

An infant oral health program: the first 18 months

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Abstract

During the 18 months from October, 1984, to April, 1986, 180 infants and toddlers younger than 3 years of age participated in the Infant Oral Health Program at the University of Iowa's Department of Pediatric Dentistry. The age of the participants, reason for seeking care, infant feeding patterns, improper bottle habits, caries, behavior of the participants, fluoride status, and parental response were monitored. The results provide a rationale supporting the need for and viability of early intervention in the oral health of infants through parental education.

In the fall of 1984 the Department of Pediatric Dentistry at the University of Iowa College of Dentistry initiated the Infant Oral Health Program based on the faculty's belief that total prevention of dental disease is a realistic possibility. This belief was supported by a decline in caries prevalence in children as observed in the National Dental Caries Prevalence Survey (NIDR 1981), the effectiveness of fluorides (Newbrun 1983b), and sealants (Haupt 1983) in caries prevention, and recent information by Newbrun (1983a) regarding the dietary influences on dental caries. The faculty also felt strongly that to be successful a prevention program should be initiated early, before the onset of disease. Support for initiating a prevention program during infancy is provided by the following factors:

1. The occurrence of nursing caries in very young children (Johnsen 1982)
2. Basic habits are established very early in life (Anderson et al. 1977; Morley and Beauchamp 1985)
3. Success of dentists in raising caries-free children by virtue of important early preventive decision making
4. Lack of public awareness of the benefits of early prevention efforts and the foundation of knowledge to make sound early preventive decisions
5. Availability of strong empirical evidence of the benefits of early oral health intervention (Nowak 1978, 1981)

6. Recent evidence suggesting that dental caries is an infectious disease via transmission of *Streptococcus mutans* from parent to infant.¹

Program Goals

In view of the evidence which suggests that the initiation of a sound oral health program in infancy by parents will maximize the possibility of raising caries-free children, the Infant Oral Health Program was developed with the following goals.

1. Discover, intercept, and modify parenting practices that may be potentially hazardous to the infant's oral health.
2. Educate parents regarding their role in an effective dental disease prevention program for their child, based on the most current information available and the current family situation.
3. Introduce the concept to both parents and children that dental care can be pleasant and need not be threatening or fear-producing.
4. Evaluate orofacial development and oral health.

Collectively, the objectives of the program established an overall goal of providing children with the opportunity to grow up experiencing optimal oral health—free of dental disease via the establishment of an individualized prevention program that parents may follow.

Program Overview

The Infant Oral Health Program was designed to provide early dental evaluation of infants/toddlers and provide parent education regarding their important role in preventing dental disease in their children. Although the program was available for children up to 3 years of age, the preferred age of the first dental visit was between 6 and 12 months of age.

¹ Berkowitz et al. 1980; van Houte et al. 1981; Davey et al. 1984; Loesch 1985.

The University of Iowa
College of Dentistry
Department of Pediatric Dentistry

Date _____

Biographical Data (Filled out by parent or guardian)

Name _____ Sex _____ Race _____
 Nickname _____ Age _____ Birthdate _____
 Pets, hobbies _____
 Home address _____
 Phone _____

Father's Name _____ Age _____ Marital status: S M W D Se _____
 Place of business _____ Phone _____
 Business address _____
 Mother's Name _____ Age _____ Marital status: S M W D Se _____
 Place of business _____ Phone _____
 Business address _____

Legal guardian (if other than parent)
 Place of business _____ Phone _____
 Business address _____

Brothers/sisters (names and ages) _____

Person responsible for this account
 is your child covered by
 Social agency Agency _____
 Dental insurance Number _____

Referred by _____
 Reason for seeking care _____

Growth and Development
Developmental Milestones

Sitting alone _____ mo. Crawling _____ mo. First word _____ mo.
 First tooth _____ mo. Standing alone _____ mo. Walking alone _____ mo.

FIG 1. Preappointment information form for biographical data.

Once an appointment was made, the parents received a preappointment information packet which included a welcome letter, registration materials, a medical history form, and a questionnaire (Figs 1, 2). This information assisted the dentist in formulating specific, concise and meaningful preventive recommendations during the counseling portion of the visit.

The child's visit began with an interview and counseling session based on the preappointment information. The interview also provided an opportunity to assess the family's current preventive behaviors (Fig 3). Based on the information gathered, the counseling segment addressed the following parameters and offered recommendations and modifications of inappropriate behaviors in each:

1. Infant feeding practices
2. Diet management and snacking patterns
3. Tooth cleaning
4. Fluoride management.

Following the counseling aspect, the infant/toddler was examined in the knee-to-knee position, beginning with a general appraisal and an extraoral head and neck evaluation which familiarizes the child

Feeding History

Breast Fed
 Totally. How long? _____ mo.
 Schedule frequency _____
 On-demand feeding
 Bedtime
 Supplemental bottle. When began? _____ mo.
 Weaned _____ mo.

Bottle Fed
 Ready-to-feed formula
 Formula reconstituted with water
 Average time of each feeding _____
 Bedtime bottle Yes No Contents _____
 Bottle used as pacifier Yes No Contents _____
 Age bottle discontinued _____

Maternal-Prenatal History

	Yes	No
1. Did you have a normal pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>
2. Did you experience any difficulties or complications during pregnancy?	<input type="checkbox"/>	<input type="checkbox"/>
If so, explain. _____		
3. Did you experience any of the following during pregnancy?		
<input type="checkbox"/> Severe morning sickness	<input type="checkbox"/>	<input type="checkbox"/> Taking medications, antibiotics, etc.
<input type="checkbox"/> Physical trauma or injury	<input type="checkbox"/>	<input type="checkbox"/> Illness (other than colds or flu)
<input type="checkbox"/> Other _____		
Comments _____		

Birth History

Full term
 Normal delivery
 Premature _____ wks.
 Forceps delivery Cesarean delivery

Complications during delivery: please explain _____
 Birth weight _____ lbs Birth length _____ in

Neonatal History (Birth-1 month)

Did your infant experience any of the following during the first few weeks of life?

Jaundice High fevers
 Breathing difficulties Serious illness
 Feeding difficulties Intubation

Other _____
 Comments _____

FIG 2. Preappointment information form for feeding and developmental histories.

with the dentist's touch (Fig 4). This procedure then was followed by an intraoral examination of the soft tissues and teeth. An in-depth description of the examination procedure has been described by Croll (1984). Following the examination, the technique and positioning for tooth cleaning was demonstrated. In cases where tight contacts are present, the demonstration of flossing with a floss holder may be included. Following the tooth cleaning demonstration, it is essential that the child be repositioned and the parent(s) given the opportunity to practice while the dentist supervises and offers helpful suggestions (Fig 5).

The conclusion of the appointment included a reinforcement of the recommendations offered by way of an individualized prevention program with emphasis on the role of the parents regarding each of the specific areas of feeding patterns, diet and snacking patterns, tooth cleaning program, and fluoride management. The development of a recall schedule of 3, 6, or 12 months was based on the child's risk or potential for developing dental disease.

Program Findings

During the first 6 months of the Infant Oral Health Program, a greater proportion of the children ranged between 18 and 30 months of age. The following 12 months revealed a trend toward a greater

Preventive Assessment*

Is there a history of tooth decay in the family? Yes No
 Mother's side
 Father's side

Do any brothers and/or sisters have a problem with tooth decay?
 Brother(s)
 Sister(s)

Comments _____

Fluoride inventory
 Water fluoridation Yes No Unsure
 Fluoride supplements Yes No What kind _____
 Fluoride rinse Yes No Water analysis _____
 Fluoride toothpaste Yes No _____

Tooth cleaning
 Frequency Times per day _____ When? _____
 Type of toothbrush _____
 Dental floss Yes No
 Disclosing tablets Yes No
 Who is responsible for tooth cleaning? Parent Child Both
 Have you received instruction in tooth cleaning? Yes No

Information provided by _____

Diet Counseling indicated Yes No
 Sealants indicated Yes No
 Water analysis indicated Yes No
 Caries experience Minimal Moderate Severe
 Gingival condition WNL Red Enlarged
 Bleeding Stain/Calculus

Attitude level (P = Parent, C = Child)
 Interest Low _____ Average _____ High _____
 Understanding Low _____ Average _____ High _____

• Results and recommendations
 Teeth recommended for sealants _____
 Tooth cleaning recommendations _____
 Brush type _____ Floss _____
 Frequency of cleaning _____ Position _____
 Location of cleaning _____ Timing _____
 Supervision/responsibility _____

Diet counseling recommendations _____

Fluoride recommendations _____

Materials dispensed _____

FIG 3. Preventive assessment form.

proportion of younger children ranging between 8 and 15 months of age.

The majority of the parents sought participation in the Infant Oral Health Program to receive information on how they could prevent dental disease in their children. Many parents were discouraged by the difficulty they had had locating a dentist who would evaluate their child under 3 years of age and were pleased to learn that the service was available.

There existed an apparent trend for increasing incidence of caries associated with an increase in the child's age. Two children younger than 18 months of age exhibited nursing caries. Of greater importance, however, was the trend for increased caries associated with increased time on the bottle. This observation is not surprising since there is an increased tendency to adopt inappropriate bottle habits when the bottle is used past 12 months of age.

For the majority of the patients, drinking water containing optimal fluoride was available. This, however, did not insure that the infant was receiving fluoride. Seven of the families were drinking bottled water and an additional 2 infants were receiving ready-to-feed formula and may not have been receiving optimal fluoride.

Of the 12 families who obtained water from a private well and were using supplemental fluoride, only 1 had supplements prescribed on the basis of a water fluoride analysis. The others were receiving the proper dose for their age, but no consideration was



FIG 4. Knee-to-knee position for infant oral examination.

given to the existing fluoride levels in their well water in determining the dosage.

A number of families who had the benefits of community fluoridation also were giving their children supplemental fluorides. Of the 27 infants in this category, 13 were breast fed and supplementation was appropriate. However, 9 of those were either switched to or received supplemental bottles of formula mixed with tap water by 3 months of age and no longer required supplements.

Discussion

During the first 18 months of the program, the age at which parents sought preventive care for their infants/toddlers in the Infant Oral Health Program steadily decreased to where a majority of the current patients range from 6 to 18 months of age. The most appropriate age that the author recommends is between 6 and 12 months of age, or shortly after the eruption of the first tooth.



FIG 5. Tooth cleaning practice by the parent.

Feeding Behaviors

Two of the major concerns related to the adoption of the Infant Oral Health Program were nursing caries and the early establishment of basic oral health patterns and habits. A majority of the children seen had been given a bottle at some point during their first years. A potentially hazardous trend emerged from the findings over the past 18 months. Nearly one-half of the children were given the bottle in bed and more than one-half of the children were on the bottle for a prolonged period of time—past 12 months of age. There is a definite trend toward an increase in the misuse of the bottle the longer the child is maintained on the bottle past 12 months of age. This observation becomes relevant when there is a trend toward increased caries with prolonged bottle use and the finding that 7 of the 9 children with caries were subjected to all 3 misuse patterns: bedtime bottle, bottle used as a pacifier, and prolonged bottle use.

Fluoride Management

The majority of the patients participating in the program were receiving fluoride through community drinking supplies. However, some inappropriate fluoride management was occurring in that there were some infants who could have benefited from fluoride supplements, but the need wasn't identified or evaluated nor were appropriate recommendations provided. In other situations, there was a *potential* need and the infant was given supplemental fluoride without a water analysis to determine the appropriate dosage. Finally, there were many children who received fluoride supplements in conjunction with fluoridated drinking water. In less than one-half of the families, the infants were being breast fed and supplementation was appropriate. However, once breast feeding was stopped or a supplemental bottle introduced, supplemental fluoride often was continued. The remaining infants were bottle fed with formula mixed with fluoridated tap water and did not require the fluoride supplement they were receiving.

Behavioral Assessment

The behavioral aspects of dentistry for children play a major role in the specialty. One of the major goals of pediatric dentistry and the Infant Oral Health Program is to provide children with a pleasant, non-threatening introduction to dentistry. The traditional recommendation for a child's first visit at 3 years of age was developed on a behavioral basis. Three years is the average age whereby the child can understand sufficiently to enable him/her to cooperate, and frequently does well. According to Piaget (1959) many children under 3 years of age don't possess sufficient cognitive skills to enable them to cooperate in a den-

tal setting. These children have been referred to as precooperative.

The behavior of the participating children in the Infant Oral Health Program when evaluated in the knee-to-knee position was assessed on a scale similar to that of Frankl (1962). The behavior of children 6–12 months of age for the most part was positive (Frankl 3) and the procedures accepted with little or no resistance. The children 13–24 months of age exhibited a trend of minimal resistance and crying at the younger ages, which progressed to an increased incidence of definite negative behavior around 24 months of age. Many children, however, accepted the procedure with minimal resistance. The definite negative behavior with physical resistance also was more prominent between 24–30 months of age. From 30 months of age and older, the instances of definite resistance decreased and the acceptance increased. A larger number of the children in all categories offered little or no resistance in the knee-to-knee position. The greatest number of negative responses occurred between 18 and 30 months of age which also correlates with the behavioral changes attributed to the "terrible twos."

Although only 77 patients have been evaluated at recall visits, empirically there was a definite trend toward positive behavior at all ages on recall. More observations will be required to substantiate any behavior trends.

Parent Response

Of the 77 recall visits, the parental compliance with tooth cleaning recommendations and suggestions for eliminating detrimental bottle feeding habits has been 93%. Compliance with fluoride supplements was equally high initially, but long-term follow-up will be necessary to determine effective compliance.

Conclusions

The dental profession possesses the knowledge and technology necessary to be effective in preventing dental disease in children. Conditions such as the presence of nursing caries in infants and caries in toddlers, the use of improper infant feeding practices, the early development of significant life-long habits/patterns, the early transmission of *S. mutans* to infants and the lack of or inappropriate management of fluorides in infants and toddlers provide the logic and the rationale for early intervention in the oral health of infants, especially in the area of parent education.

Based on the experiences gained in the Infant Oral Health Program, the author believes that personal contact with the parent and child, demonstrating various tooth cleaning techniques, and the in-

dividual evaluation of each family situation are imperative for optimal results. Reading the information in brochures cannot compare to or replace personal contact and counseling. It is the responsibility of the dental profession to provide this service.

Not only do the findings of 18 month's experiences with the Infant Oral Health Program justify this recommendation, but the parental responses to and requests for preventive services for their infants and toddlers strongly encourage pediatric dentists to take the lead in preventive dentistry today.

The author urges that pediatric dentists support the recommendation that the initial dental visit take place between 6 and 12 months of age and be willing and able to provide this preventive service.

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