Number of teeth and tooth loss of former dental school patients

Follow-up study after 10–17 years

Agnar Halse, Olav Molven and Paul J. Riordan
Departments of Oral Radiology, Cariology and Endodontics, Community Dentistry, School of Dentistry, University of Bergen, Bergen, Norway

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Persons (n = 431) who had received endodontic and other treatment at the School of Dentistry in Bergen in the 1960s were invited to attend an examination in 1980, some 10–17 years after their first course of treatment. The age range initially had been 16–55 years. The attendance rate was 55% (149 women and 89 men) and was higher for the older age groups. Data from pre- and post-treatment records were added to the information obtained in 1980. Those who attended in 1980 had had 22.8 teeth at the initial examination and 21.2 teeth after their first course of treatment in the 1960s. In 1980 they had 19.3 teeth. About 20% of the persons had the same number of teeth at all three examinations, and 43% had not lost teeth after completing treatment at the school. Molars and maxillary teeth were most likely to have been extracted. This was also the case for teeth lost during the first course of treatment. Some 4% of the individuals had become edentulous. Conventional dental treatment had not prevented further tooth loss; the number of remaining teeth within each age group was about the same in 1980 as in the 1960s. □ *Dental care; tooth loss*

Agnar Halse, School of Dentistry, Årstadveien 17, N-5000 Bergen, Norway

Epidemiological data on a selected population group—that is, endodontically treated patients at the School of Dentistry in Bergen—was presented in 1976 (1). Their status before and after both endodontic and other treatment was recorded for several variables including tooth mortality.

It could be postulated that the time-consuming nature of treatment and the emphasis placed on prevention in a dental school would have had a positive motivational effect on these patients, which would result in improved dental health. Thus, they might be expected to have had a fairly low tooth mortality after they left the dental school.

We decided to conduct a study to assess the dental status in 1980 of the selected group of patients who had received endodontic treatment in our dental school in the 1960s. We present here the findings on tooth loss and number of teeth. Other aspects, especially the results of the endodontic treatment, will be published in future reports.

Materials and methods

A sample of persons was drawn from among all those who had received endodontic treatment at the University of Bergen School of Dentistry between January 1964 and July 1969 by excluding all less than 16 years old or more than 55 years old at time of treatment and all whose surnames did not begin with one of the letters A–H. This gave a group of 171 men and 260 women.

These persons were contacted by letter in 1980 and invited to attend the School of Dentistry for examination. They were also asked to complete a questionnaire, including mainly questions about dentist-visiting pattern, the type of treatment performed, and dental complaints during the last few years. The attendance rate for examination was 55.2% (Table 1). Eight edentulous persons who answered the questionnaire are included in the attendance group. Of those who did not attend, 14.6% answered the

Table 1. Percentage (number) of invited, former endodontic patients grouped by response

Answered questionnaire and attended	55.2%	(238)
Answered questionnaire, no attendance	14.6%	(63)
Sum questionnaries answered 69.8%		
Known address, no answer despite reminder	18.8%	(81)
Unknown address	8.4%	(36)
Abroad	1.4%	(6)
Dead	1.6%	(7)
Total	100.0%	(431)

questionnaire, but most of them lived too far away for attendance to be practical. The rest, 30.2%, did not answer for different reasons (Table 1).

A considerable proportion of the youngest individuals, especially former students, had moved from the Bergen area, and the attendance rate was 26.4% in the youngest group. The attendance increased with increasing age, to 80% in the oldest group. Details on those who were examined are given in Table 2.

A 14-film series of intra-oral radiographs was taken of each subject at the Department of Oral Radiology. The radiographs were examined and the number of teeth recorded for each case. Information from earlier pre- and post-treatment radiographs was added, and the tooth loss specified. As indicated above, parts of the information collected will be presented in later reports.

Table 2. Attendance rate percentage of original number and number of attending persons distributed by age (1980) and sex

Age, years	Males	Females	Males + females
26–35	28.6%; 8	24.0%; 6	26.4%; 14
36–45	25.6%; 11	43.9%; 25	36.0%; 36
46–55	65.1%; 28	66.3%; 55	65.9%; 83
56–65	69.8%; 30	63.5%; 47	65.0%; 77
66–75	92.3%; 12	72.7%; 16	80.0%; 28
All age groups	52.3%; 89	57.1%; 149	55.2%; 238

Results

Number of teeth

The persons attending the examination in 1980 had 22.8 teeth when treatment was started in the 1960s and 21.2 teeth on completion of that course of treatment. In 1980 their average was 19.3 teeth (Fig. 1). The non-attendants had somewhat higher pre- and post-treatment numbers, 24.4 and 22.6, respectively (t test, $p < 0.001$); differences were caused mainly by the low return percentage for the youngest age group—that is, patients with the lowest tooth mortality.

We compared the number of teeth within corresponding age groups for the whole material in the 1960s and the 1980 attendants (Fig. 2). The difference found for the age group 56–65 years should be regarded as incidental. There were no sex differences for the whole material or within age groups.

Tooth loss

The attendants had had an average loss of 1.60 teeth during treatment and 1.95 during the period after they left the School of Dentistry. The non-attendants had approximately the same tooth loss during the treatment. Fig. 3 shows the tooth loss distributed in accordance with sex and age groups both for the treatment and post-treatment period. No definite pattern was disclosed.

One fifth of the patients had lost no teeth during the whole period.

Eight patients had lost on an average 12.9 teeth and had become edentulous during the post-treatment period, and one had all teeth extracted as part of treatment in the School of Dentistry.

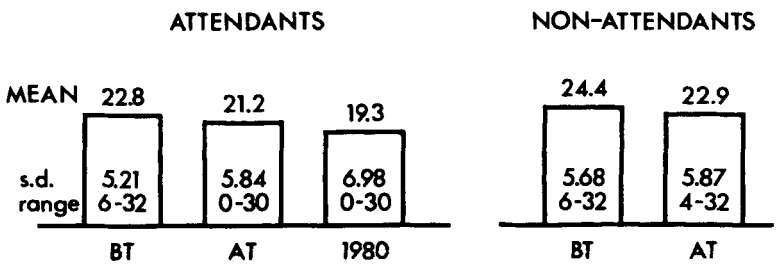

Fig. 1. Number of teeth before treatment in 1960s (BT), after treatment (AT), and in 1980.

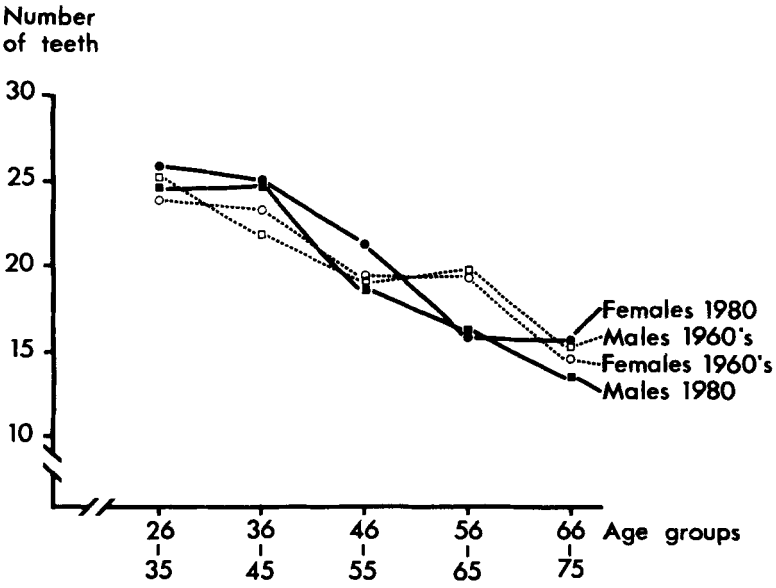

Fig. 2. Number of teeth within corresponding age groups before treatment in 1960s and in 1980. The number of teeth is at the same level on both occasions.

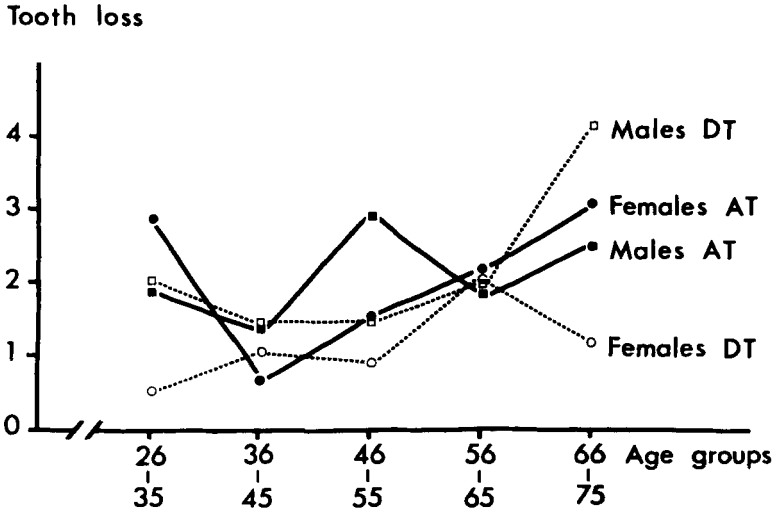

Fig. 3. Mean number of teeth lost during treatment (DT) and after treatment (AT) as a function of sex and age (1980).

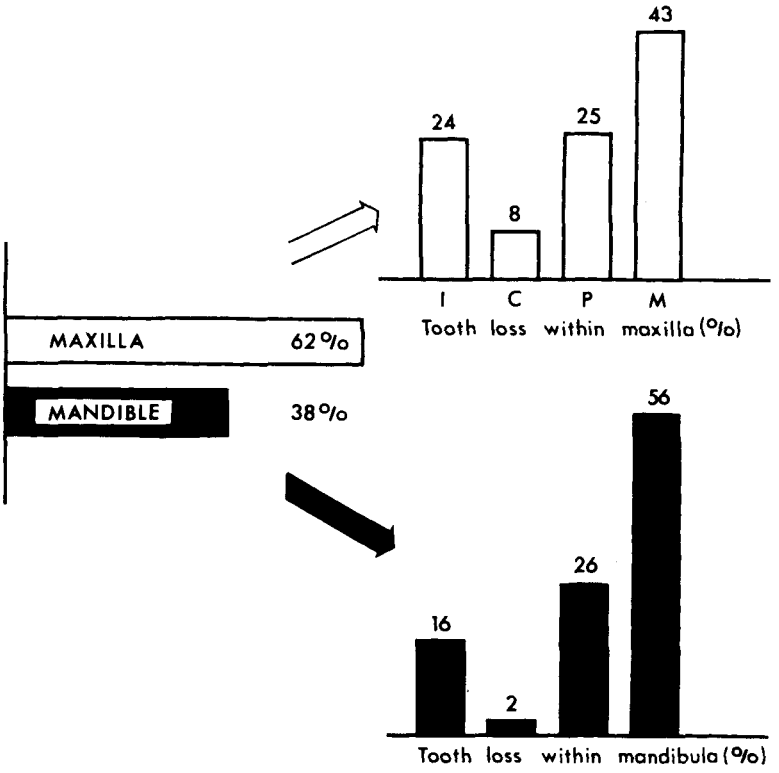

Fig. 4. Tooth loss distribution by jaw and tooth type.

The loss of maxillary teeth was greater than the loss of mandibular teeth (Fig. 4). The loss of molars was predominant in both jaws. There was a lower loss of premolars and incisors, whereas canines showed the distinctly lowest reduction in number.

An AID analysis (2) was performed to examine possible effects of the variables sex, age, and dentist-visiting pattern on tooth number and tooth loss. It showed a slight positive effect of regular dental care.

Discussion

The investigated sample was a selected one. There was an overrepresentation of females and persons aged 45 years or more, a finding that has also been made for Swedish dental school patients (3). The relatively high drop-out percentage in the age groups 26–35 and 36–45 years might lead to wrong conclusions by considering tooth loss and number of teeth for the entire sample. Systematic errors of this type was avoided by comparing the values of each age group. Furthermore, a systematic study of patients in our dental school (4) has shown that there are few underprivileged and also few white-collar workers among them. A comparison with the general population, therefore, involves uncertainty. But, as mentioned in the first study of the present sample (1), the group certainly belongs to a high-caries and high-periodontal disease population. The high tooth mortality, both during treatment in the dental school and during the following years, confirms this. Typically, maxillary tooth loss and loss of molars dominated, whereas canines showed the distinctly lowest reduction in number.

Few studies give tooth numbers of adult Norwegians and usually for selected groups (5). Our observed numbers of teeth were higher both in the 1960s and in 1980 than those found for comparable age groups by Johansen (5). This finding was expected, since his selectional criterion was individuals

treated in general practice with extractions performed at their dental visit, whereas ours was endodontic treatment in a teaching clinic.

Cohen's study (6) includes findings from a Norwegian county, Sør-Trøndelag, for the age group 35–45 years, indicating an average of nine missing teeth. Our average status for the corresponding age group is better. Again the finding is not unexpected, since edentulous individuals were included in the Sør-Trøndelag survey and the great majority of our patients come from an area with better supply of dental services than in Sør-Trøndelag.

The nearly linear decrease in number of teeth with age (Figs. 2 and 3), entailing a relatively 'constant' loss of teeth during a period of time independent of the number of teeth present, is a common finding in epidemiological studies. We can therefore support Håkansson's (7) statement that 'In similarity with earlier information from a manifold of epidemiological investigations it is found in the present investigation that the number of remaining teeth is less the older an individual is.'

The comparison of corresponding age and sex groups for the whole material in the 1960s and for the follow-up group in 1980 is interesting (Fig. 3). Ten years or more before our examination in 1980 the great majority of the patients underwent a time-consuming treatment in the School of Dentistry. They were brought to a certain clinical standard and, above all, thoroughly informed about and motivated for dental hygiene. From these facts one might have expected that further tooth loss should have been minimized. In other words, their tooth mortality during the 1970s ought to be less. Our findings were, however, disappointing. The patients had had a relatively high tooth mortality after they left the dental school. Thus their average numbers of remaining teeth showed nearly the same pattern in 1980 as was found for the whole material before treatment was started (Fig. 3).

Several factors may explain this situation. Because of the selection criterion a large proportion of the patients included in the study had extensively restored dentitions. Another factor acting in a negative direction is that, in spite of strong motivation, the dental care habits after supervision in the dental school were not of the recommended standard (O. Molven et al., unpublished observations). Too many patients were sporadic visitors during the 1970s, and extractions are relatively common among such patients (8).

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