"Six-month recall dental appointments, for all children, are (un)justifiable"

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Each child is an individual with specific needs, which necessitates a different plan of management based on the type of oral disease or disability present. This raises a question as to whether the customary fixed six-month recall visits for children commonly advocated by dental professionals need to be altered/adjusted so as to reflect the individual's oral health needs more closely, in order to optimize their clinical and cost-effectiveness. This paper provides a comprehensive review of the evidence to either justify or refute the six-month recall dental appointments for all children. Based on the available evidence, we conclude that the judgment about appropriate intervals should be made by the dental practitioner on an individual risk basis as insufficient evidence exists to either justify, or refute the six-month recall dental appointments.

Keywords: *six month recall, dentistry for children, oral examination*
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INTRODUCTION

Oral health is considered to be an essential and integral element of general health and well-being. For individuals intending to achieve and maintain good oral health, regular dental check-ups are important. A 'recall visit' is defined as "the planned, unprecipitated return of a patient who, when last seen was in good oral health."[1] The time period between two recall visits is referred to as 'recall interval', usually specified in months or years and is either fixed or individualized. The examination performed at a planned recall visit may include all, or only a few of the procedures listed in Table 1.

Customary fixed six-month recall visits for children and adults are commonly advocated by dental professionals.[2] It remains the advice offered by the dental associations and dental services in many countries.[3,4] This commonly practiced protocol for the preventive maintenance of oral health in individuals has from time to time been the subject of debate in several countries.[3,5-8] Pierre Fauchard, "The father of modern dentistry" is believed to have been the first person to have promoted the six-month recall visits in the late 18th century.[9] Anecdotally, it is assumed that in an attempt to formulate guidelines for preventive dentistry, several dental and health organizations settled on a "best guess" recommendation: the six-month recall visit. Conversely, it is rumored that *Amos and Andy,* a television program in the middle of the last century was partly responsible for the routine six-month dental check-up which has been adopted by the American Dental Association.[10]

Table 1. Components of a recall examination[4,49]

- Medical history update
- Caries detection and assessment of existing restorations
- Caries activity tests
- Plaque control through scaling, polishing, fluoride applications and oral hygiene education
- Periodontal evaluation
- Baseline data recording (i.e., radiographs, charting models)
- Diagnosis and treatment planning
- Oral cancer screening

Almost three decades ago, an article entitled "Is there a scientific basis for six-monthly dental examinations?" by Aubrey Sheiham, [3] initiated debate over appropriate recall intervals. Since then, despite the general improvement in oral health, important inequalities in dental health remain, particularly across socio-economic groups and between geographical areas with/without a fluoridated water supply. This has raised questions as to whether recall intervals should be adjusted to reflect oral health needs more closely, in order to optimize their clinical and cost-effectiveness. There appears to be no explicit recall policies and currently it is uncertain as to what might be the optimal recall frequency for a dental examination for the different oral diseases. Conversely, if the

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question is raised by a parent as to why a six-month recall visit is essential. Any oral health professional would certainly be able to convince either entirely or partly that his/her own justification is correct and "evidence based." However, this does not imply that there exists enough evidence to either support or refute the decision. Nevertheless, in the existing disposition of evidence-based healthcare, it is imperative for the practitioners to support clinical decisions with good quality evidence. Consequently, the purpose of this review is to identify in the literature the evidence to either justify, or refute the six-month recall dental appointments for all children.

METHODOLOGY

Electronic databases (PUBMED, Cochrane library) were searched for systematic reviews, randomized, non-randomized controlled trials, and observational studies. The key words employed were *dental caries, children* and *dental recall, which* were used in various combinations. The search yielded 86 citations and when limited to humans, English language and up to July 2007, it resulted in 78 citations. This included two systematic reviews, a Cochrane review, a randomized control trial and a few observational studies. The citation lists from the included references were subsequently examined in an attempt to identify additional studies and a hand search was done to find letters to the editor and opinion letters in the journals.

The evidence obtained from the literature will be discussed independently for the primary, mixed and permanent dentitions with appropriate clinical scenarios.

PRIMARY DENTITION (Approximately 0–6 years)

The primary teeth begin to erupt when a child is six months old and finish when the child is approximately two years of age, which means that young children are in an active state of eruption from approximately six months to three years of age.[11]

Relevant studies

Sheiham's[3] review, which evoked considerable debate amongst the dental fraternity on the topic of six-month recall intervals, addressed children over the age of 12 years as no reliable data existed on the pattern of disease affecting the primary dentition. In 1985, an article published in the Drug and Therapeutic Bulletin[12] initiated uncertainties over the need for routine six-month recall visits for children. It suggested that for all age groups, an annual visit to the dentist would be sufficient to maintain control of oral diseases, thus saving time and government money. Winter and Murray,[13] in response dismissed this suggestion stating that the rate of progression of carious lesions, particularly in the primary dentition was very rapid. Therefore, extending the recall visits to one year would result in more teeth having to be extracted. Furthermore, they proposed that the dental practitioner was in the best position to determine appropriate recall intervals.

Based on the study of children randomly allocated into different age groups, Wang and coworkers[14] demonstrated no statistically significant differences in the dmfs/DMFS increment between 12-month recall and 24-month recall visits. These results require cautious interpretation as the quality of the study was inadequate. The allocation concealment, blinding and the methods of generating the random sequences were unclear. There were a large number of drop-outs and selection bias existed as the high risk groups were eliminated from the trial. Furthermore, although the trend indicated that longer the recall interval, greater the dmfs/DMFS increment, it did not reach statistical significance. Later, Mellor and Lennon[15] in their study of frequency of examination of children by dentists under different payment schemes reported that 50% of the children in the 0-5 years had only one examination, while 40% had two and the remaining had three examinations per year. Similarly, Riordan[16] noticed an increase in the dmft among six year old children in two consecutive years, when reporting on the school dental care service data (1980-1994) for Western Australia. However, valid comparisons were not made to ascertain the effect of recall intervals on caries progression. A cross-sectional survey in Denmark[17] revealed that the majority of the dental services recalled children aged $2^1/_2$–5 years for recall visits every 3, 6, or 8 months. Furthermore, a systematic review[18] determining the effectiveness of routine dental check-ups in children included only three studies in their analysis, which dealt with the primary dentition and concluded no quality evidence existed to either support or refute the practice of encouraging six-month recall visits for all children.

Clinical Scenario I

At the first dental visit of a 4 year old child, the history and examination revealed no medical or social history of note, no carious teeth, good oral hygiene, and dietary practices. The recommended recall interval for the next oral health review was six-months. Is there scientific evidence for this? No, there is not. Most often it is based on the practitioner's experience and his/her logical reasoning. For example, in the presented clinical scenario the patient has no established dental history; hence a conservative recall interval of six months can be initiated. When appointment frequencies are determined only from a perspective of managing dental caries, it is not difficult to rationalize a 12-month or even a 16-month recall interval for a three-year old child who has an excellent oral health. However, in the long term it is imperative to establish proper oral hygiene habits and a trusting dentist-child patient relationship. The desirable behavioral aspects are difficult to develop without a frequent and regular recall system. In addition, the initial oral evaluation appointment should follow the eruption of the first primary tooth.[19] This should be considered as 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 and beyond.

Dental caries still remains one of the most common diseases of childhood. Interestingly, its prevalence has declined,

and is no longer so widely distributed in the population. In fact, a majority of the caries burden is found in a small percentage of the population who form the high risk groups [Table 2]. These groups require frequent recall visits (even shorter than six months) for the management of the disease process and/or modification of their risk factors. In addition, medically compromised children and those with conditions such as cleft lip and/or palate, and certain developmental dental anomalies (e.g. hypoplasia) also fall in the high risk group and hence need frequent recall visits. Furthermore, regular monitoring of the oral hygiene with reinforcements would help to optimize the oral health care which again demands regular visits. Sadly, the evidence for these links is weak as no relevant studies are available in the literature.

MIXED DENTITION (6–12 years)

Children enter a second period from 6 years to approximately 12 years of age while the permanent teeth (except the third molars) are erupting. Without the primary teeth, the permanent teeth which replace them cannot assume their proper positions in the dental arch because they are guided into their final positions by the preceding primary teeth.[11]

Relevant studies

In 1803, Joseph Fox[20] suggested that regular dental examinations were of particular value in early childhood. He demonstrated the importance of removing primary teeth when they obstructed or diverted the path of eruption of the permanent successors. He recommended an examination of the oral cavity at three month intervals when the incisors are erupting, and on completing their eruption no further examinations were required for 12 months. However, the reasoning behind this concept is unclear. Boggs and Schork[21] suggested that the optimal recall interval for children aged 5 to 9 years is 10 to 12 months. However, their statistical tests indicated a significant loss of teeth if the recall intervals were extended beyond 12 months in this age group. Sheiham,[3] though aware of the factors disposing to malocclusion, was unable to find references in the literature regarding the frequency of examinations necessary to detect these factors. He opined that 11 years was the best age for orthodontic treatment and concluded that six-month recall visits to screen for malocclusion was unjustifiable. In addition, he doubted whether a short delay in detecting and treating a malocclusion would alter the progress because it had not been the subject of any controlled study. Without delay, Knott[20] criticized this by stating, "Few practitioners would be prepared to support so nebulous a controlled study." Mellor and Lennon[15] in their study stated that more children in the 6 to 12 years age range had three examinations per year in comparison to the other age groups. Recently, a systematic review[18] included three studies investigating the relationship between dental caries and the frequency of dental check-ups in the mixed dentition which demonstrated conflicting results. Two studies were classified as 'neutral': in other words the studies did not demonstrate a significant association, or did not report the tests for significance, or

Table 2. AAPD Caries-risk Assessment Tool (CAT)[50]

Caries-risk indicators	Low risk	Moderate risk	High risk
Clinical conditions	• No carious teeth in past 24 months • No enamel demineralization (enamel caries "white-spot lesions") • No visible plaque; no gingivitis	• Carious teeth in the past 24 months • One area of enamel demineralization (enamel caries "white-spot lesions") • Gingivitis	• Carious teeth in the past 12 months • More than one area of enamel demineralization (enamel caries "white-spot lesions") • Visible plaque on anterior (front) teeth • Radiographic enamel caries • High titers of mutans streptococci • Wearing dental or orthodontic appliances • Enamel hypoplasia
Environmental characteristics	• Optimal systemic and topical fluoride exposure • Consumption of simple sugars or foods strongly associated with caries initiation primarily at mealtimes • High caregiver socioeconomic status • Regular use of dental care in an established dental home	• Suboptimal systemic fluoride exposure with optimal topical exposure • Occasional (i.e. 1-2) between-meal exposures to simple sugars or foods strongly associated with caries • Midlevel caregiver socioeconomic status (i.e. eligible for school lunch program or SCHIP) • Irregular use of dental services	• Suboptimal topical fluoride exposure • Frequent (i.e. 3 or more) between-meal exposures to simple sugars or foods strongly associated with caries • Low-level caregiver socioeconomic status (i.e. eligible for Medicaid) • No usual source of dental care • Active caries present in the mother
General health condition			• Children with special health care needs • Conditions impairing saliva composition/ flow

demonstrated statistical significance bi-directionally. The third study reported a significant increase in the number of deep cavities with the increase in the dental check frequency. Nevertheless, the conclusions of this review along with that of Beirne and co-workers[22] neither justified nor refuted six-month recall visits.

Clinical Scenario II

A healthy 10 year old girl visits a dental practice where her two elder siblings are already patients. Her mother has a high DMFT score. The family lives in an area where the fluoride level in the drinking water is low. The girl has irregular brushing habits and consumes carbonated drinks at least three times a day. Examination reveals three restorations in the primary teeth, one carious lesion in the permanent first molar and generalized gingival inflammation. The treatment performed was oral hygiene instruction, preventive advice and restoration of the first permanent molar. The recommended recall interval for the next oral health review would be three-months. Whilst there is no scientific evidence to support this decision, the justification is that the patient has a large number of caries risk factors and as this is the first visit to this practice, short recall visits are appropriate in the first instance.

The mixed dentition is the transition phase from the primary to the permanent dentition. Premature loss of primary teeth by extraction has an adverse influence on the occlusion and space for the permanent dentition. Therefore, it is sometimes necessary to use space maintaining appliances, to hold the space for the succeeding permanent teeth, which require regular maintenance and frequent follow-ups for clinical success.[23] Conversely, if regular dental examinations had been imposed earlier, the particular tooth would not have been extracted in the first place. Early diagnosis and management of several dental anomalies such as supernumerary teeth and impacted canines are possible by regularly monitoring the developing dentition. Furthermore, timely extraction of certain teeth can limit the severity of future orthodontic problems, and regular reinforcements of oral hygiene practices with appropriate preventive advice can provide the permanent teeth with a healthy environment.

PERMANENT DENTITION (12 years and above)

By the age of 12 years, most children would have all of their permanent teeth except for their third molars (wisdom teeth). However, the eruption time varies from child to child as do their growth rates.[11]

Relevant studies

Sheiham's[3] comprehensive search of the literature found one study[21] which attempted to determine the optimal recall intervals between dental examinations. As the findings did not support the idea of a six-month recall visit, Sheiham[3] proposed a 12 month recall interval for children 12-16 years of age, and 18 months for older individuals. He did not see any benefit in treating dental caries earlier because in those days carious lesions were usually treated when it had extended into the dentine. He opined that the rate of caries progression should be the major factor in determining a recall interval. Reacting to this model, Geddes and coworkers[24] orated that it lacked the concept of preventive therapy in dental practice, and that the regimen would not improve the treatment but only perpetuate the existing level of dental disease as restorations and extractions are a part of treating the consequences and not the disease. Broadway[25] was of the opinion that high risk individuals needed regular examinations and treatments every six-months and that the dental practitioner has the authority to decide the recall intervals for his/her patients. Subsequently, Knott[20] forcefully argued that the practical basis for six-month dental examinations was so strong that to render any scientific evaluation was unnecessary.

In 1985, Elderton[26] stated that "six-month recall visits are no longer justified." He criticized Sheiham's conclusions related to the rate of caries progression, saying that dentists were frequently inconsistent at diagnosing caries.[27] Therefore, due to the magnitude of the diagnostic differences, he suggested that any discussion concerning the rate of progression of caries was itself poorly documented and almost certainly varied among the different socio-economic, ethnic, and geographic groups and factors such as fluoride history. Subsequently, a review[28] of eight longitudinal datasets concluded that 38% of early carious lesions progressed into dentine within three years, while 46% of the lesions which had already reached the inner enamel of a tooth would progress into the dentine within three years. Furthermore, a computer simulation[29] to determine the optimal intervals between radiological examinations suggested that patients benefited most by attending dentists at intervals ranging from 13 months to 120 months. The reason for this large variation was that some dentists were better in identifying the disease than the others, and more importantly the rates of disease progression varied between individuals.

King and his co-workers[30] in 1986 compared the dental caries status and their treatment patterns among the 12-year-old Chinese and non-Chinese school children in Hong Kong. They identified a statistically significant lower DMFT score among the non-Chinese group of whom, 91.5% visited the dentist for regular dental check-ups. Based on these findings, they concluded that the greater the frequency of dental check-ups, the higher the level of dental awareness, a factor which in turn may contribute to the lower caries experience. Interestingly, there is a large variation in the recall intervals for patients in the Nordic countries. The recall interval in Iceland was 7.4 months; 9.2 months in Denmark, 13.1 months in Sweden, while in Norway it was 13.5 months.[31] Apparently, it has been demonstrated that extending the recall intervals would save resources[31-33] without noticeable adverse effects on the dental health.[34] In the UK, a significant difference was noted within the different payment schemes for dental services with the children under fee-for-service system more frequently visiting the dentist than those under the capitation scheme.[15]

Based on Suomi's data, Sheiham[3] concluded that the evi-

dence to support the six-month recall visit to manage periodontal diseases was weak. Kett-white[35] opposed this recommendation indicating that Suomi himself after completing the study advised patients to attend a six-month recall visit for oral prophylaxis ignoring the scientific evidence. Axelsson and Lindhe[36] reported a significantly higher prevalence of caries and periodontitis (attachment loss) in patients who did not participate in a structured 2 to 3 months recall program. Conversely, in a study of 12-year-old children, Nadanovsky and Sheiham[37] found that patients who had dental examinations at intervals longer than six months did not exhibit severe dental caries or periodontal diseases in comparison to those examined once in six-months.

An expert group was set up to review the dental examination practices and to determine the appropriate recall intervals for Finnish children and adolescents. They recommended prolonging the average examination intervals to18-24 months taking into account the risk of each individual, the local distribution of the oral health problem and cost-effective use of resources.[8] However, a systematic review[18] which included fifteen studies sought a relationship between dental check-ups and dental caries in the permanent dentition, the results of which were contradictory. A later review[22] identified a single randomized controlled trial which had a poor methodology and hence they were unable to make recommendations. Thus, the evidence to support or refute six-month recall appointments is weak.

Clinical Scenario III

A 14 year old boy who has been undergoing regular reviews since the age of 5 years has one younger sibling who is caries free. His mother is also caries free. They live in an optimally fluoridated area and all of them brush twice daily with a fluoridated dentifrice. Examination reveals healthy gingival tissues and the dentition caries free. Recommended recall interval for the next oral health review is 12 months. In the absence of scientific evidence to support the decision, the rationale here is that the patient is a regular attendee with a known past dental history. There is no current evidence or past history of dental disease, the medical history is clear and there are no additional risk factors. Therefore, the patient is considered to be at low risk and a review of 12 months seems reasonable.

As the dental caries risk varies so widely between individuals, it is only the dentist who can adequately assess the most appropriate interval between dental examinations. It has been demonstrated that the use of clinical judgment to identify persons at risk of dental caries is as good as, or better than any other selection procedure.[38] Individuals undergoing orthodontic treatment invariably pay regular dental visits to improvise their oral hygiene and prevent caries. This approach exhibits logical reasoning and has not been the subject of any controlled studies. Oral cancer is an insidious and growing problem. Regular examination of the oral tissues theoretically promotes the early detection of oral cancer and other potentially malignant lesions.[39] However, the evidence to support this hypothesis is weak.

DISCUSSION

Each child is an individual with specific needs, which necessitates a different plan of management based on the type of oral disease or disability present. Six-month recall dental appointments in children give the dentist an opportunity to familiarize the child with the dental office, build a rapport with the child and parent, facilitate behavior management techniques, and increase dental awareness for both the child and the parent. They also provide early diagnosis of oral diseases and implementation of appropriate measures (preventive and/or minimal invasive dentistry) thus, avoiding the untoward consequences by reducing the number of extractions, improving oral health and providing psychological satisfaction for parents. Furthermore, regular attendees are known to suffer significantly less from the social and psychological impacts of oral health problems.[40] Conversely, frequent recall visits have been said to initiate a tendency for over treatment, i.e. more unnecessary restorations. There is also inadequate time for initial lesions to arrest or re-mineralize, which can lead to the unreliable diagnosis of caries. In addition, productivity is decreased, resources are exploited and the costs are higher for both parents and health services. Nevertheless, the possibility of over treatment resulting from excessive exposure of patients to dentists can be confronted by improving the quality of dental care the dentists provide rather than by prolonging the recall intervals[7] which also has its demerits. These include: moving away from a preventive approach which results in the more serious consequences of caries; that is, larger restorations and an increase in the number of extractions, loss of the opportunity to arrest the development and progression of oral diseases by encouraging good oral hygiene measures and initiating the appropriate treatment.

The American Academy of Pediatric Dentistry currently recommends that children should receive their first dental evaluation when the first tooth erupts or within the first year of life, whichever happens first. In addition, there is good agreement among researchers that the greatest benefits of an oral health program are obtained when the first visit occurs between 6 and 12 months of age.[41] The rationale for these early dental visits is to determine the infant's risk status based on the information obtained from parents and by performing a dental examination before potential dental problems have a chance to manifest and become more complex and costly to treat.[42,43] Primary pediatric oral health care is best delivered in a "dental home" where competent oral health care practitioners provide continuous and comprehensive services [Table 3]. Implementation of an infant oral health care program is vital to improve access to care, to provide counseling and anticipatory guidance for children aged 6 months to 5 years, and to prevent early childhood caries.[43] Ideally, a dental home should be established at a young age (i.e., by 12 months of age in most high-risk populations) where caries and other disease processes can be effectively managed with minimal, or no restorative or surgical treatment. More importantly, these programs are meant to make the dental team more proactive in preventive dentistry rather

Table 3. Functions of a "dental home"

- An adequate dental home should be provided for children and their parents
- An accurate examination and risk assessment for dental diseases
- An individualized preventive dental health program based upon the examination and risk assessment
- Anticipatory guidance about growth and developmental issues (e.g., teething, thumb or pacifier habits)
- Advice on prevention of dental injuries and management of dental emergencies
- Information about proper care of the child's teeth and supporting structures
- Proper diet and nutrition practices
- A continuing care provider that accomplishes restorative and surgical dental care when necessary in a manner consistent with the parents' and child's psychological needs
- Interceptive orthodontic care for children with developing malocclusions
- A place for the child and parent to establish a positive attitude about dental health
- Referrals to other dental specialists when care cannot be directly provided within the dental home
- Coordination of care with the infant/child's primary care medical provider

than reactive with full-mouth rehabilitation.[44]

Risk assessment is only one stage in the comprehensive protocol for infant oral care. The program includes opportunities to establish a "dental home" and provide guidance for improved health outcomes. Risk assessment should form a part of regular, thorough oral-health evaluation visit. In the present day, caries management consists of not merely detecting carious lesions, but of using all the signs and symptoms and supplementary tests in conjunction with the patient's risk factors to diagnose the status of the disease and formulate its appropriate treatment.[45] The new caries management paradigm no longer focuses on caries detection and restoration alone, but on the integration of risk factors and the incorporation of new tools to facilitate early detection and potentially prevent or repair carious lesions. The addition of new tools such as magnification, transillumination, laser fluorescence, quantitative laser fluorescence, electrical conductance measurements, microbial assessment and digital radiography to the dentist's armamentarium to supplement the more traditional tools such as visual inspection and use of an explorer help the dentist to make early and accurate diagnoses.[45] Therefore, a good understanding of the risk

Table 4. AAPD Caries-Risk Assessment[50]

Risk factors to consider	**Risk Indicators**		
	High	**Moderate**	**Low**
History (determined by interviewing the parent/primary caregiver)			
Child has special health care needs	Yes		No
Child has a condition that impairs salivary flow/composition	Yes		No
Childs use of dental home	None	Irregular	Regular
Time lapsed since child's last cavity	<12 months	12 to 24 months	>24 months
Child wears braces or orthodontic/oral appliances	Yes		No
Child's mother has active decay present	Yes		No
Socioeconomic status of child's caregiver	Low	Mid-level	High
Daily between-meal exposure to sugars/cariogenic foods (include ad lib use of bottle/sippy cup containing juice or carbonated beverage)	≥3	1 to 2	Mealtime only
Child's exposure to fluoride	Does not use fluoridated toothpaste; drinking water is not fluoridated: not taking fluoride supplements	Uses fluoridated toothpaste; usually does not drink drink fluoridated water: does not take fluoride Supplements	Uses fluoridated toothpaste; drinks fluoridated water or take fluoride supplements
Clinical evaluation (determined by examining the child's mouth)			
Visible plaque on the anterior teeth	Present		Absent
Gingivitis		Present	Absent
Ares of demineralization (white-spot lesions)	More than one	One	None
Enamel characteristics: hypoplasia, defects, retentive pits/fissures	Present		Absent
Supplemental assessment (optional)			
Radiographic evidence of enamel caries	Present		Absent
Levels of *Mutans Streptoccoci*	High	Moderate	Low

Each child's overall risk for developing decay is based on the highest level of risk indicator (i.e. a single risk indicator in any area of the "high risk" category classifies a child as being "high risk")

factors/indicators and their changing patterns throughout life by the dentists, along with the newer tools, can aid in better decision making and form a basis for recommending recall intervals based on the patient's risk assessment.

It has been assumed by some clinicians that multiple radiolucencies in a high-risk individual is a reliable indicator of the rate of caries progression, leading to the over prescription of treatment.[41] Interestingly, there has not been a study at the site level to indicate a direct cause and effect relationship. Thus, resulting in the hypothesis that DMFS has little predictive power at individual sites and that other factors are stronger predictors.[46] Therefore, determining the frequency of recall intervals based on the rate of caries progression attracts debate as dental caries is a process involving demineralization and re-mineralization of tooth structure. It does not account for the patient's predisposition to caries which varies from individual to individual (high risk and low risk), the factors affecting the progression rate of caries such as fluoride intake, saliva, the bacterial content in the mouth and diet, the changing patterns of dental diseases, the monitoring of restorations and the presence of other oral and systemic diseases. The American Academy of Pediatric Dentistry guidelines[47] for prescribing dental radiographs recommends bitewing radiographs at 6-12 month intervals for high-risk children and adolescents if the proximal surfaces cannot be examined either visually or with a probe, while a 12-36 months interval is recommended for the low-risk groups. Radiographs when used in isolation may underestimate or overestimate the disease process as a large variation exists in the diagnostic abilities amidst dentists. However, this variation among dental practitioners in the diagnosis and treatment planning for individuals, demands implementation of continuing education courses focusing on the identification of risk factors and indicators and the use of clinical practice guidelines regarding the assignment of individual recall intervals.

The American Academy of Pediatric Dentistry caries-risk assessment [Table 3] can serve as a guide to categorize the patients into the high, moderate or low caries risk groups. Based on this risk assessment tool, the patient discussed in the clinical scenario I of this paper can be classified into the moderate/low risk group. Hence, a six-month recall visit is appropriate considering his oral health and dietary practices. On the contrary, the patient in the clinical scenario II belongs to the high risk group. These patients need frequent recall visits to modify their dietary and/or oral hygiene practices. They command regular monitoring and appropriate treatment procedures to limit the severity of their oral disability. Therefore, an intensive recall visit protocol is necessary for these high risk group patients until such time when they can be classified under a lower risk category. Furthermore, the patient discussed in the clinical scenario III can be classified under the low risk group and hence longer recall intervals are appropriate for this patient category.

In reality, most dental recall appointments are affected by factors such as the parents' wishes, the business of the dentist, the patient and the parents, what recall method the practice/health care system uses, and whether or not the practitioners are remunerated for performing six-month checks-ups. Furthermore, the general health of the child or a medical condition that reduces saliva flow, results in a high sugar intake from medication or mucosal disorders that compromise oral hygiene practices need to be taken into consideration. It is important to bear in mind that the consequences of extending recall intervals on dental health are critical. If longer recall intervals result in more carious teeth, then the "saved" examination time will be consumed by the longer treatment time. Therefore, when extended intervals are implemented, estimations of consequences on both oral health and the cost of care should be integral parts of the evaluation process.[48] Nevertheless, if optimal dental health with the pursuit of excellence is the goal for our patients, then regular recall visits are a vital link in the chain of success because the quality of care is more important than the quantity. Furthermore, the dentist is responsible for determining how frequent the visits should be by assessing the individual risk of the patient so that ultimately the patient, the parent and the dentist have a sense of satisfaction.

CONCLUSION

There is insufficient evidence to either support or refute six-month recall dental appointments for all children regardless of their age groups (<6 years, 6-12 years, and >12years). However, the decision concerning appropriate intervals for these children can only be made on an individual risk basis and has to be based on the dental practitioner's experience and logical reasoning, rather than scientific evidence. Furthermore, choices about the optimal recall interval, like most clinical decisions, can only be made by the dentist when all the relevant information has been evaluated.

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