Original Article

SURVEY OF DENTAL TREATMENTS FOR PEDIATRIC PATIENTS REFERRED TO THE PEDIATRIC DENTAL CLINIC OF A DENTAL SCHOOL HOSPITAL

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Abstract

This survey was conducted to clarify which dental treatments in children are regarded as difficult by general dentistry practitioners. The subjects were 615 children who first visited Tokyo Dental College Chiba Hospital from January 1995 to August 1999 with reference letters. There were 615 children in the study; 571 (92.8%) came from Chiba City where our hospital is located and the 11 regions surrounding Chiba City. The prime reasons for referral in the order of frequency were treatments of dental caries, malalignment/malocclusion, traumatized teeth, supernumerary teeth, retarded eruption/ impacted teeth, abnormal direction of erupted teeth, congenitally missing teeth, prolonged retention of deciduous teeth, and abnormal frenulum. Patients with dental caries or traumatized teeth in the deciduous dentition period and those with malalignment/malocclusion, supernumerary teeth, or retarded eruption/impacted teeth in the mixed dentition period were often referred to medical organizations specializing in pediatric dentistry because of the difficulties in controlling the patients' behavior and in providing adequate treatment. The information about pediatric dental treatments considered difficult by general dentists revealed by this survey appears to be useful and needs to be incorporated in the programs for clinical training of undergraduate students and education of postgraduate students.

Key words: Pediatric dentistry—Referred pediatric patients—
Survey of pediatric dental treatments

INTRODUCTION

New patients come to the Pediatric Dental Clinic of Tokyo Dental College Chiba Hospital for various reasons, including treatments of dental caries, malalignment/malocclusion,

traumatized teeth, and retarded eruption/impacted teeth^{1,5,6)}. The new pediatric patients include children referred by dentists in dental clinics or in general hospitals. To clarify the background of their first visit to our hospital, we conducted a survey investigating the

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Table 1 Number of pediatric patients and the rate of referral

Year	1995 Jan.-Dec.	1996 Jan.-Dec.	1997 Jan.-Dec.	1998 Jan.-Dec.
Number of patients				
Number of new patients	809	784	720	744
Number of referred patients	81	128	160	170
Referred patients/new patients ratio	10.0%	16.3%	22.2%	22.8%

Fig. 1 The age distribution in the total of 615 subjects

pediatric dental treatments requested by dentists in other institutions on the basis of clinical information stated in letters of reference.

SUBJECTS AND METHODS

The subjects were 615 children visiting the Pediatric Dental Clinic of Tokyo Dental College Chiba Hospital for the first time from January 1995 through August 1999 who had been referred by dentists in dental clinics or general hospitals. The 615 children (17.3%) were selected from 3,557 children who first visited at this hospital during the 4 years and 8 month period based up on the availability of a reference letter containing clinical information.

Five items of information were analyzed: patient age at the first visit, dental treatment requested, concurrent non-dental diseases, region of the medical/dental institutions

making the referral, and patient's residence. When multiple requests for treatment were made by a single patient, each request was counted separately. A statistical comparison was undertaken by chi-square (χ^2) test.

RESULTS

1. Number of children and the rate of referral

Table 1 shows the number of referred children and their ratio to the total number of new pediatric patients for each year. The number of referred children and the ratio of referral tended to increase gradually between 1995 and 1998.

Fig. 1 shows the age distribution in all of the 615 subjects registered for this survey. The age of the subjects ranged from 10 months to 15 years and 3 months; by age, the 3-year-old group was largest, followed by the 7-year-old

Table 2 Number of requests by treatment

Requests by treatment	Number of patients
Dental caries	170
Malalignment/malocclusion	93
Traumatized teeth	84
Supernumerary teeth	72
Retarded eruption/impacted teeth	65
Abnormal direction of the erupted teeth	37
Congenitally missing teeth	24
Prolonged retention of the deciduous teeth	13
Abnormal frenulum	12
Others	47
Unknown	23

group. We divided the study population into two groups; a young children (YC) group (286 children, 46.5%, aged 0–5 years) and a school children (SC) group (329 children, 53.5%, aged 6–15 years) for analysis.

2. Number of requests by treatment

Table 2 shows the number of requests by treatment. The number for dental caries treatment was largest (170), followed by treatments for malalignment/malocclusion (93), traumatized teeth (84), supernumerary teeth (72), retarded eruption/impacted teeth (65), abnormal direction of the erupted teeth (37), congenitally missing teeth (24), prolonged retention of the deciduous teeth (13), and abnormal frenulum (12). There were 47 cases unable to be classified, and these were

Table 3 Number of requests by treatment in the total 615 subjects

Age (year)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Dental caries (Number of uncooperative children)	0 (0)	11 (4)	27 (13)	39 (28)	40 (25)	19 (7)	9 (6)	6 (6)	3 (0)	5 (1)	3 (2)	3 (0)	2 (0)	3 (0)	0 (0)	0 (0)
Traumatized teeth	2	21	14	16	6	4	4	7	2	3	3	2	0	0	0	0
Malalignment/malocclusion	0	3	1	4	5	5	12	15	11	12	9	3	7	4	1	1
Supernumerary teeth	0	0	0	1	5	13	14	20	11	2	1	2	3	0	0	0
Retarded eruption/impacted teeth	0	0	2	0	0	1	6	13	8	10	7	6	6	3	1	2
Abnormal direction of the erupted teeth	0	0	0	0	1	0	5	6	5	8	7	2	2	0	1	0

Table 4 Comparison of the number of requests by treatment between YC group and SC group

Variables	Group	YC group (n = 286)	SC group (n = 329)	
Dental caries (uncooperative children)		136 (77)	34 (15)	**
Traumatized teeth		63	21	**
Malalignment/malocclusion		18	75	**
Supernumerary teeth		19	53	**
Retarded eruption/impacted teeth		3	62	**
Abnormal direction of the erupted teeth		1	36	**

**: $p < 0.01$ by chi-square test

included in the category of miscellaneous. In 23 children, the contents of the treatment request were unknown.

3. Number of treatment requests and age distribution in the subjects

Comparison between the number of requests by treatment and the age distribution revealed that dental caries treatment and traumatized teeth treatment were predominantly requested in subjects aged 0–5 years, roughly corresponding to the YC group (Table 3). Table 3 shows the number of unco-

operative children by age in 170 subjects coming to the hospital for the treatment of dental caries. Among the 170 children, the number of subjects described as being impossible to treat because they would not cooperate was 92 (54.1%), more than half of the total. The majority of them were children under 5 years of age.

The age distribution for the treatment of malalignment/malocclusion, supernumerary teeth, retarded eruption/impacted teeth, and abnormal direction of the erupted teeth is also shown in Table 3. All of the treatments were mainly requested in children aged 6–15 years, corresponding to the SC group.

Table 4 shows that the rates of dental caries treatment, uncooperative children, and traumatized teeth treatment in the YC group were significantly greater than in the SC group ($p < 0.01$ by chi-square test). In contrast, the rates of treatment of malalignment/malocclusion, supernumerary teeth, retarded eruption/impacted teeth, and abnormal direction of the erupted teeth in the SC group were significantly greater than in the YC group ($p < 0.01$ by chi-square test).

4. Concurrent non-dental diseases

Of the total of 615 subjects, 43 children (7.0%) had concurrent non-dental diseases

Table 5 Concurrent disorders noted in the 43 children

Concurrent disorders	Number of children
Allergy	18
Mental retardation	6
Cheilognathoschisis	6
Heart disease	4
Kidney disease	3
Genetic disease	2
Down's syndrome	2
Autism	1
Blood disease	1

Table 6 Distribution of the regions of medical/dental institution and patient's residence

Region \ Number of the region	Number of children by the region	Number of medical/dental institution by the region
Chiba	291	254
Narashino	87	92
Ichihara	51	54
Funabashi	43	28
Yachiyo	43	34
Ichikawa	17	31
Sakura	13	25
Sambu	8	11
Others within Chiba Prefecture	53	54
Outside from Chiba Prefecture	9	32

Fig. 2 Residence distribution of referred children within Chiba Prefecture

which required consideration in providing dental treatment. These concurrent disorders are presented in Table 5. When complications were present with a main disorder, only the primary disease was counted for analysis. Allergies were the most common disorder found in 18 of the 43 children, mainly as pediatric asthma, followed by mental retardation (6), cheilognathoschisis (6), heart disease (4), kidney disease (3), genetic disease (2), Down's syndrome (2), autism (1), and

blood disease (1).

5. Distribution of the regions of medical/dental institutions and patient's residence

Table 6 shows the number of children by the region in which they were living and the distribution of medical/dental institutions making a referral by region. Of the 615 subjects, 606 (98.5%) came from Chiba Prefecture. Fig. 2 shows the residence distribution. Of these children, the majority (291,

47.3%) came from Chiba City. The number of children coming from the 11 regions surrounding Chiba City (9 cities of Funabashi, Narashino, Yachiyo, Sakura, Yotsukaido, Yachimata, Togane, Mobara, and Ichihara; 2 districts of Sambu and Chosei) was 280 (45.5%) in total; when this table and that of Chiba City were added together, the grand total was a majority of 571 (92.8%), who lived within 20 km of Tokyo Dental College Chiba Hospital.

By location of medical/dental institutions making a referral, 94.8% (583 of the 615 hospitals) were located within Chiba Prefecture. However, referrals were also made from 32 hospitals (5.2%) outside the prefecture; the ratio of outside to inside was greater for institutions than for pediatric patients.

DISCUSSION

1. Referred pediatric patients

The ratio of referred patients from dental clinics or general hospitals to all children visiting our clinic for the first visit each year was 10.0% in 1995, 16.3% in 1996, 22.2% in 1997, and 22.8% in 1998, indicating an increasing trend. A literature review on the proportion of referred patients in the departments of pediatric dentistry in other university hospitals shows that there are several reports indicating similar upward trends. Miyata *et al.*⁽³⁾ reported that the ratio of patients referred by dentists outside their university was increasing annually, showing a more than two-fold increase in 1996 over 1980. Nagata *et al.*⁽⁴⁾ stated that the ratio increased consistently in the 14 years from 1979 to 1993, reaching levels above 55% in the years after 1991. Yoshimura *et al.*⁽⁸⁾ reported that the patients referred by other medical organizations comprised 26% of all the new children their organization treated in the 5 years from 1992 to 1996.

The increasing rate of referral appears to indicate the importance of the role the institution plays in the regional medical care. Thus, the pediatric dentists in special-

ized institutions have to support the general dentists.

2. Medical care requested

The requested treatments differed between the young children aged 0–5 years and the school children aged 6–15 years. Treatments of dental caries and traumatized teeth were more frequent in the young children. Because many of the young children brought letters of referral describing the impossibility or difficulty of dental treatment because they would not cooperate, it appears that general dentists frequently request our organization to treat uncooperative children. Yoshimura *et al.*⁽⁸⁾ also reported that poor patient cooperation was a primary reason for referral in children aged 5 years or younger.

In contrast, treatments of malalignment/malocclusion, supernumerary teeth, retarded eruption/impacted teeth, and abnormal direction of erupted teeth were the principle reasons for referral in the school children. This finding indicates that general dentists tend to ask institutions specializing in pediatric dentistry to provide occlusal guidance for malalignment/malocclusion, supernumerary, retarded eruption/impacted teeth, and abnormal direction of the erupted teeth in the mixed dentition period.

3. Concurrent medical disorders

Concurrent non-dental diseases which required consideration in providing dental treatment were present in 43 (7.0%) of the 615 children. Previous similar surveys reported frequencies of 4% (Yoshimura *et al.*⁽⁸⁾), 11.8% (Yamaguchi *et al.*⁽⁷⁾), 12.2% (Honma *et al.*⁽²⁾), and 20.4% (Nagata *et al.*⁽⁴⁾). All of these studies except for Yoshimura *et al.*'s were conducted in departments of dentistry of universities having departments of medicine and consequently included many patients referred from university hospitals. In our survey, only 13 (30.2%) of the 43 children having medical disorders were referred from divisions of medicine, dentistry, or oral surgery in general hospitals, and the remaining patients were referred from dental clinics.

This finding indicates that general dentists often turned to our institute because we have specialists, trained personnel, and equipment to treat children with concurrent medical disease who frequently require generalized care.

4. Regions of medical/dental institutions making a referral and residence of referred children

The largest proportion (47.3%) of children were from Chiba City, where our hospital is located. However, 45.5% of the total were from various regions surrounding the city, indicating that our hospital plays a significant role in providing medical care for an extended region. Of institutions making referrals, 94.8% were in Chiba Prefecture. However, the number of requests from outside the prefecture (32) was greater than that of children (9) living outside. This was due to the fact that many pediatric patients, who had moved into the city, came to the hospital with a reference letter prepared at a hospital in the region of their previous residence, usually a dental college hospital or department of dentistry in a university.

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