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irish dental association

# Journal of the Irish Dental Association

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# Oral disease and public policy in Europe

A new report on oral health in Europe highlights critical issues for dental professionals.

This edition of the *Journal* outlines the key recommendations arising from a report entitled 'The State of Oral Health in Europe' (see p240). I believe this report to be very significant and hence I am dedicating this editorial to it – notwithstanding the excellent contents throughout this edition.

The report was commissioned by The Platform for Better Oral Health in Europe in response to the Call to Action for Better Oral Health in Europe by several members of the European Parliament in 2010. The MEPs had presented their call to Health Commissioner Dalli at that time.

The mission of the Platform is to promote oral health and the cost-effective prevention of oral diseases in Europe. It seeks a common European approach towards education, prevention and access to better oral health in Europe.

In his foreword to the report, the Chairman of the Platform, Professor Kenneth Eaton, states: "It is somewhat surprising and regrettable that – for years – there has been no concerted effort at an EU level to bring dental public health to the attention of the European institutions, and to give policymakers a deeper understanding of what can and needs to be done about oral health in Europe, particularly its integral role for general health and well-being. *The stakes on this issue are high and the time for change is now*". The italics are mine, and to demonstrate how high the stakes are, consider this statement from the report: "Expenditure on treatment of oral conditions often exceeds that for other diseases, including cancer, heart disease, stroke and dementia. This is disturbing, given that much of the oral disease burden in high-income countries is due to dental caries and its complications, and this is preventable through the use of fluoride and other cost-effective measures".

Two things stand out here: one is that dental caries is a very expensive affliction; and, two, that it is preventable.

Notably also, the role of fluoride has been challenged in Ireland in recent times. This report is further evidence of the beneficial effects of fluoridated water for public health. (The report cites the Irish water fluoridation programme as an effective population-based preventive initiative. Similar programmes exist in Poland, Serbia, Spain and the UK, while some European countries are trying fluoridated salt, and others have introduced fluoridated milk to target children.)

## Costs and access issues

Costs are a critical issue and rather than overstating them, the report is worried that the costs of oral ill health are underestimated due to a lack of information: "The lack of robust data on the economic burden of oral diseases and the cost-efficiency of preventive measures is a major public health issue in Europe. This may lead to an underestimation of the true costs of oral healthcare provision, thus limiting the ability to assess the impact of existing public health measures, and invest in the most effective initiatives".

Equally worrying is the disparity in access to oral healthcare. The report says that access is a particular problem for vulnerable and low income

groups who tend to come in for care when in pain, rather than for preventive care. There is also a clear northern Europe/southern Europe split, with residents in northern Europe more likely to attend a dentist for a check-up.

## Lack of integration of oral care

The report links the lack of integration of oral healthcare into national or community health programmes in many European countries to a clear lack of research in oral health promotion, stating: "...very few high-quality outcome measures exist for use in the evaluation of oral health policy and environmental interventions. This problem is compounded by the lack of routinely available and comparable EU oral health data".

## A look to Europe

So why do I believe this report is so significant? Because for the first time there is an overview of the current lack of integrated oral health policy in Europe and this is accompanied by a series of recommendations to EU policy makers, including:

- ▶ make a commitment to improve oral health policy by 2020;
- ▶ address oral health inequalities;
- ▶ improve knowledge, bridge research gaps and develop common methodologies; and,
- ▶ make a commitment to support the development of the dental workforce in Europe.

Our national Government is failing the population by removing the most basic preventive oral care in the DTSS and DTBS schemes. We need to continue to try to convince our Government of the evidence of the cost-efficiency of prevention, while encouraging the EU to adopt progressive, perhaps even radical policies for the oral health and greater good of the European population – including us.

Finally, the report states that oral cancer is the eighth most common cancer worldwide and that there were approximately 132,000 cases of head and neck cancer across Europe in 2008. This resulted in 62,800 deaths. It's a stark reminder of the need for oral health screening and the voluntary engagement of the profession in last month's Mouth Cancer Awareness Day in Ireland is important and heart warming.



Leo F. A. Stassen

Prof. Leo F. A. Stassen  
Honorary Editor

## Dentists supporting each other and their union

The IDA/IDU continues to work hard for members, says President DR ANDREW BOLAS.

Mouth Cancer Awareness Day 2012 was once again a resounding success, particularly for patients. It is striking to hear that 13 cases of cancer were discovered during the Awareness Day in 2011. Well done to all involved in the organisation of the day and well done to all the dentists who gave up their time on the day to help out. The event has grown year on year, and even now we should be planning for 2013 and using the strengths learnt in this year's event.

### HSE Dental Surgeons Group

The Annual Seminar of the HSE Dental Surgeons Group was threatened following the release of cost-cutting measures by HSE management. Following an intervention by the IDU, the HSE has agreed to support the event. I hope as

many colleagues as possible are able to attend the event, and ensure its continued success.

### CPD

The IDA has put together an excellent roadshow of CPD seminars around the country. These roadshow events will bring CPD to the regions and provide a cost-effective method for members to gain CPD. This first cycle of roadshows has started already and offers an excellent line-up of speakers.

### Your union

Now more than ever it is important that dentists belong to a strong union. The IDU is entering the second stage of talks with the HSE regarding the restructuring of the Public Dental Service. A great deal of work is being done by the HSE Committee to ensure that the public dental health service comes out of this restructuring stronger and better equipped to face the challenges ahead.

### BDA Northern Ireland Branch Scientific Weekend

Fintan and I had the pleasure of representing the Association in Rosapenna, at the Northern Ireland Branch weekend. Fintan was the guest speaker and explained to the audience the challenges facing the profession south of the border. The close links between us and our Northern Ireland colleagues were apparent in the warm welcome we received. Congratulations to Dr Barry McGonagle, their Branch President, on a very successful event, and we wish him well when he becomes President of the British Dental Association next year.

### Never underestimate the importance of your toothbrush

On a lighter note, I read with interest that the international space station remains above our heads thanks to an astronaut's toothbrush. It seems that essential repairs were needed and a screw could not be tightened. The only answer NASA could come up with was to either launch another rocket with the essential equipment aboard, or for someone on the space station to volunteer their toothbrush to clean the screw!

Dr Andrew Bolas  
President







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Re: QUIZ

Dear Editor,

I'd like to preface my following comments by congratulating Dr Ciara Scott on providing a crucially appropriate and stimulating case study question in the *JIDA* Vol. 58 Number 4, August/September 2012, relating specifically to the appropriate treatment timing to rectify that most debilitating, disfiguring yet ubiquitous of all malocclusions, the skeletal Class II Div 1 malocclusion, in an eight-year-old boy. I was happy to note that her treatment modality unhesitatingly only mentions the functional approach, that is, not one mention was made to what was unfortunately the treatment modality still until recently very popular, of extraction and retraction.

However, I'd have to disagree with the timbre of her answer relating to the timing of the functional treatment. Her favoured choice seems to indicate that following the guidelines of a multi-centred UK study conducted by Prof. O'Brien *et al.*, that it might be wiser to delay functional twin block therapy for this young boy of eight years with his 12-and-a-half overjet until he was 12. She feels this would, for a variety of reasons, some of which I will allude to, be the wiser option. Admittedly reference is made to the negative aspects of such a delay, i.e., the risk of trauma (which I would adjudge to be very high! as the centrals overlap the lower lip), and also the social consequences (teasing – 'bugs bunny', etc.).

Such a treatment option, however, also ignores the ongoing medical consequences of delaying treatment, relating to the fact, as the accompanying profile photo demonstrates, that the young boy is a mouth breather with an underdeveloped nasal airway system, and of course there are continuing myofunctional consequences of a tongue trapped in the lower third of the oral cavity as is the case with this malocclusion. Functional therapy using the jaw alignment and arch development components of the twin block would immediately address and correct these pathological defects.

It is my experience, and I have been providing and using twin blocks for my patients irrespective of their age since 1991, that generally speaking eight-year-old children are excellent candidates for properly constructed twin blocks retained by properly designed clasps such as C clasps on solid teeth, i.e., immobile, as the relevant posterior deciduous teeth tend to be in young boys up to nearly the age of 12, and are therefore no handicap for the duration of the active treatment phase, which usually lasts only one year. The only downside is that the

Phase 2 retainer appliance will have to be adopted as the permanent teeth erupt, usually no great hassle.

It is my experience that an eight-year-old with such a disfiguring and maiming malocclusion readily appreciates the dramatic facial change effected from day one of the fitting of his twin block, and readily becomes an enthusiastic and very co-operative patient. The only times I found this not to be so was when due to circumstances (I was working for the Health Board), I was forced to use laboratories that were unable to construct the twin blocks properly such as, at the very least for such workhorse appliances, they be constructed on heat-cured acrylic resin for strength and accuracy of fit and not, as happens, they are constructed in cold cure resin to an incorrect bite with wrongly positioned and angled inclined bite planes ...

... As a general concluding observation I'd like to say that it is my opinion that so potent is the efficacy of the twin block in correcting that most malign and ubiquitous of malocclusions, and so user friendly is its operation, that a mastery of its provision and management form an essential ingredient in the armoury of knowledge of any qualifying dental student. This is by way of ensuring that no young kid such as this one in the case study presented grows into adulthood and beyond with this affliction, for whatever reason, untreated. Believe me, there are such people out there, as any casual observation will attest to, and really, as they say, in this day and age it should not be so.

Regards

Dr Liam Ó Droma BDS, NUI, BA University of Sydney

### Response from Dr Ciara Scott:

I thank the author for his comments. The answer to the quiz, however, was based on the scientific evidence referenced and not the personal opinion of one clinician. Cochrane reviews, such as the one referenced in the answer, are systematic reviews of primary research in healthcare and health policy, and are internationally recognised as the highest standard in evidenced-based healthcare.

Dr Ciara Scott BDS MFD MDentCh MOrth FFD RCSI

In this issue's  
centre pages...

### REVENUE

IDA secures vital deferral from Revenue.



### SURVEY

Latest from the Smiling Europe campaign survey.



### DTSS

The effect of cuts on dentists and patients.



**Quiz**

*Submitted by Dr Mark Kelly*

A 35-year-old female presents with a painless white irregular nodular lesion 15mm in diameter on her buccal mucosa adjacent to her heavily restored upper right first molar tooth. She smokes five cigarettes per day. She does not drink alcohol. Her medical history is unremarkable.

**Questions**

1. What investigations would you carry out?
2. What is the likely clinical diagnosis in this case?
3. What treatment would you recommend in this case?

Answers on page 265.



**Mentoring scheme for members**

A mentoring scheme for members is to be developed and a sub-committee has been established to pilot the roll out of the scheme. Drs Dermot Canavan, Conor McAlister, Gillian Smith, Saoirse O'Toole and Evelyn Connolly, IDA President Dr Andrew Bolas, and Chief Executive Fintan Hourihan are to begin plans for the establishment of the scheme,

which would offer confidential advice to members on a wide range of issues regarding practice management and career development. Discussions have already taken place with bodies that have introduced similar schemes, and it is hoped that a mentoring scheme will be launched on a pilot basis before the end of the year. Members who have an interest in this issue or any suggestions are asked to contact IDA House.





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## Dental students reach out to Nepal

SIMON SWEETNAM describes his experience as one of a group of students who travelled to Nepal to run a dental outreach clinic.



ABOVE: Simon Sweetnam and Rajiv Rajpal treat a young Nepalese patient. LEFT: Pictured with Nepalese colleagues from Work the World are: Back row (from left): Nepalese dentist Bhupesh Shakya; Gavin Nugent; Simon Sweetnam; New Zealand dentist Golnaz Safarazi; New Zealand dentist Pristesh Narsinh; Michelle Fung; and, Rajiv Rajpal; and front row (fourth from left): Thomas Murphy; Lucy Walsh; and, Orla Walsh.

Along with 11 other UCC undergraduate dental students, I recently took part in an outreach project in Nepal.

The outreach programme was run by a charity called Work the World. We split into two groups of six, with one group setting out from Kathmandu and the other from Pokhara. Both groups set up temporary clinics to provide primary care to remote mountain districts.

Our costs (about €2,500 each) were funded mainly by donations from IDA members and local fundraising. For students planning on undertaking this project, the cost is the main obstacle, so I recommend starting to fundraise early in the year.

### Getting to work

Management and efficacy are key to success and were ensured by the presence of two dentists from a local dental hospital, who monitored all treatments. Dental health in this region is poor. Some 20% of five- to seven-year-olds have caries in three or more teeth, and there are only 200 dentists to cover the whole country's population, one for every 120,000 people.

Our clinic was equipped with a wide range of extraction forceps and elevators, GIC and amalgam for restorations, local anaesthetic, portable handpieces run off a generator, basic pain relief and antibiotic medications, and the necessary cross infection control materials. We operated a screening room, where we screened 800 patients over a two-week period, and a three-chair treatment room where we treated 415 patients, most of whom required multiple treatments. A lot of the treatment involved extractions, but restorations were carried out where feasible. We were aided by 12 local adolescents who had basic English and translated for us. Our patient base came from notifications at local schools and on local

radio. The whole project was overseen and co-ordinated by a Work the World representative who was on site at all times.

We aimed to keep clinical standards identical to home, but obviously some compromises, such as packaging for sterilised instruments, were encountered.

As we were accompanied by four dentists who had recently graduated from Otago in New Zealand, this trip was a great chance to experience inter-professional learning. They all had at least one year's hospital experience post graduation, so were a great help and endless source of advice and knowledge.

### Evaluation

Feedback from all of the students involved has been positive. We gained invaluable experience and saw a wonderful country at the same time. It has to be said: having a clinic that overlooks the Himalayas is a luxury.

One concern I have is the access to aftercare in the case of a patient with dry socket or the likes, but I understand that this is an unavoidable situation with a temporary clinic. We kept a full record of patients screened and treated, so the good that was done on the project has been documented.

An outreach programme could be looked at as a great complement to the clinical experience we get here in the hospital.

### References

- Westbacke, K. Hygiene, eating habits and oral health among children in three Nepalese high schools. ISBN 91-7997-151-2.
- Van Pahanstein Helderma, W., *et al.* Analysis of epidemiological data on oral diseases in Nepal and the need for a national oral health survey. *Int Dent J* 1998; 48: 56-81.

# To pay pension or not to pay pension?

*JOHN O'CONNOR of Omega Financial Management advises on availing of tax relief for pension contributions.*

*It's the time of year again when accountants are busy preparing self-employed accounts, advising how much tax we need to pay and offering advice as to how we can reduce our tax bill.*



There are few options left, but the foremost one remains contributing to our pensions, through which, this year we will again be able to reduce our tax bill by our marginal rate of tax, up to 41%. As the budget looms and the Troika look for more sacrifices from us, we don't know how much longer we will be able to avail of this benefit.

With that in mind it would seem crazy not to avail of the benefit this year. As you can cash in 25% of your fund (up to €200k limit) at age 60, for many it is not that long an investment timeframe with huge tax benefits.

## Capital Secure Investing

I know that many dentists have suffered as a result of poorly performing funds over the last number of years. The stock market crash of 2001/02 taught me an important lesson that capital secure or very well diversified funds are the most appropriate types of investment for the Irish market. With markets still volatile, there are excellent opportunities for people to invest their funds with growth opportunity, while not having to take a risk with their capital. If you are uncomfortable with the risk profile of your existing pension, you should avail of our free pension review service to check the likelihood of achieving your target retirement date and income.

## New Tax Finance Package for IDA members

Omega Financial is delighted to announce that we have sourced a new Tax Finance Package for members of the IDA that spreads the payments of their tax bill over 10 or 11 months. The agreements have been made with the two main banks and will provide some dentists with an alternative method of sourcing the required funds to pay their revenue bill come October/ November\*. While it is possible to stretch payments with the Revenue themselves, many people find it uncomfortable to deal

with their tax bill this way and prefer to simply pay the tax bill and be done with it.

The interest rates applicable are between 6% and 7% with both banks, which is very reasonable for this type of unsecured lending. Omega will process the applications for all who wish to avail of the service which is free to Omega's existing clients and has a reduced fee of €150 to IDA members. The non-IDA fee is €250, however if any other business is done the fee will be waived.

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*DECLAN EGAN of Omega Financial Management explains the significance of tax relief on income protection.*

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Policyholders can claim tax relief at their marginal rate of tax on new Day 1 Income Protection policies taken out, resulting in a 41% saving on premium levels. DG Mutual is the only company with tax relief on Day 1 Income Protection and we are delighted to be able to offer it exclusively. If you would like us to review your current position please contact us and we will do so for free. Our number is 1850 260 261 or by email to [dentists@omegafinancial.ie](mailto:dentists@omegafinancial.ie).



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## Free examinations on Mouth Cancer Awareness Day 2012

Over 700 dental surgeries all over the country, along with the Cork and Dublin dental hospitals, offered free mouth examinations on Mouth Cancer Awareness Day, September 19, 2012. Also, in a new development this year, two dentists carried out examinations at a hostel for homeless people in Dublin.

Three hundred cases of mouth cancer are detected in Ireland each year with over 100 deaths. Dr Conor McAlister of the Irish Dental Association said the key to successful treatment is early diagnosis. "If the cancer is detected early, the chances of a good outcome are greatly enhanced. Therefore, irregular dental attendees are particularly welcome. Raising awareness is what this day is all about," he said. Mouth Cancer Awareness Day was initiated by a group of mouth, head and neck cancer survivors in September 2010. On that occasion, over 3,000 people queued outside the Cork and Dublin Dental



At the launch of Mouth Cancer Awareness Day 2012 were (from left): Mouth cancer survivor Gerry Collins; Dr Conor McAlister of the IDA; and, mouth cancer survivors Suzanne O'Leary and Reg MacMahon.

University Hospitals for a free mouth cancer examination. Six cases of cancer were detected on the day.

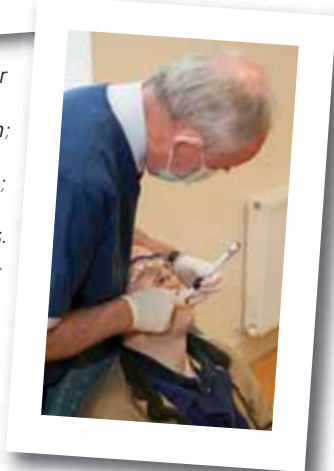
Last year the Irish Dental Association gave its full support to the initiative with 700 dentists offering free mouth cancer examinations. Ten thousand people were examined, and 13 cases of mouth cancer were discovered.

Mouth Cancer Awareness Day is a joint initiative by the Irish Dental Association, Irish Cancer Society, Dublin Dental University Hospital, Cork Dental University Hospital, the Dental Health Foundation and Mouth, Head and Neck Cancer Awareness Ireland.

IDA CEO Fintan Hourihan pointed out that people who qualify under the various dental schemes are entitled to a free dental examination once a year: "Despite the appalling cutbacks to dental services in recent times, we are anxious to make sure that the public are informed, and avail of their entitlements".



Pictured at the launch of Mouth Cancer Awareness Day 2012 are: Dr Conor McAlister of the Irish Dental Association; Joan Young, who has successfully battled mouth cancer twice since 2006; and, Joan's son, Leinster and Ireland international rugby star Shane Jennings.



**Morning Star Hostel**  
Dr Conor McAlister was one of a team who provided free mouth examinations at the Morning Star Hostel in Dublin's north inner city on Mouth Cancer Awareness Day.

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Omega Financial Management is delighted to announce that premiums on their market-leading day one income protection product will now attract full income tax relief at the policyholder's marginal rate of tax. The underwriter of the scheme, DG Mutual, has secured approval for this important, cost-saving benefit from the Revenue Commissioners.

According to John O'Connor, Managing Director at Omega Financial Management: "This elevates the benefits of day one income protection to a whole new level. Our product has always been extremely competitive in terms of its benefits. The professionals we talk to place enormous value on the ability to claim from the first day of illness or accident, being able to receive benefit when they need it most. The fact that DG Mutual also pays out such a high proportion of claims (99% of claims paid in each of the last three years) is also recognised as very important".

"If there was a single hurdle, it was the inability to claim tax relief on the premiums and this has now been addressed," O'Connor added. Policyholders can claim tax relief at their marginal rate of tax on new day one income protection policies, resulting in a 41% saving on premium levels.

### Tax finance package

Omega Financial Management has also announced a new tax finance package for members of the IDA, which spreads the payment of their tax over 10 or 11 months. Agreements have been reached with the two main banks to provide some dentists with an alternative method of funding their revenue bill in October/November.

Each year Omega is approached by a considerable number of clients from various professions (including dentists) to source finance for their tax bill. While it is possible to stretch payments with the Revenue, many people find it uncomfortable to deal with their tax bill this way and prefer to simply pay the tax bill and be done with it. The tax finance package is designed to enable dentists to source some finance to pay their tax bill.\* This gives peace of mind through being up to date with their taxes, but still offers the opportunity to spread payments over a number of months.

The interest rates applicable are between 6% and 7% with both banks, which is very reasonable for this type of unsecured lending. The normal Omega fee for processing the application is €250; however, this service is free to Omega's existing clients and a reduced fee of €150 will apply to other IDA members (if the member then does any other business with Omega, the fee will be waived). Contact Omega at 1850 260 261 or [info@omegafinancial.ie](mailto:info@omegafinancial.ie) for more information.

*\*Terms and conditions apply.*



## DeCare increasing awareness of oral health



DeCare Dental Insurance is continuing its commitment to increasing awareness of oral health issues in Ireland, both for DentalCover.ie members and for the wider public.

The latest issue of DeCare's *Oral Health Zone* magazine explores a topic that was central to the emergence of dentistry as a profession and continues to dominate much of dental practice today. It takes an in-depth look at dental decay, its origins, how it progresses, how it can be controlled, and how the dentist diagnoses and manages the condition. It also looks at what the research says about treatment need for restorations and gives an overview of safety aspects of the most commonly used dental restorative materials.

Dr Ger Gavin, Chief Dental Officer for DeCare Dental Insurance, explains: 'Increasingly, the public

want to be more knowledgeable and more involved in healthcare decisions that affect them. Dentistry should be no different and properly informed dental consumers make for better patients, who in the long run will be more proactive about their dental health and become regular dental attendees".

Also featured in this issue are articles by Dr Denise McCarthy and Dr Anthony Coughlan. Dr McCarthy gives a unique insight into the topic of oral cancer in Ireland, providing a timely reminder to patients of the value of an annual dental examination, including an oral cancer screening. Dr Coughlan gives parents a concise guide to the optimum timeline for orthodontic assessment and treatment. A final article alerts parents to the necessity for their children to wear mouth guards and avoid the trauma and costly dental treatment being experienced by thousands of Irish school children each year.



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Details from Sandra Duffy at above address.

## Seeking better oral health in Europe



The Platform for Better Oral Health in Europe is a joint initiative of the European Association of Dental Public Health (EADPH), the Association for Dental Education in Europe (ADEE), the Wrigley Oral Healthcare Program, GlaxoSmithKline Consumer Healthcare and the Council of European Chief Dental Officers (CECDO). Its work is supported by the Wrigley Oral Healthcare Program and GlaxoSmithKline Consumer Healthcare.

The Platform is chaired by Professor Kenneth Eaton and was created to respond to the Call to Action for Better Oral Health in Europe handed to Health Commissioner Dalli by several Members of the European Parliament in 2010. The mission of the Platform is to promote oral health and the cost-effective prevention of oral diseases in Europe. It seeks a common European approach to education, prevention and access to better oral health in Europe. It has released a report entitled 'The State of Oral Health in Europe'. The key policy recommendations are:

- ▶ recognise the common risk factors for oral diseases and other chronic diseases, and work towards linking oral health policies across other EU policies;
- ▶ better integrate oral health into relevant national and EU health programmes and policies;
- ▶ develop a coherent European strategy for the promotion of oral health and the prevention of oral diseases;
- ▶ address the major oral health challenges of children and adolescents, socio- and economically deprived groups, an increasingly elderly population and other vulnerable populations in Europe;
- ▶ employ an approach that focuses on the wider political, environmental, social and economic drivers that create oral health inequalities;
- ▶ develop supportive oral health environments in local settings such as schools, colleges, hospitals, workplaces and care organisations;
- ▶ encourage and promote policies to ensure access to fluoride for the whole population;
- ▶ guarantee availability of and access to high quality and affordable oral healthcare, including free basic treatment for individuals under 18 years of age;
- ▶ ensure access to relevant and evidence-based oral health information;
- ▶ maximise the potential of the dental team to ensure an appropriate use of skill mix in undertaking preventive interventions;
- ▶ develop the role of oral health professionals in generic health promotion to address risk factors such as cigarette smoking, poor diet, high alcohol consumption, and sedentary lifestyles;
- ▶ support the training and education of dentists to develop robust oral health epidemiological infrastructures and assist in oral health strategy and policy development;
- ▶ make oral health and the prevention of oral diseases a priority under the European health and research programmes to specifically focus on community-based research on the social determinants of general and oral health, and inequalities in health;
- ▶ improve the collection of validated oral health data, align methodologies between EU countries, and frequently collect reliable and comparable data; and,
- ▶ disseminate all major research outcomes, best practice measures and learning experiences in oral health policy.

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# Dental erosion – current perspectives for general practice

## Précis:

Dental erosion and tooth wear pose significant challenges to the dental practitioner today.

*Journal of the Irish Dental Association 2012; 58 (5): 241-244.*

## Introduction

Dental erosion and tooth wear in general pose significant challenges to the diagnostic, preventive and restorative skills of the dental practitioner today in his/her efforts to maintain the structural integrity and stability of a patient's dentition over their lifetime. These goals risk being substantially compromised when rapid loss of dental hard tissue occurs early in life.

Diagnosis and subsequent management of dental erosion are complicated by an often multifactorial aetiology involving other tooth wear processes such as attrition and abrasion, in addition to which are superimposed the interactions of patient habits, lifestyle and behavioural factors. Of the three individual processes, erosion is considered to make the greatest contribution to tooth wear.<sup>1,2</sup>

The influence and effect of attritional and abrasive tooth wear are not specifically discussed in this overview, but the potential

for their coexistence in conjunction with erosive tooth wear is always presumed.

## What is dental erosion?

Dental erosion is taken to refer to the loss of dental hard tissue due to chemical action, excluding chemicals produced by bacteria. It could also be described as a condition caused by acid insult with the acid being of non-bacterial origin (Figure 1).

## Prevalence

Available epidemiological data on prevalence are inconsistent across studies and show huge variation due to a lack of standardisation in the terminology used to define erosion and the indices used to measure it. Ranges of 6-50% in pre-school children, 11-100% in adolescents and 4-82% in adults have been reported.<sup>3,4</sup> Given such inconsistency, reliable conclusions regarding the occurrence, progression and distribution of erosive tooth wear cannot easily be made.

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FIGURE 1:  
Early to moderate  
stage erosion showing  
flattening of labial  
contour.





**FIGURE 2:** Erosion due to excessive consumption of fizzy drinks. There is almost total loss of molar occlusal anatomy with wide dentine exposure (perimolysis). The patient was not experiencing sensitivity.



**FIGURE 3:** Combined case demonstrating erosion on the lingual aspect and incisal attrition.

However, the data trend is for an increased prevalence of erosive tooth wear in younger age groups, particularly in adolescents.<sup>5</sup>

### Aetiology

A thorough and detailed history should aim to elicit the following contributory/risk factors:

#### Extrinsic

- ▶ Citrus fruits and juices, smoothies, carbonated/fizzy drinks, sports drinks (**Figure 2**);
- ▶ acidic foodstuffs, i.e., vinegars, pickles, salad dressings;
- ▶ medications that reduce saliva flow rate and volume;
- ▶ acidic medications, i.e., chewable vitamin C tablets;
- ▶ exposure to acidic fumes in certain occupations;
- ▶ recreational, e.g., chlorine from swimming pools; and,
- ▶ use of whitening products (with caution: can disrupt surface pellicle and may increase susceptibility to erosion).

#### Intrinsic

- ▶ Gastric acid regurgitation consequent upon:
  - gastro-oesophageal reflux disease (GORD; affects 7% of population on daily basis);
  - hiatus hernia;
  - pregnancy;
  - chronic alcoholism;
  - eating disorders; and,
  - rumination.

### Diagnosis

Clinically, changes in the appearance of the teeth are the most important diagnostic features. Subjectivity is inevitably an issue here as there is no device available for the specific detection and quantification of dental erosion in routine practice. Early changes are subtle, with affected teeth initially manifesting loss of lustre and flattening of convex contours.

With progressive erosion, concavities appear on smooth surfaces and there is grooving, cupping and thinning affecting incisal and occlusal surfaces. Enamel may be lost almost entirely with wide areas of dentine exposed. Extreme cases of especially rapid tissue loss can lead to pulpal exposure.

The recognition of the early signs of erosion is of crucial importance for patient awareness and the instigation of preventive measures at the earliest opportunity. Unresolved dentine hypersensitivity may be an indication of active erosion. The observation of pristine, clean surfaces on particular teeth that might normally be susceptible to routine extrinsic staining between recall visits may also suggest the possibility of erosion.

The use of magnification by the dentist and the demonstration of changes in tooth morphology and appearance by means of an intraoral camera may be especially useful in this regard, as patients are likely to be much more impressed by visual rather than verbal communication. These images may then serve as baseline records to monitor progression/stability, as well as providing documentation of patient compliance/non-compliance from a medicolegal perspective, which could become more important as public awareness of erosion increases (**Figure 3**).

The taking of serial study casts also has a valuable role to play in the documentation and monitoring of tooth wear generally, from whatever source.<sup>6</sup>

### Management

The cornerstone of effective management is elimination or at least control of identified risk factors. The general dental practitioner is ideally placed to alert and educate the patient as to the nature of their tooth erosion, and their own role and responsibility for the protection of their dentition.

The observed tooth tissue loss may be classified into mild, moderate or severe based on the clinical assessment. This is necessarily



FIGURE 4: Same case as in Figure 1 restored with minimal preparation porcelain veneers.

subjective and imprecise, and various clinical indices have been proposed over the years.<sup>7</sup> Speed and ease of use are essential requirements if such indices are to be routinely used in general practice. It is important that such categorisation is correlated with the patient's age as this will be critical in deciding the most appropriate approach to management.

If dietary acids are implicated, research shows that suggested changes should be realistic and achievable, and that sudden, radical changes to a patient's existing dietary practices may not be sustainable or successful in the longer term.

Patient education should focus on modification of the pattern and frequency of consumption of acidic foods and beverages. The consumption of soft drinks has increased by 300% in the US over the past 20 years; this translates into an average of 212 litres per person per year in the US in 2009.<sup>8</sup>

Intraoral retention of low pH liquids and foods in the form of swilling, sucking or swishing should be avoided. Gum chewing can help to increase saliva flow and tooth brushing is best delayed for up to one hour following entry of acid into the mouth.

For children and adolescents especially, the overuse of carbonated drinks, fruit juices and sports drinks should be discouraged on the grounds of their sugar content and erosive potential. The desirability of milk and water consumption as a healthier, less destructive form of hydration should be promoted.

In cases where GORD is reported or suspected (20% of cases have no symptoms of heartburn or indigestion – the so-called "silent refluxers"),<sup>9</sup> referral to a gastroenterologist is indicated.

Appropriate medical evaluation and/or counselling services will be required in cases where the history and examination suggest alcohol abuse, anorexia or bulimia.

In cases of dentine sensitivity, dentine bonding agents, fluoride mouthrinses, desensitising agents, topical creams such as Tooth Mousse and high fluoride content toothpastes, i.e., Duraphat 5000, can all be helpful.

### Restoration

The decision to proceed from a stabilisation/monitoring approach to one where the restoration of teeth is deemed necessary will be influenced by a number of factors:

1. The extent and severity of the wear. Is it progressive and is it likely that further unacceptable loss of tooth structure will take place without treatment?
2. Is the patient experiencing pain or sensitivity, or is there a requirement to restore functional occlusion and address impaired aesthetics?
3. Is restoration necessary to protect weakened and vulnerable tooth structure from risk of fracture even if causative factors have been successfully addressed?

Progressive loss of occlusal anatomy will result in undesirable changes in the dentition, such as loss of more stable cusp tip to fossa relationships and/or effective anterior guidance leading to increased posterior tooth contacts in working excursions. Interocclusal space in which to place restorative materials will become more restricted due to compensatory alveolar growth. Localised space management utilising the 'Dahl' concept in such cases has been described elsewhere and is beyond the scope of this article.<sup>10</sup> These sequelae may be underappreciated in the case of the asymptomatic patient with no complaints related to deteriorating aesthetics, altered tooth morphology or dentinal sensitivity, but can significantly complicate any future restorative treatment.

When operative treatment must be undertaken following the identification and control of risk factors, further reduction of eroded tooth substrate must be minimised or avoided if at all possible, and the least invasive restorative option selected appropriate to the individual patient situation. Many case reports attest to the successful rehabilitation of eroded dentitions using contemporary adhesive techniques, although evidence from prospective, controlled studies is scarce.

These can range from direct composite resin for smaller lesions in

isolated areas to indirect, partial coverage resin, ceramic or gold alloy restorations, and adhesively bonded crowns and veneers, in the case of more extensive reconstructions.<sup>11,12,13</sup>

It is important to note that all dental restorative materials are susceptible to degradation under acidic conditions over time. Nonetheless, ceramic and composite materials do seem to exhibit substantial resistance and durability.<sup>14</sup> Modern hybrid composite is a versatile material, which can be used in anterior and posterior teeth, and allows for greater ease of maintenance and repair for reduced cost in comparison with ceramic (Figure 4).

### Maintenance

The prognosis for treated and unrestored tooth wear cases has to be considered to be more uncertain than that applying to routine restorative dentistry, and any restorations placed will require replacement several times over a patient's lifetime. This will be for reasons of unidentified or uncontrolled aetiology, compromised tooth structure, continued habit activities, psychological disorder and non-compliance with preventive/homecare advice. Therefore, patient education and understanding of the need for regular recall for maintenance care and reinforcement of preventive regimens is paramount.

### Conclusion

Dental erosion is the outcome of multiple biological, chemical and behavioural factors interacting synergistically with the tooth surface. The dentist needs to be acutely aware of the erosive potential of drinks and foodstuffs, together with an appreciation of how these multiple biological, chemical and behavioural factors interact in order to best direct his/her efforts to restore equilibrium to the oral environment. All patients seen in the practice should be screened for signs of erosion with the same rigour that applies to the diagnosis of caries and periodontal diseases. It is regrettable that some dental care payment systems seem to do little to incentivise dentists to apply the investment of time needed to identify erosion in its early stages, raise patient awareness, apply preventive measures and monitor compliance.

Comprehensive history taking, detailed clinical examination and record keeping will always be essential to informing decisions on whether the patient's condition can be managed conservatively and on the extent to which restorative intervention may be required. When restoration is deemed essential it should be performed in accordance with the principles of minimally invasive dentistry, using additive techniques wherever possible.

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## Sugar tax and obesity

### Précis:

A report from two separate workshops on the merits or otherwise of imposing a so-called 'sugar tax' as a response to rising levels of obesity, concluding with a commentary.

*Journal of the Irish Dental Association 2012; 58 (5): 245-248.*

### Introduction

The UCD Institute of Food and Health, in conjunction with the UCD Geary Institute, hosted a workshop on June 8, 2012, to explore whether or not fiscal interventions, such as the imposition of fat and sugar taxes, will in fact impact on public health and, specifically, obesity. The workshop consisted of four presentations by UCD experts on food intake and obesity and the economic aspects of a 'sugar' or 'fat' tax. There was a general discussion on the merits or otherwise of introducing such a tax and it was chaired by Professor Cecily Kelliher of the School of Public Health in UCD.

The Health Impact Assessment workshop was carried out at the Department of Health, Hawkins Street, Dublin, on June 12, 2012. Minister James Reilly introduced the session and stated that: "This is a positive first step in the battle against obesity". There were participants from the food and drinks industry, food and health, public health and academia, and the meeting was chaired by Dr Donal O'Shea, Chairperson of the Obesity Task Force.

### UCD – Fat and sugar taxes: will they solve the problem?

This seminar consisted of four presentations and a general discussion. These can be viewed at <http://www.ucd.ie/foodandhealth/seminarseries/fatsugartaxes/>:

1. Obesity and food patterns in Ireland (Dr Anne Nugent).

2. The economics of fat taxes (Dr Kevin Denny).
3. Obesity: down a road less travelled (Professor Mike Gibney).
4. The distributional impact of a 'fat' tax (Professor David Madden).

### Obesity and food patterns in Ireland

Dr Anne Nugent gave a detailed analysis of the national trends and current levels of food intake with a specific focus on sugars and fats. The main finding regarding sugar intake is that, currently, it constitutes 14.3% of our energy intake;<sup>1</sup> this also includes fruit sugars as non-milk extrinsic sugar (NMES). The frequency of sugar intake per day (national average) has reduced from 4.2x/day in 2001<sup>2</sup> to 3.3x/day in 2011.<sup>1</sup>

As sugar-sweetened beverages (SSBs) or 'soft drinks' appear to be the focus for a sugar tax, it is interesting to note that only 1.2% of our total dietary energy intake (national average of consumers and non-consumers) comes from this source, although for consumers SSBs constitute 3.6% of energy intake. The national average consumption of fruit juice is 0.9% of energy intake; 48% of the population consume fruit juice regularly and for these consumers it constitutes 2.3% of energy intake. Also, approximately 60% of the population do not consume SSBs and any measure aimed at taxing this food group would only potentially impact on a minority of the population.

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While obesity rates have undoubtedly increased in Ireland and it is a significant public health problem, it is also an extremely complex phenomenon with a multi-factorial aetiology. There appears to be a levelling off of the rate of increase in obesity compared to the rapid rise between 1990 and 2001. Half of Irish adult males are overweight, while the comparable figure for females is just under one-third. The respective figures for obesity levels are one-quarter and one-fifth. Neither sugar nor fat intake was correlated with indices of obesity such as BMI or waist circumference measurement. Even in the highest quartile of sugar (or fat) intake, there was no difference in BMI or waist circumference. Consequently, based on the Irish national consumption data for these foods, it cannot be shown that an increased consumption of SSBs can be correlated with an increase in obesity.

#### The economics of fat taxes

Dr Kevin Denny of the UCD Geary Institute gave an overview of some of the wider issues that economists would take into account with regard to taxes on foods or nutrients. The following summary is extracted from Mike Gibney's food blog: <http://gibneyonfood.blogspot.ie/2012/06/sugar-taxes-re-visited-economic-and.html>.

Kevin pointed out that economists start with the view that the individual knows what is best for them personally. However, for some groups and in certain instances, this may not be the case. The information upon which a decision is to be made may be poorly available, too complex, or time and emotion may defer an informed decision. Policy decisions in such instances therefore start with education and then move to regulation of some form, which might include taxes.

Taxes that are designed to introduce enhanced social behaviour are referred to as Pigouvian taxes and it could be argued that food taxes fall into this category if we think that people's consumption of food is not socially optimal for some reason. But one needs to be clear about why people's food consumption imposes a burden on society. The standard argument is that eating too much (and hence causing obesity) imposes a burden, as the taxpayer will pick up most of the additional health costs (estimated at about €400 million p.a. in Ireland). In that context, however, taxing nutrients such as calories should only apply to those calories that are consumed in excess. If for example, people don't consume many calories, or they burn off what they consume through exercise, there is no reason to tax such calories. Taxing calories for individuals in energy balance would be unfair. The taxing of nutrients is made more complex by the fact that foods contain multiple nutrients. Taxing the fat in cheese ignores the important contribution cheese makes to calcium intake among consumers of cheese. Kevin explained the sequence of steps the economist would look at, always assuming that nutritionists really did have a genuine target for taxation in the first instance: How much to tax? How does that affect price given that taxes are often not passed on in full to consumers? In turn, how does that influence consumption of the foods concerned? How does that influence BMI and, of course, eventually health costs? He went on to cite the work of Powell and

Chaloupka, who conclude that: "The limited existing evidence suggests that small taxes or subsidies are not likely to produce significant changes in BMI or obesity prevalence, but that nontrivial pricing interventions may have some measurable effects on Americans' weight outcomes, particularly for children and adolescents, low-SES populations, and those most at risk for overweight. Additional research is needed to be able to draw strong policy conclusions regarding the effectiveness of fiscal pricing interventions aimed at reducing obesity". In other words minor taxes will have little effect and that effect would only be seen with quite considerable taxes.

#### Obesity: down a road less travelled

Professor Mike Gibney gave an overview of the epidemiology and genetics of obesity and the importance of physical activity, particularly in the context of the built environment. He showed the data in the USA in relation to the growing obesity problem and associated chronic disease conditions but also explained that obesity has always been a health issue even for early societies. He suggested that obesity comes in waves and that there is some evidence that the current "Tsunami of lard" is no longer accelerating at the same rate.

According to Professor Gibney: "Just under half of Irish adult males are overweight, while the comparable figure for females is just under one-third. The respective figures for obesity levels are one-quarter and one-fifth. So, we have a problem, as have most developed countries".

He also suggested that an excess of calorie intake over physical activity expenditure is an incorrectly simplistic view of how people become overweight or obese. We all live in an "obesogenic environment", but the susceptibility to weight gain is strongly genetically determined and he elaborated on this using data from identical twin studies.

He commented on the particularly poor quality, methodology and bias of peer-reviewed articles on SSB and obesity published between 2001 and 2011. Systematic reviews of the SSB health outcomes issue are needed to better inform policy.

No one particular pattern of food intake has been associated with obesity (unlike, for example, high frequency sugar intake and dental caries). Furthermore, it is important to ask: why do some people choose to eat more than others? People do not "choose to become obese".

"Most of the studies linking SSBs and obesity are based on observational studies, examples of which are in the data presented by Anne Nugent. These data do not prove cause and effect. To do so, we need to construct very large multi-centre studies of sufficient duration to see any true effect. The Women's Health Initiative on dietary fat, the DASH study on diet and hypertension, the DART and GISSI studies on fish oil, and the MRC trial on folic acid are all examples of these large, internationally approved intervention studies specifically designed to test the true cause and effect hypothesis. As regards reducing or increasing intakes of SSBs, no such study exists. In the EU, we demand multiple human intervention trials to sustain health claims on foods and clearly that bar is too high for public health nutrition policy."

### The distributional impact of a 'fat' tax

Professor David Madden of the School of Economics used data from the nationally representative Household Budget Survey to examine the impact of possible fat taxes on poor households. The following summary of this presentation is extracted from Mike Gibney's food blog: <http://gibneyonfood.blogspot.ie/2012/06/sugar-taxes-revisited-economic-and.html>.

Professor Madden's results showed that pretty much any food-based fat tax will have a disproportionate effect on poor households, reflecting the general tendency across all countries for poor households to devote a higher fraction of their budget to food. However, a revenue neutral tax/subsidy package, with higher taxes on some foods combined with lower taxes on other foods, would be neutral in its poverty impact, and could even be mildly beneficial to poor households. In terms of a tax on SSBs, the impact of a 10% tax on poor households would be relatively modest, given that SSBs are a relatively small fraction of the budgets of poor households. Depending upon the ability of the Government to accurately target poor households to compensate them for such a tax, the cost of compensation in 2005 prices would most likely be less than €10m. However, this takes no account of the loss in welfare borne by non-poor households from such a tax.

### Department of Health: Health Impact Assessment (HIA) on the proposed introduction of a tax on sugar-sweetened beverages

The HIA workshop consisted of a large group invited from various aspects of healthcare, economics, and the food and drinks industry. Professor Donal O'Shea introduced the background to the HIA and his role as an endocrinologist in treating what he described as "the results of obesity". Following Minister Reilly's speech, attendees were advised that small group discussions would take place and there would be a final summation with some feedback from each of the appointed chairs of these group discussions. There was neither written documentation provided nor a definition of which drinks/beverages would be subjected to a tax. SSBs or 'soft drinks' were mentioned in discussion but the parameters of the proposed tax were not defined. Approximately 40 participants were split into four groups and a series of questions on the topic were discussed openly. There were many and varied views on the potential effectiveness of a sugar tax and differences of opinion on the level of evidence for a causal mechanism and any impact it would have on the obesity problem in Ireland. The workshop concluded with a summary by Eoin Metcalfe from the Institute of Public Health. Participants were advised that they would be informed of the next stages of the introduction of a sugar tax by the Minister.

The main points outlined in a summary of the discussions were:

- ▶ why can't a sugar tax be ring fenced for a health/obesity/nutrition programme?;
- ▶ would a sugar tax have a "measurable impact" on obesity?;
- ▶ what are the other components of the anti-obesity strategy?;
- ▶ how will the greater tax burden of a sugar tax on lower income families be addressed?; and,

- ▶ division of opinion on the "level of evidence" relating to intake of SSBs and obesity.

### Commentary following participation in both workshops

Although the sugar tax was proposed by the Obesity Task Force and Department of Health as only one aspect of addressing the obesity problem, it is difficult to see how it could have any significant impact on average dietary energy intake and thus on obesity. The average population dietary energy intake from SSBs is 1.2%, and for regular consumers (40% of the population), SSBs constitute 3.6% of energy intake.<sup>1</sup> It seems hopeful, at best, to suggest that the introduction of a sugar tax will result in a measurable reduction in obesity and the appropriate high-quality randomised controlled trial has not been carried out to support this measure. Obesity is a complex phenomenon with a multi-factorial aetiology, and in the opinion of this participant the proposed 'solution' is too simplistic and does not really address the important issues. Pereira<sup>3</sup> has suggested that: "Some have drawn analogies between the fight against the food industry and the fight against the tobacco industry. However, the complexity of our food supply and of dietary intake behaviour, and how diet relates to other behaviours, makes the acquisition of clear and consistent scientific data on the topic of specific dietary factors and obesity risk especially elusive. Only more high-quality randomised trials on this topic will provide the necessary data to properly evaluate the possible link between changes in SSB intake and obesity risk".

Marantz<sup>4</sup> warns against the urge to implement public health nutrition policy guidelines in the absence of evidence: "A 'risk factor' is not necessarily a cause. Inaction is sometimes the best option. Although emergency situations may demand action even in the setting of inconclusive evidence, dietary guidelines are not an emergency. When the evidence is inconclusive ... why issue guidelines?" However, as SSBs are micronutrient poor, recommendations to limit their intake would generally appear to be important for the promotion of good nutrition. A recent review<sup>5</sup> suggested that: "There are few established adverse consequences of high intakes of digestible carbohydrate for young children ... However, overall, there is sufficient evidence for public health strategies to discourage over-consumption of sugary drinks as part of a healthy lifestyle".

From a dental perspective this would seem to be logical also, although there are many other factors that will influence the development of dental caries. Gibson and Williams<sup>6</sup> analysed data for children from the British National Diet and Nutrition Survey and found an association between the percentage of energy intake from NMEs and dental caries only in children who brushed their teeth less than twice a day, suggesting that oral hygiene was more important than sugars consumption.

While positive relationships have been found for both fat and protein intake and obesity, there appears to be little evidence of a positive relationship between sugars (or digestible dietary carbohydrate in general) in relation to body weight, with many studies showing an inverse relationship between the incidences of obesity and increased sugars intake.<sup>7,8,9</sup> The joint FAO and WHO report<sup>10</sup> on carbohydrates



stated that: "There is no direct evidence to implicate that sugar has a role in the aetiology of obesity, based on data derived from studies in affluent societies". The FAO/WHO report<sup>11</sup> of 2007 updated some of the key issues related to carbohydrates, and based on this and previous FAO/WHO reports, the European Food Safety Authority (EFSA) panel has recently proposed 45-60% energy as the reference intake range for carbohydrates and 10% energy intake from free sugars.<sup>12</sup> The EFSA panel also suggested that as sucrose is the most cariogenic sugar, its consumption should be minimised in children, but there is "no scientific evidence to establish a specific dietary intake value for sucrose and other free sugars".

The obvious possibility of a substitution with either lower cost SSB products or 'diet' beverage products was mentioned at both workshops. The point was made by several participants of the well established 'see-saw' relationship between sugar and fat intake.<sup>8,13</sup>

When sugar intake in the diet decreases, fat intake tends to increase and vice versa. In our group discussion it was suggested that while fruit juices can contribute valuable nutrients, a switch to consuming fruit juices rather than soft drinks or SSBs would not necessarily contribute to a reduction in energy intake. Furthermore, more frequent consumption of fruit juice could contribute the same cariogenic and dental erosion risks as SSBs, while a switch to diet drinks alone would still contribute to dental erosion risk.

In conclusion, there appears to be a political will to do something about the obesity problem. Unfortunately, from this participant's perspective, this does not seem to be matched with a desire to do so with an evidence-based approach. It was suggested by many of the individuals involved in the HIA that "we can't afford to wait for the evidence". One proponent at the UCD seminar asked: "Why not start with soft drinks and see if it works?" The contradictions in our public health nutrition policy are best summarised by Professor Mike Gibney, Director of UCD's Institute of Food and Health:

"So, in summary we have a proposal to tax SSBs, which contribute 0% of daily calories among the 60% of the population who don't consume them, and which contribute a mere 3.6% to the caloric intake among consumers of these products. In doing so, we ignore the obesity issues of the 60% of non-consumers and, among consumers, we tax those who are lean and those with excess body fat. And we do all this with zero data from internationally acceptable randomised controlled intervention studies on the effects of SSBs on medium-term body weight regulation. Whereas we insist that such studies govern health claims as regulated by the European Food Safety Authority, that doesn't seem to apply to public health nutrition policy. Moreover, we do so knowing that food taxes that are small will be ineffective and to be successful they must be significant. And of course we do this knowing that it will hit the poorest in society with the greatest financial burden unless we find some way to subsidise a healthy food eaten in significant quantities by poorer households. Simple, isn't it?"

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# The oral health benefits of chewing gum

## Précis

This paper provides an overview of the scientific and clinical support for the dental benefits of sugar-free gum as an adjunct to regular daily oral care.

## Abstract

The use of sugar-free gum provides a proven anti-caries benefit, but other oral health effects are less clearly elucidated. Chewing sugar-free chewing gum promotes a strong flow of stimulated saliva, which helps to provide a number of dental benefits: first, the higher flow rate promotes more rapid oral clearance of sugars; second, the high pH and buffering capacity of the stimulated saliva help to neutralise plaque pH after a sugar challenge; and, lastly, studies have shown enhanced remineralisation of early caries-like lesions and ultimately prospective clinical trials have shown reduced caries incidence in children chewing sugar-free gum. This paper reviews the scientific evidence for these functional claims and discusses other benefits, including plaque and extrinsic stain reduction, along with the possibility of adding specific active agents, including fluoride, antimicrobials, urea and calcium phosphates, to enhance these inherent effects. The evidence for a specific effect of xylitol as a caries-therapeutic agent is also discussed. In conclusion, it is asserted that chewing gum has a place as an additional mode of dental disease prevention to be used in conjunction with the more traditional preventive methods.

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## Introduction

The oral health, particularly caries-reducing, benefits of sugar-free chewing gums have been well documented in many studies and reviews.<sup>1-6</sup> In addition, chewing gum is increasingly being viewed as a delivery system for active agents that could potentially provide direct oral care benefits. The purpose of this paper is to provide an

overview of the use of chewing gum as an adjunct to other oral health prevention strategies, reviewing the scientific support for these claims, along with some insights into the chewing gum industry, allowing the interested dental practitioner to stay informed and to be able to answer patients' questions as they arise.

### Use of active agents in chewing gums

Imfeld reviewed the literature on dental benefits of chewing gum in 1999 and concluded that chewing gum was a feasible delivery system for a number of therapeutic agents.<sup>4</sup> Despite this, there are a number of factors that potentially limit the incorporation of pharmaceutically active products into chewing gum, including consistency of release, regulatory constraints and consumer acceptance.

### Release and formulation issues

Traditional chewing gum is a blend of gum base, flavourings and colourings, preservatives, sweeteners and softeners. The gum base component is a mix of high molecular weight polymers, rubbers and other substances, which facilitates prolonged chewing, but also gives gum a lipophilic character, which can limit release of hydrophobic compounds. During chewing, gum is hydrated and softened by saliva, and the soluble components, such as the bulk sweeteners, are mostly released within the first five minutes, whereas strongly lipophilic substances release more slowly, with extended chewing releasing less than 50% of the loaded amount, limiting the ability of gum to deliver precisely metered dosages of highly lipophilic active ingredients. In addition to release concerns, the stability of actives or ingredients during processing and shelf life needs to be confirmed. Therefore it is crucial, when formulating chewing gum with active ingredients, to understand the factors that could influence release of actives and to monitor the kinetics of release of the product, and pharmacokinetics where appropriate, to determine uptake. The best approach to monitoring the release of actives would be to compare loading levels to levels remaining in the gum cud after different periods of chewing, and preferably also in saliva, to determine the mass balance over the duration of the chewing period.

### Regulatory issues

Chewing gum is regulated as a food by the US Food and Drug Administration, European Union (EU) food law and most other regulatory agencies around the world. As such, most commercial chewing gum is made according to food good manufacturing practices (GMP) and the marketing, distribution and sales of the product are regulated accordingly. Depending on the country or region, it may be possible to have gum regulated as cosmetic, over-the-counter drug, prescription drug, or medical device for specific formulations or claims. The addition of fluoride, chlorhexidine or other actives with undisputed efficacy against oral diseases would require that the product be manufactured to drug GMP in factories certified for this type of production, with rigorous monitoring by the relevant local regulatory agencies. Although all of this is possible, and there are examples of medicated chewing gums containing active agents such as aspirin and nicotine, most chewing gum is sold as a food or confection, with a price structure and business model that relies on low cost and high volume. Similarly, it is possible for a product to be classified as a drug, depending on the claims made; while approved disease risk reduction claims may be allowable for some foods, in many cases the mere mention of a therapeutic effect (for example,

**TABLE 1: Chewing gum claims reviewed by the European Food Safety Authority, as of September 2012: Article 13(1) – health claims pertaining to the effects of nutrients or other substances in the growth, development and functions of the body; and, Article 14 claims – reduction of disease risk claims and claims referring to children’s development and health. For precise wording on claims, refer to the EFSA website – <http://www.efsa.europa.eu/>.**

APPROVED	NOT APPROVED
Sugar-free chewing gum contributes to the neutralisation of plaque acids	Sugar-free chewing gum reduces plaque formation
Sugar-free chewing gum contributes to the maintenance of tooth mineralisation	Sugar-free chewing gum sweetened with xylitol helps to reduce plaque
Sugar-free chewing gum contributes to the reduction of oral dryness	Sugar-free chewing gum sweetened with xylitol is good for the health of the ears
Sugar-free chewing gums with carbamide neutralises plaque acids more effectively than sugar-free chewing gums without carbamide	Sugar-free chewing gum with pyro- and triphosphates reduces calculus formation
Chewing gum sweetened with 100% xylitol has been shown to reduce dental plaque. High content/level of dental plaque is a risk factor in the development of caries in children (Article 14)	Sugar-free chewing gum with calcium phosphoryl oligosaccharides helps to maintain tooth mineralisation
Sugar-free chewing gum with fluoride increases the resistance of enamel to acid attacks and the rate of remineralisation (based on delivering 0.75mg F per day; number of servings/day not stipulated)	Gum Periobalance™ lozenge and chewing gum with the active ingredient <i>Lactobacillus reuteri</i> rebalances the oral microflora and improves oral health

plaque reduction) would drive the product into the drug category. Since 2007, companies or organisations wishing to make a health claim on food products sold in the EU have been required to submit scientific dossiers of supporting evidence to the European Food Safety Authority (EFSA). This is a rigorous review process intended to protect consumers from being exposed to misleading or fraudulent health claims associated with specific foods. Claims are allowed pertaining to three general categories under EU law: (1) Article 13.1 claims, referring to the role of a nutrient or other substance in the growth, development and function of the body, based on generally accepted scientific evidence; (2) Article 13.5 claims, referring to the role of a nutrient or other substance in the growth, development and functions of body, based on newly developed scientific evidence and/or proprietary data; and, (3) Article 14 claims, referring to disease risk reduction or children’s development/health. To date, six chewing gum-specific claims have received positive opinions, while six others have not been approved (Table 1).



While these regulations dictate what consumer claims can currently be made, there is a general understanding that health professionals, with more in-depth understanding of the science, can interpret the impact of other benefits. For example, most dentists would agree that a reduction in oral Mutans Streptococcus (MS) counts would be a positive oral health outcome, but without direct evidence that such an isolated effect would have an impact on caries incidence, this would not be an allowable claim under EFSA regulations.

### Consumer acceptance

While most consumers purchase and chew gum for the enjoyment of an affordable pleasurable sensory experience, the addition of specific and supportable health benefits, particularly around the established oral health benefits of saliva stimulation and plaque pH neutralisation, provides them with an additional reason to chew. However, consumer research has consistently shown that a pleasant sensory experience is non-negotiable, and most consumers will not chew a product with an unpleasant flavour, oral side effect, aftertaste, or that adversely affects taste perception. Likewise, there are two other aspects of the consumer experience that need to be considered; namely, cost and believability. While consumers may not want to pay too much for a pack of gum, if a product with associated health claims does not come at a premium price, they may not believe the claims.

Chewing gum as a drug delivery system offers some attractive consumer benefits, such as portability, relatively rapid onset of action, and ability to swallow easily without water. Specific powdered gum formulations are commercially available to allow the pharmaceutical industry to manufacture gum using existing tableting technology as an alternative product form. Selected pharmaceutical ingredients can simply be incorporated into the product, or encapsulated in suitable carrier systems as required if stability, taste or compatibility with the gum matrix are problematic. For some drugs oral mucosal absorption could allow more rapid uptake, and pharmacokinetic studies of both nicotine and caffeine gums suggest that this pathway results in relatively rapid (and in the case of nicotine, prolonged) plasma levels being reached by bypassing the stomach and first pass liver metabolism.<sup>7,8</sup> However, the added benefits of using chewing gum as a pharmaceutical delivery system are only realisable as long as the organoleptic properties of the product encourage patient compliance with dosing.

While chewing gum may not be an ideal drug delivery system for general or systemic health, the fact that it is consumed in such a way that the product is in contact with the oral tissues for a prolonged period provides the possibility of pursuing specific topical benefits of chewing gum actives on the mouth and dental hard tissues. These could include prevention or removal of biofilm, improved remineralisation or caries protection, anti-gingivitis, or other effects. These benefits will be summarised in the remainder of this article.

### Non-specific benefits of chewing sugar-free gum

#### Oral clearance and saliva stimulation, plaque pH neutralisation

The major benefits of sugar-free chewing gum are mediated through oral physiology: stimulation of the salivary glands to produce a strong

flow of saliva (a 10-12 fold increase over unstimulated saliva) is elicited by a combination of masticatory and gustatory stimuli.<sup>9</sup> Although saliva flow rates are highest during the first five to seven minutes of chewing, when the sweeteners and flavour release is maximal, a two-fold increase in flow rate (over unstimulated flow) is maintained for as long as the gum continues to be chewed.<sup>10</sup>

One of the immediate short-term effects of this enhanced saliva flow is the increased clearance of sugars and food debris from the oral cavity.<sup>11</sup> The higher flow rate, pH and buffer capacity of stimulated saliva further help to neutralise acids found in the mouth, and in particular help to raise the plaque pH, accelerating the recovery phase of the Stephan curve.<sup>12,13</sup> The short-term neutralisation of plaque pH out of the demineralisation danger zone can also be supplemented by medium-term benefits, as it has been shown that frequent chewing increases baseline (unstimulated) saliva flow rate and increases the resting plaque pH and subsequent ability of the plaque to form acid from sugar.<sup>14,15</sup> Some studies have suggested that chewing gum is better tolerated than artificial saliva for symptomatic relief of xerostomia.<sup>16,17</sup>

### Remineralisation and clinical caries reduction

In addition to the pH neutralising effect, the increased rate of delivery of soluble calcium and phosphate ions from the stimulated saliva helps to remineralise surface enamel lesions, as shown in a number of *in situ* remineralisation studies.<sup>18-21</sup> Finally, clinical studies conducted in children who chewed gum at least three times daily for two or three years show that they have significantly lower rates of decay than children who do not chew gum.<sup>22-24</sup> Furthermore, these caries-reducing effects have been confirmed by systematic reviews.<sup>2,5,25</sup> Indeed, the American Dental Association has recently provided clinical guidelines for the use of sucrose-free polyol chewing gums in high-caries-risk children and adults.<sup>25</sup>

### Extrinsic stain reduction

Chewing gum can reduce extrinsic tooth stain, either by removing existing stain or inhibiting its formation,<sup>26</sup> while the addition of specific active agents (typically polyphosphates) may provide additional efficacy.<sup>27,28</sup> However, it should be noted that these types of claims are cosmetic and do not directly affect oral health, and the magnitude of the effect is small compared to chair-side or over-the-counter bleaching therapies. On the other hand, accelerated oral clearance of staining agents such as tea or coffee, by chewing gum-stimulated saliva, could conceivably reduce the formation of extrinsic stain over time and help to prolong the benefits of a dental prophylaxis. Interestingly, chewing gum has been found to counteract the short-term sensitivity associated with professionally applied bleaching treatments,<sup>29</sup> although the mechanism of this effect is not clear. On a related note, some orthodontists use chewing gum to help distract patients from the discomfort associated with placement or tightening of bands or appliances. This effect was confirmed in a recent study that measured patients' responses on the impact of the fixed orthodontic treatment and found that those who chewed gum

reported decreased intensity of pain 24 hours after the treatment.<sup>30</sup>

### Effects on plaque and gingivitis

There is evidence that regular use of chewing gum, in conjunction with normal oral hygiene procedures, provides a slight, but significant, reduction in plaque scores,<sup>31-33</sup> although one other study did not show this effect.<sup>34</sup> In addition, two of these studies showed effects on inflammatory parameters, such as bleeding score or gingival index.<sup>32,33</sup>

Interestingly, the EFSA did not approve claims on plaque reduction from chewing gum, although this may be due to the fact that the submission did not effectively distinguish between studies that looked at chewing with or without normal oral hygiene. While there is evidence from some studies that chewing gum in the absence of other routine oral hygiene measures can reduce plaque accumulation, it has been argued that most of the reduction occurs at occlusal sites and is therefore not relevant to prevention of gingivitis.<sup>35</sup> A recent systematic review concluded that chewing sugar-free gum provides a small but significant reduction in plaque scores when used as an adjunct to normal plaque control measures.<sup>36</sup> Therefore, any claims regarding effects of sugar-free gum without actives on plaque should be interpreted only as a potential adjunctive effect, not intended to substitute chewing gum as an alternative to regular brushing and flossing.

### Active agents for remineralisation/caries

There have been many attempts to improve the inherent remineralising effect of chewing gum-stimulated saliva through the addition of specific active ingredients. These actives include: specific polyols; urea; fluoride; established antimicrobial agents (such as chlorhexidine, CPC or Triclosan); enzymes; natural bioactives (including antioxidants and various polyphenols); probiotics; and, calcium salts, including calcium phosphates and novel calcium substances, such as casein phosphopeptide-amorphous calcium phosphate (CPP-ACP).

### Specific polyol effects – is xylitol a magic ingredient?

Sugar-free gums are usually sweetened with polyol (sugar alcohol) sweeteners, such as sorbitol, mannitol, xylitol or maltitol, and blends of these are used to provide the required physical processing, cost and organoleptic properties of the final product. These polyols have all been certified as safe for teeth by appropriate plaque pH testing; thus, while their inherent sweetness helps to stimulate saliva, their rate of metabolism and acid production by the oral (plaque) bacteria is slow and does not cause an effective drop in the plaque pH, so the net effect is an increase in the plaque pH. There has been considerable research to test whether certain polyols show superior efficacy. One specific example is xylitol, a five-carbon polyol sugar, which cannot be metabolised by the acid-forming bacteria in the dental plaque. Although in theory this should confer some advantage for xylitol as a sweetening agent, clinical data confirming the superior efficacy of xylitol over other polyols in chewing gum for prevention of plaque,

reduction of plaque acidogenicity, and decreased caries incidence are contradictory. **Table 2** is a summary of chewing gum studies that allows for direct comparisons between xylitol and other polyol (predominantly sorbitol) sweeteners. To summarise, there is no difference between polyols on short-term plaque pH neutralisation,<sup>37</sup> while chronic usage of xylitol was shown to reduce plaque acidogenicity in two studies,<sup>38,39</sup> but not in another two.<sup>40,41</sup> There appears to be a more consistent effect of xylitol gums on suppressing salivary MS counts,<sup>42,43</sup> while one recent study showed suppression of plaque MS from caries-prone interdental sites.<sup>44</sup> On the other hand, *in situ* remineralisation studies have not found any significant differences in the amount of mineral found in the enamel samples after chewing with sorbitol- or xylitol/sorbitol-sweetened gums.<sup>21,40</sup> A total of four double-blind caries clinical trials of xylitol chewing gum versus other polyol- (sorbitol) sweetened gums have been conducted. Three showed no differences between xylitol and sorbitol gums in terms of new caries development,<sup>23,45,46</sup> while one study showed an advantage for the xylitol-sweetened gums.<sup>47</sup> Thus, despite the impression that xylitol may confer specific dental health advantages over other polyol sugars, the clinical evidence for this is equivocal. Similarly, previous reviews on the topic have provided mixed conclusions, in some cases favourable,<sup>1</sup> in others equivocal,<sup>2</sup> and in other cases negative.<sup>48-50</sup> Since the efficacious dose range for xylitol consumption has been determined to be 6-10g per day based on data showing suppression of salivary *Streptococcus mutans* counts,<sup>51</sup> it is possible that some of the studies showing no superiority of xylitol over other polyol-sweetened gums failed to provide the required dosage. Indeed, of the previously mentioned caries clinical trials, only two achieved this minimum dosage.<sup>46-47</sup> Thus, the evidence is that xylitol in chewing gum may help to reduce salivary MS counts, and in some cases slightly reduce plaque acidogenicity, but the clinical data for a superior remineralisation or caries-reducing effect are not consistent. Notably, the EFSA has only approved one xylitol claim for chewing gum, which is that chewing gum sweetened with 100% xylitol may reduce caries risk in children.

Interestingly, erythritol, a four-carbon polyol sugar, has been shown to be as effective, if not more effective, than xylitol in reducing caries-associated factors. After six months of six-times-daily use of erythritol tablets, saliva and plaque levels of *Streptococcus mutans* were reduced, and clinical plaque scores were also lower in the erythritol and xylitol groups,<sup>52</sup> although whether this is a specific effect of the polyol itself remains to be confirmed.

### Fluoride chewing gum

Fluoride has been added to chewing gum and claims for its use in chewing gum have been approved by the EFSA. However, relatively few studies have been conducted on the remineralisation effect of fluoride-containing gums, and most of these were in small groups who also used fluoride-free dentifrices.<sup>53,54</sup> A larger (N=15) *in situ* remineralisation study, which also specifically excluded use of fluoride dentifrice, failed to show an overall difference in remineralisation parameters between fluoride-containing and placebo gums.<sup>55</sup>

TABLE 2: Overview of design and results of studies that have compared xylitol in chewing gum directly to other polyol sweeteners.

STUDY	TYPE OF STUDY	GROUPS	EXPERIMENTAL DESIGN*	SUMMARY OF FINDINGS
Aguirre-Zero 1993 <sup>38</sup>	Plaque pH	No gum Sucrose gum Sorbitol gum Xylitol gum	N=10; two weeks' gum use, 5x daily; Plaque pH response to sucrose measured after treatments	Decreased plaque pH response to sucrose after two weeks' xylitol gum
Söderling 1989 <sup>39</sup>	Plaque pH	Sucrose gum Sorbitol gum Xylitol gum Sorbitol/xylitol gum	N=7; two weeks' gum use, 5x daily; plaque pH response to sucrose measured following pre-rinse with polyol solution corresponding to gum group	Decreased plaque in xylitol groups; minimum plaque pH to sucrose higher in xylitol groups
Park 1995 <sup>37</sup>	Plaque pH	Five commercial gums with different sweeteners, no gum and paraffin	N=8; plaque pH response to sucrose measure followed by chewing one of five gums	All sugar-free gums raise plaque pH after sucrose rinse – no differences are under pH curve between groups
Wennerholm 1994 <sup>40</sup>	Plaque pH <i>In situ</i> remineralisation	Xylitol gum Sorbitol gum 50:50 xyl:sorb 25:75 xyl:sorb	N=17; 25 days' gum use, 12x daily; plaque pH response to sucrose and sorbitol; salivary and plaque MS; enamel mineral content	No differences in plaque pH response to sucrose; plaque pH response to sorbitol decreased with increasing xylitol gum content; no differences in mineral loss between groups
Scheie 1998 <sup>41</sup>	Plaque quantity and acids	Xylitol gum Xylitol/sorbitol gum Sucrose gum	N=30; 33 days' gum use, 5x daily; plaque collected, analysed for quantity and <i>ex vivo</i> acid production	No differences between groups in plaque quantity or acidogenic potential
Hildebrandt 2000 <sup>42</sup>	Oral MS counts	No gum Sorbitol gum Xylitol gum	N=46-48; three months' gum use, 3x daily, following two weeks' CHX treatment; salivary MS counts measured before and after treatments	Xylitol gum helped to maintain suppression of salivary MS, significantly lower than control or sorbitol gum
Manning 1992 <sup>21</sup>	<i>In situ</i> remineralisation	Xylitol gum 25:75 xyl:sorb gum	N=9; two weeks' gum use, 5x daily; enamel mineral content	No differences in mineral gain (remineralisation)
Campus 2009 <sup>43</sup>	Plaque pH Salivary MS	Polyol blends: xylitol gum (50%); no xylitol	N=204; six months' gum use, 5x daily; salivary MS and plaque pH response to sucrose at baseline, one, three and six months, and three months after cessation	Higher pH minimum after sucrose rinse at three and six months, xylitol vs. control gum; lower salivary MS at three and six months
Söderling 2011 <sup>44</sup>	Total salivary bacteria, LB and MS; plaque MS	Xylitol gum Sorbitol gum	N=12; four weeks' gum with crossover	Xylitol gum reduced plaque MS counts from caries-prone (interdental) sites; no other effects noted
Kandelman 1990 <sup>45</sup>	Clinical caries study	No gum Low xylitol gum High xylitol gum	N=274; age eight to nine; two years' gum use, 3x daily (school days only)	Both xylitol groups had lower DMFS increment than control, with no differences between gum groups
Machiulskene 2001 <sup>23</sup>	Clinical caries study	No gum Control gum (HIS) Xylitol gum Sorbitol gum (sorbitol gum with urea)	N=432; age nine to 14; three years' gum use, 5x daily	Two-year DMFS increments significantly lower in sorbitol group; three-year DMFS increments showed no differences between control, xylitol and sorbitol groups; sorbitol/urea gum group had higher increment than other gum groups
Mäkinen 1995 <sup>47</sup>	Clinical caries study	Nine groups: control; four xylitol gums; two xylitol/sorbitol gums; sorbitol gum; sucrose gum	N=1135; age 10; 40 months' gum use, 3-5x daily	Sorbitol gum reduced caries rates, but not as effectively as xylitol gums, with the xylitol pellet gum consumed five times daily being significantly better than any other gum
Mäkinen 1996 <sup>46</sup>	Clinical caries study	Seven groups: control; two xylitol gums (stick, pellet); two xylitol/sorbitol groups (pellets, low and high xylitol:sorbitol ratios); two sorbitol gums (stick, pellet)	N=427; age six; 24 months' gum use, 5x daily	All gums reduced caries incidence; 100% xylitol pellet gum was most effective, sorbitol stick least; otherwise there were no differences between the groups

\* When indicated, 'N' refers to number of subjects at end of study, and age is age at study initiation; MS = Mutans Streptococci; LB = lactobacilli.



Thus, despite the positive review by the EFSA, the present evidence does not support a clear anti-caries benefit of putting small amounts of fluoride in chewing gum, and regulatory and safety concerns further weaken this position.

### Calcium and phosphate salts

Other approaches to improving the inherent anti-caries effect of sugar-free gums have focused on the use of suitable calcium or calcium phosphate salts to supplement the natural calcium and phosphate levels of saliva, raising the level of saturation of the immediate tooth environment with respect to these ions to aid remineralisation.<sup>56,57</sup> Calcium lactate added to chewing gum has also been shown to provide an enhanced remineralisation benefit.<sup>58,59</sup>

The clinical evidence for a superior remineralising/anti-caries effect of casein-calcium conjugates, such as CPP-ACP, has previously been reviewed.<sup>60-63</sup> Based on these reviews there is still no scientific consensus that CPP-ACP provides superior remineralisation benefits in a chewing gum delivery system, and the published *in situ* chewing gum studies have for the most part relied on a methodology that has been criticised.<sup>62</sup> Therefore, while CPP-ACP shows promise as a remineralising agent in topical pastes, creams and rinses,<sup>60,63</sup> its efficacy in chewing gum requires confirmation by independent research groups.<sup>61</sup>

### Urea (carbamide)

Urea has been approved by the EFSA for claims that it helps to neutralise plaque pH more effectively than regular sugar-free gum, although the clinical research findings on the addition of this ingredient to chewing gum are equivocal. Some studies showed that urea-containing gums helped to neutralise plaque pH more effectively than placebo gum,<sup>64,65</sup> while others found no differences in terms of either plaque pH response after sugar challenge or extent of remineralisation in subjects who chewed either urea or placebo gums for four weeks.<sup>55,66</sup> Finally, a three-year clinical intervention study showed no benefit of chewing gum with urea compared to either sorbitol, xylitol or non-polyol gums;<sup>23</sup> in terms of raw DMFS data, the urea gum group had significantly higher caries increments than all other groups, except the no gum group.

### Antimicrobials

#### *Chlorhexidine, Triclosan, CPC*

A number of studies of chlorhexidine (CHX) gum and plaque/gingivitis have been undertaken, and most have demonstrated significant plaque- and gingivitis-reducing effects of the CHX gums.<sup>67,68</sup> However, as described earlier, there may be regulatory and consumer acceptance issues with marketing a chewing gum with a strong antimicrobial agent, especially one where there is a known taste issue. Therefore, CHX gums may be indicated for certain high-risk groups, but they would not be available as over-the-counter gum products for the general public. Similar concerns exist for other known antimicrobial agents, such as Triclosan and CPC, while there is also concern about long-term antimicrobial usage affecting the

commensal oral and gut flora.

### Natural antimicrobials

#### *Magnolia bark extract*

Magnolia bark extract (MBE) is a natural extract and traditional Chinese medicine, consisting mainly of the phenolic isomers magnolol and honokiol.

Following the finding that MBE reduces salivary bacterial counts,<sup>69</sup> we showed significant reduction of *in vitro* biofilm growth with this active, as well as *in vivo* reduction of salivary Mutans Streptococci and plaque following longer term gum usage.<sup>70-72</sup> More recently, MBE gum reduced oral MS counts and plaque acidogenic response to a sucrose rinse in 40 subjects after 30 days, chewing three times a day to deliver 11.9mg MBE/day, compared to either xylitol or non-xylitol control gums.<sup>73</sup> These results suggest a synergistic effect between MBE and xylitol, as the daily xylitol intake from the gum vehicle was a sub-optimal 2.2g/day.

### Other natural substances and probiotics

It is beyond the scope of this paper to provide a comprehensive review of all the natural ingredients that have been tested in chewing gums, but a recent review provides an excellent starting point for determining the potential of such actives to provide a clinical benefit from chewing gum.<sup>74</sup> Many of these actives are antimicrobial and have the potential to inhibit biofilm formation and/or activity (for example by inhibiting *S. mutans* glucosyl transferase), but there are few, if any, clinical studies to confirm that any of these have a caries-preventive benefit.

Probiotic therapy has the potential to provide oral health benefits, through modulation or suppression of oral pathogens, although chewing gum studies are rare, and few of these have determined an end point directly relevant to caries. One such study measured salivary counts of lactobacilli and *S. mutans* in subjects who consumed probiotic gum, xylitol gum, xylitol gum with probiotic, or placebo for three weeks.<sup>75</sup> While both probiotic and xylitol gum groups showed significant reductions in *S. mutans* scores, the combination of probiotics and xylitol had no effect, suggesting a negative interaction between the two. Recent EFSA opinions on probiotics for systemic health in general have not been favourable, and the oral health claim for *L. reuteri* was also not approved.

### Potential negative effects of chewing gum

It is worth acknowledging that there are some concerns over chewing gum use, including its potential to be a choking hazard in young children, be subject to littering, exert a laxative effect and to contribute to temporomandibular dysfunction (TMD). Therefore, consumers should be reminded not to give gum to children younger than school age and to dispose of chewed gum responsibly. Although a significant part of our research and development programme focuses on creating a gum base that is less adhesive and/or more degradable if improperly disposed, even with technical advances, the most effective and the only total solution to littered gum is for people

to dispose of their used gum responsibly by putting it in a bin. The laxative threshold of most polyol sweeteners used in gum is typically more than 15g/day, which would require consumption of 10 or more sticks of chewing gum per day to achieve. In fact, this effect has been used to help bowel function recovery following abdominal surgery.<sup>76</sup> Despite limited evidence that chewing gum is a causative agent of TMD or jaw muscle pain,<sup>77</sup> the prudent practitioner should probably avoid recommending chewing gum for patients suffering from these conditions.

### Conclusions

As mentioned earlier, the scientific evidence supporting the non-specific benefits of chewing sugar-free gum has been reviewed and endorsed by the EFSA. Traditionally, preventive dentistry has focused on sugar restriction, plaque removal/oral hygiene, fluoride usage, fissure sealants and education. More recently, these approaches have been modified by improved diagnostic methods to allow early identification of disease, together with an accurate assessment of disease activity.

There is an opportunity for chewing gum to be considered as another preventive modality to provide an additional layer of prevention by helping to maintain the oral ecology in high and lower risk individuals and populations. While it is not the intention of this article to provide clinical guidelines for the use of sugar-free chewing gum, the informed practitioner should be able to accurately answer his or her patients' questions regarding this topic and be able to provide appropriate guidance about this as a possible home use adjunct to the normal oral care regimen, especially in high-risk patients. It is this author's contention that chewing sugar-free gum provides scientifically and clinically proven oral health benefits that complement other aspects of usual oral care regimens. While chewing gum may not be a treatment for oral diseases, by helping to generate a healthy flow of saliva, it may help to offset the perturbations in the oral ecology that lead to clinical disease states.

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## Developing a diet diary

JENNIFER CARMODY discusses how a diet diary could help patients to take responsibility for their oral health.



The prevalence of caries is affected by the frequency and timing of sugar consumption, rather than the type of sugar that is involved; the cariogenic level of non-milk extrinsic dietary sugars (NMES) is higher when they are consumed frequently.<sup>1</sup> Increasing the number of times we eat per day, combined with eating a high amount of NMES at these times, puts us at high risk of developing tooth decay.<sup>2</sup> Frequent consumption of NMES prevents the pH in the saliva from recovering between meals, which leads to a highly acidic oral environment.<sup>3</sup> By altering the times when sugary foods are eaten, we can decrease the risk of tooth decay, as well as that of erosion. So, how do we convey this important message to patients?

### Self-empowerment is the key

The first International Conference on Health Promotion was held in Ottawa in 1986. The Ottawa Charter employs empowerment as an integral component of health promotion. Self-empowerment is essential to developing personal skills, confidence and control.<sup>4</sup>

The Health Strategy drawn up by the Department of Health and Children in 2001 stated that patient empowerment should be an integral part of any health strategy. The Strategy envisaged a health system that encouraged people to have their say, and to have their opinions heard and considered.<sup>5</sup>

Through working with the patient to develop oral health skills, we can enable the patient's own empowerment. Self-empowerment can be utilised as a health promotion tool through client-centred education in order to alter what patients believe they can and cannot change.<sup>4</sup>

### Taking control with a diet diary

The issues of oral hygiene and dietary habits are closely linked and should be addressed in conjunction with one another. A useful tool with which a patient can take control of his or her oral health is to use a diet diary. Through mapping the course of the patient's diet, it may become evident where their nutrition is having an effect on their oral health.

The aim of the dietary assessment is to collect the information most relevant to dental health: frequency of meals; how many of these were snacks; how many contained NMES; and, the times of the meals during the day.<sup>6</sup>

Watt *et al.*<sup>6</sup> recommends that diet interventions should be designed from a behavioural theory point of view and suggests this six-step

systematic approach to diet diary application:

1. Identify high-risk patients requiring a higher level of support.
2. Take a detailed dietary history to ascertain relevant information.
3. Set clear, realistic goals that the patient agrees with.
4. Tailor a plan of action for the patient and encourage support from family and friends to aid motivation and maintenance.
5. Monitor, review and support, with repeated contact over a period of time to promote sustained changes.
6. Flag individuals with medical conditions, special diets or extreme dietary patterns.

Facilitation of change requires evidence-based instruction, practice and feedback.<sup>7</sup> The long-term solution to behaviour modification depends on the patient's readiness to change and can be a time-consuming road requiring dedication from both dental professionals and patient.

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### Jennifer Carmody

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### **Sleeping vs. loaded implants: long-term observations via a retrospective analysis**

Marcellis, K., Vercruyssen, M., Nicu, E., Naert, I., Quirynen, M.

#### **Objective**

Several theories have been presented to explain initial and secondary marginal bone loss around dental implants (e.g., microbial load, adverse loading, microbial leakage, and compromised healing/adaptation of host-implant interface).

#### **Material and methods**

This study compared the long-term outcome (up to 12 years) of sleeping with loaded implants in the mandible via a split-mouth concept. Fourteen patients with overdentures were enrolled (10 women; mean age at implant insertion: 56 years [range: 33-71]). They presented with 28 loaded (position 33/43) and 14 sleeping implants (mostly position 31/41). At several follow-up visits, intra-oral radiographs (long-cone principle) were taken to observe marginal bone level changes.

#### **Results**

At each observation, compared with abutment connection, the submerged non-loaded implants showed less bone loss (P values: 1st year – 0.007; three years – 0.000; five years – 0.002; eight years – 0.007; 12 years – 0.000) than their neighbouring functional implants. This difference was primarily due to a more significant bone loss during the first year of loading (0.8 vs. 0.1mm, respectively), since afterwards the bone level changes remained quite similar for both implant types.

#### **Conclusions**

Our data suggest that the first months of loading have a significant impact on the bone level (initial difference sleeping vs. loaded implants), followed by a more physiological bone level change afterwards. This initial difference might be explained by the adaptation of the surrounding bone to the loaded implant.

*Clinical Oral Implants Research 2012; 23 (9): 1118-1122.*

### **The combination of amoxicillin and metronidazole improves clinical and microbiologic results of one-stage, full-mouth, ultrasonic debridement in aggressive periodontitis treatment**

Renato, C.V., Casarin, É.D.P.R., Sallum, E.A., Nociti Jr., F.H., Gonçalves, R.B., Casati, M.Z.

#### **Background**

The aim of the present study is to assess clinical, microbiologic and immunologic benefits of amoxicillin/metronidazole (AM) when

performing full-mouth ultrasonic debridement (FMUD) in generalised aggressive periodontitis (GAGP) treatment.

#### **Methods**

Twenty-four GAGP patients were divided into two groups: the FMUD group (n=12), which received FMUD plus placebo, and the FMUD+AM group (n=12), which received FMUD and 375mg amoxicillin plus 250mg metronidazole for seven days. The following clinical outcomes were tested: plaque and bleeding on probing indices; pocket probing depth (PD); relative gingival margin position (GMP); and, relative clinical attachment level (CAL). Total amount of *Porphyromonas gingivalis* (Pg), *Aggregatibacter actinomycetemcomitans* (Aa), *Tannerella forsythia* (Tf), and gingival crevicular fluid (GCF) concentration of interleukin (IL)-10 and IL-1 $\beta$  were also determined. All clinical, microbiologic and immunologic parameters were assessed at baseline, and at three and six months post therapy. The ANOVA/Tukey test was used for statistical analysis ( $\alpha=5\%$ ).

#### **Results**

Amoxicillin/metronidazole used as an adjunct to the FMUD protocol added clinical and microbiologic benefits to GAGP treatment (P<0.05). FMUD+AM groups presented an additional PD reduction in initially deep PDs at the three-month follow-up (3.99 $\pm$ 1.16mm and 3.09 $\pm$ 0.78mm for FMUD+AM and FMUD, respectively; P<0.05), a lower number of residual pockets at the three- and six-month follow-ups, and a statistical reduction in amounts of Aa (P<0.05). Analysis of Tf and Pg amounts, as well as IL-10 and IL-1 $\beta$  GCF concentrations, failed to demonstrate a difference between the groups (P>0.05).

#### **Conclusion**

It may be concluded that amoxicillin/metronidazole improves the clinical and microbiologic results of FMUD in GAGP treatment.

*Journal of Periodontology 2012; 83 (8): 988-998.*

### **Is fracture resistance of endodontically treated mandibular molars restored with indirect onlay composite restorations influenced by fibre post insertion?**

Scotti, N., Borgia, F.A.C., Alovisi, M., Rota, R., Pasqualini, D., Berutti, E.

#### **Objectives**

The aim of this study was to investigate the influence of post placement on fracture resistance of endodontically treated mandibular molars restored with adhesive overlay restorations.

#### **Methods**

Endodontically treated human molars with two- and one-wall cavities either underwent or did not undergo fibre post insertion within

composite build-up before cementation of indirect composite onlay restorations. The specimens were thermocycled, exposed to cyclic loading, and submitted to the static fracture resistance test. Fracture loads and mode of failure were evaluated.

### Results

Statistical analysis revealed that specimens with fibre posts demonstrated similar failure loads ( $p=0.065$ ) but more favourable fracture patterns compared with specimens without fibre posts. No difference was found between two- and one-wall cavities.

### Conclusions

Within the limitations of this study, the insertion of fibre posts did not improve support under indirect composite overlays.

### Clinical significance

When restoring heavily broken down endodontically treated mandibular molars with an indirect overlay composite restoration, the fibre posts inserted within the composite build-up do not provide any increase in fracture resistance.

*Journal of Dentistry 2012; 40 (10): 814-820.*

## Effect of different orthodontic adhesive removal techniques on sound, demineralised and remineralised enamel

*Cochrane, N.J., Ratneser, S., Reynolds, E.C.*

### Background

The aim of this *in vitro* study was to determine the effect of four different orthodontic adhesive removal techniques on sound, demineralised and remineralised enamel.

### Methods

Composite resin adhesive was bonded to 100 teeth, which were divided into four groups, each comprising five sound teeth and 20 teeth with demineralised and remineralised lesions adjacent to the adhesive. Adhesive was removed with either: (1) slow speed bur (SS); (2) high speed bur (HS); (3) aluminium oxide disc (DC); or, (4) ultrasonic scaler (US). Damage to the enamel was assessed using white light profilometry, digital photography and scanning electron microscopy.

### Results

The least to greatest mean depth of damage with the four different adhesive removal techniques to sound enamel was  $DC = SS < US = HS$ , and to demineralised and remineralised enamel were  $DC < HS < US = SS$ . Sound enamel experienced the least amount of damage. Remineralisation prior to adhesive removal significantly reduced the amount of damage produced by all techniques compared with

demineralised enamel. Discs were the least damaging to demineralised and remineralised enamel compared with the other removal techniques.

### Conclusions

When demineralisation was present, discs were found to be the least damaging adhesive removal technique and remineralisation further reduced the amount of enamel damage.

*Australian Dental Journal 2012; 57 (3): 365-372.*

## Quiz answers

(questions on page 233)



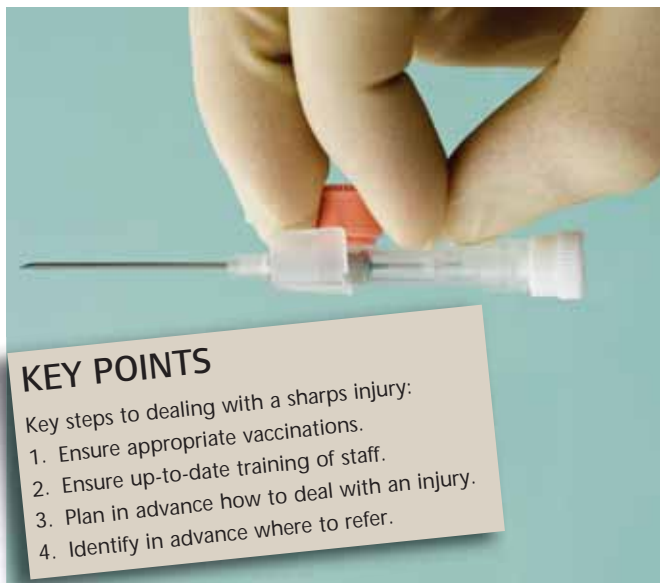
1. Photographs should be taken to accurately record the lesion. A biopsy of the lesion should be undertaken and sent for histological analysis. Providing as much information as possible to the lab is important (i.e., a list of medications, allergies, and dental products that the patient is using, as well as a good description of the medical history, previous diseases, and a clinical photograph).
2. Histological analysis confirmed the clinical diagnosis of a contact lichenoid reaction. Lichenoid reactions may be frequently caused by contact allergens in amalgam restorations, or metal sensitivity such as to orthodontic wires, cobalt chrome dentures, etc. Crowns and composite restorations may also suggest a lichenoid reaction in sensitive patients.
3. Treatment of lichenoid reactions depends upon the offending agent. In this case, removal of the amalgam restoration and replacement with a non-amalgam alternative (e.g., composite resin) would be appropriate to allow the lesion to subside. The patient should also be encouraged to cease smoking and practise meticulous oral hygiene.

## Bibliography

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- Myers, S.L., Rhodus, N.L., Parsons, H.M., Hodges, J.S., Kaimal, S. A retrospective survey of oral lichenoid lesions: Revisiting the diagnostic process for oral lichen planus. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002; 93: 676-681.

# Sharps injuries – what to do

A set of guidelines on how to deal with needlestick injuries is included in a new report on the emergency management of injuries prepared for the Scientific Advisory Committee of the Health Protection Surveillance Centre. Dentists were represented on the Committee by DR TOM FEENEY who now summarises the guidelines for dentists.



### KEY POINTS

- Key steps to dealing with a sharps injury:
1. Ensure appropriate vaccinations.
  2. Ensure up-to-date training of staff.
  3. Plan in advance how to deal with an injury.
  4. Identify in advance where to refer.

Needlestick and other sharps injuries are occupational hazards in dental practice and while there is structured access to professional support in the HSE and Hospital Service, this is not the case in private practice. Health care workers (HCWs) in the HSE and Hospital Service have ready access to an occupational health department in contrast to private practice where often an incident can be the source of much stress and worry, particularly when easy access to appropriate advice is not available.

It is timely therefore that after two years' work the Emergency Management of Injuries (EMI) Working Group set up to develop standardised guidelines on the management of injuries (such as needlesticks, bites, sexual exposures), where there is a risk of transmission of bloodborne viruses (BBVs), has now published its Guidelines.

The Guidelines provide a very important section on risk management in dental practice, i.e., the absolute necessity to be prepared should an injury or event occur. This article reprints the management of injuries flow chart from the EMI Guidelines and also contains the on-site assessment form, which should be filled out in advance of an injured HCW attending the Hospital Emergency Department. This form is now also downloadable from the IDA website, as are the complete EMI Guidelines.

### Background

Injuries where there is a risk of transmission of infection frequently

*On-site assessment form (dental/primary care practice), which should be filled out in advance of an injured HCW attending the hospital emergency department.*

present in emergency departments, occupational health departments and primary care settings. BBV infections such as hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV) are of particular concern because of the potential long-term health effects for people who become infected, the anxiety experienced by the injured persons, and the increase in their prevalence in the population in recent decades.



The appropriate management of such injuries, in the emergency and follow-up periods, has important implications in terms of minimising the risk of transmission of BBVs and in allaying the psychological impact on the injured person.

Many emergency departments and occupational health departments throughout Ireland have developed guidelines for the management of injuries where there is a risk of BBV transmission. However, these guidelines differ in their scope (e.g., all BBVs versus HIV; all exposures versus occupational or sexual), their level of detail, and recommended actions, such as testing schedules and the use of post-exposure prophylaxis (PEP). The development of these guidelines was prompted by the idea of having standardised guidelines on the management of these injuries that could be used in all relevant settings throughout the country and that would be based on best available evidence and expert opinion.

### Purpose and scope

The purpose of these Guidelines is to provide comprehensive guidance on the appropriate management of injuries where there is a risk of transmission of BBVs and other infections.

### Toolkit

The Guidelines will shortly be presented as a user-friendly toolkit with separate access to individual parts of the Guidelines. In this way, the user will be able to rapidly and easily access the relevant algorithms, forms, leaflets and background material as needed in an emergency. For example, it will be possible to rapidly access the recommended care pathway based on the different types of presenting injuries, e.g., community needlestick, occupational exposure, human bite, sexual exposure. There will also be electronic hyperlinks internally between all the relevant sections.

THE GUIDELINES ARE INTENDED FOR USE IN THE FOLLOWING WAYS:

### Setting

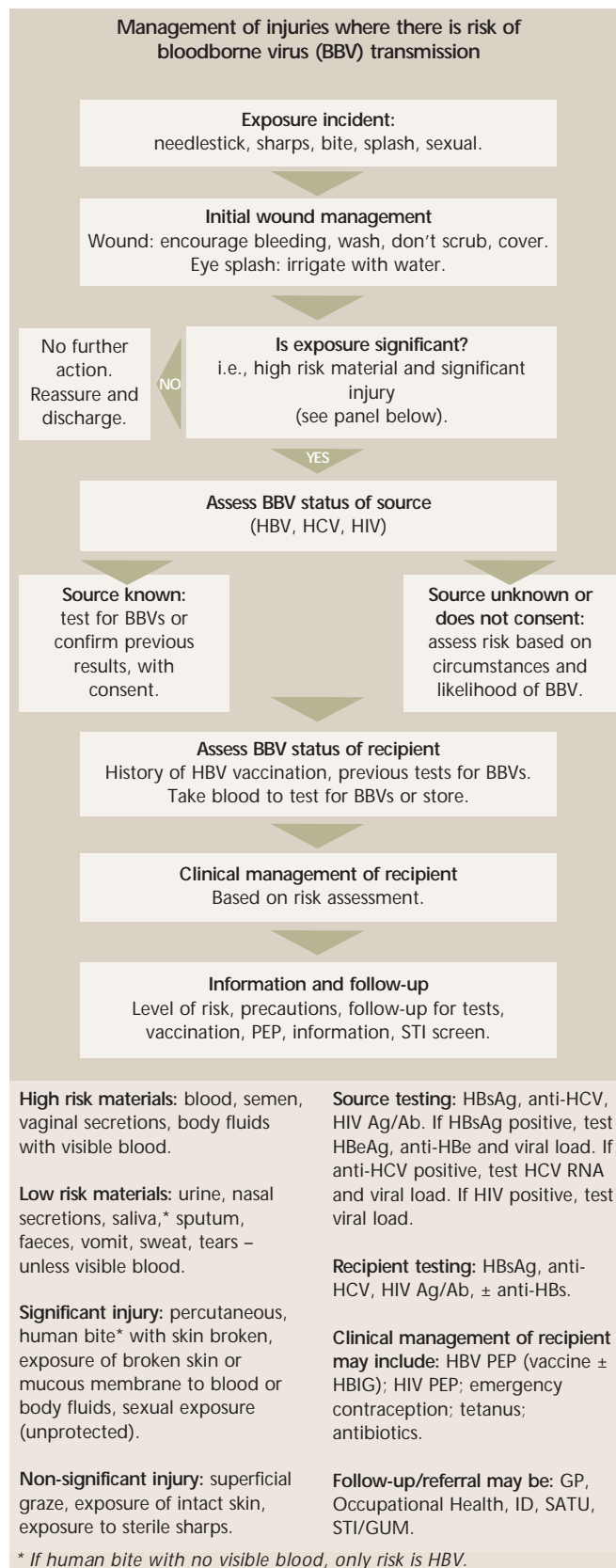
Any medical setting where the patient first presents with the injury, for example, a hospital emergency department or occupational health department, a general practice, a dental practice, a Garda occupational health department, a clinic for sexually transmitted infections or a sexual assault treatment unit (SATU).

### Patient population

Members of the public in a healthcare or community setting; healthcare workers (HCW) or other workers (e.g., members of the Garda or defence forces) in an occupational setting; adults and children; both recipients and sources of injuries.

### Type of injury

Needlestick or other sharps injury, sexual exposure, human bites, exposure of broken skin or of mucous membranes. These guidelines do not cover injuries where the source is an animal.



### Time

Emergency management on first presentation, and also arrangements for any necessary follow-up.

### Main issues

The main questions covered by the guidelines are as follows:

- ▶ What first aid treatment should be administered?
- ▶ Is the exposure significant?
- ▶ What materials are significant for BBVs?
- ▶ What injuries are significant for BBVs?
- ▶ How to assess the risk of transmission of BBVs?
- ▶ What is the level of risk of HBV, HCV or HIV?
- ▶ What factors in the injury increase the risk of transmission?
- ▶ How should the source be investigated?
- ▶ How should the recipient be investigated?
- ▶ What blood tests should be done and when?
- ▶ Who should receive HBV vaccine and/or hepatitis B specific immunoglobulin (HBIG)?
- ▶ When is HIV PEP indicated and what treatment protocol should be used?
- ▶ How should HCV exposure be managed?
- ▶ What reassurance can be given to the recipient?
- ▶ What precautions are advised?
- ▶ What follow-up is needed?

### Injury in dental practice

Protocols should be in place in the dental setting to prevent avoidable exposures and to minimise risk. These protocols should include: the safe use of equipment; the use of personal protective equipment; training; re-training and induction; the need for vaccination; the need for documentary evidence of immunity; and, what to do in case of an accident. A responsible person should be appointed to manage such incidents. It is vitally important that the practice identifies, in advance, an appropriate unit to which to refer an injured person. The legislation

which covers this area is the Safety, Health and Welfare at Work Act 2005 (and 2007 Regulations).

### Emergency management of an injury

Immediate wound hygiene should be carried out.

If a significant exposure has occurred, i.e., a bite, or an injury from a used needle or from a used sharp, immediate referral should take place to the appropriate unit (emergency department or infectious disease specialist or occupational health specialist) where a definitive risk assessment is carried out.

The management of the recipient (injured party) is directly based on risk assessment of the source. The information to assist the appropriate unit in making this assessment should be provided by the practice using the on-site assessment form (Appendix 20), which is downloadable from the IDA website ([www.dentist.ie](http://www.dentist.ie)). Copies of this form should be readily available in all practices to facilitate speedy referral.

The source must be informed before they leave the practice that an injury has occurred and the on-site assessment form should be completed in their presence. The source should be asked if they have any relevant medical history or risk factors for BBVs. They should be asked if their medical history and contact phone number can be passed on to the medical team that will treat the recipient. The source should also be informed that they may be contacted by the recipient's treating doctors and asked to provide a blood test. They should be reassured that all information will be treated with strict confidentiality by the recipient's treating doctors, and that where necessary appropriate follow-up care will be offered to them. The source should be informed that the results of their blood tests may have to be disclosed to the recipient.

The use of information put on the on-site assessment form must comply with data protection legislation. Contact details of the responsible person (from the dental practice) both during and after hours must be made available to the appropriate unit.

## Working Group

The Working Group that developed the guidelines is a sub-committee of the Scientific Advisory Committee (SAC) of the Health Protection Surveillance Centre (HPSC), and included professionals with the relevant expertise and experience, and target users of the guidelines.

The disciplines represented were dentistry, emergency medicine, infection prevention and control nursing, infectious diseases, medical microbiology, occupational medicine (hospital and Garda), and public health medicine. The members were chosen to represent a professional body or because of their individual expertise. The Irish College of General Practitioners (ICGP) was unable to provide a representative but agreed to be available for consultation during the course of the Guidelines' development.

The members of the working group were:

Dr Anthony Breslin	Specialist in Public Health Medicine, HSE NW;
Dr Tomás Breslin	Consultant in Emergency Medicine, MMUH;
Dr Susan Clarke	Consultant in Infectious Diseases, SJH;
Dr Brendan Crowley	Consultant Clinical Microbiologist, SJH;
Dr Tom Feeney	Dental Practitioner, Blackrock, Co. Dublin;
Dr Deirdre Fitzgerald	SpR in Occupational Medicine, AMNCH;
Ms Mary Clare Kennedy	IP and Control Nurse, SLH, Kilkenny;
Dr Una Kennedy	Consultant in Emergency Medicine, SJH;
Dr Jack Lambert	Consultant in Infectious Diseases, MMUH;
Dr Oghenovo Oghuvbu	Occupational Health Physician, Garda Síochána;
Dr Coilin Ó hAiseadha	SpR in Public Health Medicine, HSE SE;
Dr Alex Reid	Occupational Health Physician, AMNCH Hospital;
Dr Lelia Thornton	Specialist in Public Health Medicine, HPSC (Chair); and,
Ms Aoibheann O'Malley	HPSC (administrative secretary).

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## Critical information on best practice

The Association's Quality and Patient Safety Committee has developed advice and self-assessment guides for members. The *Journal* reports on its work.

The IDA Quality and Patient Safety Committee was established in 2009. The aim of the Committee is to assist members to achieve compliance with the regulations applicable to dental practices. The Committee intends to achieve this aim by:

- identifying the statutory obligations applicable to dentists in Ireland;
- identifying and developing protocols for quality and patient safety;
- identifying and developing clinical audit and self-assessment;
- determining and supporting educational programmes; and,
- engaging with the relevant authorities and programmes.

The Committee is made up of volunteer IDA members representing all parts of the profession, public and private, general and specialist dentistry.

### Generating practical advice

The Committee has a proactive ethos. At the outset it met with the new Health Information and Quality Authority (HIQA) and stressed that it is imperative that any standards that are introduced for dentistry in Ireland:

- should be fair and reasonable;
- should be appropriate for healthcare settings regardless of funding or size;
- should not impose an unreasonable burden on any healthcare service provider;
- should be cost-effective;
- should be easily measurable; and,
- should have a clear benefit for the patient.

Keeping in mind HIQA's aims and following an overview of the relevant legislation, the Committee focused on creating tools that are easily used by dentists and their staff. We aim to ensure that any advice we generate is reasonable and practical, and is based on the best available evidence. We are very much aware of the economic constraints within both public and private practice. The litmus test is that the advice can be applied in a standard dental surgery.

The advice is prepared following a review of international and national standards and, in particular, having examined evidence-based practice, the research is put through in-depth assessment by the members of the Committee. The advice is presented, in the main, on the following levels:

- essential standards – by following this advice, the dentist will ensure compliance with the required standards;
- recommended standards – this is the advice recommended by the Committee, which is in keeping with the evidence in relation to 'best practice'; and,

- future planning for dental practices – this is the advice that the Committee would recommend to those who are perhaps starting out in practice, or upgrading their practice, who want to ensure that their systems will be compliant with potential future regulation.

The advice is coupled with audit tools to allow self-assessment and to support risk identification and management. The advice is developed to support the delivery of high-quality, safe, reliable care in a physical environment that is planned and managed to maintain the quality of care and safety of patients and staff.

### Completed work

So far, the Committee has developed advice in the following modules:

- Decontamination in Dentistry;
- Hand Hygiene;
- Emergency Drugs and Equipment; and,
- Risk Assessment and Safety Statements.

### Work in progress

The Committee is currently working on advice in the following areas:

- Amalgam Separation; and,
- Dental Practice Inspections.

### Future work

The Committee is scheduled to review and update the following best practice modules:

- Waste Management; and,
- Radiology.

### How do I find out more?

We hope you will visit the 'Best Practice' section of the IDA website – [www.dentist.ie](http://www.dentist.ie) – and avail of the advice and audit tools prepared by the Committee. You will need a username and password to log in. Please contact IDA House if you have forgotten yours.

To further expand on the advice available in the website, the Committee holds workshops at the Annual Conference on specific topics. The Committee is currently looking at delivering workshops to IDA branch meetings.

## Members of the Committee

Drs John Adye-Curran, Nick Armstrong, Eamon Croke, Barry Harrington, Niall Jennings, Ray McCarthy, Daniel McIlgorm, Barney Murphy, Liam Jones, Jim O'Connell, Mary Ormsby, Jane Renehan and James Tarpey.



## Decontamination



Good practice in dental decontamination is essential to ensure the safety of both patients and all the members of the dental team. As a profession we need to be aware of the relevant EU Directives, EU standards, Irish standards, health and safety legislation, and HIQA standards, and their implications for dental decontamination.

The Quality and Patient Safety Committee has developed decontamination guidelines that are available in the 'Best Practice' section of the IDA website. These guidelines are arranged in a step-wise pattern to help practitioners move to a higher standard over a period of time. The first step indicates what it is necessary to do immediately to comply with the present minimum standards (as in the present Dental Code of Practice Relating to Infection Control in Dentistry). The other steps show how to move to a higher level of decontamination in a practical manner. There is also a simple and quick audit that will help dental teams to identify deficiencies in their decontamination process and monitor improvements.

Advice and self-assessment guide available at [www.dentist.ie](http://www.dentist.ie).

## Hand Hygiene



Good hand hygiene is the simplest and most important method of preventing the spread of infection in the dental surgery. This fact is supported by the World Health Organisation, HIQA and the Dental Council. The Quality and Patient Safety Committee has developed a short but thorough guide to essential hand hygiene standards. The

guide sets out fundamental principles.

This information is available in the 'Best Practice' section of the IDA website. You will also find hand hygiene audit tools, which allow risk assessment of your hand hygiene technique and the available facilities against national and international standards.

The audits can be undertaken as a self-assessment or carried out by one staff member of the practice on another staff member. The audit tools are designed to take no more than five minutes to complete. You can now demonstrate that your hand hygiene techniques and facilities satisfy national and international standards.

Advice and self-assessment guide available at [www.dentist.ie](http://www.dentist.ie).

## Emergency Drugs and Equipment



Thankfully, medical emergencies are infrequent in the dental chair. However, we are required by the Dental Council to attain and maintain competency in the management of medical emergencies. The Quality and Patient Safety Committee has produced a list of essential drugs and equipment in case of a medical emergency.

Emergency drugs have a lifespan and medical equipment may require maintenance so the 'Best Practice' section of the IDA website includes a simple audit tool to allow you to self-assess your emergency protocol. This audit is an effective way of managing risk.

You hope you will never have to use them, but if you do, you could save a life.

Advice and self-assessment guide available at [www.dentist.ie](http://www.dentist.ie).

## Risk Assessment and Safety Statement



Every employer in Ireland, regardless of size, is required to carry out a risk assessment and produce a safety statement for the workplace.

The risk assessment identifies any hazards present in the workplace, assesses the risks arising from such hazards and identifies the steps to be taken to deal with any risks.

Once the risk assessment is complete, a document known as a safety statement must be produced. The safety statement sets out how the employer will ensure safety and health in the workplace. This document must be displayed in an area where it is easily accessible to all staff. Complying with this legal requirement has heretofore been a difficult and time-consuming task for small business owners as it involves every aspect of health and safety in the workplace.

Now the Health and Safety Authority (HSA) has developed an online tool called BeSmart that will allow you to complete a risk assessment and generate a safety statement appropriate to your practice. You can access the tool at the following link – <http://besmart.hsa.ie/>. Select 'Dental Surgery' to access the appropriate template. You are then prompted to answer questions regarding the various risks in the practice. In answering the questions you will develop a personalised safety statement. This will allow you to fulfil your legal requirement to complete a risk assessment and a safety statement.

Advice and self-assessment guide available at [www.dentist.ie](http://www.dentist.ie).

If you would like to discuss the work of the Committee, if you would like to contribute to the Committee or if you would like the Committee to consider a particular topic, please contact Clare Dowling in IDA House, Tel: 01-295 0072, or Email: [clare@irishdentalassoc.ie](mailto:clare@irishdentalassoc.ie).

## Classified advert procedure

Please read these instructions prior to sending an advertisement. Below are the charges for placing an advertisement for both members and non-members. Advertisements will only be accepted in writing via fax (01- 295 0092), letter or email (fionnuala@irishdentalassoc.ie). Non-members must pre-pay for advertisements, which must arrive no later than Monday, November 5, 2012, by cheque made payable to the Irish Dental Association. If a box number is required, please indicate this at the end of the ad (replies to box number X). Classified ads placed in the *Journal* are also published on our website [www.dentist.ie](http://www.dentist.ie) for 12 weeks.

Advert size	Members	Non-members
up to 25 words	€75	€150
26 to 40 words	€90	€180

Non-members must send in a cheque in advance with their advert. The maximum number of words for classified ads is 40.

**Only if the advert is in excess of 40 words, then please contact:**  
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The Malthouse, 537 North Circular Road, Dublin 1.  
Tel: 01-856 1166 Fax: 01-856 1169 Email: [paul@thinkmedia.ie](mailto:paul@thinkmedia.ie)

Please note that all classified adverts MUST come under one of the following headings:

- ▶ Positions Wanted
- ▶ Positions Vacant
- ▶ Practices for Sale/To Let
- ▶ Practices Wanted
- ▶ Unwanted/Second Hand Equipment for Sale

Classified adverts must not be of a commercial nature. All commercial adverts must be display advertisements, and these can be arranged by contacting Paul O'Grady at Think Media, Tel: 01 856 1166.

### POSITIONS WANTED

Experienced dentist looking for part-time work in the west/north west. Email: [associateireland@hotmail.com](mailto:associateireland@hotmail.com).

Motivated, conscientious Italian periodontist – certified by the European Federation of Periodontology – available for work two to three days per month in Dublin area. Tel: 086-229 0171, or Email: [fabianogalassi@alice.it](mailto:fabianogalassi@alice.it).

### POSITIONS VACANT

Experienced associate required two-and-a-half days per week in Kilkenny. Must have an outgoing personality. Position available from September. Email: [edelcallandental@gmail.com](mailto:edelcallandental@gmail.com).

Part-time dental associate required for busy Dublin northside practice. Interest in endodontics and aesthetic dentistry essential. Minimum of three years' experience required. Modern, computerised practice with hygienist and excellent support staff. Email: [northdublindentalcare@gmail.com](mailto:northdublindentalcare@gmail.com).

Co. Carlow. Associate required for two sessions per week, one afternoon and Saturday, and holiday cover when required. Email: [jmoneill78@hotmail.com](mailto:jmoneill78@hotmail.com).

Associate required, Monaghan Town. Fully computerised and digital practice. Please reply with your CV to: [monaghandentsurgery@hotmail.com](mailto:monaghandentsurgery@hotmail.com).

Full-time associate (Monday to Friday) to replace departing colleague

for busy three-surgery north east practice. Visiting oral surgeon, orthodontist and hygienist. Computerised and OPG. Begin November. Minimum one to two years' experience. Contact Bernie, Tel: 086-823 7145, or Email CV to: [bfeedental@hotmail.com](mailto:bfeedental@hotmail.com).

Part-time associate required for Meath area. Digital/OPG/hygienist. Medical card/private. Available from September. Tel: 086-252 0985, or Email: [oakleypark1@eircom.net](mailto:oakleypark1@eircom.net).

Full/part-time associate required for seaside practice in southeast from October. Digital/OPG, 90 minutes from Dublin/Cork. Contact: [sorchawhite@hotmail.com](mailto:sorchawhite@hotmail.com) with CV.

Two part-time associate positions available. Days and hours flexible. Gorey, Co. Wexford. Junction 22 M11. Hygienist, OPG, full support staff. 50:50 med card:pvt. Bonus/incentives for weekends and/or evenings. Email: [info@irishdentalassoc.ie](mailto:info@irishdentalassoc.ie).

Associate dental surgeon required for busy modern Cavan Town dental practice. Thursday, Friday and Saturday. Happy working environment. Tel: 087-864 1990, or send CV application to: [churchstreetdental@eircom.net](mailto:churchstreetdental@eircom.net).

Experienced associate required to join busy, modern, expanding practice in Galway City and environs. Initially part-time. Start October 2012. Email CV to: [galwaydent.assoc@gmail.com](mailto:galwaydent.assoc@gmail.com).

Part-time associate required for Saturday mornings and possibly late Thursday evenings, Ballincollig. Tel: 086-893 6544.

Experienced dentist required for full-time position (departing colleague) in busy, fully computerised practice in Navan, Co. Meath. Experienced staff, OPT, Kavo chair/fibreoptics. Email: don@navandental.com.

Locum wanted for one to two days a week in Killibegs, Co. Donegal. Must be capable of working under own initiative. 75%/25% medical card/private. Full clinical freedom. Tel: 087-165 7411 after 6.00pm, or Email: donegaldental@yahoo.ie.

Locum dentist required to cover ill health, Co. Wicklow. Busy surgery, mainly private patient base, long-term potential for associateship. Please Tel: 085-785 5120, or Email: ldental99@yahoo.ie.

Part-time dentist required as locum cover in west Dublin. Tel: 086-821 8898.

Part time endodontist, periodontist and restorative specialist required for expanding multi award-winning private referral practice in Belfast. Entry on GDC specialist register preferable but not essential. For further details please Tel: 079-173 555 55, Email: info@cranmoredental.co.uk, or visit www.cranmoredental.com.

Orthodontic sessions available in busy dental surgeries in Mayo and also 30 minutes from Galway City. History of orthodontic treatment by visiting orthodontist for over 20 years. Please Email: orthosessions@hotmail.co.uk.

Limerick. Part-time orthodontist required for sessions in modern, busy, three-surgery practice. Significant demand for treatment. Flexible terms. Tel: 086-827 8007, or Email: limerickdentaljob@gmail.com.

Required: dental hygienist. Salary over \$2,500pm. Tax free. Plus accommodation. Plus annual vacation. Plus annual flight ticket. Plus commission. Interested? Please Email: hrdamdc@gmail.com.

Locum hygienist required to cover maternity leave in a well-established Drogheda general dental practice. One to two days per week for four months, commencing early December 2012. Please email CV to: info@angelakearney.ie before November 9, 2012.

Dental surgery assistant required for Clifden dental practice. Chairside assistance, reception and administration work included. Please send CV to: clifdendentalpractice@eircom.net.

DSA wanted on Thursdays in Blanchardstown to cover sick leave for next six weeks starting immediately (August 30, 2012). Email: dublindentist@utvinternet.com.

Part-time dental surgery assistant required in busy Dublin City Centre practice. Experienced required. Please email CV to: dentaldublin@gmail.com.

Dental surgery assistant required for busy practice in Killaloe, Co. Clare. Two-day week required commencing ASAP. No agencies. Computer literacy essential. CV with cover letter to: killalloedental@gmail.com.

Dental nurse required near Heuston Station, Dublin 8. Chairside assistance/reception with administration work included. Oral surgery experience preferable. Send CVs to: info@specialist.ie.

Hiring now for a state-of-the-art specialist periodontal clinic five minutes from St Stephen's Green. Fantastic opportunity for the right individual. Candidates for position of DSA/practice manager should ideally have experience, but all candidates will be considered. Email CV to: adelaidperiodontist@gmail.com.

#### PRACTICES FOR SALE/TO LET

Dental surgery for sale in Carndonagh, Co. Donegal. Two surgeries with full book. Principal moving abroad. Tel: 087-165 7411 after 6.00pm, or Email: donegaldental@yahoo.ie.

Complete top floor over health food shop. Prime location on main street, free parking outside. Excellent footfall and passing trade. Rent €100 per week. Only one other dentist in town. Population approximately 9,000. Contact Ailish, Tel: 086-829 9525, or Email: bridiehealth@gmail.com.

Busy, modern three-surgery dental practice for sale 30 minutes from Galway City. Long-established practice with large patient numbers in a very busy town; 90% private patients. Fully computerised, recently renovated and profitable. Option for sale of building. Email: dentalpractice4sale@gmail.com.

Surgery for rent – Co. Galway. Good opportunity for dynamic personality. Busy primary care centre. Existing dental footfall. High profile location. Ample room for expansion. Low overheads. Easy parking. Area open for dental development. Low start-up costs. Email: surgeriesavailable@yahoo.ie.

To Let. Fully furnished and well equipped dental room with digital x-ray/OPG in well-established dental practice in Meath. Suitable for range of associated dental specialists or GP. To reply, Email: oakleypark1@eircom.net.

Practice for sale, south Dublin, in excellent location. Long established. Two surgeries, private, SW, medical card. To include the freehold. Tel: 087-705 1529 evenings.

## Diary of events

JOURNAL OF THE IRISH DENTAL ASSOCIATION

### OCTOBER

#### The European Society of Microscope Dentistry (ESMD) Congress

October 4-6 *Berlin, Germany*  
For further information, log on to [www.esmd.info](http://www.esmd.info).

#### HSE Group of the IDA – Annual Seminar

October 10-12 *The Galway Bay Hotel, Galway*  
For further information contact IDA House, Tel: 01-295 0072.

#### 4th World Implant Orthodontic Conference

October 10-13 *Hilton Hotel, Sydney, Australia*  
For further information, Email: [info@wioc2012.com](mailto:info@wioc2012.com).

#### IDA CPD Roadshow – Cork

October 13 *Rochestown Park Hotel, Cork*



#### Metropolitan Branch Golf Outing

October 14 *Luttrellstown Castle Golf & Country Club*



#### Metropolitan Branch IDA – Meeting

October 18 *Hilton Hotel, Charlemont Place*  
Meeting commences at 7.30pm. Speakers are Drs Mark Condon, Kieran Daly and Ronan Perry.



#### CPD Roadshow – Dublin

October 20 *Bewleys Dublin Airport Hotel*



#### CPD Roadshow – Galway

October 20 *Clayton Hotel, Galway*



#### Faculty of Dentistry of the Royal College of Surgeons in Ireland – 2012 Annual Scientific Meeting: ‘Aesthetic Dentistry’

October 25-26 *Royal College of Surgeons, Dublin 2*  
Full programme and details on how to book are available from the Faculty’s website – [www.dentistry.rcsi.ie](http://www.dentistry.rcsi.ie).

#### 21st Congress - International Association for Disability and Oral Health

October 28-31 *Melbourne, Australia*  
For further information, log on to [www.iadh2012.com](http://www.iadh2012.com).

### NOVEMBER

#### CPD Roadshow – Limerick

November 10 *Strand Hotel, Limerick*

#### Metropolitan Branch IDA – Meeting

November 15 *Hilton Hotel, Charlemont Place*  
Meeting commences at 7.30pm. Speakers are Drs Tom Canning and David Finucane.



#### The Asia Pacific Orthodontic Conference

November 29 to December 2 *New Delhi, India*  
For further information, log on to [www.8thapoc-47thioc.in](http://www.8thapoc-47thioc.in).

#### Orthodontic Society of Ireland – Meeting

November 23-24 *K Club, Co Kildare.*  
‘The face and occlusion in the diagnostic process: new strategies for treatment from mixed dentition to surgery’. Speakers are Drs Marco Rosa, Renato Colconi and Mirco Raffaini.

### JANUARY 2013

#### Joint Irish Endodontic Society/IDA Metropolitan Branch Meeting

January 24 *Hilton Hotel, Charlemont Place, Dublin 2*  
Meeting commences at 7.30pm. Topics covered: orthograde versus retrograde treatment of persisting apical periodontitis and perio-endo lesions.



#### IDA Practice Management Day

January 26 *Croke Park*  
Further details to follow when available.

### FEBRUARY 2013

#### The Dental Hygiene and Therapy Conference 2013

February 8 *ILEC Conference Centre, London*  
For further information, log on to <http://dentalhygienetherapy.co.uk/docs/DHandT-Sponsor.pdf>.

#### Metropolitan Branch Annual Scientific Meeting

February 9 *Hilton Hotel, Charlemont Place, Dublin 2*



#### CPD Roadshow – Galway

February 9 *Clayton Hotel, Galway*



### MARCH 2013

#### CPD Roadshow – Cork

March 2 *Rochestown Park Hotel, Cork*



#### CPD Roadshow – Kilkenny

March 2 *Ormonde Hotel, Kilkenny*



#### CPD Roadshow – Sligo

March 2 *Clarion Hotel, Sligo*



#### Metropolitan Branch IDA – Meeting and AGM

March 7 *Hilton Hotel, Charlemont Place, Dublin 2*  
Speakers are Drs Alison Dougall and Spencer Woolfe. This meeting will be followed by the Metropolitan Branch AGM.



#### CPD Roadshow – Dublin

March 23 *Bewleys Dublin Airport Hotel*



#### CPD Roadshow – Limerick

March 23 *Strand Hotel, Limerick*







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**References:** 1. Burwell A et al. J Clin Dent 2010; 21(Spec Iss): 66-71. 2. LaTorre G, Greenspan DC. J Clin Dent 2010; in press. 3. Effiant SE et al. J Mater Sci Mater Med 2002; 20(6):557-565. 4. Clark AE et al. J Dent Res 2002; 81 (Spec Iss A): 2182. 5. GSK data on file. 6. Du MO et al. Am J Dent 2006; 21(4): 210-214. 7. Pradeep AR et al. J Periodontol 2010; 81(8): 1167-1113. 8. Salari S et al. J Clin Dent 2010; in press. SENSODYNE® and the rings device are registered trademarks of the GlaxoSmithKline group of companies. Prepared November 2010. GSKCH/2011/0026.

## Dental erosion – current perspectives for general practice

### Précis:

Dental erosion and tooth wear pose significant challenges to the dental practitioner today.

*Journal of the Irish Dental Association* 2012; 58 (5): 241-244.

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## Sugar tax and obesity

### Précis:

A report from two separate workshops on the merits or otherwise of imposing a so-called 'sugar tax' as a response to rising levels of obesity, concluding with a commentary.

*Journal of the Irish Dental Association* 2012; 58 (5): 245-248.

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# The oral health benefits of chewing gum

## Précis

This paper provides an overview of the scientific and clinical support for the dental benefits of sugar-free gum as an adjunct to regular daily oral care.

## Abstract

The use of sugar-free gum provides a proven anti-caries benefit, but other oral health effects are less clearly elucidated. Chewing sugar-free chewing gum promotes a strong flow of stimulated saliva, which helps to provide a number of dental benefits: first, the higher flow rate promotes more rapid oral clearance of sugars; second, the high pH and buffering capacity of the stimulated saliva help to neutralise plaque pH after a sugar challenge; and, lastly, studies have shown enhanced remineralisation of early caries-like lesions and ultimately prospective clinical trials have shown reduced caries incidence in children chewing sugar-free gum. This paper reviews the scientific evidence for these functional claims and discusses other benefits, including plaque and extrinsic stain reduction, along with the possibility of adding specific active agents, including fluoride, antimicrobials, urea and calcium phosphates, to enhance these inherent effects. The evidence for a specific effect of xylitol as a caries-therapeutic agent is also discussed. In conclusion, it is asserted that chewing gum has a place as an additional mode of dental disease prevention to be used in conjunction with the more traditional preventive methods.

*Journal of the Irish Dental Association* 2012; 58 (5): 253-261.

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