8)	5 (2)	5 (4)	2 (5)	63 (7)
All	80 (17)	57 (11)	21 (6)	8 (4)	7 (11)	173 (11)
Third molar (root fragment)						
Men	3 (1)	3 (1)	5 (2)	2 (2)	1 (3)	14 (1)
Women	4 (1)	1 (0)	3 (1)	1 (0)	1 (2)	10 (1)
All	7 (1)	4 (0)	8 (2)	3 (1)	2 (3)	24 (1)
Third molar (others)						
Men	11 (5)	5 (1)	1 (0)	1 (1)	0 (0)	18 (2)
Women	5 (1)	1 (0)	1 (0)	0 (0)	0 (0)	7 (0)
All	16 (3)	6 (1)	2 (0)	1 (0)	0 (0)	25 (1)

*$P < 0.05$ *vs* men of 31–40 years of age.

#$P < 0.05$ *vs* men of 61–70 years of age.

Vertical position: fully erupted vertical dentition without any bone defect at the anterior border of the ramus; others: vertical dentition with bone defect at the anterior border of ramus, or horizontal dentition.

none among those in their 40s to 60s. There was, however, a significant increase between men over 60 in the frequency of retained left impacted third molars ($P < 0.05$).

In women, no significant differences were seen among those between their 30s and 60s for right vertical third molars, but a significant decrease in the presence of the tooth was recorded in those over 70 ($P < 0.05$). There was no significant difference among women between their 30s and 40s in the remaining number of right impacted third molars. A significant decrease was, however, seen in the 50 year olds versus the 40 year olds ($P < 0.05$). In women, no significant difference was seen between any pairs of age groups for the left vertical third molars or left impacted third molars. There was a significant increase of the frequency of root fragment of the right third molar in women 71 years or older.

For each decade, the number of men per 100 women with the third molar present is shown in Fig. 1. The men outnumbered the women in almost every age group. Significant sex difference was seen in right ($P < 0.05$) and left impactions ($P < 0.01$) in the 30 year olds, in right ($P < 0.01$) and left vertical third molars ($P < 0.001$) in the 40 year olds and in left erupted ($P < 0.05$) and left impacted third molars ($P < 0.05$) in the 50 year olds.

Discussion

Tooth loss is substantial in the elderly. Our results can be related to previous reports that the molars (Halse

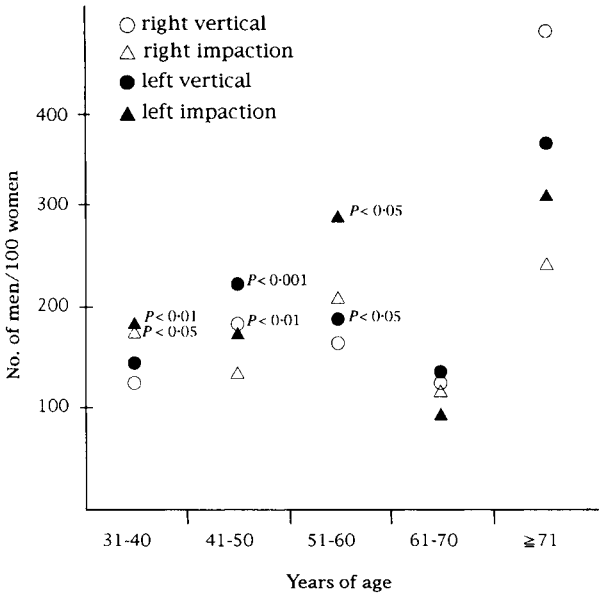

Fig. 1. Number of men per 100 women with third molars (○, right vertical; ●, left vertical; Δ, right impaction; ▲, left impaction).

et al., 1985; Wood, Greco & McFall, 1989) are the teeth lost most frequently and the canines least frequently (van-Wyk, Farman & Staz,1977; Halse *et al.*,1985; Wood *et al.*,1989; Hoover *et al.*, 1989). The frequency of remaining second molars showed substantial reduction across the age decades. The more frequent loss of mandibular molars is partly due to the higher rate of carious attack on these teeth (Anagnon-Verelzides *et al.*, 1986). A relationship is reported between age and prevalence of periodontal disease (Ismail *et al.*,1990; Hunt, Levy & Beck,1990) and the influence of endodontic infection on progression of marginal bone loss in periodontitis has also been reported (Jansson *et al.*, 1993, 1995). The risk factors for the loss studied here may be similar for the second molars and the erupted third molars. Indeed, it seems clear that the frequency of the latter was decreased in women of 71 years of age or older. On the other hand, no decrease in the relative frequency of impacted third molars was apparent in the men of 71 years of age or older.

Bone atrophy would not account for the sex differences in the frequency of remianing third molars. Kribbs (1990) noted that periodontal pocket measurements are not influenced either by skeletal bone disease or its impact is obscured by individual variation. However, the sex-related pattern of dentition loss does require futher clarification.

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