Patterns and reasons for tooth extraction at the Winterveldt Clinic: 1998–2002

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Published
2009

Journal Title
South African Dental Journal

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Patterns and Reasons for Tooth Extraction at the Winterveldt Clinic: 1998-2002

ABSTRACT

Background: Tooth extraction is the most common form of dental treatment in developing countries despite significant advances in medicine and dentistry. Dental caries, periodontitis, orthodontics, trauma and prosthodontics are the main reasons for extractions.

Objective: To determine the patterns of tooth extractions and the reasons for these extractions in a primary care dental clinic attached to a dental training institution.

Methods: A descriptive, retrospective and quantitative study design was followed. Data was gathered from 3793 patient files to record the following variables: age, gender, type of tooth extracted and reason for the extraction.

Results: Almost 60% of teeth extracted were lower and upper molars. The main reasons for extractions were dental caries (47.9%) and periodontitis (22.6%).

Conclusions: The findings of the study show an urgent need to reverse the trends in extractions and more emphasis should be placed on primary prevention in order to reduce tooth loss.

INTRODUCTION

The Winterveldt Primary Oral Health Care Clinic in Gauteng province is linked to a dental training institution. Ideally in such a clinical setting a full range of dental treatment procedures should be offered to all patients seeking care. However, due to limited resources in developing countries, dental treatment options, especially in the public sector, are limited to simple care procedures, especially in the public sector. Despite these circumstances, extractions done in these countries and reasons reported tend to mimic developed countries, albeit at much higher rates. To date two studies have investigated reasons for extraction in South African populations, with dental caries responsible for 72% and periodontal diseases accounting for 29% of extractions. Not all teeth are extracted at the same frequency; there is evidence of patterns of tooth type lost due to extractions. Anatomical or morphological features, eruption sequence and position in the arch, are amongst reasons why different teeth are susceptible to different dental conditions or diseases and hence reasons for their extractions. Clearer trends on tooth type extracted and associated reasons have emerged from studies. For example maxillary incisors are extracted mainly due to dental caries, trauma and periodontal disease while mandibular molars are lost almost exclusively due to dental caries and periodontal disease. Premolars are mainly extracted due to dental caries and in a subset of patients undergoing orthodontic treatment space consideration necessitates extraction to correct anterior malocclusion. Eruption problems, impactions and pericoronitis are associated with lower third molars. Gender differences reveal that dental caries and periodontal diseases are reasons why women extract their teeth while men lose them due to prosthetic reasons and periodontal disease. As more and more studies are published, patterns and reasons for dental extraction will solidify and coalesce to give a uniform picture. However, differences in study design and most importantly, the differences in the underlying social determinants of oral diseases and access to care will continue to influence the patterns and reasons for tooth extractions.

The aim of this study was to assess the patterns of and reasons for tooth extractions in patients reporting for treatment at Winterveldt Clinic in the years 1998 to 2002.
The files of patients reporting for treatment at the Winterveldt clinic from 1998 to 2002 were used to collect data. Consent to use these files was obtained from the Medunsa Oral Health Centre, as the clinic is a satellite of University of Limpopo (Medunsa campus). Consent from patients was not required, as their names were not used. It was however considered and clarified during the initial consultation that patient information may be used for research purposes.

A descriptive, retrospective and quantitative study design was followed. A total of 3793 patient records were included. Information on gender, age, year of consultation, type of tooth and reason for extraction was captured prior to analysis in SPSS (version 13). The administration form used for patient management recorded the main complaint of the patient and final diagnosis of the clinician. For the purpose of this study the clinician’s diagnosis was recorded as the reason for the extraction. The types of teeth were categorised into upper incisors + canines, lower incisors + canines, upper pre-molars, lower pre-molars, upper molars and lower molars. Two categories of age were created for comparison, ≤ 40 years and > 40 years. The frequency distributions of all the variables were explored. To assess the levels of significance between the demographic factors and types of teeth extracted and their reasons the Chi-square test was applied, and a p-value < 0.05 was considered significant.

Clinical records may be prone to inaccuracies and poor quality. However, due to large sample size in the study; these are unlikely to significantly alter the findings of the study.

RESULTS

A total of 3793 patient records were included in the study, with a total of 5919 extractions being performed. Of the total patient sample, 57% were female. The age ranged from 7 to 98 years, with a mean (SD) age of 41.5 (17.6) years.

A third (33.8%) of all teeth extracted were lower molars (Table 1). This was followed by upper molars at 28.2%. There was a significant difference in the type of teeth extracted by gender and age group. Males were more likely to extract upper molars compared to females. Amongst the patients ≤ 40 years, almost a half (46.9%) of all the teeth extracted were lower molars, compared to just less than a quarter (23.9%) in those aged more than 40 years. In the younger age group, 75% of all teeth extracted were molars (Table 1).

Almost a half (47.9%) of extractions were due to dental caries and just more than a fifth (22.6%) due to periodontitis (Table 2). Few teeth were extracted for trauma, orthodontics (this often meant the few remaining teeth extracted for a full set of dentures) reasons. Other reasons for extraction included, for example, impactions, pericoronitis, restorative failure, failed endodontics and dentine sensitivity due to abrasion. There were significant differences in reasons for extractions by both gender and age group. Females were more likely to extract teeth due to dental caries and less likely due to periodontitis compared to males. Amongst the patients ≤ 40 years, almost three-quarters (72.3%) of all extractions were due to dental caries. In the older group a similar percentage of extractions were due to dental caries and periodontitis (Table 2). Analysing only first and second molars, 60% were extracted due to dental caries and 17% due to periodontitis.

DISCUSSION

The findings of this study further confirm those reported elsewhere,10,14 both in terms of type of teeth most often extracted as well as the reasons for the extractions. Molar teeth, slightly more in the mandible compared to maxilla, were the teeth most often extracted. More than 70% of teeth were extracted due to dental caries and periodontal disease. The few teeth extracted

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**Table 1: Percentage distribution of teeth by group, overall, and by gender and age group**

<table>
<thead>
<tr>
<th>Tooth group</th>
<th>N</th>
<th>Overall %</th>
<th>Female</th>
<th>Male</th>
<th>≤ 40 year</th>
<th>&gt; 40 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper incisors &amp; canines</td>
<td>613</td>
<td>10.4</td>
<td>11.0</td>
<td>9.6</td>
<td>7.5</td>
<td>12.6</td>
</tr>
<tr>
<td>Lower incisors &amp; canines</td>
<td>568</td>
<td>9.6</td>
<td>10.1</td>
<td>8.9</td>
<td>3.8</td>
<td>14.0</td>
</tr>
<tr>
<td>Upper pre-molars</td>
<td>619</td>
<td>10.5</td>
<td>10.8</td>
<td>10.0</td>
<td>8.4</td>
<td>12.0</td>
</tr>
<tr>
<td>Lower pre-molars</td>
<td>449</td>
<td>7.6</td>
<td>8.0</td>
<td>7.0</td>
<td>5.2</td>
<td>9.4</td>
</tr>
<tr>
<td>Upper molars</td>
<td>1669</td>
<td>28.2</td>
<td>26.6</td>
<td>30.4</td>
<td>28.3</td>
<td>28.1</td>
</tr>
<tr>
<td>Lower molars</td>
<td>2001</td>
<td>33.8</td>
<td>33.5</td>
<td>34.2</td>
<td>46.9</td>
<td>23.9</td>
</tr>
</tbody>
</table>

P = 0.008

**Table 2: Percentage distribution of reasons for extractions, overall, and by gender and age group**

<table>
<thead>
<tr>
<th>Reasons</th>
<th>N</th>
<th>Overall %</th>
<th>Female</th>
<th>Male</th>
<th>≤ 40 year</th>
<th>&gt; 40 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodontitis</td>
<td>1339</td>
<td>22.6</td>
<td>19.3</td>
<td>27.1</td>
<td>6.7</td>
<td>34.7</td>
</tr>
<tr>
<td>Dental Caries</td>
<td>2839</td>
<td>47.9</td>
<td>50.8</td>
<td>43.7</td>
<td>72.3</td>
<td>29.3</td>
</tr>
<tr>
<td>Orthodontics</td>
<td>113</td>
<td>1.9</td>
<td>1.7</td>
<td>2.2</td>
<td>3.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Trauma</td>
<td>105</td>
<td>1.8</td>
<td>1.6</td>
<td>2.0</td>
<td>2.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Prosthodontics</td>
<td>527</td>
<td>8.9</td>
<td>10.2</td>
<td>7.2</td>
<td>1.1</td>
<td>14.8</td>
</tr>
<tr>
<td>Others</td>
<td>1010</td>
<td>17.0</td>
<td>16.5</td>
<td>17.8</td>
<td>14.0</td>
<td>19.3</td>
</tr>
</tbody>
</table>

P < 0.0001
due to trauma may be because these are treated by or referred to specialised facilities. Differences by gender and age for both tooth type and reasons were also similar to that reported.\textsuperscript{16,17} For example, dental caries was by far the most common reason for tooth extractions in the younger age group while in the older age group both dental caries and periodontal disease being almost equally as common.

Permanent molars have larger surface areas, deeper pits and fissures to lodge foods, they erupt early into the mouth resulting in prolonged duration of exposure to an unfavourable oral environment.\textsuperscript{16,17} Accordingly molars, unlike other teeth, are more susceptible to oral diseases including dental caries, which is more common in the young.\textsuperscript{18-20} A possible further reason why teeth are lost due to dental caries in the young is that they tend to engage in unhealthy oral health habits at the time in which their dentition is still developing. During this period these individuals have not formed good oral hygiene habits and practices to avoid the development of dental caries.\textsuperscript{19,22} Periodontal disease is a chronic irreversible condition, its effects are cumulative in nature, such that once an individual presents with bone loss, it cannot be regained.\textsuperscript{21,22} Consequently, those individuals who develop periodontal disease at younger ages are likely to present with the worst form of the condition later in life. It is for this reason that periodontal disease is regarded as a disease of the aged, while in fact it is a cumulative destruction of periodontal tissues over time. It is not surprising therefore that most extractions done after the age of 40 years will be mainly due to periodontal disease as opposed to dental caries or any other condition as the periodontal disease would have advanced to stages where no other intervention was suitable but extraction - particularly in poor communities such as in Witenveldt.\textsuperscript{1,2,4,25}

Gender differences indicate that females extracted more teeth due to dental caries than males. This could be due to their affinity for cariogenic foods, and their likelihood to seek dental treatment earlier.\textsuperscript{26} Males on the other hand extracted teeth more due to periodontitis and trauma which could be as a result of their health-seeking behaviour and involvement in dangerous activities. Literature suggests that males in general present with more mortality than morbidity, a consistent dental analogy would mean more tooth extractions (due to periodontal disease) than extensive dental treatment, as they wait for extended periods of time before they seek for any medical or dental help.\textsuperscript{27}

The findings emphasise the need to reverse the trends in the number of extractions carried out. This high number of extractions may be due to patients demanding an extraction even if a restorative approach is offered; patients presenting late for care and resources and infrastructure may not always be available to provide a comprehensive service. To reduce the number of extractions being carried out requires a paradigm shift in making health promotion and prevention the most important strategy. With most dental caries occurring on the occlusal surfaces of permanent first and second molars\textsuperscript{28-30} - and in this study molar teeth were most often extracted and mainly due to dental caries, especially in the younger age group - there is an urgent need to fissure seal permanent first and second molars shortly after eruption to achieve the maximum protective effect\textsuperscript{29} as this preventative intervention has been found to be both effective and cost-effective in reducing occlusal surface dental caries in permanent molars.\textsuperscript{28,30,31} This will reduce the burden of dental caries and furthermore decrease the future costs of surgical, restorative and prosthetic treatments. Other acceptable and cost-effective measures to control and prevent dental caries, especially in younger populations, include atraumatic restorative treatment (ART)\textsuperscript{32} and daily brushing with fluoridated toothpastes.\textsuperscript{33}

Changing the strategy to a focus on health promotion and prevention, whilst dealing with the pain and sepsis that presents daily, should substantially enhance the training experience of oral health students. This experience may also facilitate changes urgently required, especially in the public oral sector, from an extraction service to a more holistic one.

In summary, molars are the most common teeth extracted. The main reasons for the extractions are dental caries and periodontal disease. This study indicates an urgent need to increase the provision of health promoting and preventive services to reduce the extraction rates.

Declaration: No conflict of interest was declared

REFERENCES