

Influence of adjacent teeth on impacted third molars in the upper and lower jaws

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Abstract

Panoramic radiographs of 1834 patients older than 21 years were evaluated for the prevalence of impacted teeth at different ages. The frequency of impacted teeth by age was constant, that is, the presence of completely impacted teeth could not be related to age.

The interrelationship between the angulation of impacted teeth and the existence of adjacent teeth was studied in individuals older than 61 years. The angulation of most of the completely impacted teeth in the upper-third molar region was horizontal when adjacent teeth were not present, whereas impacted teeth in the upper-third molar region showed vertical angulation when adjacent teeth were present, suggesting that vertically impacted teeth may become exposed by bone resorption or infection and should be removed. The angulation of impacted lower third molars was horizontal irrespective of the presence of adjacent teeth. It appears that the interrelationship between the angulation of completely impacted teeth and the presence of adjacent teeth is different between the upper and lower third molar regions. The angulation of completely impacted teeth and the presence of adjacent teeth should be included in those criteria which determine whether or not completely impacted teeth should be removed.

Key words: Impacted teeth, prevalence, angulation, adjacent teeth, third molars.

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Introduction

It has been claimed that completely impacted teeth should be left in place because there is no opportunity for infection. However, Carl and Schaaf¹ stated that such teeth should be removed even if deeply embedded because of possible exposure due to resorption of bone structure. Huang and Mercier² claimed that asymptomatic impacted teeth should be left in place as long as the integrity of the covering tissues was preserved.

The aim of this report from a panoramic radiographic survey in an adult population is to present data about the distribution and prevalence of impacted teeth and to document the interrelationship between the angulation of completely impacted teeth and the existence of adjacent teeth in order to assist in the management of completely impacted teeth.

Materials and methods

The subjects were 9854 patients seeking consultation and care at the Oral and Maxillofacial Surgery Department II at the Matsumoto Dental College between April 1984 and March 1993 from whom 1834 older than 21 years were examined fully by panoramic radiography. The sample comprised 1003 females and 831 males ranging in age from 21 to 97 years (Table 1). The authors limited their surveys to selected groups of the adult population older than 21 years whose tooth eruption was complete. Different age groups were studied separately.

Panoramic radiographs§ were taken and the films processed in an automatic developing machine.|| All of the radiographs were evaluated by the same examiner. Completely impacted teeth were those shown to be well covered by healthy bone in the radiographs.

The number and frequency distribution of individuals with impacted teeth were studied in incisor, canine, premolar, molar and third molar regions in the maxilla

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

Table 1. Age and sex distribution of subjects

Age groups (years)	Male	Female	Total
21-30	191	258	449
31-40	147	212	359
41-50	205	207	412
51-60	154	142	296
61-70	80	120	200
≥ 71	54	64	118
Total	831	1003	1834

and mandible. The angulation of completely impacted teeth was classified as vertical, horizontal and mesio- or disto-angular in relation to the long axis of the second molar,³ and transverse angulation was included in horizontal angulation. The angulation and the existence of adjacent teeth were recorded. Patients who had follicular dental cysts and odontomas were not included among those with completely impacted teeth. A contingency table was used to determine the significance of differences between independent groups.

Results

The evaluation showed 155 patients with 181 completely impacted teeth (average, 1.17 impacted teeth/patient) among the 1834 patients chosen for the study; 155 (8.5 per cent) had completely impacted teeth. The distribution by age and sex is presented in Table 1.

The prevalence of impacted teeth in the maxilla and the mandible in the different age groups was studied separately and is presented in Table 2. Except for some increases in females aged 31-40 and males aged 41-50, no significant differences in the number of individuals with completely impacted teeth could be demonstrated between age groups, or between males and females.

The prevalence of completely impacted teeth in the upper third molar region, and the lower third molar region is presented in Tables 3 and 4, respectively. There was no significant difference between the age groups and gender groups in these regions.

The prevalence and distribution of completely impacted teeth in the upper third molar region in relation to the angulation of the long axis of the tooth and adjacent teeth for individuals older than 61 are presented in Table 5. There was a relationship between the high prevalence of horizontal impactions and the absence of adjacent teeth compared with the presence of adjacent teeth. Four out of eight impacted teeth in the upper third molar region

Table 2. Number of subjects with impacted teeth in maxilla and mandible

Age groups (years)	Male	Female	Total
21-30	13	20	33
31-40	13	24	37
41-50	23	19	42
51-60	11	11	22
61-70	3	8	11
≥ 71	5	5	10
Total	68	87	155

Table 3. Number of subjects with impacted teeth in upper third molar region

Age groups (years)	Male	Female	Total
21-30	1	12	13
31-40	1	14	15
41-50	6	13	19
51-60	6	7	13
61-70	2	2	4
≥ 71	2	2	4
Total	18	50	68

were horizontally impacted (anteriorly or posteriorly), or lay transversely, that is, were horizontally positioned in a buccolingual direction (medially or laterally); and all four had adjacent teeth absent. The other four were angulated vertically, and three of them contacted the root apex of the second molar; another one had no adjacent tooth present. The angulation of impacted teeth in the lower third molar region was horizontal in all nine cases regardless of whether adjacent teeth were seen or not (Table 6). Mesio- or disto-angular impactions were not seen in either upper or lower third molar regions in the age groups of 61-70 and over 71.

Discussion

Allowing for the differences in study design of Dachi and Howell,⁴ Mourshed,⁵ Ettinger,⁶ Nitzan *et al.*,⁷ and Garcia and Chauncery,⁸ the results from this survey of completely impacted teeth are in agreement. Carl and Schaaf¹ stated that impacted or unerupted teeth in the denture-bearing area should be removed even if they are deeply embedded and completely covered with bone, as the resorption of investing osseous structures with advancing age may cause the tooth to become exposed to the oral flora. Garcia and Chauncery⁸ stated that the eruption of third molars in older adults appeared to be a more frequent phenomenon than was previously recognized. However, Eliasson *et al.*⁹ concluded that the relative frequency by age of such pericoronary changes remained rather constant. Huang and Mercier² noted that asymptomatic impacted teeth in edentulous jaws embedded in bone or covered with mucosa did not cause any problem to the patients. Ettinger⁶ noted that impacted or unerupted teeth should be surgically removed if partially erupted and without adequate bone covering them.

Table 4. Number of subjects with impacted teeth in lower third molar region

Age groups (years)	Male	Female	Total
21-30	4	4	8
31-40	7	5	12
41-50	13	3	16
51-60	3	1	4
61-70	1	2	3
≥ 71	3	1	4
Total	31	16	47

Table 5. Number of impacted teeth in upper third molar region in age groups older than 61 years

Angulation of impacted tooth	With adjacent teeth	Without adjacent teeth	Total
Vertical	3	1	4
Horizontal	0	4	4
(Transverse)	(0)	(2)	(2)
Total	3	5	8

Age and gender showed no significant difference in any group. Age and gender factors, therefore, would not have a strong influence on the eruption of impacted teeth. However, the observed similarity in age and sex distribution of completely impacted teeth may not necessarily reflect similarity of bone resorption in regard to age and sex. The eruption of completely impacted teeth should be regarded as influenced by bone resorption which may occur as a result of several factors, such as mechanical force associated with denture occlusal trauma, and systemic factors such as nutrition, hormonal imbalance, and metabolic bone disease.¹⁰ It seems reasonable to assume that the presence of adjacent teeth, with only a small amount of bone resorption, would justify the retention of impacted teeth.

The interrelationship between the angulation of completely impacted teeth and the presence or absence of adjacent teeth was studied in individuals older than 61 years, the majority of whom were without adjacent teeth, where the groups with and without adjacent teeth appeared to be comparable. The angulation illustrated in Table 5 shows horizontal or transverse impactions (anteriorly, posteriorly, laterally or medially) in the majority of completely impacted teeth in the upper third molar regions when no adjacent teeth are present, whereas completely impacted teeth with adjacent teeth were vertical in angulation, suggesting that horizontally impacted teeth may be retained while vertical angulation may predispose to eruption or impaction in the absence of adjacent teeth. Due to resorption of the alveolar bone, vertical, mesio- or disto-angular impaction teeth are considered to erupt easily and should be removed, whereas vertically impacted teeth are more likely to remain stationary in the bone when adjacent teeth are present.

Table 6. Number of impacted teeth in lower third molar region in age groups older than 61 years

Angulation of impacted tooth	With adjacent teeth	Without adjacent teeth	Total
Vertical	0	0	0
Horizontal	3	6	9
(Transverse)	(0)	(0)	(0)
Total	3	6	9

When comparing the interrelationships between the angulations of complete impactions in upper third molar and lower third molar regions in the presence of adjacent teeth, interesting differences can be observed (Tables 5, 6). The prevalence of horizontally impacted teeth in the lower third molar region was seen to have no relationship to the presence of adjacent teeth. This suggests that the interrelationship between the angulation of the impacted tooth and the presence of adjacent teeth is different between the upper third molar and lower third molar regions. This may relate to differences of eruption or infection between maxilla and mandible. These data may indicate that vertically impacted teeth in these groups would be dependent upon the presence of adjacent teeth in regard to their likely eruption or proneness to infection.

This study suggests that not only should the relationship between the marginal bone level and the impacted tooth be considered in evaluating the need to remove impacted third molars, but also the angulation of completely impacted teeth and the presence of adjacent teeth, at least in the upper jaw.

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