

Seminars on Controversial Issues

The paper printed below and the four commentaries which follow make up the second in our occasional series of Seminars on Controversial Issues. In this case, the subject addressed is the timing and purpose of a child's first dental visit. Letters for publication from readers on the subject would be welcome.

Editor.

Targeting of the Year One dental visit for United States children

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Summary. The aim of this review was to evaluate the evidence with regard to the timing of the first dental visit for children in the United States. It was concluded that the Year One dental visit should be performed for all children of low socioeconomic status. However, it should be regarded as an elective procedure for infants of middle-to-high socioeconomic status, except for certain selected high dental caries risk subgroups.

Introduction

In its recommendations for preventive paediatric health care, the American Academy of Pediatrics suggests that a child should visit the dentist for the first time between 1–3 years of age with the addendum that some children may require an earlier initial dental examination [1]. However, the American Academy of Pediatric Dentistry and the American Dental Association recommend that a child should visit the dentist 'within six months of the eruption of the first primary tooth and no later than 12 months of age' [2,3]. The objective of this review was to evaluate the evidence regarding timing of the first dental visit for children in the United States.

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Rationale for the Year One dental visit

The American Academy of Pediatric Dentistry indicates that the purpose for the Year One dental visit is to lay 'the foundation on which a lifetime of preventive education and dental care can be built, in order to help assure optimal oral health into childhood.' [2] This stated purpose for the Year One dental visit is in accordance with the United Nations Declaration of the Rights of the Child containing the lofty assertion that 'mankind owes to the child the best it has to give' [4].

The reasons in support of the Year One dental visit, i.e., oral anticipatory guidance and the establishment of a 'dental home', have been well stated by Nowak and Casamassimo in two classic papers [5,6]. Preventive dentistry for children has historically focused on dental caries management driven by the infectious disease model proposed by Keyes [5].

It was previously believed that the primary cariogenic microorganism, *mutans streptococci*, was initially acquired by the infant during a discrete period, termed the 'window of infectivity', around 2 years of age [7]. It would therefore seem prudent to screen the child prior to the manifestation of frank caries lesions. The importance of early dental evaluation is underscored by a recent report that *mutans streptococci* colonization has been detected even earlier, by six months of age, in predate children [8]. In both of these studies, the mother was the source of *mutans streptococci* infection [7,8]. This intuitively reinforces the need for early dental intervention and maternal counselling to prevent initiation of caries lesions and/or to arrest incipient lesions.

The Year One dental visit provides the dentist with an opportunity to reinforce parental child rearing practices related to oral health. Anticipatory guidance topics would include among others, counselling parents on injury prevention and non-nutritive oral habits [5]. It has been noted that dental trauma affects as many as 30% of children in the primary dentition stage of life [5].

Evidence-based framework for preventive recommendations

The traditional paradigm in health care was based upon an understanding of the basic disease mechanism and pathophysiological principles as a sufficient guide for clinical practice [9], although this decision framework is not an adequate rationale for evidence-based practice. Epidemiologic profile and the concept of efficacy in individual patients under ideal conditions *versus* effectiveness under field conditions also merit consideration prior to any preventive intervention.

Guyatt and colleagues from the Evidence-based Medicine Working Group have described a mechanism to develop recommendations for health care interventions based on the following three components:

- 1 Strength of the evidence.
- 2 Threshold or magnitude of the intervention effect at which benefit exceeds the risks (adverse effects and costs) of therapy.
- 3 The relationships between the estimate of the magnitude of the intervention effect, the precision of that estimate, and the threshold [10].

The evidence-based paradigm for prevention promotes the concept of Number Needed to Treat

(NNT) to provide an estimate of the number of children who must be treated in order to prevent one adverse event (e.g., dental caries lesion) [11].

Evidence related to the infant dental visit and caries prevention

A recent field study reported the outcomes of a risk-based caries prevention programme in Finnish preschool children residing in an area with a low level of fluoride [12]. The children were 2 years old at baseline and were then followed for 3 years and it was concluded that 'prevention of caries can be targeted efficiently to individuals at risk' [12]. In these children, *mutans streptococci* colonization (detected via microbiological testing) and incipient caries lesions (detected via dental examination) were the two screening parameters employed for dental caries risk stratification [12]. The importance of targeted prevention in this field study was underscored by the fact that the overall NNT for the programme was 8.3, i.e., 'eight subjects had to be screened and treated to avoid one subject having cavitated (frank dental) caries (lesion) or fillings at the age of five years.' [12] However, based on caries risk stratification, two-thirds of the children were at low risk for dental caries (*mutans streptococci*-negative and caries-free at baseline), and only one in 10 had dental caries lesions or fillings at 5 years of age [12]. Meanwhile, the NNT was 2 for those at high risk for dental caries (caries-positive at baseline), i.e., 'only two subjects had to be treated to keep one subject free of restorative treatment of caries at the age of 5 years, indicating a very high treatment effect of the program' [12].

Epidemiologic data from The Third National Health and Nutrition Examination Survey (NHANES III, 1988–94) may be employed as a screening instrument for caries risk stratification in U.S. preschool children. Those with caries seemed to have multiple caries lesions. Based on NHANES III data, it has been reported that one in five U.S. children between the ages of 2–5 years had one or more decayed teeth [13]. Purely from a caries prevention perspective, only one in five U.S. children would therefore benefit from a Year One dental visit (baseline risk = 0.2). An optimistic relative risk reduction of 50% for the Year One dental visit would result in an NNT of 10 while a relative risk reduction of 25% would result in an NNT of 20. Thus the NNT

threshold is certainly not favourable with regard to the provision of a Year One dental visit to all children in the United States. It has been recommended that 'clinicians should treat patients where the NNT is lower than a threshold NNT at which point the therapeutic risk (adverse effects and costs) equals the therapeutic benefit' [14]. This argues for a targeted approach.

The above discussion does not dissuade from the current practice of seeing all children for their first dental visit by the age of 2¹/₂–3 years of age. However, it can be countered that as only one in five children between the ages of 2–5 years will benefit from caries prevention, why have a child visit the dentist at approximately 3 years of age? However this reasoning is fallacious and comes solely from a caries prevention perspective. Other factors such as the child's emotional and cognitive development and the ability to learn and adapt to the dental environment do justify the first dental visit as per the current practice of 2¹/₂–3 years of age.

Evidence for selective targeting of the Year One dental visit

Recommending a Year One dental visit for all children residing in the United States would be contrary, as seen above, to the principle of targeting preventive services. From the perspective of efficiency in the utilization of the health care preventive dollar, the economic notion of an opportunity cost of a preventive intervention has to be considered and understandably rules against a universal Year One dental visit for U.S. children.

Undoubtedly a minority of infants would definitely benefit from early caries prevention as it has been reported that 'early childhood caries is a risk factor for future caries' while recall dental visits were a protective factor [15]. NHANES III data indicates that it is more likely that caries-susceptible infants are from lower socioeconomic backgrounds [13]. Comparison of the caries experience in primary teeth observed in two of the National Health and Nutrition Examination Surveys (NHANES I, 1971–74 and NHANES III, 1988–94) has demonstrated that while there was a significant (33%) decline in caries experience for children between 2 and 5 years of age who were above the poverty level, there was no significant difference seen for 2–5 year-olds who were at or below the poverty level [16].

Provision of preventive dental services to low socioeconomic preschool children

The above discussion indicates that children from a low socioeconomic background would benefit from preventive dental services, beginning with the Year One dental visit. However, data from the 1996 Medical Expenditure Panel Survey (MEPS) has shown that preschool children from a low socioeconomic background were less likely to have had a preventive dental visit as compared to children from a middle or high income family [17]. This is in tandem with NHANES III data reporting that 75–79% of the decayed primary teeth had not been restored in 2–5 year old children from a low socioeconomic background [13].

Data from the 1987 National Medical Expenditure Survey has shown that factors such as the lower educational attainment of low-income mothers explain approximately 80% of the gap in preventive services utilization between children above and below 200% of the poverty line [18]. In addition, the 1989 National Health Interview Survey found that U.S. children aged 2–4 years who had dental insurance had a greater probability of having had a dental visit in the past 12 months [19]. Further, it has been reported that low income children (covered by the Medicaid programme) have great difficulty in accessing dental care [20]. This barrier to dental access is partly due to the low reimbursement rates provided by the Medicaid programme [21]. Therefore, it does seem plausible that the current recommendations of the American Academy of Pediatric Dentistry and the American Dental Association on the universal provision of the Year One dental visit may not benefit those who most need the early dental intervention. Rather, it might work to widen the gap in dental services utilization between middle-to-high and low socioeconomic background children.

Utilization patterns for the infant dental visit

There is little data reflecting the provision of an early dental visit in actual clinical practice. The 1989 National Health Interview Survey reported that only 32% of U.S. children aged 2–4 years had had a dental visit in the past 12 months [19]. More recently, the Iowa Fluoride Study, an observational, longitudinal study of a cohort of children followed from birth to 3 years of age, found that only 2% of the parents reported that their child had had a dental

visit by 1 year of age, and this proportion increased slightly to 11% by 2 years of age, and to 31% by 3 years of age [22]. Also, this study from Iowa found a significant association between the child's early dental visit and maternal level of education 'with more educated mothers more likely to have children with early dental visits.' [22] This is in accordance with data from the 1987 National Medical Expenditure Survey where the lower educational attainment of low-income mothers explained most of the gap in preventive services utilization between children above and below 200% of the poverty line [18].

The 2002 American Academy of Pediatric Dentistry Foundation and Oral-B Checkup on Children's Oral Health Study found that for children who had been to the dentist, seven out of 10 mothers/primary care-takers in this national sample reported that their child first went to the dentist between the ages of 2–4 years [23]. This is in accordance with the recommendation of the American Academy of Pediatrics [1].

Dentists' opinion and availability for the Year One dental visit

A 1996 Survey of the American Academy of Pediatric Dentistry Membership found that though 73% of the respondents agreed with their Academy's policy on infant oral health care, only 47% indicated that an asymptomatic child should be seen for her/his first dental evaluation by 12 months of age or younger [24]. Also, as almost 30% of the membership disagreed with their Academy's policy on infant oral health care, it is likely that physicians in the United States might encounter difficulty in implementing a dental referral for infants by their first birthday [24]. Furthermore, it was reported that one in five paediatric dentists did not perform infant dental evaluations [24].

In addition to paediatric dentists, general dentists also provide dental care to children and are actually responsible for the bulk of dental services provided to children in the U.S. [25]. It has been reported that less than one in five general dentists were willing to perform a dental examination on children 1 year of age or younger [26]. Given the reticence on the part of paediatric and general dentists in the United States to provide a Year One dental visit, the American Academy of Pediatrics has been pragmatic in its reluctance to endorse this concept citing the 'inadequate numbers of dentists who are willing to

see a 12-month-old child for a dental examination' [27].

Clinical application of the Year One dental visit

The Year One dental visit should therefore be provided to all children from a low socioeconomic background and to selected children with a middle-to-high socioeconomic status. These selected children would include, among others, high dental caries risk subgroups such as those with chronic medical conditions requiring long-term medications [28]. It has been reported that 'children taking long-term liquid oral medicines had significantly more caries of deciduous anterior teeth than their siblings' [29].

The recommendation of the American Academy of Pediatric Dentistry and the American Dental Association on a Year One dental visit for all children is logical although dogmatic. Given the lack of evidence in support of universal application of this procedure, it is prudent to heed Occam's razor: *pluralitas non est ponenda sine necessitate* (entities should not be multiplied unnecessarily). Evidence indicates that the current recommendation of the American Academy of Pediatrics on a dental visit for all children between 1–3 years of age is realistic [1]. But there is a need to clarify the addendum to the American Academy of Pediatrics recommendations for preventive paediatric health care which at present simply states that 'earlier initial dental examinations may be appropriate for some children' [1]. It would be of benefit to physicians triaging the dental needs of children if the American Academy of Pediatrics modified the addendum to state that all children from a low socioeconomic background as well as selected children from middle-to-high socioeconomic backgrounds who were at high dental caries risk, such as those with chronic medical conditions, require referral to the dentist for a Year One dental visit.

There is also a need to improve dental knowledge and referral patterns of paediatric primary care providers. A recent study from North Carolina showed that paediatric primary care providers 'tended to under-refer and only 70% of children with evidence of dental disease received a referral' [30]. In addition, family practitioners who are aware of mothers who delayed prenatal care should proactively refer the infants for a Year One dental visit as recognition of this marker allows 'for targeted interventions that

aim to ensure that children receive appropriate preventive care' [31].

International perspective on the Year One dental visit

The above review focused towards infant oral health policy in the United States. However, it may serve to foster discussion of this topic in other countries. For example, the Royal College of Surgeons of England in its National Clinical Guidelines for Paediatric Dentistry mentioned that dental caries is the commonest dental disease in children [32]. They then identified that low socioeconomic status and long-term usage of medication containing sugar as two of several factors that indicate an increased risk of dental disease [32]. These two factors, as noted above with regard to the United States population, were the mainstay for targeting the Year One dental visit. In addition, mirroring the recommendations of the American Academy of Pediatric Dentistry and the American Dental Association, the Royal College of Surgeons of England observed that 'in initiating the continuing care process, there should be no lower age limit to the first (dental) visit for a child which should, if possible, be within the first year of life' [32].

As dentistry transitions to an evidence-based care mechanism, it is incumbent to aggregate information that would provide the basis for determining infant oral health policy while simultaneously maintaining a perspective on cost-benefit considerations. To date, very little evidence is available for a Year One dental visit for all children. This shift from dogmatic health care dictated by professional consensus to one guided by scientific evidence may result in varying national standards based on local epidemiological data. However, it is equally likely that evidence-based recommendations in similar populations, such as those in developed countries, may mirror each other even if developed independently.

Conclusions

- A Year One dental visit should be performed for all children from a low socioeconomic background in the United States.
- A Year One dental visit should be regarded as an elective procedure for infants of middle-to-high socioeconomic status, except for certain selected high dental caries risk subgroups.

Résumé. L'objectif de cette revue de littérature a été d'évaluer l'époque de la première visite dentaire chez les enfants aux Etats-Unis. Il en ressort que la visite à l'âge de un an devrait être effectuée pour les enfants de classe socio-économique défavorisée. Cependant, cela devrait être considéré comme une procédure facultative pour les jeunes enfants issus de classes moyennes à élevées, à l'exception de quelques sous-groupes particuliers à haut risque de carie.

Zusammenfassung. Ziel dieser Übersichtsarbeit ist die Bedeutung des Zeitpunktes der ersten Zahnarztbesuches von Kindern in den U.S.A. Es wurde gefolgert, dass die Untersuchung mit einem Jahr für alle Kinder aus niedrigen sozioökonomischen Schichten. Für andere sozioökonomische Schichten sollte die zahnärztliche Untersuchung von Einjährigen als elektiv angesehen werden, bis auf bestimmte Hochrisikogruppen.

Resumen. El objetivo de esta revisión fue evaluar los datos en relación con el momento de la primera visita dental para los niños en Estados Unidos. Se concluyó que la visita dental al año de edad debería realizarse para todos los niños de bajo nivel socioeconómico. Sin embargo, debería observarse como un procedimiento electivo para niños de estatus socioeconómico entre medio y alto, excepto para ciertos subgrupos seleccionados con alto riesgo de caries.

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