

Symptoms and lesions associated with retained or partially erupted third molars

Some variables of third-molar surgery in Norwegian general practice

Trond Inge Berge and Olav Egil Bøe

Institute of Oral Surgery and Oral Medicine and Institute of Orthodontics, University of Bergen, Bergen, Norway

Berge TI, Bøe OE. Symptoms and lesions associated with retained or partially erupted third molars. Some variables of third-molar surgery in Norwegian general practice. *Acta Odontol Scand* 1993;51:115–121. Oslo. ISSN 0001–6357.

A questionnaire on third-molar problems was mailed to a systematic random sample of 200 Norwegian general dental practitioners in November 1991. A 88% return rate was obtained. The following conclusions were drawn: on an average, 3.8 patients with lesions or complaints from retained or partially erupted third molars were seen in general practice in 1 month, and most of these consultations were associated with partially erupted third molars. A mean of 1.3 surgical removals of third molars was performed in general practice in 1 month. The mean one-way travel time for patients to specialists in oral surgery was 1.3 h, and variations were not related to surgical activity in practice. Fourteen per cent of the general practitioners refer surgical cases to non-specialists. □ *Epidemiology; impacted teeth; oral surgery; questionnaire survey*

Trond I. Berge, Institute of Oral Surgery and Oral Medicine, University of Bergen, Årstadveien 17, N-5009 Bergen, Norway

The change in indications for third-molar removal over the past decade has reflected a more conscious approach to a problem consisting of a balanced decision between the risks of surgery and the risks of leaving a retained or partially erupted third molar untreated. Both short- and long-term risks of third-molar surgery are well documented (1–4), whereas the risks of no treatment have been more difficult to assess, in spite of several studies on the occurrence of lesions associated with third molars that have been left untreated (5–7). Problems in methods applied and the populations studied have made it difficult to draw conclusions on the entire population at risk. A previous study showed a considerable frequency of problems or lesions associated with retained or partially erupted third molars in a general dental-practice patient population (8). As leaving a third molar untreated is an important variable in the risk assessment, a need for confirmation and further in-depth studies was identified as a contribution to the discussion on indications for third-molar removal.

Norwegian general practitioners perform

a substantial amount of oral surgery in their own practice (9). Eighty-two per cent of general practitioners indicated that surgical removal of impacted teeth was performed in practice. To complete the picture of third-molar surgical activity in general practice, an assessment of the frequency of this type of surgery was needed, as was an evaluation of correlations with access to specialist service and occurrence of referrals to non-specialists in the field.

The aims of this study were therefore to determine the frequency and distribution of symptoms and lesions associated with retained or partially erupted third molars in a general dental patient population and to describe some variables of surgical activity with regard to third molars in general practice.

Materials and methods

From the Norwegian Dental Association's register of members and non-members in 1991, the following groups were excluded:

specialists in any discipline, occupation within research and teaching, year of graduation 1991, born in 1921 or earlier, and indicated place of residence outside Norway. In addition, participants of a previous survey were excluded (8, 9). The remaining population consisted of 3725 general dental practitioners (GPs). From this population, 200 was selected by systematic random sampling (1:18) to receive a questionnaire in November 1991. No stratification was attempted.

The purpose of the study was explained in a covering letter; the anonymity of the respondents was guaranteed, and no reward was offered. After one selected reminder had been mailed after 2 weeks, 176 answers were received, giving a return rate of 88%. No statistically significant differences on the basis of sex, age, geographic region, and type of practice (private/public) were found between respondents and the remaining population (Table 1). The discrepancy in the indicated population of GPs was mainly due to different sources and years of registration.

The questions contained in this paper were

part of a questionnaire, a major part of which dealt with decisions on diagnosis, treatment, and referrals for ten third-molar cases presented in written and radiologic information. The results of the rest of the questionnaire will be presented in a separate paper. The respondents were asked to state the one-way travel time for the patients to the nearest specialist oral surgery. An indicated travel time less than 30 min was registered as 0 h. Wording of the other questions relevant to the present study will be apparent in the text of the Results section.

Statistics

The chi-square test was used to test whether the distribution of respondents on the basis of sex, age, region of residence, and type of practice differed significantly from the corresponding distribution of the population. Means of independent samples were compared by applying Student's two-sample *t* test. Unless stated, differences did not reach significance at the 5% level. Pear-

Table 1. Percentage distribution of the population of Norwegian general dental practitioners and those who returned the questionnaire, on the basis of age, sex, residence, and occupation

	Respondents (<i>n</i> = 176), %	Population* (<i>n</i> = 4225), %
Sex		
Female	24	26
Male	72	74
(No answer)	4	
Age (in years last birthday)		
Under 35	25	27
35-44	31	32
45-54	25	26
55 and over	15	15
(No answer)	4	
Region of residence		
Eastern	46	55
Southern and western	29	29
Northern and Trøndelag	22	16
(No answer)	3	
Type of practice		
Private practice	65	58
Public dental health service	30	37
Other/no answer	5	5

No group differences reached significance at the 5% level.

* Economically active dentists. Statistics on health personnel 1985 (14), Statistical Yearbook of Norway, 1992, Central Bureau of Statistics of Norway (15).

Table 2. Mean number of patients (\bar{x}) with complaints or lesions associated with a retained or partially erupted third molar during 1 month in general practice

Type of practice	Respondents, <i>n</i>	Patients per month		
		\bar{x}	SD*	Range
Private	109	3.9	3.5	0–20
Public	50	3.5	2.8	0–12
Total†	164	3.8	3.3	0–20

* = Standard deviation.

† = Five respondents did not state type of practice.

son's product moment correlation coefficient was calculated to assess correlation between continuous variables.

When significant differences were detected by univariate analysis, multiple classification analysis (10) was used to assess the bivariate (η) and multivariate (β) effects of the predictor variables sex, age,

region of residence, and type of practice, and the proportion of variance in the dependent variables explained by all predictors together (multiple R^2).

Results

In Table 2 the response to the question, 'State the number of patients you have seen in your practice during the last month with complaints or lesions associated with a retained or partially erupted third molar?' is presented. The total mean number of patients per month was 3.8, with a 95% confidence interval of 3.4–4.3. Private practitioners saw 0.4 more patients in one month than dentists employed in the public dental health service; this difference was not found to be statistically significant.

Fig. 1 shows the frequency distribution of these patients; 31 (19%) of the respondents

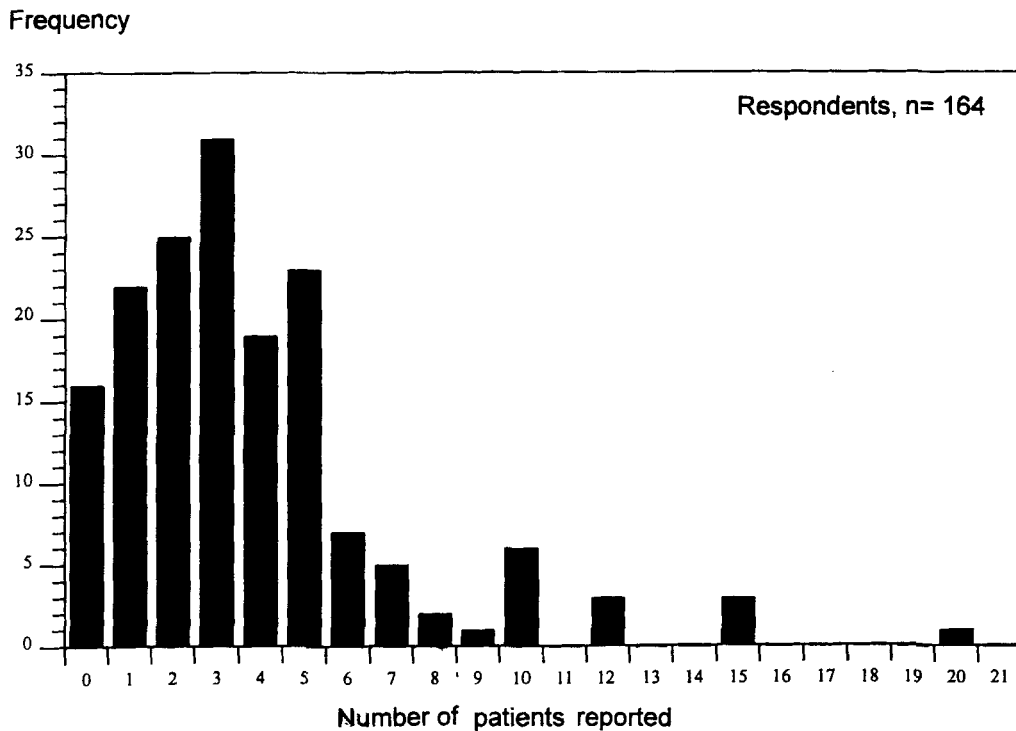


Fig. 1. Frequency distribution of reported number of patients in general practice in 1 month with complaints or lesion associated with third molars.

Table 3. Multiple classification analysis to assess the effect of four predictor variables on the number of patients seen in general practice with third-molar problems during 1 month (grand mean, 3.72; $n = 160$ dentists*)

Predictor variable	Unadjusted eta	Adjusted beta
Sex of dentist	0.10	0.13
Age of dentist	0.22	0.23
Region of residence	0.18	0.19
Type of practice	0.06	0.08

Multiple $R^2 = 0.101$; $p < 0.05$.

* Missing cases were excluded.

saw 3 patients in 1 month, which was the most frequent occurrence, whereas 16 (10%) saw no such patients. Multiple classification analysis (Table 3) showed that the predictor variables explained only 10.1% of the variance in frequency of third-molar problems. Weak correlations between predictor variables were indicated by the small deviations between etas and betas.

The respondents were asked to indicate the frequency of different types of third-molar problems. Table 4 shows the response to one open and five closed answer alternatives for different types of third-molar-related problems. Pericoronitis was indicated as the main problem, constituting 43% of all complaints. The sum of problems is larger than the reported frequency of patients, indicating that some patients had more than one problem at the same time.

The practitioners were asked to state the number of third molars surgically removed in their own practice during the past month. Surgical removal was defined as at least mobilizing a mucoperiosteal flap and using at least one suture for closure. An average of 1.3 third molars (range, 0–12) was removed according to these criteria. The frequency distribution shows that 79 (48%) of the respondents had not operated on a third molar at all during the past month (Fig. 2). Univariate analysis showed a significantly greater frequency of removals by the private practitioners, 1.5 per month, whereas publicly employed dentists removed 1.0 third molar ($p < 0.05$). In addition, a slight tendency for male practitioners less than 45 years

Table 4. Type of third-molar-related problems reported from a general practice patient population (respondents, $n = 161$)

Problem	Mean no. of patients in 1 month
Pericoronitis	2.12
Pain, 'irritation', 'pressure'	1.03
Caries	0.87
Hygiene or periodontal problems	0.68
Cysts, tumors, etc	0.08
Other, unclassified*	0.11
Total	4.89

* Including resorption of second-molar and cheek-biting.

of age to operate on more third molars was noted. No geographic differences were found. Multiple classification analysis showed that only 5.5% of the variance was explained by the predictor variables.

The mean one-way travel time for the patients to the nearest specialist in oral surgery was 1.3 h, with a range of 0–10 h (Table 5). A significantly ($p < 0.01$) increased travel time in the northern region was found, with only slight differences between the west/south and eastern regions. The correlation coefficient between the number of surgically removed third molars in own practice and one-way travel time to an oral surgeon was 0.18.

The practitioners were asked whether they ever referred cases for surgery to dentists who were not specialists. Of the respondents 14% ($n = 173$) indicated that they did, whereas 80% indicated that they did not. Female dentists showed a significantly ($p < 0.01$) increased positive response to this

Table 5. Mean one-way travel time in hours for patients to specialist in oral surgery on the basis of geographic region (respondents = n)

Region	n	Mean travel time in hours	Range
North, Trøndelag	35	2.1	0–10
West/south	50	1.3	0–4
East	76	1.0	0–4
Total	161	1.3	0–10

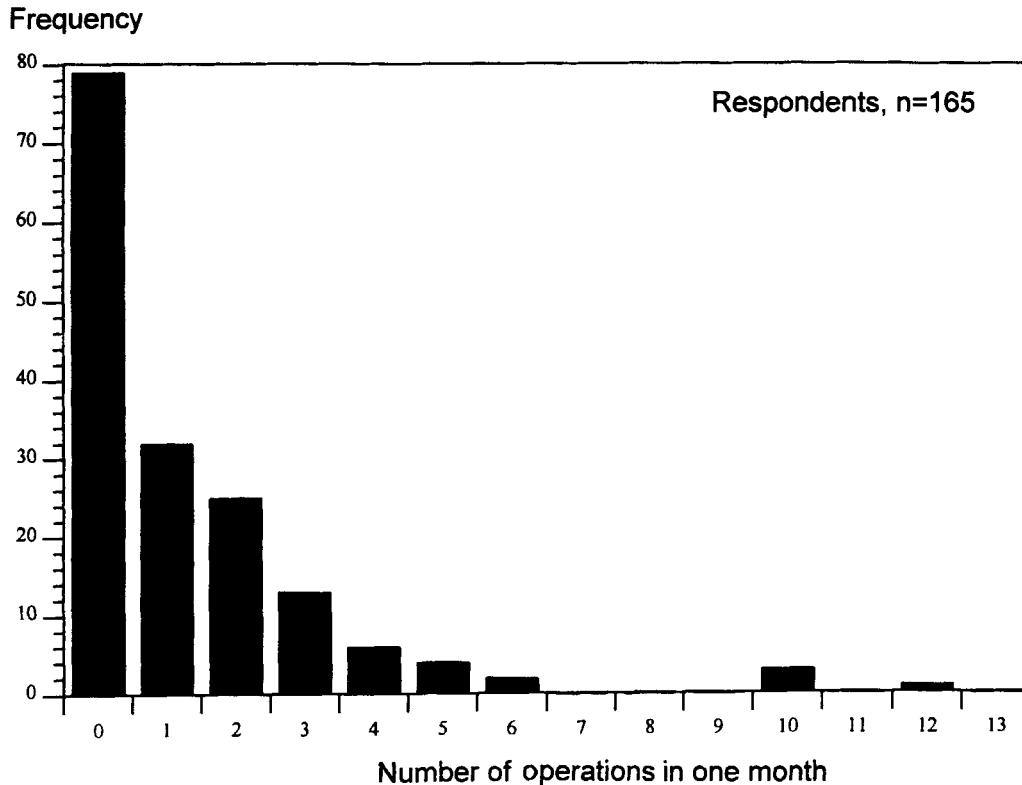


Fig. 2. Frequency distribution of third-molar operations in general practice in 1 month.

question, as did dentists more than 44 years of age ($p < 0.01$) and those serving in the public dental health service ($p < 0.01$). Dentists in the west/south indicated less referrals to non-specialists than their colleagues in the northern and eastern regions ($p < 0.01$).

Discussion

The high response rate of 88% of this survey is to some extent explained by an increased interest created by the diagnostic and treatment questions accompanied by copies of radiographs. The present response rate is notably higher than the 60% of a previous study including only written questions, mailed to a similar selection of Norwegian GPs in 1989 (8, 9). The present results constitute approximately 11% of the total number of questions. The comparable

demographic characteristics of the population and respondents support the conclusion that the validity of the response is adequate.

An average of 3.8 patients were seen in general practice in 1 month with complaints or lesions associated with retained or partially erupted third molars. A similar but individually different respondent group of 300 GPs indicated an average frequency of 4.3 patients per month 2 years earlier, when asked an identical question (8). The 1989 study also showed an increased difference between private practitioners and public dentists which was not detectable in the present study. The indicated frequencies are directly comparable, and the observed differences may thus reflect a tendency towards a reduction in prevalence of complaints or lesions over the 2 years. The reduction occurred mainly in the age group of more

than 20 years, predominantly seen by private practitioners. The observed differences may, on the other hand, be due to a diluted patient influx to the respondents, due to an increase in the number of available GPs, as the calculated incidence rate is slightly increased compared with the 1989 study (8). The difference in observed frequencies between the two studies did not reach statistical significance.

The observed types of third-molar problems indicated that conditions associated with partially erupted third molars dominate. Depending on whether the category 'pain, etc' is included or not, the percentage of complaints from partially erupted teeth is 96 or 75, respectively. A study of dental students by von Wowern & Nielsen (11) demonstrated that during an observation period of 4 years, 26% of 130 third molars were removed owing to mild pain, caries, and pericoronitis. The characteristics of the studied populations may explain differences in relation to the present general population.

A study of the reasons for third-molar extraction by British teaching-hospital dentists (12) showed that 91% of 164 third molars had been removed because of pericoronitis, periodontal problems connected with second molars, and caries. The generalization of results to the entire population is, however, again a problem. Still, it supports the present conclusions that pericoronitis, mild pain, periodontal/hygiene problems, and caries are the dominant complaints from third molars and consequently that partially erupted third molars are at a higher risk of developing situations that indicate their removal.

As the Norwegian population at risk for third-molar problems consists of 900,000 individuals past the age of 16 years (8, 15), the assumption that the observed figures are representative for the whole year and the population, and the number of general practitioners is 4200, the presented frequency indicates an incidence rate of 212 per 100 per year of a situation indicating removal of a third molar. The present results also strongly suggest that the partially erupted third molar has a marked potential for developing symptoms or lesions that will indicate its removal.

The present and previously reported (8) incidence rates of third-molar problems may justify prophylactic removal of symptomless partially erupted third molars as soon as their eruptive potential is exhausted, approximately after the age of 25 years (11, 13), and before the rate of complications increases (1, 4).

The present findings also agree with several reports (5-7) stating that pathologic conditions associated with retained third molars, such as cysts and tumors, are rare. It is, however, likely that these cross-sectional studies of long-term retained teeth will underestimate the occurrence of pathologic conditions due to an unknown rate of earlier removal of retained third molars. The present study may also be biased in this manner, as the Norwegian population more than 30 years of age to some extent has been subjected to prophylactic removal of retained third molars.

The observed frequency of third-molar operations in general practice indicated that the 4200 Norwegian GPs working 10 months a year operate on approximately 55,000 third molars in 1 year. Of these practitioners 82% operate on third molars in their own practice (8); however, this activity seems to be concentrated to 52% of the practitioners with a frequency of at least once a month. Only 1 in 10 dentists operated on third molars as often as once a week.

The observed increased travel time for patients to specialists in oral surgery in the northern region was expected for geographic reason, whereas an anticipated increased travel time in the western/southern, compared with the eastern region could not be demonstrated. The assumption that increased travel time to a specialist would be associated with an increased frequency of surgery in general practice was not supported, as no significant correlation between these variables was found.

Less than one in seven practitioners indicated referral of cases to non-specialists. The characteristics of this comparatively small group was female dentists past the age of 44, employment in the public dental health service, and location in the northern or eastern part of Norway. An explanation may be

that these dentists do not feel comfortable with third-molar surgery, combined with an inadequate access to specialist services in northern Norway.

Conclusions

In an average general dental practice approximately one patient per week is seen with complaints or lesions from predominantly partially erupted third molars. On an average, 1.3 operations of third molars are performed in general practice in 1 month. The activity is concentrated to 52% of the GPs, who perform this kind of surgery at least once a month.

Travel time for the patients to a specialist in oral surgery is increased in northern Norway but is not correlated to indicated surgical activity in practice. Only 14% of the respondents refer surgical cases to a non-specialist dentist.

References

1. Osborn TP, Fredrickson G Jr, Small IA, Torgerson TS. A prospective study of complications related to mandibular third molar surgery. *J Oral Maxillofac Surg* 1985;43:767-9.
2. Nordenram Å. Postoperative complications in oral surgery. *Swed Dent J* 1983;7:109-13.
3. Sisk AL, Hammer WB, Shelton DW, Joy ED. Complications following removal of impacted third molars. The role of the experience of the surgeon. *J Oral Maxillofac Surg* 1986;44:855-9.
4. Kugelberg CF. Peridontal healing two and four years after impacted lower third molar surgery: a comparative retrospective study. *Int J Oral Maxillofac Surg* 1991;19:341-5.
5. Stanley HR, Alattar M, Collett WK, Stringfellow HR, Spiegel EH. Pathological sequelae of 'neglected' impacted third molars. *J Oral Pathol* 1988;17:113-7.
6. Eliasson S, Heimdahl A, Nordenram Å. Pathological changes related to long-term impaction of third molars: a radiographic study. *Int J Oral Maxillofac Surg* 1989;18:210-2.
7. Ahlqwist M, Gröndahl H-G. Prevalence of impacted teeth and associated pathology in middle-aged and older Swedish women. *Community Dent Oral Epidemiol* 1991;19:116-9.
8. Berge TI. Third molars in Norwegian general dental practice. *Acta Odontol Scand* 1992;50:17-24.
9. Berge TI. Oral surgery in Norwegian general dental practice—a survey. Extent, scope, referrals, emergencies, and medically compromised patients. *Acta Odontol Scand* 1992;50:7-16.
10. Andrews FM, Morgan JN, Sondquist JA, Klem L. Multiple classification analysis. A report on a computer program for multiple regression using categorical predictors. Ann Arbor (MI): The University of Michigan, 1975.
11. von Wowern N, Nielsen HO. The fate of impacted lower third molars after the age of 20. A four-year clinical follow-up. *Int J Oral Maxillofac Surg* 1989;18:277-80.
12. Brickley M, Heald H, Shepherd J. Third molar wisdom. *Br Dent J* 1990;169:314.
13. Ventä I, Murtomaa H, Turtola L, Meurman J, Ylipaavalniemi P. Clinical follow-up study of third molar eruption from ages 20 to 26 years. *Oral Surg* 1991;72:150-3.
14. Statistics on health personnel 1985. Oslo: Central Bureau of Statistics of Norway, 1986.
15. Statistical yearbook of Norway 1992. 111th ed. Oslo-Kongsvinger: Central Bureau of Statistics of Norway, 1992.