Reasons for Early Loss of Primary Molars

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Purpose: The aims of this study were to investigate the principal reasons for untimely loss of primary molars and to evaluate the risk factors of early primary molar loss in children aged four to nine years.

Materials and Methods: 1150 untimely lost primary molars were analyzed from 546 patients. The early loss of primary molars was analyzed in relation to age, sex, dmf (t), DMF (T) scores, toothbrushing frequency, history of treatment and maternal education. The data were converted to SPSS format. Pearson Chi-square test was used for statistical analysis.

Results: Among the investigated subjects, 15.2% of children reported regular toothbrushing. Only 23.1% of subjects had a history of treatment before the tooth extraction and 33% of mothers had a low education level. Untimely loss of primary molars due to pain, caries and sepsis were 30.2%, 31% and 38.8%, respectively. The frequency of 'only one primary molar loss' was significantly higher in group 1 ($p < 0.05$), however the frequency of 'more than one primary molar loss' for group 2 was more than group 1 ($p < 0.05$).

Irregular toothbrushing for the children in group 2 was found significantly high than in group 1 ($p < 0.05$). Irregular toothbrushing was associated with number of early primary molar loss in group 2 ($p < 0.05$).

The level of maternal education was associated with dmf (t) scores ($p < 0.05$).

The caries incidence was associated with number of early primary molar loss in both groups ($p < 0.05$).

The mean number of treated teeth before extraction for group 2 was significantly higher than for group 1 ($p < 0.05$).

Conclusion: Results of this study suggested that irregular toothbrushing, high dmf (t) scores and untreatment of carious primary molars were significant risk factors in early loss of primary molars. Every effort must be taken into account in restoring rather than extracting carious teeth.

Key words: early tooth loss, primary molars

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Early loss of primary molars causes, without doubt, permanent changes in regard to space and sagittal molar relations, in the permanent dentition.

The care index, which measures the proportion of carious teeth treated by restoration has fallen markedly in the five-year-old child population over the last 15 years (Tickle et al, 2002).

Whittle et al (1995) reported dmfs data on five-year old children from an area of Manchester, UK, that showed an increase in the "m" component and a decrease in the "f".

Several studies have reported that caries is the principal cause of tooth loss in younger age groups (Ainamo et al, 1984; Cahen et al, 1985; Kay and Blinkhorn, 1986; Agerholm and Sidi, 1988; Corbet and Davies, 1991; Klock and Haugejorden, 1991;

Reich et al, 1993; Angelillo et al, 1996; Alsheneifi and Hughes, 2001).

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.

Murray et al (1997), reported that orthodontic considerations were the main reasons for permanent tooth loss in childhood and caries continued to be an important cause of tooth loss at all ages.

Several studies have investigated the risk indicators of tooth loss; income, education, oral hygiene practices, smoking and gender are reported factors associated with tooth loss (Marcus et al, 1994; Locker et al, 1996; Hamasha et al, 2000).

Despite a number of studies documenting reasons for loss of permanent teeth, little information exists describing risk indicators and reasons for the early loss of primary teeth. In order to develop strategies for the future for the reduction in tooth loss, it is important to understand the factors which lead to early loss of primary molars.

The aims of this study were to investigate the principal reasons for early loss of primary molars and to evaluate the risk factors associated with tooth loss in children aged four to nine years old.

MATERIALS AND METHODS

The patients selected for this retrospective study were identified by analyzing dental records of children receiving treatment at University of Istanbul, Faculty of Dentistry, Department of Pedodontics and Department of Oral Surgery and Oral Medicine.

In total 2180 records were reviewed and 1150 early lost primary molars were analyzed from 546 patients. The study sample consisted of 256 male and 290 female and the subjects ranged in age from four to nine years.

The criteria for inclusion in this study was at least one early loss of primary molar by extraction under local anesthesia. The subjects participated in this study were divided into 2 groups, according to primary and mixed dentition. Group 1 consisted of 140 children (62 girls, 78 boys) aged between four to six years and group 2 consisted of 406 children (194 girls, 212 boys) aged between seven to nine years. The data were collected by interviews and clinical examinations.

The information about dental diagnosis for the extracted tooth, tooth number and the reason for the extraction was obtained from patient's records.

Reasons for early loss of primary molars were recorded according to the following categories based on those described by Kay and Blinkhorn (1986), Alsheneifi and Hughes (2001) and Agerholm and Sidi (1988):

Caries: Teeth requiring extraction because of caries or its sequelae, including root remnants, endodontics and fractures of teeth weakened by caries or endodontics.

Pain: Tooth extracted because of pain resulting from caries.

Sepsis: Tooth extracted because of periapical abscesses with soft tissue swelling and lymphadenopathy. Prophylactic extractions for general medical reasons also evaluated in sepsis category.

Orthodontic: Tooth extracted for orthodontic reasons.

Other reasons: Economic reasons and parent request were evaluated in this category.

Dental examinations were conducted under the same conditions, in Pediatric Dental Clinic. One skilled pedodontist performed the dental examinations and interviews.

Caries status, decayed (cavitated), missing and filled primary (dmf) or permanent (DMF) teeth were assesed according to WHO caries diagnostic criteria (WHO, 1987).

Subjects and their parents were asked questions regarding their name, date of birth, medical history, oral hygiene practices, maternal education and the type of performed treatments before the extraction.

Statistical analysis:
The data were converted to SPSS Base 7.5 for Windows. Descriptive statistics were calculated for the data. Pearson Chi-square test was used for statistical analysis.

RESULTS

Results from the descriptive analysis are presented in Table 1.

From 2180 records reviewed, 546 (25%) patients had early loss of primary molars.

A total of 1150 primary molar teeth were extracted from these patients.

The mean ± (SD) age of patients was 7.45 ± 1.39. The age distribution was presented in Table 1.

7.6% of the subjects had systemic diseases. 66.8% of mothers had a low education level. Among the investigated subjects, 15.6% of children reported regular toothbrushing. Only 23.6% of subjects had a history of treatment before the tooth extraction. The type and number of restorations are presented in Table 1.

The mean ± (SD) of dmf (t) was found as 4.31 ± 1.00 in group 1. The mean ± (SD) of dmf (t) and DMF (T) were found as 4.50 ± 1.10 and 2.25 ± 0.96, respectively in group 2. The difference in dmf (t) scores between the groups was not statistically significant.

308 (56.4%) patients had only one and 238 (43.6%) had more than one early primary molar loss. The distribution of early loss primary molars related to age is presented in Fig 1.

Of the 1150 early extracted primary molars, 87.2% were first primary molars.

Extractions due to pain, caries and sepsis were 30.2%, 31% and 38.8%, respectively.

The principal reasons for early primary molar extraction by age are presented in Fig 2.

The frequency of 'only one primary molar extraction' was significantly higher in group 1 ($p < 0.05$), however the frequency of 'more than one primary molar extraction' for group 2 was more than group 1 ($p < 0.05$).

Irregular toothbrushing for the children in group 2 was found significantly high than in group 1 ($p < 0.05$). Irregular toothbrushing was associated with number of early primary molar extraction in group 2 ($p < 0.05$).

The level of maternal education was associated with dmf (t) scores ($p < 0.05$).

The caries incidence was associated with number of early primary molar extraction in both groups ($p < 0.05$).

The mean number of treated teeth before extraction for group 2 was significantly higher than for group 1 ($p < 0.05$).

Table 1 Distribution of numbers and percentages of subjects by demographics, investigated variables

Variable	Category	Number	Percentage
Age	4	18	3.3
	5	39	7.1
	6	84	15.4
	7	97	17.8
	8	157	28.8
	9	151	27.7
Gender	Males	255	46.7
	Females	291	53.3
Medical history	Yes	42	7.6
	No	504	92.4
Maternal education	Low-education	365	66.8
	High-education	181	33.2
Brushing	Never	187	34.2
	Sometimes	274	50.2
	Regular	85	15.6
History of restoration	Yes	129	23.6
	a-Restorative Treatment	72	55.8
	– composite	43	59.7
	– amalgam	29	40.3
	b-Endodontic Treatment		
	Yes	57	44.2
	No	417	76.4
Reason for extraction	Pain	165	30.2
	Caries	169	31.0
	Sepsis	212	38.8

DISCUSSION

Extraction of primary teeth is a relatively common part of pediatric dental practice, often included as part of treatment predicated by caries, trauma and orthodontic considerations (Alsheneifi and Hughes, 2002).

In this study, dental charts of 2180 dental patients were reviewed to examine the frequency of early extracted primary molars and the reasons for the extraction. Of these, 25% patients had early primary molar extraction.

Regarding early loss of primary molars, several findings were evident from the data. In the first place extractions were not attributed to orthodontic

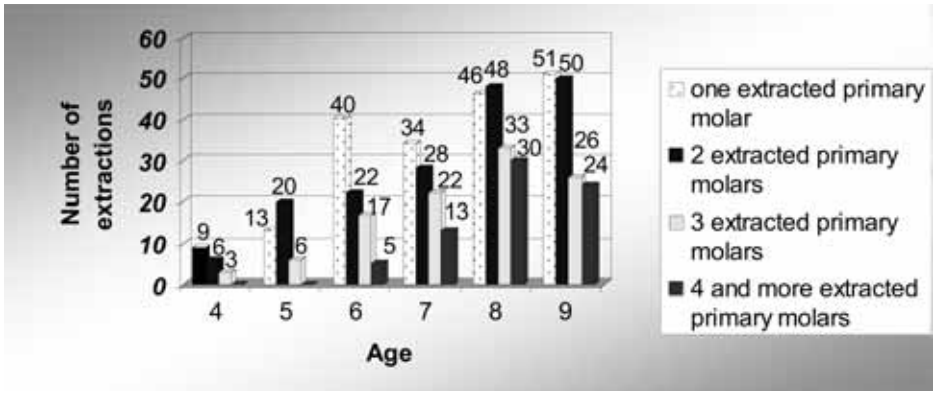

Fig 1 The distribution of early extracted primary molars related to age.

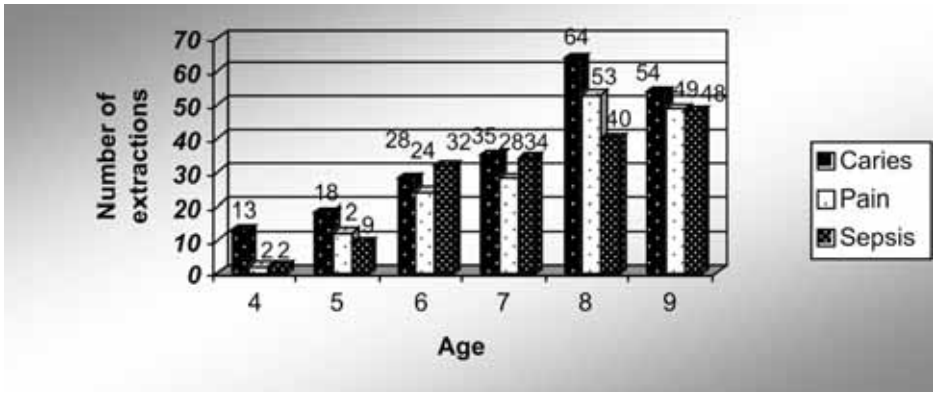

Fig 2 The principal reasons for extractions, by age.

or traumatic reasons, while "sepsis" was the most common reason for extraction. Secondly, early loss of primary molars had an increase between the ages of six to nine. Primary second molars were rarely extracted in the youngest age group (four to five years), presumably due to their relatively late eruption and their strategic importance during dental development in this period. Thirdly, the high percentage (76.4%) of the sample who never had a treatment before the tooth extraction was an important finding to discuss.

Dentists' treatment decisions concerning the care of the primary dentition are complex (Tickle et al, 1999), but clinical considerations are not the only factors to influence the care provided. Attendance patterns affect the treatment provided to children as does health-care policy and the system within which the child receives the dental care (Tickle et al, 1999). Also the parents' wishes concerning the treatment of their children can play an important role on dentists' treatment decisions.

Income and education have always been reported in the literature to be associated with missing teeth. In the United States, the level of education and income together (social economic status) were negatively associated with missing teeth when age was constant (Douglass et al, 1993). Income alone has been reported to be associated with missing teeth in some studies (Hunt et al, 1985; Weintraub and Burt, 1985), while the level of education alone has also been reported (Clarkson and O'Mullane, 1983; Ismail et al, 1987; Miller and Locker, 1994).

In the present study, no child had extractions due to orthodontic reasons or parent request and extractions due to caries were not the predominant reason. The results were similar with reports of Alsheneifi and Hughes (2001), but different from the other studies regarding the current reasons for dental extractions (Ainamo et al, 1984; Kay and Blinkhorn, 1986; Agerholm and Sidi, 1988).

Ainamo et al (1984) and Kay and Blinkhorn (1986) reported that caries was the most important reason for extraction amongst young people. Agerholm and Sidi (1988) also found that in children three-quarters of extractions were for orthodontic reasons. The results of these studies were obtained from the questionnaires of dental practitioners.

In comparison between studies, cultural differences must be taken into consideration.

In this study, the high percentage of low educational level might explain the high percentage of the

sample who had irregular toothbrushing, high dmf (t) scores and less treatments before the tooth extraction.

There were some limitations in this study. These included a relatively small sample and limited ability to assess the treatment history of some patients.

Many primary teeth can be saved with appropriate pulpal intervention. Extraction may be correct and necessary in some situations but it should not be performed merely as the simplest solution, especially if loss of the tooth may lead to compromised dental arch circumference. The best space maintainer is a successfully treated or restored tooth (Belanger, 1988).

Results of this study suggested that irregular toothbrushing, high dmf (t) scores and untreatment of carious primary molars were significant risk factors in early loss of primary molars.

In order to avoid the early loss of primary molars, restorative care and effective preventing methods need to be expanded. Efforts also must be made to change the values and beliefs of certain populations about the importance of restoring rather than extracting carious teeth.

CONCLUSIONS

1. Sepsis, caries and pain are the most common reasons for early extraction of primary molars.
2. Irregular toothbrushing, high dmf (t), DMF (T) scores and untreatment of carious primary molars were significant risk factors in early loss of primary molars.

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