

Oral Health Research Review

Making Education Easy

Issue 4 – 2010

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Independent commentary by Jonathan Leichter DMD, Cert Perio (Harvard). Dr Leichter is currently Senior Lecturer in the Department of Oral Sciences at the University of Otago. Dr Leichter joined the faculty after 20 years in fulltime private practice in New York and Boston, 18 of which were spent in specialist practice limited to periodontology and implant dentistry. Trained at Tufts University and obtaining his specialist training at Harvard University, he has been actively involved in clinical dental implant practice since 1984. Since 2002, he has supervised and mentored postgraduate students in periodontology, endodontics and prosthodontics. His research interests and publications are in the field of periodontology, dental trauma and laser applications in dentistry.

Welcome to our first issue of Oral Health Research Review for 2010.

A number of the summaries in this issue focus on our younger patients, including which restorative materials last the longest in primary teeth, a look at the special considerations for managing low-birth-weight children, and the relationship between the dental health of mother and child. However, we kick off this issue with a study on a common snack food that many parents consider to be healthy, but dental professionals have had concerns about due to its high sugar content – raisins!

Susan Moffat, a lecturer Oral Health at the University of Otago, is our guest reviewer for this issue. Together, we hope you find this issue interesting and helpful in everyday practice, and we welcome your feedback.

Kind regards,

Jonathan Leichter D.M.D

jonathanleichter@researchreview.co.nz

The effect of raisin-containing cereals on the pH of dental plaque in young children

Authors: Utreja A et al

Summary: This RCT tested the acidogenicity of raisins and raisin-containing cereals in 20 children aged 7–11 years, with sucrose and sorbitol used as positive and negative controls, respectively. The six-week study period involved weekly testing with the plaque pH measured at baseline and 30 minutes after eating either one of the four test foods, or rinsing with a control solution. The test foods, ranked in order of acidogenicity (highest to lowest) according to the study findings, were: 1) commercial raisin bran cereal (cRB); 2) bran flakes; 3) raisins; and 4) experimental raisin bran cereal (eRB) prepared by the researchers.

Comment (JL): Raisins range from about 67% to 72% sugars by weight. I have always felt that those little boxes of raisins that parents are so fond of feeding their children as snacks cannot possibly be a healthy option – visions of all that cariogenic sugar sticking in their fissures! After reading this article, though, I may have to stop frowning disapprovingly at total strangers as their children enjoy their snack. I discovered that raisins are almost completely cleared from tooth surfaces five minutes after chewing and swallowing, they are cholesterol and fat free, rich in antioxidants, contain many minerals and vitamins and are a good source of fibre. It was found that consumption of raisins, or the experimental raisins and bran mixture, did not reduce plaque pH below 6 over the 30-minute testing period. The cRB was found to be the most acidogenic, probably because the raisins are coated to prevent clumping with what was thought to be a readily fermentable sugar. This resulted in a pH drop to below 6 for the entire testing period. In conclusion, raisins represent a healthy snack for parents to offer their children. Further studies on their recently discovered growth inhibitory activity against *Streptococcus mutans* and *Porphyromonas gingivalis* will no doubt further enhance their healthy status!

Comment (SM): Of particular interest to those treating children, who usually advise against raisins as a snack food, is the fact that raisins were ranked as less acidogenic in this study. The authors suggest that, although raisins are sweet, they are not retained on teeth for as long as, for example, the bran flakes, and are rapidly cleared after eating. The eRB ranked lowest in acidogenicity; the raisins in this cereal may have actually contributed to clearing the bran flakes from the teeth. The authors believe that more research is needed on the effect of raisins on plaque acidity, but also acknowledge a recent study that has found antimicrobial agents in one type of raisin. In addition, raisins contain many necessary minerals and vitamins, are cholesterol and fat free, are rich in antioxidants and are a good source of fibre. Raisins may prove to be a healthy alternative to commonly consumed sugary snack foods.

Pediatr Dent 2009; 31(7):498–503

<http://www.ingentaconnect.com/content/aapd/pd/2009/00000031/00000007/art00010>

Independent commentary by Susan Moffat. Susan is employed as a lecturer with the Bachelor of Oral Health programme at the School of Dentistry, University of Otago, and is Head of Discipline for dental therapy. Before joining the university staff, Susan worked as a dental therapist in Otago and Southland, and completed a Bachelor of Arts (Anthropology) while working as a therapist. She also has a Postgraduate Diploma in Public Health and is now carrying out research towards a PhD in Public Health.

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Long-term performance of resin based fissure sealants placed in a general practice

Authors: Hevinga MA et al

Summary: In this retrospective analysis of the performance of 1204 resin-based fissure sealants placed in 148 patients followed for 11.6 years, failure rates were significantly higher in: a) patients with a high restoration profile versus a low restoration profile; and b) molars versus premolars. Discolouration was common in fissures with partial or complete sealant loss, regardless of the patient's restoration profile.

Comment (JL): With changes in caries prevalence and lesion progression in mind, it was interesting to read this study. Although no-one can dispute the value and necessity of preventive measures, I was interested to find out if placement of a sealant in a low-risk patient is warranted? Many of the studies I have read were carried out in the 1970s when caries prevalence in Western countries was high, or they were carried out in university settings with limited observation intervals. This was a retrospective study, with the sealants having been placed by four dentists and one oral hygienist in a general practice. Patients selected for the study had one or more sealants placed before 1st January 2000, and the examinations were carried out from July 2006 until November 2007 when the patients attended the practice for their routine checkups. Failure was defined as placement of an occlusal restoration or the presence of a cavitated carious lesion, but, surprisingly, did not include sealant absence. Results showed that 41.3% of the sealants were fully retained. Sealants were more effective in high caries-risk patients and there were no statistical significant differences present in survival rates of the sealants placed by the dentists and those placed by the hygienist. Taking into consideration that 38% partially failed and 9.3% were totally lost, but that only 11.4% failed in a way that caries was not prevented and a restoration needed to be placed, I am vindicated in my decision not to seal all occlusal surfaces as a preventive measure, but to assess the necessity based on the patient's caries risk.

Comment (SM): While only 41.3% of fissure sealants were fully retained in this study, only 11.4% of those that failed required a restoration. A high percentage of teeth, where the sealant had been totally lost or only partly retained, had not become carious. These findings suggest that the practice of preventive fissure sealing for all occlusal surfaces is not justified, as many low-risk caries patients do not develop caries. Other studies also show that sealants are more effective, including more cost-effective, if placed in high caries-risk patients. The School Dental Service in NZ introduced fissure sealants in the late 1980s as a caries-preventive measure for high caries-risk individuals. Limited public health funding and high workloads mean that dental therapists would be unable to provide fissure sealants for every child, but they can be reassured that, by targeting high-risk individuals for fissure sealants, they are providing the most appropriate care.

J Dent 2010;38(1): 23-8

<http://tinyurl.com/JDent-38-23>

The longevity of different restorations in primary teeth

Authors: Qvist V et al

Summary: This paper included a review of three published studies and the results from a fourth study investigating the best alternative restorative material to amalgam in primary teeth. The longevity of resin modified glass ionomer (RMGI) and compomer restorations were similar to the longevity of amalgam, while conventional glass ionomer (GI) restorations were associated with a significantly shorter longevity. The authors commented that enhanced clinical properties were not always evident for materials with 'new and improved' properties based on *in vitro* tests.

Comment (JL): Four studies were included in this article. In the first 3 studies, which lasted 10 years and were reviewed in this paper, 1807 restorations were placed. The fourth study was conducted 4 years after the initial studies, and an additional 476 restorations were placed by the same clinicians. Restorations were followed until extraction or the tooth, or repair or replacement of the restoration was needed. As dentists and therapists, we take many factors into consideration when deciding which restorative material to use. Ease of handling, aesthetics, the longevity of the restoration, its biological properties as well as our own personal preferences and the wishes of the parent/patient are all factors to consider. In many countries the use of amalgam has now been discontinued as mercury use in restorations is banned. Amalgam is frequently used as the 'gold standard' when comparing restorative materials with regards to quality and longevity of the restorations. The authors of this paper concluded that tooth-coloured restorative materials can be successfully used as a realistic alternative to amalgam. However, although the survival distributions for RMGIs and compomers were almost the same as that for amalgam (3.8 years), the 75% survival times for a class II GI was only 1.4 years! In addition, endodontic complications occurred most frequently in teeth with GI restorations. Our choices need to be evidence based to ensure the best possible dental health for our patients.

Comment (SM): Public concerns about the toxicity and aesthetics of amalgam restorations has meant that in many countries amalgam is no longer the preferred restoration material for dentists or their patients. In Scandinavia, the use of amalgam in primary teeth has been banned, as children potentially may be more vulnerable to mercury exposure. This research is particularly relevant for dental therapists. Within the NZ School Dental Service, both RMGI and conventional GI are widely available; however, composite and compomer are less widely available, possibly due to the cost of these materials. Which material is used to restore a primary tooth is often based on operator preference for that particular clinical situation. Reviews, such as this one, enable dental therapists to select suitable restorative materials for primary teeth based on clinical evidence.

Int J Paediatr Dentistry 2010;20(1):1-7

<http://www3.interscience.wiley.com/journal/123214950/abstract>

Medical, nutritional, and dental considerations in children with low birth weight

Authors: O'Connell S et al

Summary: The authors of this paper reviewed: a) medical terminology and issues related to foetal growth; b) morbidities associated with babies born prematurely, small for gestational age or with a low birth weight; and c) the importance of appropriate nutrition for these newborns. They highlighted the fact that nutrition during the postnatal period has been identified as a critical factor in the development of lifelong metabolic disturbances and obesity. They point out that paediatric dentists have an important role to play in supporting healthy feeding practices for these babies, and they encourage integration of medical and dental care.

Comment (JL): Low birth weight, which is defined as a birth weight at term of under 2.5 kg, has been associated with increased incidences of infant mortality and morbidity. From an oral health perspective, complications around birth can result in enamel hypoplasia, molar incisor hypomineralisation and eruption disorders. Not only are these of concern to us, but inappropriate food intake and eating patterns that are often initiated in an attempt to encourage 'catch up' growth can impact negatively on the dentition due to the role they play in the aetiology of caries and erosion. Strategies used by parents are to increase the extent and frequency of feeds using energy/nutrient dense supplemented formulas and high-calorie foods. An increased frequency of sugar consumption is therefore common. Unfortunately, these patterns of food intake often remain unchanged even after catch-up growth has occurred, and can persist into adulthood maintaining a high caries risk. So, where do we fit into this? Parents need guidance to encourage sustainable healthy eating patterns and, where fortified foods and supplements are being used, the oral health of the child needs to be regularly monitored. Prevention needs to be instituted as soon as teeth erupt. Teeth should be cleaned after each food intake, water consumption after snacking to reduce tooth surface contact time must be encouraged and the daily use of fluoride is recommended to prevent demineralisation of the enamel. This special group of children needs our input in providing appropriate dental care starting from early infancy.

Comment (SM): Those providing oral health care for children, including dental therapists, will be aware that birth complications can cause enamel hypoplasia, molar incisor hypomineralisation and eruption disorders. They may be less aware of the nutritional issues that low birth weight, premature and small-for-gestational-age infants may have. It is important that these infants receive adequate caloric intake, in order to ensure satisfactory postnatal growth, and reduce the risk of health problems in adult life. However, sometimes these infants' diets have an adverse effect on their oral health. Infants may only breastfeed for a short period, and their diet may need to be supplemented with energy/nutrient dense supplemented formulas and high-calorie food. Parental anxiety about an infant's appetite, weight and growth may lead to delayed weaning and sugary snacks for the infant. Oral health professionals need to support parents with appropriate advice, and provide an individualised preventive programme for each child, depending on his/her oral health needs.

Pediatr Dent 2009;31(7):504-12

<http://www.ingentaconnect.com/content/aapd/pdp/2009/00000031/00000007/art00011>



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Periodontal disease in mothers indicates risk in their children

Authors: Pähkla ER et al

Summary: This analysis, which included four study groups (mothers with untreated generalised severe chronic periodontitis [n=20], their children [34], periodontally healthy mothers [13] and their children [13]), identified that periodontal disease in mothers was associated with the presence of such disease (especially gingivitis) in their children, and oral hygiene was also worse and the was more clinical gingival inflammation among these children. Children of diseased mothers were more likely to harbour pathogens than the children of healthy mothers. There were five families in which *Prevotella intermedia/nigrescens* was shared between mother and child/children and *Aggregatibacter actinomycetemcomitans* was shared in two families.

Comment (JL): Although it is well established that severe periodontitis clusters in families, there has, until now, been no data about the relationship between mothers with chronic periodontitis and their children's periodontal status. Although I would automatically presume that a major contributing factor would be the common behavioural patterns, the authors moved beyond this to obtain and culture periodontal microbiological samples in order to compare interfamilial spread of the same genotype of the pathogens. The clinical examination included the registration of visible plaque index, modified gingival index and bleeding sites on probing. Although the authors suggest that maternal severe periodontitis might be predictive for future disease of their child, the study was of a limited size and we must remember that periodontal disease is not a single bacterial infection. However, identifying high-risk children and treating them early may well help to reduce their risks of developing periodontal disease.

Comment (SM): This study concluded that periodontitis, oral hygiene habits and periodontal microflora in mothers are risk factors for childhood periodontal diseases. The identification of high-risk children may help to reduce the development of periodontal disease in later life. NZ's dual-trained dental hygiene/dental therapy graduates may have an important role here. As these graduates treat adults in their hygiene scope of practice, and children and adolescents in both the hygiene and therapy scopes of practice, they will be able to treat and educate mothers with periodontal diseases, as well as identify the risk for periodontal disease in their children, and provide appropriate care and advice.

Int J Paediatr Dent 2010;20(1):24-30

<http://www3.interscience.wiley.com/cgi-bin/fulltext/123214954/HTMLSTART>

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Dental avoidance behaviour in parent and child as risk indicators for caries in 5-year-old children

Authors: Wigen TI et al

Summary: A multivariate analysis of response data from a questionnaire completed by the parents of 523 children revealed associations between caries experience at age 5 years and: a) missing ≥ 1 appointments (OR 4.0); and b) child behavioural management problems (2.4).

Comment (JL): The ability to identify children at risk for caries means that these children can be specifically targeted with regards to prevention. The caries risk assessment I commonly use details information such as medical and dental histories (caries in the last 2 years and the family caries history), clinical/radiographic examination, saliva testing (in some cases), a brief diet analysis, fluoride exposure and oral hygiene practices. This provides me with an overall caries risk of high, medium or low on which to base preventive measures, recall and treatment decisions. Data for this study were collected from clinical examinations and bitewing radiographs of the children and questionnaires filled in by the parents. These included information about education and national background, dental anxiety and attendance, and the children's anxiety and behaviour management problems. Not surprisingly, it was found that, although the majority of parents (92%) reported no behaviour management problems during previous dental visits with their children having low dental anxiety and no missed appointments, those parents who did not prioritise their own dental attendance and did not bring their children for scheduled appointments, had children with a higher caries experience! We need to establish contact with these parents, exploring the barriers for bringing in their children and attempting to change parental behaviour in order to deliver optimum and appropriate care to their children. Perhaps parental behaviours should be included more formally into our existing caries risk assessment strategies?

Comment (SM): The findings of this study suggest that those who provide dental care for preschoolers, such as dental therapists, should establish early contact with parents and preschoolers in order to assess the caries risk status of each child. Those caring for children need to be particularly aware that frequent missed appointments and behaviour management difficulties may indicate increased risk for caries, and should provide suitable preventive care and advice at each dental appointment, in the hope of reducing caries risk. Barriers to parents keeping appointments should be explored in the hope of finding suitable solutions. At a population level, the NZ Government's strategic vision for oral health recognises that there are barriers to access to care for preschoolers, and is attempting to establish care for preschoolers that is more acceptable, appropriate and accessible.

Int J Paediatr Dent 2009;19(6):431-7

<http://www3.interscience.wiley.com/journal/122575046/abstract>

Association between socioeconomic factors and dental erosion in Brazilian schoolchildren

Authors: Manguera DF et al

Summary: This study found that among 983 children from Joao Pessoa, Brazil, dental erosion, which was present in 19.9% of them (61.8% and 38.2% with primary and permanent dentition erosion, respectively), was significantly associated with: a) male gender (p=0.005); b) those attending private schools (p=0.029); and c) those with more highly educated parents (p=0.05). Children from high-income families were also more likely to have dental erosion than those from low-income families (21.3% vs. 13.5%), but the difference did not reach statistical significance.

Comment (JL): Is higher socioeconomic status a potential risk factor for dental erosion? Dental erosion, the progressive loss of dental tissue by a chemical process without the involvement of bacteria, can occur when the oral pH is below 4.5. The aetiology is multifactorial, either idiopathic or caused by a known acid source such as acidic foods, medication, gastro-oesophageal reflux or acidic contaminants at work or in the environment. It has been reported that the prevalence of erosion varies from 5.7–70% in primary teeth, and from 11.6–60% in permanent teeth. Because most epidemiological studies have been conducted in developed countries, erosion has been linked with a high socioeconomic background. However, no data have been available regarding the prevalence of erosion in communities where less processed food is consumed or in the general population with unfavourable socioeconomic strata. The authors focused the study on the age group of 6- to 12-year olds, which enabled the comparison of erosion prevalence in primary, mixed and permanent dentitions as well as comparison with other epidemiological studies. Findings in this study were similar to other studies: the primary dentition was more affected, a high prevalence of erosion was found on the palatal and incisal surfaces of the primary dentition, and a higher prevalence was found among males. Previous studies have shown contradictory results regarding socioeconomic background risks. Overall, in the present study, no difference between socioeconomic groups was found. The study had included children from both private and public schools, with the school regarded as an indication of social class, an approach that is valid for Brazilian surveys. However, the dental erosion prevalence was higher in children whose mothers had a high educational status. This possibly results in an increased amount and frequency of fast foods and carbonated drink consumption.

Comment (SM): Previous studies on erosion in children have shown contradictory results to some of the findings in this study. Some find that erosion is more prevalent in high socioeconomic groups, while others find it is more prevalent in lower socioeconomic groups. It would be interesting to carry out a similar study with NZ children. While children from higher socioeconomic backgrounds may have more money for the type of food and drink that causes erosion, the fact that some of these erosion-causing foods and drinks, for example carbonated drinks, are less expensive than more healthier options, for example milk, may mean that, in NZ, those from low socioeconomic groups could experience more erosion in their teeth.

J Public Health Dent 2009;69(4):254-9

<http://www.ingentaconnect.com/content/bpl/jphd/2009/00000069/00000004/art00007>



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The Caries Management System: an evidence-based preventive strategy for dental practitioners. Application for children and adolescents.

Authors: Evans RW & Dennison PJ

Summary: The application of the Caries Management System (CMS) for children and adolescents was outlined in this paper. The protocols relating to caries risk assessment, diagnosis/management of lesions and patient recall were specific for these age groups, while those relating to diet, plaque distribution and signs of caries in bitewing x-rays followed those for adults. The system includes management of noncavitated lesions in primary and especially permanent teeth by professional preservative noninvasive means (e.g. fluoride varnish and sealants) and daily home toothbrushing with a fluoridated toothpaste with the aim of halting progression of the lesion(s), thereby eliminating the need for restorations. The management programme is intensified for those who do not follow the anticariogenic advice offered and experience further lesion development.

Comment (JL): The CMS is a 10-step, risk-based, noninvasive strategy to arrest and remineralise early lesions and to enhance caries primary prevention. In spite of the fact that measures to prevent caries and to arrest noncavitated lesions have been developed and are effective, they are not being efficiently used by the dental profession. The CMS includes consideration of the patient at risk (plaque, frequency of sucrose intake, fluoride), the status of each lesion (clinical signs and bitewing radiography), patient management (diet advice, oral hygiene instruction), clinical management (preventive, preservative and operative) and monitoring (based on caries risk status). This article provides a good overview of treatment and preventive protocols. Although the coding systems (International Caries Detection and Assessment System) is not one that I could envisage being incorporated into our routine checkups, and the radiographic coding differs from what we in NZ routinely use ('C' instead of 'P'), this article provides us with clear and easy-to-follow tables regarding the criteria for caries risk in children with primary, mixed or permanent dentitions, and protocols for the management of lesions, topical fluoride use and recall timing. Being in table form, they are easy to read and would be a useful tool to have readily available for quick reference. This article also reinforces the message that preventive strategies cannot be underestimated and that the decision to use operative intervention is not one that can be taken lightly.

Comment (SM): The authors of this article take the CMS for adults and adapt it for use in children and adolescents. Noncavitated lesions are managed with fluoride varnish, sealants and home brushing with fluoride toothpaste, and lesions are monitored clinically and with radiographs. While many practitioners may already treat early lesions in a similar manner, of particular interest to those treating children and adolescents are the protocols that have been developed for this system, which include caries risk assessment, diagnosis and management of lesions, use of topical fluoride professionally and at home, and patient recall. These detailed protocols are easy to follow, and give those treating children and adolescents specific guidelines to manage and prevent early carious lesions.

Aust Dent J 2009;54(4):381-9

<http://www3.interscience.wiley.com/journal/123191158/abstract>

Association between caries experience and body mass index in 12-year old French children

Authors: Tramini P et al

Summary: The association between body mass index (BMI) and caries experience (using the D3+4MFT index) was investigated using various statistical regression models in 835 schoolchildren from Montpellier, France. There was a significant association between caries experience and sugar consumption, but not between caries experience and BMI.

Comment (JL): According to the 2006/07 New Zealand Health Survey, one in five NZ children aged 2-14 years was overweight (20.9%) and one in twelve was obese (8.3%). Overweight and obesity, especially among children, are a major public health concern all over the world. In France, where the prevalence of obesity and overweight was 19.7% in 2005, nationwide programmes have been broadly implemented to reduce overconsumption of sugars, salts and fats. Because data suggest that oral health and nutrition have a synergistic bidirectional relationship, the authors sought to assess the prevalence and the distribution of BMI and caries experience in a sample of 12-year-old children. Caries experience (DMFT) was assessed, BMI calculated and information about frequency of sugar and soft drink consumption gained from the parents. The lack of difference in DMFT between obese and nonobese children could be due to a variety of factors: overconsumption of fatty food has less influence on caries development than a sugary diet, only dental carious lesions were recorded, and the prevalence of overweight children was lower in the sample than in the general French population. Also, the authors noted that they could probably improve on the accuracy of the calculations and the model fit. We do know, though, that obesity and dental caries have common determinants and it would be prudent for us to keep the overall health of our patients in mind, and give both children and their parents dietary advice. It is also of value to remember that, while the BMI of a patient can return to a normal level, the DMFT score will remain high.

Comment (SM): Overweight and obesity among children and adolescents has become a public health concern in many countries, including NZ. While other studies have found varying results, the authors of this study recognise that obesity and dental caries have 'common determinants'. Therefore, there is good opportunity for oral health professionals, such as dental therapists, to provide appropriate nutrition advice to children and adolescents that will, hopefully, help to prevent dental caries and weight problems in this group.

Caries Res 2009;43(6):468-73

<http://content.karger.com/ProdukteDB/produkte.asp?Aktion=ShowAbstract&ArtikelNr=264684&Ausgabe=253643&ProduktNr=224219>

Oral biofilms: emerging concepts in microbial ecology

Authors: Filoche S et al

Summary: Emerging concepts related to microbial ecology and their relationship with oral biofilm development and oral disease treatment were reviewed. The authors noted that the overall biology and health of the host have a strong link with the development of biofilm, and that other complex systems (e.g. gut microbiota and host interactions, and even biofilm development on the surface of leaves) may provide the necessary clues for determining how oral biofilms develop. They added that thanks to advances in molecular technologies, there is now a great appreciation for the diversity of microbiota in humans, the extent to which they interact with us and how that is affected by interindividual variability.

Comment (JL): Microbial ecology is defined as the relationship of micro-organisms with one another and with their environment. As molecular techniques have advanced, there has been a greater understanding of the diversity and complexity of human microbiota communities, including plaque. This has resulted in changes in the approach to treatment as researchers and clinicians have become aware that plaque development is not a generic process but a highly individualised process. Dental plaque consists of at least 800 bacterial species. Health appears to be associated with the lack of detection of certain species and elevated levels of other species with an ecological balance existing between the human host and the indigenous micro-organisms. Add to the mix exposure to sugary foods, tobacco smoke, poor oral hygiene, aging, ethnicity, genetic factors, changes in immune response and access to fluoridated water, and one can understand why the aetiology of oral diseases (caries and periodontal disease) is so complex. Although it is essential to be wide awake when reading this review, the message that plaque formation is person-specific and that our treatment modalities will need to take this into account was clear. This review highlighted the complexities of dental plaque and the diseases it causes, and the fact that so much is still unknown and undiscovered.

Comment (SM): Dental plaque research spans many years, but the view that dental plaque is a biofilm, and a microbial ecosystem, is relatively new. New research on microbial ecology and the development of oral biofilm is being undertaken at present. The authors of this article showed that plaque development is not a generic process, but a highly individualised process. This in turn affects the treatment of diseases such as dental caries and periodontitis. This article may be of more relevance to those currently involved in research; however, oral health professionals may also find this article of interest, as it may help them to gain a more in-depth understanding of plaque development and the need for effective, patient-individualised preventive treatment.

J Dent Res 2010; 89(1):8-18

<http://jdr.sagepub.com/cgi/content/abstract/89/1/8>

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