Research for tooth extraction in 3-8 year-old Turkish children

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Abstract

Objective: Extraction of primary or permanent teeth is performed for several reasons, including caries, periodontal disease, orthodontic treatment, traumatic injuries, treatment failure, tooth impaction or eruption. The aim of this study was to investigate the principal reasons for extraction in children aged between 3-8 years.

Methods: The patients selected randomly for this retrospective study were identified by analyzing dental records of 3-8 year-old children receiving dental treatment at Istanbul University, Faculty of Dentistry, Department of Pedodontics. A total of 825 patients and their panoramic radiographs have been viewed. The patient's age and gender, df, dfs, DMF, DMFS, number of extracted teeth and the reasons for the extraction were recorded.

Results: A total of 1405 (16 permanent, 1389 primary) extractions were performed in 825 (362 female, 463 male) of the patients. Patient's mean ages 6.5 ± 1.36. Reasons for extractions were; caries:72.8%, orthodontics: 0.2%, trauma: 5.9%, periodontal: 0.2%, eruption: 14.9%, treatment failure:1.7%, other reasons: 4.05%.The mean df,dfs,DMF,DMFS scores were found respectively 5.41 ± 3.2, 9.45 ± 7.0, 0.52 ± 1.0, 0.68 ± 1.6. The data were converted to SPSS format, frequency and Chi-square, T test was used for analysis.

Conclusions: The results of this study indicate that caries is the main reason for extraction in 3-8 year-old children. This result may be due to a lack of oral hygiene habits in children aged 3-8.
These are:

**Caries**: Teeth requiring extraction because of caries (initial or recurrent) and its consequences. Extracted root’s remnants where the crown was lost through caries and teeth fracturing due to weakening by caries.

**Orthodontic treatment**: Teeth to be removed for orthodontic treatment (reasons).

**Trauma**: Teeth extracted due to or as a result of trauma, including jaw fractures.

**Periodontal disease**: Teeth requiring extraction due to periodontitis including pain, loss of function, loose and supporting teeth.

**Eruption problems**: Partial impacted and fully impacted teeth and those, which are characterized by pericoronitis (persistent inflammation around third molar, which necessitates removal of one or all third molars).

**Treatment failure**: Failed restorations and root canal treatment and fracture of teeth weakened by endodontic treatment.

**Other**: Any other reason, which is not encompassed by one of the above categories.

Additionally, the prevalence of tooth loss was evaluated by reasons of extractions and type of teeth (primary or permanent molars, premolars, incisors and canines).

SPSS software (Statistical Package for Social Sciences) for Windows 15.0 was used for statistical analysis. Descriptive data were expressed by means of numbers and percentages. Chi-square test and Fisher’s exact test was used to comparison of qualitative data. Statistical significance was defined at p<0.05.

### Results

A Total of 1405 (16 permanent, 1389 primary tooth) extractions were performed in 825 (362 female, 463 male) of the patients. The patients were selected randomly between 3-8 aged. Patient’s mean age was $6.5 \pm 1.36$. The mean df, dfs, DMF, DMFS scores were found respectively $5.41 \pm 3.2$, $9.45 \pm 7.0$, $0.52 \pm 1.0$, $0.68 \pm 1.6$.

Caries related extraction were found higher in both gender (M 40.2%, F 32.5%).

Totaly, extraction was performed in 825 (362 female, 463 male) of the patients. The patients were selected randomly between 3-8 aged. Patient’s mean age was $6.5 \pm 1.36$. The mean df, dfs, DMF, DMFS scores were found respectively $5.41 \pm 3.2$, $9.45 \pm 7.0$, $0.52 \pm 1.0$, $0.68 \pm 1.6$.

### Discussion

Extraction of teeth is a relatively common treatment of pediatric dental practice. The clinical considerations are not the only factors to influence the care provided for dentists’ treatment decisions. Attendance patterns affect the treatment provided to children as does health-care policy and the system within which the child receives the dental care. Also the parents’ wishes concerning the treatment of their children can play an important role on dentist’s treatment/extraction decisions whose name is social indications [6].

Previous studies have shown that dental caries and periodontal disease are the main causes of tooth extraction in several countries.

**Caries**: Dental caries appears to be the main cause of tooth extraction in a large number of research with the following percentages: 59.0% [1], 45% [11], 51% [12], 49.0% [13], 55.3% [14], 43.7% [3], 31% than males (p<0.05). There was no statistically significant differences was found between caries, periodontal, orthodontic, eruption, trauma and gender (p>0.05) (Table 5).
Table 3. Distribution of extraction reasons according to tooth types.

<table>
<thead>
<tr>
<th>Number of tooth</th>
<th>Caries (n) (%)</th>
<th>Orthodontics (n) (%)</th>
<th>Trauma (n) (%)</th>
<th>Periodontal (n) (%)</th>
<th>Eruption (n) (%)</th>
<th>Treatment Failure (n) (%)</th>
<th>Other Reasons (n) (%)</th>
<th>TOTAL (n) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary central</td>
<td>36 (2.5)</td>
<td>0</td>
<td>54 (3.8)</td>
<td>1 (0.07)</td>
<td>52 (3.7)</td>
<td>0</td>
<td>6 (0.4)</td>
<td>149 (10.6)</td>
</tr>
<tr>
<td>primary lateral</td>
<td>40 (2.8)</td>
<td>0</td>
<td>25 (1.7)</td>
<td>1 (0.07)</td>
<td>121 (8.6)</td>
<td>0</td>
<td>39 (2.7)</td>
<td>226 (16)</td>
</tr>
<tr>
<td>primary canine</td>
<td>13 (0.9)</td>
<td>4 (0.28)</td>
<td>1 (0.7)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7 (0.4)</td>
<td>25 (1.7)</td>
</tr>
<tr>
<td>primary first molar</td>
<td>483 (34.3)</td>
<td>0</td>
<td>0</td>
<td>1 (0.07)</td>
<td>28 (1.9)</td>
<td>18 (1.2)</td>
<td>2 (0.14)</td>
<td>532 (37.8)</td>
</tr>
<tr>
<td>primary second molar</td>
<td>440 (31.3)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6 (0.4)</td>
<td>0</td>
<td>457 (32.5)</td>
</tr>
<tr>
<td>permanent central</td>
<td>1 (0.07)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>permanent lateral</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>permanent first molar</td>
<td>10 (0.71)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5 (0.35)</td>
<td>10 (0.71)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1023 (72.8)</td>
<td>4 (0.28)</td>
<td>84 (5.9)</td>
<td>3 (0.21)</td>
<td>210 (14.9)</td>
<td>24 (1.7)</td>
<td>57 (4)</td>
<td>1405 (96.0)</td>
</tr>
</tbody>
</table>

Chi-square, Fisher’s Exact test  *p<0.05  **p<0.01

Table 4. Comparisons of extraction reasons according to age groups.

<table>
<thead>
<tr>
<th>Reasons</th>
<th>3-5 aged (n=13434)</th>
<th>6-8 aged (n=826)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries</td>
<td>130 (%74.7)</td>
<td>892 (%77.0)</td>
<td>0.001**</td>
</tr>
<tr>
<td>Periodontal</td>
<td>2 (0.2)</td>
<td>1 (0.2)</td>
<td>0.163</td>
</tr>
<tr>
<td>Orthodontics</td>
<td>0 (0.0)</td>
<td>4 (0.7)</td>
<td>0.577</td>
</tr>
<tr>
<td>Eruption</td>
<td>3 (%14)</td>
<td>207 (%29.0)</td>
<td>0.001**</td>
</tr>
<tr>
<td>Trauma</td>
<td>16 (%7.3)</td>
<td>68 (%10.6)</td>
<td>0.164</td>
</tr>
<tr>
<td>Treatment failure</td>
<td>1 (%0.5)</td>
<td>23 (%3.7)</td>
<td>0.016*</td>
</tr>
<tr>
<td>Other reasons</td>
<td>3 (%14)</td>
<td>54 (%8.6)</td>
<td>0.001**</td>
</tr>
</tbody>
</table>

Chi-square, Fisher’s Exact test  *p<0.05  **p<0.01

Table 5. Comparisons of extraction reasons according to gender.

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Female (n=826)</th>
<th>Male (n=13434)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries</td>
<td>456 (%71.6)</td>
<td>566 (%71.0)</td>
<td>0.813</td>
</tr>
<tr>
<td>Periodontal</td>
<td>0 (%0.0)</td>
<td>3 (%0.6)</td>
<td>0.261</td>
</tr>
<tr>
<td>Orthodontics</td>
<td>0 (%0.0)</td>
<td>3 (%0.6)</td>
<td>0.261</td>
</tr>
<tr>
<td>Eruption</td>
<td>83 (%20.5)</td>
<td>127 (%24.3)</td>
<td>0.173</td>
</tr>
<tr>
<td>Trauma</td>
<td>32 (%8.6)</td>
<td>52 (%10.7)</td>
<td>0.298</td>
</tr>
<tr>
<td>Treatment failure</td>
<td>9 (%2.5)</td>
<td>15 (%3.2)</td>
<td>0.530</td>
</tr>
<tr>
<td>Other reasons</td>
<td>34 (%10.1)</td>
<td>23 (%4.9)</td>
<td>0.015*</td>
</tr>
</tbody>
</table>

Chi-square, Fisher’s Exact test  *p<0.05  **p<0.01

Greek population, which is similar to previous studies [24]. Chesnutt et al. found 21% tooth extraction related for periodontal disease [12]. In this study, it was thought that extraction due to the periodontal reasons was found 0.2%, because of the younger age group.

**Orthodontics:** The reasons for extraction among teenagers are usually related to orthodontic treatment plans. There are several reasons for extractions of primary teeth as a part in an orthodontic treatment plan [2]. Montandon et al. [7], 2012 found that 5.7%, Caldas [15], 2000 found that 2.5% level of patients with orthodontic treatment plan related extraction. In this study, orthodontics was the reason for extraction in 0.2% of the teeth.

**Eruption:** Extraction depending on eruption problems for 6.4% [7]; depending on third molar eruption disorders for 3.7% [15] and impaction for 12.1% [14] were reported different researches. In this study we found 14.9% extraction, related to eruption problems. Especially in the transition period of mix dentition eruption problems are more frequent. So this will be the reason of high percentage.

**Trauma:** Trauma was the reason for early extraction especially younger age groups. There are different results about this reason as 10.4% [2]; 2.6% [7]; 1% [15]. In this study, trauma was found 5.9%. It can be explained as the age of school time and children will exposed to trauma more in 6-8 aged group.

**Treatment Failure:** Extraction related to iatrogenic factors were found 9.9% in Montandon et al. [7], 2012 research. A failed dental treatments (e.g. root canal treatments) was recorded 33.4% in the another study [24]. Our study findings about treatment failure is 1.7%. This results is the lowest percentage in all studies.

**Other reasons:** Prosthetic indication (3.6%), and occlusal problems (1.1%) were found an other reasons in different researches [7]. Caldas et al. also evaluated other reasons for extractions such as prosthetic reasons (6.4%), and patients request (1%) [15]. Also few studies have assessed the reasons for tooth extraction based on social class diversities [25]. Cysts and supernumerary teeth were found an other reasons (4.04%) in the present study.

**Conclusions**

The important factor was age for extraction decision after clinical prognosis in children. The results of this study indicate that caries is the main reason for extraction in 3-8 year-old children in Turkey. This result may be due to a lack of oral hygiene habits in children aged 3-8. The role of the dentists is quite important in maintaining the permanent teeth, especially in this younger aged groups. Also families and children
informed about oral hygiene habits are very important.

Conflict of interest

The authors confirm that this article content has no conflicts of interest.

References