Clinical Outcome of Third Molars in Adults Followed During 18 Years

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Purpose: The aim of the present study was to follow the clinical changes in third molar status during an 18-year period in patients aged 20 to 38 years.

Patients and Methods: The series consisted of 118 subjects (37 men and 81 women). In the beginning of the study, the mean age was 20.2 years (SD, ±0.6 year), and at the end, it was 38.6 years (SD, ±0.6 year). Panoramic radiographs were taken at baseline and at age 38. All of the subjects were clinically examined at baseline and at the end of the study. A portion of the subjects (n = 69) were also examined at age 32.

Results: Most of the initially unerupted third molars were removed during the follow-up period (73%, maxilla and mandible together). More than half of the initially partially erupted third molars were removed during the follow-up period (64%, maxilla and mandible together). The percentage of erupted third molars found in the mouth at age 38 increased significantly depending on the initial status. Of the initially unerupted, partially erupted, or erupted third molars, 10%, 33%, and 50%, respectively, were erupted at age 38 (maxilla and mandible together). Changes in the status of third molars continued from age 32 to age 38, although to a lesser extent (8%). The 3 third molars with advanced eruption were all maxillary teeth in men.

Conclusion: Third molars undergo continuous clinical change on a reduced scale at least up to the age of 38 years.

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Follow-up studies of third molars are needed. Results from such studies are required for evidence-based clinical decisions. An indication of this need is the follow-up studies carried out in adults.[1-8] All of these studies have added to our knowledge regarding 2 aspects in adults with third molars: 1) eruption of the tooth and 2) the probability of pathologic conditions related to the tooth. Impacted third molars recorded at age 20 may erupt during the next few years, and therefore observation may be recommended instead of removal.[1,6,8,9] After the age of 25, it is not probable for an impacted third molar to erupt into a functional position.[2] Instead, impacted third molars in adults have a tendency to change the inclination in the bone without notable symptoms to the patient.[5,7] Among adult population, the risk for an impacted third molar of getting involved with pathology is small.[3,4,10] However, to validate clinical decisions related to treatment of third molars, longitudinal studies of greater length are needed. A repeat of similar follow-up studies is also needed.

The aim of this study was to follow the clinical changes in third molar status during an 18-year period in patients aged 20 to 38 years. To our knowledge, this may be the longest follow-up study of third molars reported in the literature.

Patients and Methods

This study was carried out at the Finnish Student Health Service in Helsinki between the years 1982 and 2000. The subjects were first-year students at the University of Helsinki in 1982, born in Helsinki in 1961 or 1962, and residing in Helsinki in 1982. The number of participants is shown in Table 1. The mean age of the subjects (n = 118) at baseline was 20.2 years (SD, ±0.6 year), and at the end of the study, it was 38.6 years (SD, ±0.6 year).

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Table 1. NUMBER OF SUBJECTS INVITED AND EXAMINED AND NONPARTICIPANTS IN THE 18 YEARS OF FOLLOW-UP STUDY

	Invited	Examined	Nonparticipants
Age 20	248	181 (73%)	67
Men	85	59	26
Women	163	122	41
Age 38	181	118 (65%)	63
Men	59	37	22
Women	122	81	41

The subjects were clinically examined and panoramic radiographs were taken at baseline and at the end of the study. Some of the present participants were also examined at the age of 26 years (n = 86) and at age 32 (n = 69). The results of the follow-up study at the ages of 26 and 32 years were published earlier.[7,9] Related to the 69 subjects examined at the ages of 32 and 38, the clinical follow-up changes of third molar status were assessed for this study.

Clinical status of the third molars was classified as follows: 1) missing (verified from the x-ray films), 2) unerupted (not visible in the mouth), 3) partially erupted (part of the occlusal surface visible), and 4) erupted (whole of the occlusal surface visible or in a more advanced stage). In the clinical examination, a probe was not used to detect unerupted teeth that might be probed in the distal pocket of the second molar. When assessing the clinical status, the function of the tooth in occlusion was not taken into account. The periodontal condition of third molars was not assessed for this report.

The study was carried out with the approval of the local ethical committee. Analysis of the data was made using the Microsoft Excel (Redmond, WA) spreadsheet program.

Results

The percentage of missing third molars at age 20 was 15% (11% in the upper jaw and 19% in the lower jaw). The total number of third molars present at baseline was 402. Third molars that were unerupted at age 20 were in most cases removed by age 38 (Fig 1). Similarly, initially partially erupted third molars were often removed by age 38 (Fig 2). A considerable number of initially erupted third molars were still erupted in the mouth 18 years later, namely 65% of teeth in the lower jaw and 44% in the upper jaw (Fig 3).

The initial status of erupted third molars present in the mouth at age 38 can be traced from Figures 1 to 3. It was less probable that unerupted third molars at age 20 would be seen in the mouth as erupted teeth after 18 years (only 10%, maxilla and mandible together). Some of the initially partially erupted third molars could be seen in the mouth as erupted at age 38 (33%, maxilla and mandible together). However, a considerable portion (50%, maxilla and mandible together) of the third molars that had erupted by age 20 were still in the mouth after 18 years.

Changes in the status of third molars occurred, although to a small extent, between the ages of 32 and 38 years (Fig 4). Changes in status were found related to 8% (n = 21 teeth) of the total amount of third molars (n = 276 teeth in 69 subjects). The 3 third molars with advanced eruption after age 32 were all maxillary teeth in men with a complete number of teeth in those dental quadrants, and 2 of the third molars were rudimentary.

Discussion

It was not very probable that a third molar erupted between the ages of 32 and 38. In our study, there were only 3 upper third molars with advanced eruption (1%, 3 of 276 teeth). These teeth served no useful purpose in the occlusion as 2 of them were rudimentary teeth. In our earlier reports, we found that between the ages of 26 and 32, the percentage of ad-

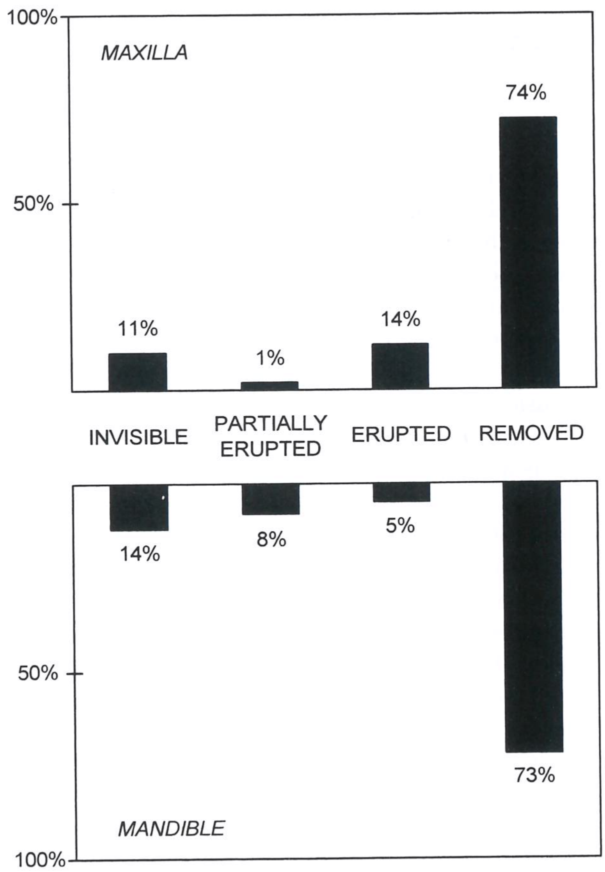

FIGURE 1. Status of initially invisible third molars (98 teeth in maxilla, 93 in mandible) 18 years later.

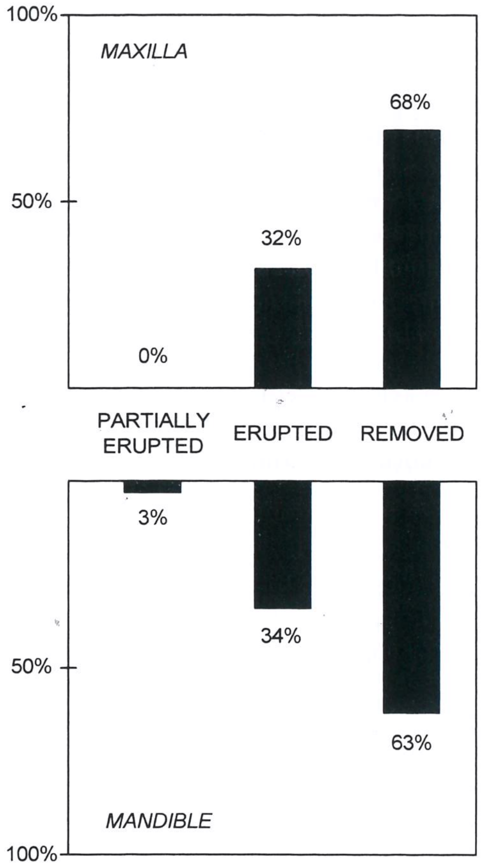

FIGURE 2. Status of initially partially erupted third molars (19 in maxilla, 59 in mandible) 18 years later.

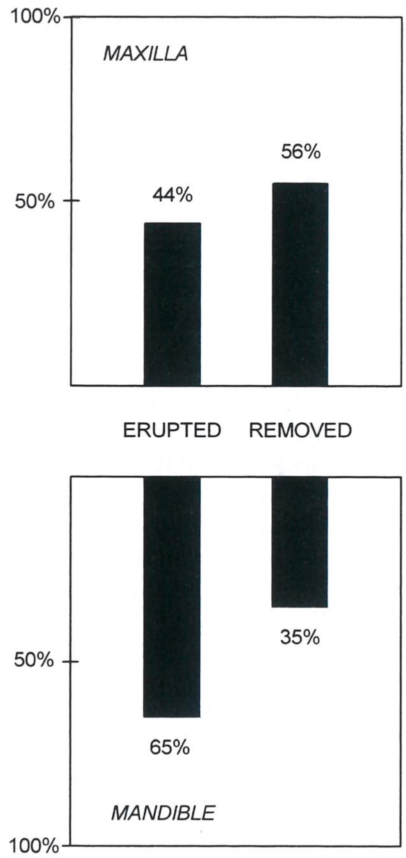

FIGURE 3. Status of initially erupted third molars (93 in maxilla, 40 in mandible) 18 years later.

vanced eruption was 3% (7 of 240 teeth),[11] and during the period from 20 to 26 years, the percentage of erupting third molars was 25% (57 of 225 teeth).[9] In Finland the age at which the eruption of a third molar is most likely is between 19 and 20 years.[12] In American men over 25 years of age, the eruption rate was 0.8%.[2] From these eruption data one can draw a conclusion that in regions with a Western style of life, the most probable period for the eruption of a third molar is around age 20.

The results of this study can be used when informing the patient about the expected development of third molars. It may be of interest to the 20-year-old patient to know the probability of a certain third molar to be still in the mouth after 18 years. However, the probabilities reported here for the development of third molars may not be applicable in every country or for every racial and socioeconomic group. In addition, treatment modalities may be different in varying health care systems. It may be that nearly every third molar is removed around age 17 in one country and only symptomatic third molars are removed in the other country; further, all modifications between these may be found.

From our earlier reports related to this follow-up study, it can be found that the number of third molars decreased gradually during the 18 years[9,11,13] (Fig 5). The change was greatest during the first 6-year period of the study. In total, more than half (54%) of third molars were removed between the ages of 20 through 38. According to the community-based Swedish study by Hugoson and Kugelberg,[14] the number of persons

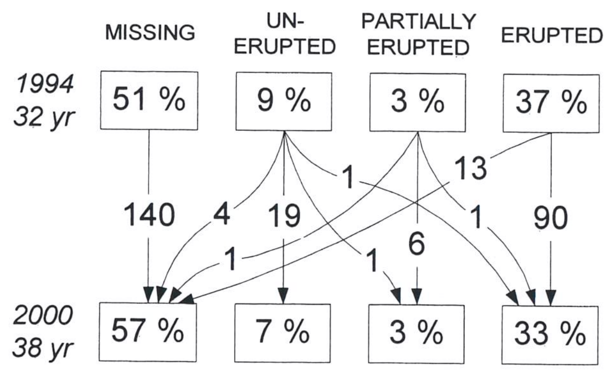

FIGURE 4. Changes in the status of mandibular and maxillary third molars between the ages of 32 and 38 (69 subjects, 276 teeth). Numbers along lines indicate number of teeth.

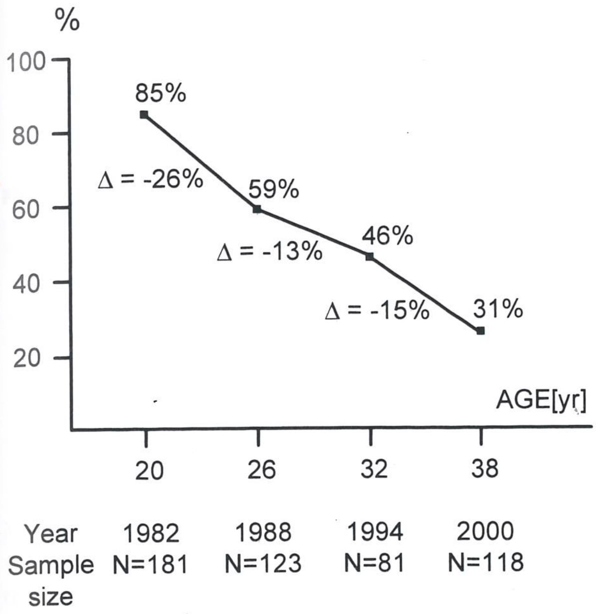

FIGURE 5. Decrease and change of the number of third molars in percentage during 18 years (maxilla and mandible together). The percentage of initially missing third molars was 15%. Data at ages 20, 26, and 32 years are drawn from our earlier reports.[9,11,13]

with all 4 third molars missing increased most between the ages of 30 and 40 years. At 40 years, the rate was 42%. In addition, the number of persons with all 4 third molars present in the mouth begins to decrease dramatically after age 20; up to age 40, it decreased from 77% to 8%.[14] In an American private practice, most patients (81%) referred for extraction of third molars were between 15 and 30 years old.[15] Those years between 20 and 40 may be considered the most active years for third molar removal.

In our study, some of the remaining 31% of third molars may need removal later in life (Fig 5). Erupted third molars may become carious and need either restoration or extraction. One fifth (23%) of all of the remaining teeth were unerupted or partially erupted (Figs 1, 2). These teeth may need operative extraction, which may be more difficult than they would have been at an earlier age. It is becoming obvious that although our study group was very well informed about third molars, there still were third molars in need of treatment at age 38.

We conducted our follow-up study in 6-year periods. It seems that the period from 20 to 30 years of age was the most active regarding eruption and extractions. It appears to be indicated that follow-up should be more active during those years, such as every second or third year.

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