On becoming edentulous. An investigation into the dental and behavioural reasons for full mouth extractions.
Bouma, Jelte

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Chapter three

CARIES AND TOTAL EXTRACTION IN A MEDIUM-SIZED CITY IN THE NETHERLANDS

3.1 Introduction

The percentage of edentulous people is a somatic criterion for expressing the dental health condition of a population as a whole. Although it could be considered a professionally determined concept, it nevertheless gives some insight into the success of the dental care system (1-3). A high rate of edentulousness shows that the dental health care system has been unable to utilize the available scientific dental knowledge and sophisticated technology for the maintenance of lifelong dental health. Therefore, it is important to investigate why people despite (long) periods of regular attendance "decide" to have full dentures. Another interesting group of people are those who have stopped regular dental visits or never have been to a dentist on a regular basis. Information about the social background, their behavioural past and their motives for total extraction might help to improve the success of the dental health system. In 1982 a combined sociodental research project was started in the city of Groningen in order to gain insight into the dental and social reasons for total extraction.

The aims were a): to describe the dental condition of patients who underwent total extraction during that year and b): to gather information about the social background, knowledge, attitude and behaviour towards oral health and full dentures.

1) This chapter has been published as: Bouma J, Poel ACM van de: Caries and total extraction in a medium-sized city in The Netherlands. Community Dent Oral Epidemiol 1985; 13: 168-72.
In this chapter the caries status of the patients participating in this research project is described in relation to the different social backgrounds of the patients and their dental attendance patterns.

3.2 Materials and methods

At the beginning of 1982 all dental practitioners (68) in the city of Groningen (170 000 inhabitants) were asked to participate in this research project. The project was supported by the Local Board of the Dutch Dental Association. Ninety-one percent of the dentists supported this investigation by collecting the extracted teeth and by filling out a short questionnaire concerning the dental status of the patient and the reason (diagnosis) for total extraction. The dentists also asked their patients to fill out a questionnaire concerning behavioural aspects of total tooth loss. Of the 134 patients 78% returned their questionnaires to the Department of Social Dentistry. Patients who participated in this study were those who received full dentures during 1982, regardless of whether they already had partial dentures.

The teeth were collected by the dentists and stored in jars containing a 10% formaline solution (one jar per patient). After identification each tooth was categorized according to the following criteria: sound (no cavity or filling), caries (clear lesion in enamel), filled (otherwise sound), filled with primary caries, filled with secondary caries. After that the number of filled and/or decayed surfaces were recorded. If teeth were beyond repair by simple means (according to State Health Insurance rules) they were categorized as extraction indicated.

1) Almost 70% of people in Holland, who earn less than about £ 10 000, belong to this compulsory insurance system known as the Sick Fund.
3.3 Results

3.3.1 Social background and dental attendance pattern

Table 3.1 shows some general background information about the total group. Table 3.1 shows that although the mean age of the patients was 44.2 yr, more than one-third of this group was younger than 35 yr old at the time of extraction.

Table 3.1

Social background of patients who underwent total extraction in Groningen in 1982

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-34</td>
<td>37</td>
<td>(35.9)</td>
</tr>
<tr>
<td>35-54</td>
<td>33</td>
<td>(32.0)</td>
</tr>
<tr>
<td>&gt; 55</td>
<td>33</td>
<td>(32.0)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>54</td>
<td>(52.9)</td>
</tr>
<tr>
<td>Women</td>
<td>48</td>
<td>(47.1)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>56</td>
<td>(55.4)</td>
</tr>
<tr>
<td>Middle</td>
<td>27</td>
<td>(26.7)</td>
</tr>
<tr>
<td>High</td>
<td>18</td>
<td>(17.8)</td>
</tr>
<tr>
<td>Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Health Insurance</td>
<td>73</td>
<td>(71.6)</td>
</tr>
<tr>
<td>Other</td>
<td>29</td>
<td>(28.4)</td>
</tr>
</tbody>
</table>
A relatively high proportion of the patients were classified in the middle and high education group. The relationship between age, sex and education was analyzed in order to find out to what degree these variables were interrelated. Only the relationship between sex and education appeared to be statistically significant \( (X^2 = 7.7499; 2 \text{ df}; 0.05 > P > 0.02) \), i.e. the males had a higher educational level.

Almost 28% of the patients paid regular visits to the dentist up to the date of extraction; 46.5% had stopped regular visits many years before the study; 25.7% stated that they only visited the dentist for symptomatic reasons. The mean ages for these groups were 48.1, 41.1 and 45.2 respectively. These differences did not reach the level of significance (t-test, \( P = 0.05 \)). The same applies to the variables sex, education and type of insurance \( (X^2\text{-test}) \). Table 3.2 shows the result of the three groups.

Table 3.2

| Age, sex, education and type of insurance according to dental attendance pattern |
|--------------------------------------|------------------------|------------------------|
|                                      | Regular attenders n=28 | Regular in the past n=47 | Symptomatic attenders n=26 |
| Average age                          | 48.1                  | 41.1                   | 45.2                   |
| Men                                  | 35.7\%                | 59.0\%                 | 57.7\%                 |
| Low education                        | 42.9\%                | 47.8\%                 | 80.0\%                 |
| State Health Insurance               | 57.1\%                | 74.5\%                 | 80.0\%                 |

As regards the reasons for total extraction, given by the patients, the three groups differed depending on the dental attendance pattern (Table 3.3).
Table 3.3

Reasons for extraction, given by the patients, according to dental attendance pattern

<table>
<thead>
<tr>
<th></th>
<th>Regular attenders n=28</th>
<th>Regular in the past n=47</th>
<th>Symptomatic attenders n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>48.1%</td>
<td>25.9%</td>
<td>17.1%</td>
</tr>
<tr>
<td>Aesthetic reasons</td>
<td>14.8%</td>
<td>52.3%</td>
<td>43.5%</td>
</tr>
<tr>
<td>Bad dental condition</td>
<td>40.7%</td>
<td>43.2%</td>
<td>73.9%</td>
</tr>
<tr>
<td>Periodontal reasons</td>
<td>37.0%</td>
<td>11.4%</td>
<td>26.1%</td>
</tr>
<tr>
<td>Fatalism</td>
<td>25.9%</td>
<td>25.0%</td>
<td>21.8%</td>
</tr>
</tbody>
</table>

Regular attenders, relatively frequently gave pain and periodontal problems as a reason for total extraction. Those who had stopped visiting the dentist on a regular basis gave aesthetic reasons as the most important factor, while the patients who had never visited the dentist regularly stressed their bad dental condition.

3.3.2 Dental status at the time of extraction

At the time of extraction 55% of the patients had only natural teeth, whilst 45% wore partial dentures. The average age of partial denture wearers was higher (48.1 versus 40.5) and there were significantly more women wearing partial dentures. There was no significant relationship between the dental attendance pattern and educational level. The average number of teeth, for the total group, at the time of extraction was 14.2. The average number of teeth in the group with only natural teeth was 15.4 and for the group with partial dentures it was 9.9.
Table 3.4

Frequency distribution of number of teeth at the time of extraction for the group "Natural teeth only"

<table>
<thead>
<tr>
<th>Number of teeth</th>
<th>Natural teeth only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=55</td>
</tr>
<tr>
<td>0-10</td>
<td>20.0%</td>
</tr>
<tr>
<td>11-15</td>
<td>27.3%</td>
</tr>
<tr>
<td>16-20</td>
<td>34.5%</td>
</tr>
<tr>
<td>≥ 21</td>
<td>18.2%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
</tr>
<tr>
<td>x</td>
<td>15.4</td>
</tr>
<tr>
<td>SD</td>
<td>5.9</td>
</tr>
</tbody>
</table>

Table 3.4 shows the frequency distribution of the total number of teeth for the group with only natural teeth. An overall impression of the dental status of the patients can be derived from the DEMFT index. The E (extraction indicated) component, a subdivision of the D component, was added because the number of teeth classified as extraction indicated gives more information about active caries than the D component (Fig. 3.1). Table 3.5 shows the DEMFT figures for the total group and for some subgroups.

People wearing partial dentures had a higher DEMFT value than those with only natural teeth. Patients with a high educational level had a higher DEMFT value. The differences between regular and symptomatic attenders, men and women and between the three age categories did not reach a significant level.
Fig. 3.1 D, E, M, F and S(sound) figures in relation to dental attendance pattern. R = regular, R_p = regular in the past, but stopped, S = symptomatic. [ ]: statistically significant (t-test, P<0.05).

Table 3.5

DEMFT figures for the total group and for some subgroups

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>( \bar{x} ) (SD)</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural teeth only</td>
<td>55</td>
<td>22.1 (4.8)</td>
<td>-2.1515</td>
<td>0.05&gt; P &gt; 0.02</td>
</tr>
<tr>
<td>Partial dentures</td>
<td>45</td>
<td>24.1 (4.4)</td>
<td>0.01&gt; P &gt; 0.001</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>56</td>
<td>21.6 (5.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>27</td>
<td>23.7 (4.2)</td>
<td>-2.7947</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>18</td>
<td>25.3 (3.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>22.8 (4.8)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Fig. 3.1 the relationship between dental attendance pattern and D, E, M and F is shown. As expected, regular attenders had less D and E teeth than irregular attenders, whereas, somewhat surprisingly, they had an average of 3.5 teeth with active caries (D+E) despite their 6-monthly dental visits. Only one patient was reported as having an agreement with their dentist for future extractions. It might therefore be concluded that the question of the need for a full clearance in the future was not openly discussed between the parties.

Differences in the number of sound teeth found in "regular" and "symptomatic attenders" (3.3 and 5.8, respectively) is also of interest. There are three possible explanations for these differences; 1) dentists can, themselves, sometimes be a threat to sound teeth (for example when initial cavities are filled when they would actually not become a cavity), 2) people with a good dentition are less motivated to visit the dentist regularly, and 3) patients who visit the dentist regularly postpone the decision for total extraction until there is no other alternative.

In Figs. 3.2 and 3.3 the condition of the individual teeth in the maxilla and mandible, respectively, is shown for the group with "Only natural teeth". Only a small number of the teeth had no caries. The canines and incisors in the maxilla and mandible seemed to be in a slightly better condition than the molars and premolars.

The large number of missing molars and premolars in the maxilla and mandible must certainly have affected the chewing ability of most of the patients. The number of patients with missing front teeth in the maxilla and especially the mandible is remarkable. This together with the fact that the front teeth were very often decayed and in some cases were even categorized as "extraction indicated" explains why so many patients (47%) gave aesthetic reasons as a determining factor for extraction.

In the group wearing partial dentures the condition of the individual teeth in the mandible was, in general, the same as for people with only natural teeth. This was not the case
Fig 3.2 Condition of individual teeth in maxilla for people with natural teeth only


Fig. 3.3 Condition of individual teeth in mandible for people with natural teeth only
with the maxilla. Thirteen patients wore full maxillary den-
tures at the time of extraction. More teeth may have been
replaced by partial dentures with front teeth, because a
much smaller percentage (29%) gave aesthetic reasons as a
determining factor for total extraction.

3.4 Discussion

When talking about total extraction with dental practitio-
ners they all agree that the boom in total extraction is
over. Although this might be true for most of the dentists,
it is remarkable that a relatively small group (30%) ac-
counted for 80% of the total extractions in the city of Gro-
ningen. Silversin et al (4) concluded that factors like the
personality and values of the dentist must play an important
role in explaining differences in preventive behaviour on
the part of the practising dentist. It would be worthwhile
to find out how far these factors are responsible for the
differences in the number of total extractions or wether
these differences simply reflect differences in characteristics of dental practices (i.e., number of patients, age and
socioeconomic status of the patients, etc.). However, the
fact that there were only 137 total extractions during the
11-month research period in a city of almost 170 000 inhab-
itants may reflect the impact of increasing dental conscious-
ness together with the growing number of dentists. In The
Netherlands, like in many other Western countries, this ten-
dency towards better dental health has been shown to be true
in the case of children (5). The situation, as regards to
adults, is not so clear due to a shortage in data. When
looking at the scarce data concerning edentulousness, there
does not seem to be much improvement.
The percentage of edentulous adults seems to be quite stable
(about 30%; 6), although there might have been a slight im-
provement. There was no dramatic decline, as was the case in
England between 1968 and 1978 (7). It is possible that now-
adays people are more inclined to postpone the decision for

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total extraction by initially opting for partial dentures. As this research only concerns total extraction this tendency might only become evident if the study were repeated in 5 or 10 yr. Although the percentage of edentulous people in the population of 16 yr and over in England dropped from 37% to 29% between 1968 and 1978, the percentage of people who were given full dentures directly decreased only slightly, from 51% to 49%, during the same period (7). This figure was 55% in Groningen in 1982. It would be interesting to investigate whether or not the increasing number of dentists and a growing dental awareness influences the preference of dentists and patients for partial dentures as opposed to immediately fitting full dentures.

Another consideration is the impact of the dental health care system on the dental health of the population. Eighty percent of the group "Symptomatic attenders" could be categorized as being of a low SES. Lennon (10) stated that the potential demand among all social groups depends to a considerable extent upon the availability of dentists rather than upon inherent attitudes towards dental treatment. It may be expected that the present trend in The Netherlands towards an increasing number of dentists and a more equal distribution of them will result in a reduction in the number of "symptomatic attenders".

A relatively large group (46.5%) were non attenders but had been regular attenders in the past. Although the reasons for that will be analyzed in more detail in the future, the most important reasons were: anxiety, bad experiences with the dental treatment and fatalistic feelings about the possibility of keeping your own teeth for a lifetime. It should, however, be kept in mind that the Dutch State Health Scheme might be a barrier to going to the dentist having once stopped, because if the patient stops his regular dental visits he can only revert to the State Health Scheme if he pays for the necessary dental treatment (11).

The question of whether regular dental visits are useful in delaying the moment when one gets full dentures is a crucial one. The dental health impact of regular attendance might be
expressed in terms of the age at which regular attenders become full denture wearers. Another indication of the effort spent in delaying the advent of full dentures might be whether people wore partial dentures first before becoming full denture wearers. However, in this study no substantial variation in the percentage denture wearers and in the average age could be found between regular attenders and non attenders. This conclusion would not make sense if only a small proportion of the regular attenders finally end up as full denture wearers. However, when looking at epidemiologic data, it is clear that only a small proportion of older people do not have full dentures (12). Therefore, when using the above criteria, there is no clear evidence that dental attendance contributes substantially to the longevity of natural teeth. Finally there is one possible explanation which has not yet been mentioned: non attenders had a naturally better dental condition than regular attenders. As a result they would not have much trouble with their dentition, which means that there would be fewer reasons for them to visit the dentist on a regular basis. There is some evidence to support this hypothesis. The patients were asked whether they had had many problems with their teeth in the past. More of the regular attenders (31%) compared with the symptomatic attenders (18%) said they had. No definite conclusion can be drawn from this research. Future research with a clear hypothesis could give more insight into the extent to which the dental health care system contributes to the dental health of the population.
References


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