

Well-baby dental examinations: a survey of preschool children's oral health

Anthony A. Kamp, DMD, MSD

Abstract

Well-baby dental visits provide early prevention and detection of dental disease for the infant and preschool child. A survey of the dental records of 379 preschool children from the ages of 6 months to 4.5 years were reviewed from a population of military family dependents. The caries activity of this population was found to be 8.9%, with a dft of 0.25. Nursing caries was clinically definable in 5.3% of the children, accounting for 58.8% of all reported caries. Malocclusion occurred in 6.3%, with anterior open bite and posterior crossbite found most commonly. No soft tissue pathology was noted. Evidence of previous dental trauma to the maxillary incisors with crown discoloration was found in 2.9%. These early dental visits provide a pleasant introduction to dental oral health and prevention for both parents and children. Early dental examinations should focus the parent's attention on the child's future oral health and provide an understanding of the causes of nursing caries.

Introduction

The detection and prevention of dental disease should begin with dental counseling and examinations within six months of the eruption of the first primary tooth, and no later than one year of age (American Academy of Pediatric Dentistry 1989). The dental profession must encourage prevention of dental disease, rather than waiting to treat the effects of disease (Goepferd 1986a). Early dental visits may be referred to as "well-baby" visits. These visits provide a pleasant, nonthreatening introduction to oral health care and prevention for both the child and parents.

Preventing dental disease requires making critical decisions early in infancy regarding feeding patterns, fluoride supplementation, and oral hygiene programs

This article is a work of the United States Government and may be reprinted without permission. The author is an employee of the United States Air Force at Ramstein, Germany. Opinions expressed herein, unless otherwise specifically indicated, are those of the authors. He does not purport to express views of the Dental Corps of the United States Air Force or any other Department or Agency of the United States Government.

(Goepferd 1987). Empirical evidence supports initiating a preventive program during infancy and early childhood (Nowak 1978, 1981). The success of dentists in raising caries-free children is evidence of the effect of implementing early preventive practices (Goepferd 1986a). Nursing decay in the dentition of toddlers is but one example of an inadequate oral health preventive program (Johnsen 1982). Parents usually do not have access to dental preventive information to help them make proper oral health decisions, except through discussion with dentists (Goepferd 1986a).

There is substantial literature concerning the dental needs for children attending school, but there are few published reports on young preschool children (Bentley and Drake 1986). The prevalence of nursing caries in the general population needs to be established (Ripa 1988). The purpose of this study is to describe the oral health status of preschool children from infancy to 4 years of age whose introductory dental visit was for "well-baby" dental examinations. This information should help direct the dental profession in establishing preventive programs for this patient population.

Methods and Materials

The dental records of 379 preschool dental patients who participated in "well-baby" screening examinations from February, 1989, to June, 1990, at Misawa Air Base were reviewed. The "well-baby" clinics were available to children of military and department of defense dependents 4 years of age and younger as a public service activity. The survey population included children presenting for their introductory dental examination. All participants were reported to be in good general health. The majority of patients resided on base, which had optimally fluoridated drinking water. The presence of decayed and filled teeth and other treatment findings were inferred from chart entries and treatment plans.

The examinations were performed by nine general dentists and a pediatric dentist stationed at Misawa Air

Base. The protocol was similar to that advocated by Goepferd (1986b). All dental examinations were performed in an operatory utilizing the dental chair or a "knee-to-knee position" with the parent holding the child. The oral examination included a soft tissue assessment and inspection of the dentition. Charting reported

obvious clinical findings, but did not utilize a clinical checklist to record negative findings. Use of the dental mirror and explorer was at the discretion of the examining dentist (Goepferd 1987; Ripa 1988). Dental radiographs were not utilized for the screening examination, and calibration between examiners was not undertaken.

Following inspection of the oral cavity, toothbrush cleaning and proper plaque removal and oral hygiene were demonstrated and discussed. Finally, the parents were given a verbal summary of the clinical findings and oral health counseling, and were scheduled for recall or definitive care.

Results

The age of the patients ranged from 6 months to 4 years and 6 months, with a mean age of 2.3 years. Males comprised 49.9% (N = 189) and females 50.1% (N = 190). The distribution of the patient population by age and gender is presented in Table 1.

No obvious caries or notable dental chart entries were made in 80.7% of the patients examined (N = 306). Notable clinical examination findings could be classified as caries activity, malocclusal or functional problems, soft tissue notations, trauma and discolored anterior crowns secondary to trauma and other findings. The dental records did not contain an examination checklist, so only obvious positive clinical findings were recorded. There may have been a tendency for the examiners to only report findings requiring treatment.

Table 1. Distribution of preschool children by age and gender

Age of Patient (years)	Male	Female	Total Patients	% of Total
0.0 – 1.5 years	50	49	99	26.1
1.5 – 2.5	76	79	155	40.9
2.5 – 3.5	54	56	110	29.0
3.5 – 4.5 years	9	6	15	4.0
Total	189	190	379	100.0

Caries activity was found in 8.9% (N = 34) of the preschool children examined. Table 2 shows the per cent of infants and preschool children with caries experience in the primary dentition. The mean number of decayed and filled teeth (dft) per child by age group is shown in Table 3. The nursing caries prevalence, based on the criteria of at least one carious maxillary incisor, was 5.3% (N = 20). Nursing caries accounted for 58.8% of all reported caries in this preschool population.

Malocclusion was reported in 6.3% of the patients (N = 24), crossbite or transverse relationships in 1.6% (N = 6), anterior open bite in 2.3% (N = 9), excessive overjet in 0.8% (N = 3), and excessive dental malalignment of the primary dentition in 0.5% (N = 2).

Soft tissue annotations were found in 1.8% (N = 7) of the examined children, none of which required biopsy for microscopic examination. Soft tissue abnormalities included benign migratory glossitis (geographic tongue), ankyloglossia, and traumatic ulcerations. Other clinical findings included 11 patients with evidence of trauma with darkened anterior maxillary incisors or enamel fracture of an incisor. Nineteen patients were referred for sealant placement on primary molars. Eleven parents who resided in a nonfluoridated area off-base requested supplemental fluoride prescriptions for their children. Two patients were referred for medical consultation for reported heart murmurs. The distribution of clinical findings by frequency and age is shown in Table 4 (next page).

Table 2. Per cent of preschool children with caries

Age of Patient (years)	Per cent	No. of Patients
0.0 – 1.5	2.0	2/99
1.5 – 2.5	9.7	15/155
2.5 – 3.5	13.6	15/110
3.5 – 4.5	13.3	2/15
Total	8.9	34/379

Table 3. Caries experience (dft) in the primary teeth per child by age groups

Age of patient (years)	dft	No. teeth/No. patient
0.0 – 1.5	0.06	6/99
1.5 – 2.5	0.28	45/158
2.5 – 3.5	0.33	36/110
3.5 – 4.5	0.4	6/15
Total	0.25	93/379

Table 4. Frequency of dental findings by age

	0-1.5	1.5-2.5	2.5-3.5	3.5-4.5
	Years			
No pathology	91	123	82	10
Caries	2	15	15	2
Occlusion	2	14	6	2
Sealant referral	0	7	8	4
Soft tissue	2	2	2	1
Fluoride Rx	1	8	2	0
Evidence of trauma	1	4	4	2
Other	3	3	2	0

Discussion

The prevention of dental disease in infants and very young children begins with informed parents. Many parents, however, remain unaware of the need to begin early regular dental care. The majority of children are not examined by a dentist until they reach school age, at which time a dental examination is often mandatory (Bentley and Drake 1986; Waldman 1990). Well-baby visits are one way to provide an early, pleasant, and nonthreatening introduction to oral health care and prevention for both parents and children (Goepferd 1986a; Croll 1987).

Dental caries has been declining for the general population and especially for older children (Brunelle and Carlos 1982; Stamm 1984; Stookey et al. 1985), however the caries prevalence for young children, age 3 to 4 years, has not shown a statistically significant declining trend (Bentley and Drake 1986). This study found an overall caries prevalence of 8.9% and dft of 0.25 in children younger than 4.5 years, a prevalence lower than previously reported studies. Freeman et al. (1989) reported a caries prevalence of 23% of children from 0 to 5 years, and Edelstein and Tinanoff (1983) reported a caries prevalence of 30% in the examination of children younger than age 6 years. Weddell and Klein (1981) cited a dft range of 0.128 at 12 months of age to 1.1 at 36 months. Other researchers found dft ranges of 1.23 to 1.36 among children 2 years old and 2.79 to 3.63 among those 4 to 5 years old (Wisan et al. 1957; Infante and Owen 1975). Smythe et al. (1990), in a caries prevalence study of USAF family members, found an average dfts of 2.74 for ages 3 to 4 years. Smythe et al. (1990) also found there was no significant difference in the caries rate between officers and enlisted family members and no overall significant difference when comparing ethnic origin in military dependent populations.

Nursing caries can be differentiated from other enamel defects and rampant decay (Robinson and

Naylor 1963; Goose 1967; Dilley et al. 1980; Johnsen 1984; Ripa 1988). The decay pattern involves the four maxillary incisors, while the mandibular incisors usually remain unaffected by caries. The localization of the carious lesions is associated with the teeth present, and the flow path of the liquid while nursing. A caries experience defined to include children with nursing caries has been suggested as the only severe caries experience in children younger than 2.5 years of age (Johnsen et al. 1984b). The incidence of nursing caries varies with researcher and the population studied. Ripa (1988) reports nursing caries prevalence in the United States and other Western countries no higher than 5%. Utilizing the criteria of Cleaton-Jones et al. (1978), a prevalence of 5.3% was found in the current study. Johnsen et al. (1984a) report a higher nursing caries prevalence of 11% in Head Start children from two fluoridated communities in Ohio. Currier and Glinka (1977), however, found a prevalence of nursing caries of 5% in predominantly black children attending a child health clinic in optimally fluoridated Richmond, VA.

Determining the true incidence of caries in the preschool age is difficult, since these children are not as accessible as older children, and those chosen for examination may not represent the general population for that age group (Ripa 1988). Children who present for examination or treatment to a dental facility may bias the sample because many have parents who are aware that a problem exists (Bentley and Drake 1986; Ripa 1988) or who are more motivated in early preventive measures. The age when caries are first noticed by parents is, on average, 20 months (Johnsen 1984).

Malocclusion problems comprised a small segment of the sample (6.3%). Kelly et al. (1973) found a 30% incidence of occlusal problems in a patient population 6-11 years of age. In this study, common occlusal problems were anterior open bite and transverse or crossbites. These findings differ from Kelly et al. (1973), who found crowding, malalignment and excessive overjet most commonly in an older child population.

Thumb sucking is a common childhood habit; up to 95% of children under 4 years of age have been found to suck their thumbs or a pacifier (Musselman 1981). Prolonged sucking of the thumb, finger, or pacifier is associated with dental and skeletal malocclusions such as dental anterior open bite and transverse or posterior crossbites. Generally this habit decreases by age 4 years, which may explain the difference in findings between these two populations. Orthodontic diagnosis and treatment in the primary dentition can allow for normal growth and development and correct any functional problems that may otherwise interfere with normal growth (Ngan et al. 1988).

No soft tissue pathology was observed in this population. The incidence of oral pathology is relatively low

for preschool age groups. Skinner et al. (1986) found from a sample of 1525 pediatric biopsied oral lesions, that approximately 4% of the lesions occurred in children 4 years and younger. The largest category of submitted lesions for biopsy were inflammatory and reactive lesions and not neoplastic (Skinner et al. 1986).

Pediatric oral trauma accounts for more than 7% of children seen in hospital emergency rooms (O'Neil et al. 1989). Harrington et al. (1988), in a study of dentofacial trauma, found that 6% of children ages 4 years and younger had extrusion/intrusion dental injuries which could cause crown discoloration. The incidence of discolored maxillary teeth was found to be 3% (N = 6) in the Misawa sample. Displacement injuries of the primary dentition are more common than crown fractures. This may be due to the softness and resiliency of the bone and the periodontal ligament, which absorb more of the energy during trauma (Andreasen 1970). Falls have been reported as the leading cause of dentofacial injuries during childhood (Levine 1982; Carroll et al. 1987; O'Neil et al. 1989).

Most new parents are unaware of the cause of dental caries in their children. Tsamtsouris et al. (1986) reported that of 179 expectant parents attending prenatal classes at a hospital in the Boston area, 54% thought that a bottle of milk at other than regular feeding times would not harm the teeth of the infant, and 84% had never heard of nursing caries. A positive educational program designed to lower the incidence of nursing caries should avoid high fear-arousal techniques and promote the oral health of the child (Schuman and Mills 1981). Several articles have described nursing caries educational programs which are directed primarily to prospective or new parents (Gardner et al. 1977; Shelton et al. 1977; Tsamtsouris and White 1977; Shearer et al. 1978; Kammerman and Starkey 1981; Ripa 1988).

Conclusion

A survey of military preschool children found that approximately 9% had caries and that 5% could be clinically defined as having nursing caries. Nursing caries accounted for 58.8% of all reported caries in this population. My findings support the view that oral counseling should begin within six months of the eruption of the first primary tooth and no later than 1 year of age. Well-baby dental examinations are an excellent method of providing early dental consultation to focus parents' attention toward the child's future dental health.

The author thanks the dental officers and enlisted personnel who volunteered their time and talents to make well-baby examinations a reality for Misawa Air Base.

Dr. Kamp was chief, Pediatric Dentistry, 432d Medical Group, Misawa, Japan, at the time of this study. Currently, he is chief, Pediatric

Dentistry, 316 Air Division Clinic/SGD, Ramstein, Germany. Reprint requests should be sent to: Dr. Anthony A. Kamp, Box 5533, 316 Air Division Clinic/SGD, APO New York 09012.

- American Academy of Pediatric Dentistry: Oral Health Policies; Policy Statement on Infant Dental Care. Revised May, 1989.
- Andreasen JO: Etiology and pathogenesis of traumatic dental injuries: a clinical study of 1,298 cases. *Scan J Dent Res* 78:329-42, 1970.
- Bentley C, Drake CW: Changing patterns of dental caries in young children presenting at the University of North Carolina School of Dentistry between 1960 and 1984. *Pediatr Dent* 8:216-20, 1986.
- Brunelle JA, Carlos JP: Changes in the prevalence of dental caries in U.S. school children, 1961-1980. *J Dent Res* 61:1346-51, 1982.
- Carroll MJ, Hill CM, Mason DA: Facial fractures in children. *Br Dent J* 163:23-6, 1987.
- Cleaton-Jones P, Richardson BD, Rantscho JM: Dental caries in rural and urban black preschoolchildren. *Community Dent Oral Epidemiol* 6:135-38, 1978.
- Croll TP: The three-year-myth. *Pediatr Dent* 9:86-87, 1987.
- Currier GF, Glinka MP: The prevalence of nursing bottle caries or baby bottle syndrome in an inner city fluoridated community. *Virginia Dent J* 54:9-19, 1977.
- Dilley GJ, Dilley DH, Machen JB: Prolonged nursing habit: a profile of patients and their families. *ASDC J Dent Child* 47:102-8, 1980.
- Edelstein B, Tinanoff N: Screening preschool children for dental caries using a microbial test. *Pediatr Dent* 11: 129-32, 1989.
- Freeman L, Martin S, Rutenberg G, Shirejian P, Skarie M: Relationships between def, demographic, and behavioral variables among multiracial preschool children. *ASDC J Dent Child* 56:205-10, 1989.
- Gardner DE, Norwood JR, Eisenson JE: At-will breast feeding and dental caries: four case reports. *J Dent Child* 44:187-91, 1977.
- Goepferd SJ: Infant oral health: a rationale. *ASDC J Dent Child* 53:257-60, 1986a.
- Goepferd SJ: Infant oral health: a protocol. *ASDC J Dent Child* 53:261-66, 1986b.
- Goepferd SJ: An infant oral health program: the first 18 months. *Pediatr Dent* 9:8-12, 1987.
- Goose DH: Infant feeding and caries of the incisors: an epidemiological approach. *Caries Res* 1:166-73, 1967.
- Harrington MS, Eberhart AB, Knapp JF: Dentofacial trauma in children. *J Dent Child* 55:334-38, 1988.
- Infante PF, Owen GM: Dental caries and levels of treatment for school children by geographical region, socioeconomic status, race and size of community. *J Public Health Dent* 35:19-27, 1975.
- Johnsen DC: Characteristics and backgrounds of children with "nursing caries." *Pediatr Dent* 4:218-24, 1982.
- Johnsen DC: Dental caries patterns in preschool children. *Dent Clin North Am* 28:3-20, 1984.
- Johnsen DC, Schechner TR, Bhat M: Caries progression reconstructed for children in the primary dentition. *J Dent Res* 63: (Abstr 102) 182, 1984b.
- Johnsen DC, Schultz DW, Schubot DB: Caries patterns in Head Start children in a fluoridated community. *J Public Health Dent* 44:61-66, 1984a.
- Kammerman AM, Starkey PE: Nursing caries: a case history. *J Indiana Dent Assoc* 60:7-10, 1981.
- Kelly JE, Sanchez M, VanKirk LE: An assessment of the occlusion of teeth of children, Washington, DC. 1973, National Center for Health Statistics, U.S. Public Health Service. DHEW Publication No. (HRA) 74-1612.
- Levine N: Injury to the primary dentition. *Dent Clin North Am* 26:461-80, 1982.
- Musselman RJ: Oral facial development and oral habits. In *Pediatric Basics*, No. 30. Fremont, MI: Gerber Medical Marketing Services. Gerber Products Company, 1981, pp 12-14.
- Ngan PW, Wei SHY, Yen PK-Y: Orthodontic treatment of the primary dentition. *J Am Dent Assoc* 116:336-40, 1988.

- Nowak AJ: Early intervention: prenatal and postnatal counseling and infant dental care, in *Pediatric Dental Care — An Update for the Dentist and for the Pediatrician*, Wei SHY, ed. New York: Medcom Inc, 1978, pp 41-43.
- Nowak AJ: Infant dental care. *Pediatric Basics* 30:3-11, 1981.
- O'Neil DW, Clark MV, Lome JW, Harrington MS: Oral trauma in children: a hospital survey. *Oral Surg* 68:691-96, 1983.
- Ripa LW: Nursing caries: a comprehensive review. *Pediatr Dent* 10:268-82, 1988.
- Robinson S, Naylor SR: The effects of late weaning on the deciduous incisor teeth: a pilot study. *Br Dent J* 115:250-52, 1963.
- Schuman NJ, Mills JA: A strategy for decreasing the incidence of baby bottle syndrome. *J Tenn Dent Assoc* 61:22-4, 1981.
- Shearer TR, Howard HE, DeSart DJ: Breast-feeding and nursing caries. *J Oreg Dent Assoc* 47:17, 1978.
- Shelton PG, Berkowitz RJ, Forrester DJ: Nursing bottle caries. *Pediatrics* 53:777-78, 1377.
- Skinner RL, Davenport WD, Weir JC, Carr RF: A survey of biopsied oral lesions in pediatric dental patients. *Pediatr Dent* 8:163-7, 1986.
- Smythe SJ, Shulman ER, Patrissi G, Drum D, Foreman FJ, Paquette DE, Preisch JW: Prevalence of dental caries in USAF family members age 3-15. *Pediatr Dent* 12:172-79, 1990.
- Stamm JW: Is there a need for dental sealants? Epidemiological indications in the 1980s. *J Dent Educ (Suppl)* 48:9-17, 1984.
- Stokey GK, Park KK, Drook CA, Sergeant JW, Jackson RD: Prevalence of dental caries in Indiana school children: results of 1982 survey. *Pediatr Dent* 7:8-13, 1985.
- Tsamtsouris A, White GE: Nursing caries. *J Pedod* 1:198-207, 1977.
- Tsamtsouris A, Stack A, Padamsee M: Dental education of expectant parents. *J Pedod* 10:309-22, 1986.
- Waldman BH: Is there a future for pediatric dentistry? Reviewing the other side of the story. *ASDC J Dent Child* 57:198-202, 1990.
- Weddell JA, Klein AI: Socioeconomic correlation of oral disease in six-to thirty-six month children. *Pediatr Dent* 3:306-10, 1981.
- Wisn JM, Lavell M, Colwell FH: Dental survey of Philadelphia preschool children by income, age, and treatment status. *J Am Dent Assoc* 55:1-10, 1957.

Is the military fighting a losing battle?

New dentists are concluding increasingly that a military uniform does not fit their needs, reports *AGD Impact*, newsmagazine of the Academy of General Dentistry.

"There is no doubt that the ability to recruit and retain dental officers has been on the decline in recent years," says Colonel Ed Herbold, DDS, deputy director for professional affairs, Office of the Assistant Secretary of Defense for Health Affairs. "We haven't met recruitment and retention goals since 1985."

The percentage of graduating seniors planning to enter government service has dropped from 19.7% in 1978 to 10.6% in 1990, according to the American Association of Dental School (AADS) 190 survey of dental school seniors.

Traditional draws of armed forces dentistry — education, travel, and professional experience — are not attracting dental school graduates like they used to, say leaders in military dentistry. Cumbersome debts borne by graduates, a growing disparity in salaries, and changing demographics are among the factors that have dulled the luster of a military career and have hobbled the services efforts to fill their ranks from a shrinking pool of prospects.

Graduates start out making approximately \$30,000 a year in the military and at the end of four years, they're up to only about \$40,000 a year," says Larry R. Camp, DMD, FAGD, a lieutenant colonel in the U.S. Army Dental Corps and president-elect of the AGD Army constituency. "In the civilian sector, once you get past those first couple of years, the average income is \$64,000."

Many graduates cannot afford the military because their average debt after school is \$45,550, compared to \$12,700 in 1978, according to the AADS survey, and the 1986 Tax Reform Act no longer permits students to deduct loan interest.

The AADS survey also indicates that of the 483 seniors going into government service after graduation, 121 (or 25%) are women, who historically have been less likely to enter government service and stay, says Dr. Herbold.

He says that if dental school graduates continue to favor civilian practice over government service by such a large measure, the military may not be able to meet its mission requirements.