

# Completely impacted teeth in dentate and edentulous jaws

Minoru Yamaoka, DDS, PhD\*

Kiyofumi Furusawa, DDS, PhD†

Katsuhiko Fujimoto, DDS, PhD†

Takashi Uematsu, DDS‡

## Abstract

Panoramic radiographs from 1026 patients were examined for the presence of completely impacted teeth. The prevalence of completely impacted teeth in the edentulous jaw was lower than that in the dentate jaw in both the upper and lower jaws. The prevalence of completely impacted third molars in the edentulous jaw was also lower than that in the dentate jaw. However, there was no difference in the prevalence of completely impacted canine teeth and completely impacted anterior maxillary supernumerary teeth (mesiodens) in the edentulous jaw. These findings may indicate that completely impacted canine teeth and impacted anterior maxillary supernumerary teeth (mesiodens) are not influenced by the loss of erupted teeth.

**Key words:** Impacted teeth, edentulous jaw, maxilla, mandible, bone resorption.

(Received for publication January 1994. Revised June 1994. Accepted July 1994.)

## Introduction

A large number of completely impacted teeth may be retained when asymptomatic, and Huang and Mercier<sup>1</sup> claimed that these teeth should be left in place as the integrity of the covering tissues was preserved. Cases of exposed impacted teeth can be seen in elderly persons (Fig. 1) due to the reduction of alveolar height following periodontal and/or systemic diseases. It was shown that the angulation of most of the completely impacted teeth in the upper third molar region was horizontal when

adjacent teeth were not present in individuals older than 61 years.<sup>2</sup> This status may expose completely impacted teeth through loss of adjacent teeth as shown in Fig. 1. It is necessary to understand the life cycle of not only impacted third molars as noted by NIH consensus,<sup>3</sup> but also other impacted teeth and the selective criteria for treatment of these impacted teeth before prosthetic treatment is undertaken.

The aim of this report using a panoramic radiograph survey of an adult population is to present data about the distribution of completely impacted teeth and to document the influence a loss of all erupted teeth has on completely impacted teeth.

## Materials and methods

The subjects were selected from 9854 patients who sought consultation and care at the Oral and Maxillofacial Surgery Department II at Matsumoto Dental College between April 1984 and March 1993. The authors limited their surveys to selected groups of the adult population older than 41 years who had been examined fully by panoramic radiography because there were no edentulous patients under age 41. The sample consisted of 533 females and 493 males. The maximum age was 90 years. Panoramic radiographs<sup>§</sup> were taken and the films processed in an automatic developing machine.<sup>||</sup> All the radiographs were evaluated by one examiner. Completely impacted teeth were those shown to be well covered by healthy bone. Maxillary and mandibular dentate and edentulous jaws were studied when one or several completely impacted teeth were detected. Frequency distribution was also

\*Professor and Chairman, Oral and Maxillofacial Surgery Department II, Matsumoto Dental College, Japan.

†Assistant Professor, Oral and Maxillofacial Surgery Department II, Matsumoto Dental College, Japan.

‡Staff Member, Oral and Maxillofacial Surgery Department II, Matsumoto Dental College, Japan.

§Panoramax Auto I, 20 mA, 80-84 kVp. Asahi, Kyoto, Japan.  
||Konica SRX-501. Konica, Tokyo, Japan.

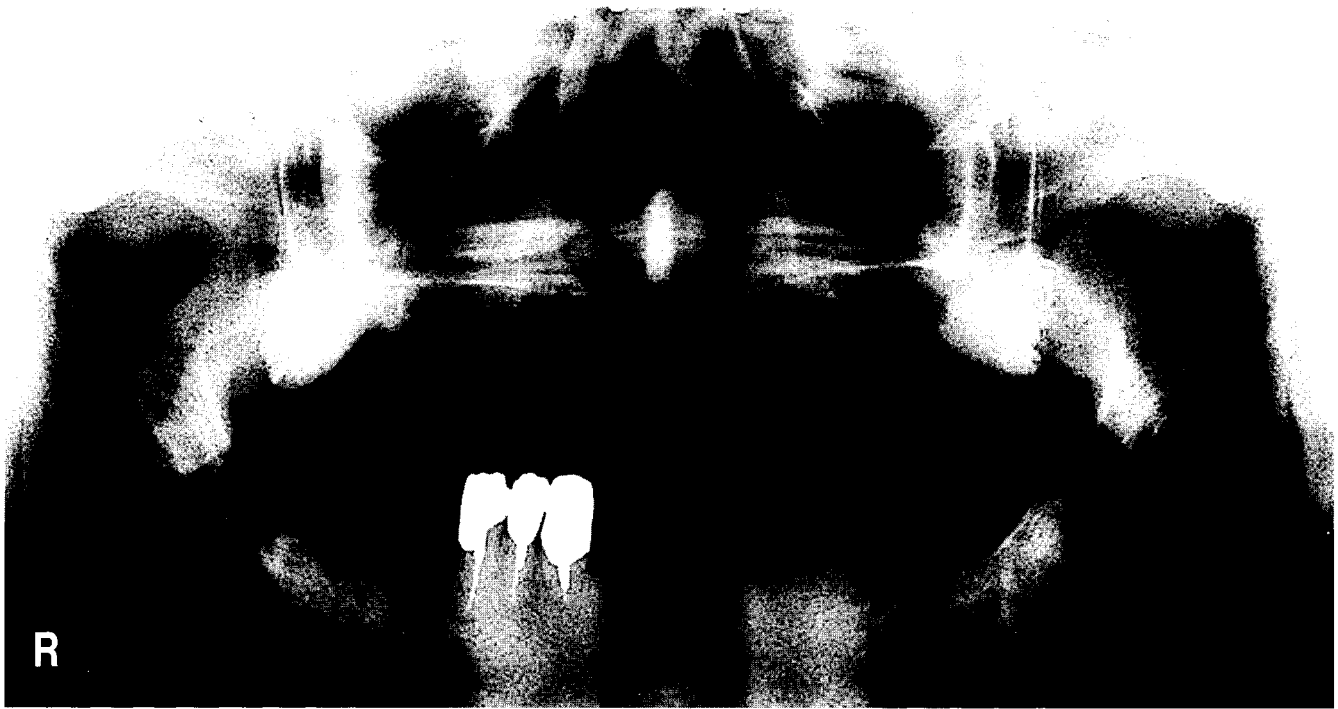


Fig. 1. – Impacted teeth in a 75 year old male probably due to reduction of the distance between the alveolar ridge and the impacted teeth.

studied according to different age groups. Patients who had follicular dental cysts and odontomas were not included among those with completely impacted teeth.

### Results

In the study, 919 out of the 1026 patients were dentate and 107 patients were edentulous in the upper jaw. In the case of the lower jaw, 932 out of the 1026 patients were dentate while 94 were edentulous.

Fifty-three (5.8 per cent) of the 919 patients with a dentate upper jaw had completely impacted teeth (Table 1). The maximum prevalence was 9.7 per cent in female patients older than 71 years of age, and the minimum prevalence was 1.6 per cent in males of the 61-70 year range. Five out of the 107 patients (4.7 per cent) with an edentulous jaw had completely impacted teeth (Table 2). Of these five patients, one was a 78 year old female with an impacted right third molar; one male and one female between 61-70 years old had impacted right canines; and two females in the 51-60 year old and 61-70 year old range, respectively, had anterior maxillary supernumerary teeth (mesiodens).

Thirty-one (3.3 per cent) out of the 932 patients with a dentate jaw had completely impacted teeth (Table 3). The maximum prevalence of 10 per cent was seen in male patients older than 71 years of age, and the minimum prevalence of 1.5 per cent was found in males in the 61-70 age range. None of the

94 patients with an edentulous jaw had completely impacted teeth (Table 4). The prevalence of completely impacted third molars in dentate and edentulous patients showed forty out of the 919 patients (4.4 per cent) with a dentate upper jaw had impacted upper third molars, whereas only one out of the 107 patients (0.9 per cent) with an edentulous upper jaw had impacted upper third molars (Table 5). Twenty-eight (3 per cent) out of the 932 patients with a dentate lower jaw had an impacted lower third molar, whereas none of 94 patients with an edentulous lower jaw had impacted lower third molars (Table 6).

The prevalence of completely impacted upper canine teeth and impacted anterior maxillary supernumerary teeth (mesiodens) was as follows. Five (0.5 per cent) out of the 919 patients with a dentate upper jaw had impacted upper canine teeth, and two (1.9 per cent) out of the 107 patients with an edentulous upper jaw had impacted upper canine teeth (Table 7). In the case of impacted anterior maxillary supernumerary teeth (mesiodens), similar numbers of impacted upper canine teeth were found in dentate and edentulous upper jaws (Table 8).

### Discussion

The alveolar ridge is resorbed in cases of advanced periodontitis, systemic diseases, smoking,<sup>4,5</sup> and with a decrease in body mass. If an impacted tooth is located in a shallow position in the alveolar bone, it may become exposed with advancing age and hence

**Table 1. Distribution of persons with completely impacted teeth in dentate upper jaw**

Age groups	41-50		51-60		61-70		71≤		Total
	M	F	M	F	M	F	M	F	
Participants with dentate jaw	202	205	145	131	64	104	37	31	919
Participants with completely impacted teeth in dentate jaw	11 (5.4)	15 (7.3)	8 (5.5)	9 (6.9)	1 (1.6)	4 (3.8)	2 (5.4)	3 (9.7)	53 (5.8)

Percentage in parenthesis.

**Table 2. Distribution of persons with completely impacted teeth in edentulous upper jaw**

Age groups	41-50		51-60		61-70		71≤		Total
	M	F	M	F	M	F	M	F	
Participants with edentulous jaw	3	2	9	11	16	16	17	33	107
Participants with edentulous jaw and completely impacted teeth	0	0	0	1	1	2	0	1	5 (4.7)

Percentage in parenthesis.

**Table 3. Distribution of persons with completely impacted teeth in dentate lower jaw**

Age groups	41-50		51-60		61-70		71≤		Total
	M	F	M	F	M	F	M	F	
Participants with dentate jaw	204	204	149	132	65	101	40	37	932
Participants with completely impacted teeth in dentate jaw	13 (6.4)	4 (2.0)	5 (3.4)	1 (0.8)	1 (1.5)	2 (2.0)	4 (10.0)	1 (2.7)	31 (3.3)

Percentage in parenthesis.

become infected. The criteria that decide whether a completely impacted tooth should be saved<sup>1</sup> or removed<sup>6</sup> may be influenced by the possibility that exposure is related to the location of the completely impacted tooth and the resorption in the bone structure. Yamaoka *et al.*<sup>2</sup> have noted that the need for treatment of impacted teeth is influenced by the remaining adjacent teeth. Loss of the adjacent tooth due to progressive bone resorption is thought to influence a completely impacted tooth. The conditions of the impacted tooth or teeth which may become exposed in the future should be understood for this is important in determining the prosthetic treatment.

From the data it was observed that the percentage of patients who had completely impacted teeth did not decrease with age and that the prevalence of

**Table 4. Distribution of persons with completely impacted teeth in edentulous lower jaw**

Age groups	41-50		51-60		61-70		71≤		Total
	M	F	M	F	M	F	M	F	
Participants with edentulous jaw	1	3	5	10	15	19	14	27	94
Participants with edentulous jaw and completely impacted teeth	0	0	0	0	0	0	0	0	0

Percentage in parenthesis.

**Table 5. Comparison between dentate patients and edentulous patients for prevalence of completely impacted upper third molars**

	Dentate patients	Edentulous patients
Participants	919	107
Participants with completely impacted upper third molars	40 (4.4)	1 (0.9)

Percentage in parenthesis.

**Table 6. Comparison between dentate patients and edentulous patients for prevalence of completely impacted lower third molars**

	Dentate patients	Edentulous patients
Participants	932	94
Participants with completely impacted lower third molars	28 (3.0)	0 (0.0)

Percentage in parenthesis.

**Table 7. Comparison between dentate patients and edentulous patients for prevalence of completely impacted upper canine teeth**

	Dentate patients	Edentulous patients
Participants	919	107
Participants with completely impacted upper canine teeth	5 (0.5)	2 (1.9)

Percentage in parenthesis.

**Table 8. Comparison between dentate patients and edentulous patients for prevalence of completely impacted anterior maxillary supernumerary teeth (mesiodens)**

	Dentate patients	Edentulous patients
Participants	919	107
Participants with completely impacted mesiodens	5 (0.5)	2 (1.9)

Percentage in parenthesis.

impacted teeth was not different for males and females, but remained rather constant for each group. Neither age nor gender seemed to be an important factor in the loss of a completely impacted tooth, though these are possible background factors. Again, loss of completely impacted teeth may be related to differences in individual patterns of bone resorption.

When the interrelationship between completely impacted teeth and loss of all the erupted teeth was studied it was seen that the prevalence of impacted teeth in the patients with an edentulous jaw was lower than those patients with an upper and lower dentate jaw. The ratio of the patients who had an impacted third molar which is commonly seen, was distinctly smaller for the patients who had both upper and lower edentulous jaws. As expected, these data indicate that completely impacted third molars might be removed due to exposure or increasing opportunities of infection accompanied by bone resorption or the loss of erupted teeth. Although it would be difficult to predict bone resorption, these findings are in agreement with those of Garcia and Chauncey,<sup>7</sup> who found that the eruption of third molars in older adults appears to be a frequent phenomenon.

On the other hand, prevalence of impacted upper canine teeth and impacted anterior maxillary supernumerary teeth (mesiodens) did not show a decrease in the edentulous jaw. These teeth may not be influenced by the loss of erupted teeth. They might not be easily exposed in elderly persons due to the fact that these teeth are often situated in a deep position in the maxilla. In other situations, removal may not be possible because of surgical complexities that arise in cases where the direction of the long axis of the mesiodens becomes either inverted, horizontal or palatal, or if a malposition of the permanent incisors or diastema formation are not seen. Another important suggestion may be that alveolar bone of the incisal and canine region in the maxilla would not be resorbed in the edentulous upper jaw. Ulm *et al.*<sup>8,9</sup> reported that the reduction is most clearly pronounced in the area of the first molar in the mandible. Bone resorption may be characteristic for a particular location in each jaw. Moreover, the recorded data may suggest that the maxilla is not resorbed to a position deeper than the floors of the

nasal cavity and maxillary sinus, whereas the mandible may show an extremely atrophic edentulous jaw. Thus, the findings of this study are also in agreement with Ettinger<sup>10</sup> who noted that it may not become necessary to remove all impacted teeth. The data also suggest that completely impacted teeth except for upper impacted anterior maxillary supernumerary teeth (mesiodens) and canine teeth should be removed when the patient becomes edentulous.

### Acknowledgements

The authors thank Mr Howard E. Pine, teacher of English at Matsumoto Dental College, for his kind revision of this manuscript.

### References

1. Huang H, Mercier P. Asymptomatic impacted teeth in edentulous jaws undergoing preprosthetic surgery. A long-term evaluation. *Int J Oral Maxillofac Surg* 1992;21:147-9.
2. Yamaoka M, Furusawa K, Yamamoto M. Influence of adjacent teeth on impacted third molars in the upper and lower jaws. *Aust Dent J* 1995;40:233-5.
3. National Institute of Dental Research, National Institute of Health. NIH consensus development conference on removal of third molars. *J Oral Surg* 1980;38:235-6.
4. Österberg T, Mellström D. Tobacco smoking: a major risk factor for loss of teeth in those 70-year-old cohorts. *Community Dent Oral Epidemiol* 1986;14:367-70.
5. Burt BA, Ismail AL, Morrison EC, Beltran ED. Risk factors for tooth loss over a 28-year period. *J Dent Res* 1990;69:1126-30.
6. Carl W, Schaaf NG. Impacted teeth denture-bearing areas: a potential source of problems. *Oral Surg Oral Med Oral Pathol* 1972;33:331-4.
7. Garcia RI, Chauncey HH. The eruption of third molars in adults: A 10-year longitudinal study. *Oral Surg Oral Med Oral Pathol* 1989;68:9-13.
8. Ulm C, Solar P, Blahout R, Matejka M, Gruber H. Reduction of the compact and cancellous bone substances of the edentulous mandible caused by resorption. *Oral Surg Oral Med Oral Pathol* 1992;74:131-6.
9. Ulm CW, Solar P, Blahout R, Matejka M, Watzek G, Gruber H. Location of the mandibular canal within the atrophic mandible. *Br J Oral Maxillofac Surg* 1993;31:370-5.
10. Ettinger RL. Roentgenographic evaluation of the edentulous patient. *Aust Dent J* 1971;16:210-9.

*Address for correspondence/reprints:*

Dr Minoru Yamaoka,  
Oral and Maxillofacial Surgery Department II,  
Matsumoto Dental College,  
Shiojiri City, Nagano 399-07, Japan.