

M. Bani*, N. Akal*, H. Bodur*, M. E. Odabaş*,
T. Tüzüner**, A. E. Delilbaşı***,
Y. T. Özdoğan****

*Department of Paediatric Dentistry, Faculty of Dentistry,
Gazi University, Ankara, Turkey

**Department of Paediatric Dentistry, Faculty of Dentistry,
Karadeniz Technical University, Trabzon, Turkey

***Department of Paediatric Dentistry, Faculty of Dentistry,
Yeni Yüzyıl University, Istanbul, Turkey

****Department of Pediatric Dentistry, 75. Yıl Dental Center,
Ankara, Turkey

e-mail: mehmetbani@hotmail.com

The reasons for extractions of primary teeth in Turkish children

ABSTRACT

Aim The aim of this study was to determine the current reasons for primary teeth extractions in Turkish children and their relative importance.

Materials and methods Study Design: retrospective evaluation of patients by analysing dental records of children aged 2-13 years, receiving treatment in different regions in Turkey over a period of five years (2007-2012). Patient's age, gender, any significant medical finding, type of tooth extracted and the reason for the extraction were the parameters evaluated.

Results It resulted that 2,508 primary teeth belonging to 1,755 children aged of 2-13 years were extracted. Extraction due to caries (57,4%) was found to be the most common reason. Statistics: Chi-square tests were performed for statistical analysis. Although no differences in the types of teeth extracted were observed between genders, striking differences were noted in the different age groups.

Conclusion From this study it can be concluded that caries and subsequent pulpal pathology are the most common reasons for extraction of primary teeth in Turkey. Primary molars were the most common tooth type extracted. Preventive programmes for preschool children should be given importance.

Keywords Caries; Primary teeth; Teeth extraction.

Introduction

Reports of tooth extraction are often the reflection of the pattern of oral health diseases in the community [Folayan et al., 2005; Alsheneifi and Hughes, 2001; Ashiwaju et al., 2011]. Although recent aepidemiological studies show that the prevalence of dental caries in children has decreased considerably in many industrialised countries, the disease continues to be a major problem for both children and adults in developing countries [Alsheneifi and Hughes, 2001; Christensen and Fields, 2001].

Early tooth loss of one or more primary teeth may result in malocclusion, speech pathology, functional and aesthetic problems. These complications appear to continue throughout life [Folayan et al., 2005; Christensen and Fields, 2001]. To organise an improved approach to prevention and treatment of oral diseases more information is required about the reasons for extraction of permanent teeth, since currently little information exists on the reasons for the extraction of primary teeth and tooth type extracted [Alsheneifi and Hughes, 2001].

A number of studies have identified that caries was the principal cause of tooth loss in children [Mansour and Bâgesund, 2010; Moles and Ashley, 2009]. Several authors [Ashiwaju et al., 2011; Alsheneifi and Hughes, 2001; Folayan et al., 2005; Galicia-Sosa et al., 2003; Latif and Omran, 2002] reported that caries and resulting pulpal pathology are the most common reasons for extraction of primary teeth. Studies showed that beside caries other major causes are periodontal disease, trauma and extraction of primary teeth for orthodontic reasons [Ashiwaju et al., 2011; Mansour and Bâgesund, 2010; Moles and Ashley, 2009]. However there are also non-disease factors that are highly contributory to tooth extraction. These include ignorance, socioeconomic and cultural factors [Folayan et al., 2005]. Reason or extraction vary according to the cultural and economic development of the countries.

Nationwide surveys to determine the reasons for children extraction have been carried out in several countries [Folayan et al., 2005; Alsheneifi and Hughes, 2001; McCaul et al., 2001; Mansour and Bâgesund, 2010; Moles and Ashley, 2009]. To date, data about the leading causes for extracting primary teeth in children in Turkey are rare. The aim of this study was to determine the current reasons of primary teeth extractions in Turkish children and their relative importance.

Materials and methods

Patient's age, gender, any significant medical condition, type of tooth extracted and the reason for extraction were collected from the medical records of the patient visited between the years 2007-2012 at Gazi University Faculty of Dentistry Department of Paediatric Dentistry, Karadeniz Technical University Faculty of Dentistry Department

of Paediatric Dentistry, 75. Yil Dental Health Center, and Istanbul Yeni Yüzyil University Faculty of Dentistry Department of Paediatric Dentistry.

The criteria for inclusion were: children between 2-13 years of age, treated under local anaesthesia. The reasons for extraction criteria used in this study are based on the following categories described by Kay and Blinkhorn [1986] and Alsheneifi and Hughes [2001]: caries, orthodontic, trauma, mobility, root resorption, over-retention, periodontal problems, general medical reasons, economic reasons and parental preference (Table 1). The reasons for extraction were analysed for each tooth type in the maxillary and mandibular arch. Data were considered according to the following age groups: 2-5, 6-9 and 10-13 years.

All the data were analysed by SPSS software (13.0, SPSS Inc., Chicago Ill, USA). Descriptive statistics was calculated for the data from all groups and used to interpret the data. Chi-square tests were performed using a P 0.05 significance level to determine if any significant difference existed between the age groups.

Results

In this study, 2,508 primary teeth of 1,755 children between the age of 2-13 years (mean age 8) were extracted. Distribution of the causes of extraction is shown in Table 2. The number of teeth extracted due to caries (57.4%) was the most common reason for extraction, followed by root resorption (34.9%).

The number of extractions in boys (52.7%) was higher

1.Caries	Primary and secondary caries plus all sequelae including periapical abscess and failed pulpotomy, endodontics
2.Orthodontic	Tooth removed to prevent or correct malocclusion
3.Trauma	Tooth extracted as a direct result of acute trauma
4.Mobility	Tooth extracted because of without causing tooth mobility
5.Root resorption	Tooth extracted as a time for exfoliation
6.Over-retention	Prolonged retention of primary teeth
7.Periodontal disease	Loss of function, periodontal abscess and pain
8.General medical reasons	Prophylactic extraction
9.Economic reasons	Due to the economic situation, the patient does not want to come to the sessions
10.Patient/Parent request	The tooth could have been repaired instead of extracted

TABLE 1 Reasons for extraction.

than in girls (47.3%) but this difference was not significant (Table 3).

Maxillary and mandibular teeth extraction rate was similar (Table 4), however mandibular teeth (41,4%) showed the highest extraction rate, followed by maxillary molars (33%) and maxillary incisors (12%) (Table 4). The extraction of canines (upper and lower) were relatively infrequent. In this study, the 6-9 years old group showed the highest extraction rate among the three groups (Table 5). Of the 2,508 extracted teeth, 406 (16.1%) were in the age group 2-5, 1,134 (45.2%) in the age group 6-9, and 968 (38.5%) in the age group 10-13 (Table 5).

There was a difference between the tooth types extracted and age groups. In the age group 2-5, almost 88.1% of the extracted teeth were incisors extracted due to caries, molar teeth were the most common tooth type extracted in all age groups.

Trauma was seen mostly in the maxillary incisors 82.2% (37 out of 45 teeth). Orthodontic reasons accounted for more than half of the extractions of upper and lower canines (Table 4).

Discussion

Tooth mortality in a population can provide information regarding the availability of dental care, the prevalence of dental disease, and attitudes toward tooth loss [Alsheneifi and Hughes, 2001; Angelillo et al., 1996; Murray et al., 1997]. In order to facilitate planning for dental health services and to develop strategies to continue the reduction

Reasons for extraction	Incidence	Percentage%
1.Caries	1,440	57.4
2. Orthodontic	48	1.9
3. Trauma	45	1.8
4. Mobility	51	2.0
5. Root resorptions	875	34.9
6. Over-retention	28	1.1
7. Periodontal disease	6	0.2
8. General medical reasons	3	0.1
9. Economic reasons	8	0.3
10. Patient/Parent request	4	0.1

TABLE 2 Distribution of the reasons for extraction of primary teeth.

Gender	Patients	%	N. of extracted teeth	%
Girls	838	47.7	1,186	47.3
Boys	917	52.3	1,322	52.7

TABLE 3 Distribution of the patients and number of the extraction by gender.

	Maxillary Insisors	Maxillary Canine	Maxillary Molars	Mandibular Insisors	Mandibular Canine	Mandibular Molars	Total
Caries	157	33	507	32	25	686	1440
Orthodontic	4	13	9	0	12	10	48
Trauma	37	1	1	5	1	0	45
Mobility	13	7	10	8	3	10	51
Root Resorption	83	60	285	70	62	315	875
Over-Retention	7	0	11	1	1	8	28
Peridental Disease	0	0	2	1	0	3	6
General Medical Reasons	0	0	1	0	1	1	3
Economic Reasons	1	0	3	0	0	4	8
Patients/Parent Request	0	0	1	0	1	2	4
Total	302 (12.1%)	114 (4.5%)	830 (33.1%)	117 (4.6%)	106 (4.2%)	1039 (41.4%)	2508

TABLE 4 Distribution of the reasons for the extraction of primary teeth by tooth type.

in tooth loss it is important to identify the factors which caused such loss [McCaul et al., 2001]. Despite the relative abundance of studies examining the nature of tooth loss and dental extractions in the permanent dentition, surprisingly little information exists regarding tooth loss in the primary dentition [Alsheneifi and Hughes, 2001]. In the current study, the dental charts of 1,755 children were reviewed to examine the frequency of extraction, the tooth types, and the reasons for extractions.

The data presented in different international surveys reveal that among all studies published between 1984-2001, reported rates of extractions caused by caries ranged from 21% to 60% [McCaul et al., 2001]. Moles and Ashley [2009] reported that caries accounted for 51.5% among the reasons for primary teeth extraction in children. Alsheneifi and Hughes [2001] reported a 53% rate, while Mansour and Bâgesund [2010] 60.5%. They showed that caries was the main reason for teeth extraction in children population of patients. To date, two different studies of Turkey reported a ratio of 38.8% and 41% of extraction due to caries [Ak et al., 2005; Şen et al., 2009]. In this study we found that in the Turkish children examined 57.4% of teeth extractions are due to caries. As the response rates in each center in the study were similar to the sample population, the latter may be considered representative of Turkish children as a whole. Despite the dramatic improvement in paediatric oral health over the last years, recent evidence suggests that dental decay still remains the main cause of tooth loss in pediatric population [Alsheneifi and Hughes, 2001; Ashiwaju et al., 2011]. The data from the current study support these findings, and in addition there is the need to investigate the risk of caries in children with new studies. In this study, among causes other than caries, extraction due to physiological root resorption (34.7%) show a high percentage, followed by trauma and orthodontic considerations.

The reasons for primary teeth extraction varied between

	2-5 (years)	6-9 Age (years)	10-13 Age (years)
Caries	358* 88.1%	673 59.3%	409 42.2%
Orthodontic	0	20 1.7%	28 2.9%
Trauma	22 5.4%	17 1.5%	6 0.6%
Mobility	2 0.5%	26 2.3%	23 2.3%
Root Resorption	19 4.6%	382 *33.6%	474 *48.9%
Over-Retention	3 0.7%	4 0.3%	21 2.1%
Peridental Disease	0	4 0.3%	2 0.2%
General Medical Reasons	0	2 0.1%	1 0.1%
Economic Reasons	1 0.2%	5 0.4%	2 0.2%
Patients/Parent Request	1 0.2%	1 0.08%	2 0.2%
Extraction Teeth	406	1134	968
* Distribution significantly different from baseline, p<0.05, Chi-square test			

TABLE 5 Distribution of the reasons for the extraction for primary teeth by age.

the different age groups. In this study the extraction rate of 88.1% due to caries (358 out of 406 teeth) was remarkable for the 2-5 year-old group, where primary incisors were the most commonly extracted teeth, presumably due to ECC (Early Childhood Caries). In age groups 6-9 and 10-13 molars were more frequently extracted due to the chronology of eruption, and the frequent involvement of

these teeth in dental caries. In these groups extraction of primary teeth due to caries was common, however in the 10-13 age group root resorption and caries showed similar rate.

The reasons for extraction varies among the different tooth type. In this study the most frequent extracted teeth due to trauma are incisors. Kuthy et al. [1994] reported that orthodontic considerations are more frequently the reason for the extraction of primary canines, which are rarely extracted as a consequence of caries or trauma. Stephens et al. [1991] reported that, in patients under 20 years of age, extraction for orthodontic purposes accounted for 33% of extractions in a certain Canadian population. In this study, canines were extracted mostly for orthodontic reasons. Alsheneifi and Hughes [2001] reported that, in patients 3-13 years of age, the first molar was the type of teeth most frequently extracted due to caries; molars were the most commonly lost type of tooth [Ashiwaju et al., 2011; Ak et al., 2005]. In this study primary molars are frequently extracted mostly owing to dental caries and pulpal involvement.

This study documents the rate of extraction of primary teeth in a Turkey. Caries of the primary dentition is a clinical problem that decreased in higher socioeconomic groups in many developed countries in recent years [Levine et al., 2002; Pitts et al., 2001; Jamieson et al., 2007]. The study shows that the prevalence of tooth loss due to caries is still higher in Turkey than in other parts of the world. These differences are at least partly attributable to methodological differences and related to socioeconomic levels between countries. Comparison of tooth extraction data between different countries is very difficult. ?

Conclusions

- › Caries is the most common reason for extraction of primary teeth (57.4%).
- › Caries was the main reasons for multiple teeth extraction in the 2-5 and 6-9 years age groups.
- › Molars were the most common type of teeth extracted.
- › Although no differences in types of teeth extracted

were observed between genders, striking differences were noted in the different age groups.

- › Preventive programmes for pre-school children should be given importance.

References

- › Ak G, Sepet E, Pinar A, Aren G, Turan N. Reasons for early loss of primary molars. *Oral Health Prev Dent* 2005;3:113-117.
- › Alsheneifi T, Hughes CV. Reasons for dental extractions in children. *Pediatr Dent* 2001;23:109-112.
- › Angelillo IF, Nobile CG, Pavia M. Survey of Reasons for Extraction of Permanent Teeth in Italy. *Community Dent Oral Epidemiol* 1996;24:336-340.
- › Ashiwaju MO, Folayan MO, Sote EO, Isikwe MC. Pattern of tooth extraction in children attending tertiary health care centers in Nigeria: a prospective study. *J Clin Pediatr Dent* 2011;36:107-110.
- › Christensen JR, Fields HW. Space maintenance in the primary dentition. In: Pinkham JR, Casamassimo PS, Mc Tighe DJ, Fields HW, Nowak AJ. *Pediatric Dentistry: Infancy through adolescence*. 4th ed. Elsevier Saunders, pp 423-430.
- › Folayan MO, Otuyemi OD, Esan TA, Adeleke AA, Adedigba MA. Pattern of dental extraction in children in a Nigerian tertiary hospital. *J Contemp Dent Pract* 2005;6:80-90.
- › Galicia-Sosa A, Hernandez-Guerrero JC, Jimenez-Farfan M, Ledesma-Montes C. Reasons for primary teeth extraction in mexican children. *Bol Med Hosp Infant Mex* 2003;60:184-188.
- › Jamieson LM, Koopu PI. Child use of dental services and receipt of dental care in New Zealand. *J Paediatr Child Health* 2007;43:732-739.
- › Kay EJ, Blinkhorn AS. The reasons underlying the extraction of teeth in Scotland. *Br Dent J* 1986;160:287-290.
- › Kuthy RA, Antkowiak MF, Clive JM. Extractions prior to comprehensive orthodontic treatment in the mixed dentition. *Pediatr Dent* 1994;16:211-216.
- › Latif AEA, Omran AK. Reasons of primary teeth extraction in egyptian children. *Egypt Dent J* 2002;48:823-826.
- › Levine RS, Pitts NB, Nugent ZJ. The fate of 1,587 unrestored carious deciduous teeth: a retrospective general dental practice based study from northern England. *Br Dent J* 2002;193:99-103.
- › Mansour ON, Bågesund M. Reasons for extractions, and treatment preceding caries-related extractions in 3-8 year-old children. *Eur Arch Paediatr Dent* 2010;11:122-130.
- › McCaul LK, Jenkins WM, Kay EJ. The reasons for the extraction of various tooth types in Scotland: a 15-year follow up. *J Dent* 2001;29:401-407.
- › Moles DR, Ashley P. Hospital admissions for dental care in children: England 1997-2006. *Br Dent J* 2009;206:E14.
- › Murray H, Clarke M, Locker D, Kay EJ. Reasons for tooth extractions in dental practices in Ontario, Canada according to tooth type. *Int Dent J* 1997;47:3-8.
- › Pitts NB, Evans DJ, Nugent ZJ. The dental caries experience of 5-year-old children in Great Britain. Surveys coordinated by the British Association for the study of Community Dentistry in 1999/2000. *Community Dent Health* 2001;18:49-55.
- › Stephens RG, Kogon SL. A study of "Reasons for tooth extraction in a Canadian population sample." *J Can Dent Assoc* 1991;57:501-504.
- › Şen Tunç E, Özen B, Özer L, Özalp N, Çetiner S. Reasons for primary tooth extractions. *Dental J Dicle* 2009;10:50-54.