

Other journals in brief

A selection of abstracts of clinically relevant papers from other journals.

The abstracts on this page have been chosen and edited by John R. Radford.

Preventing secondary caries

Lack of buffering by composites promotes shift to more cariogenic bacteria

Nedeljkovic I, De Munck J *et al.* *J Dent Res* 2016; **95**: 875–881

Amalgam shows the highest acid-buffering ability and antibacterial effect.

The incidence of secondary caries associated with composite resin restorations is up to 3.4 times higher than that found with amalgam restorations. There may be several reasons for this, such as polymerisation shrinkage associated with composites, 'higher plaque receptiveness, the release of bacteria-stimulating compounds, and the lack of antibacterial properties'. This *in vitro* study showed that the composite, in addition, did not exhibit any buffering capacity. This was in contrast to amalgam, a glass-ionomer cement and the so-called giomer. This study examined the effect of disks of the above restorative materials 1) on a buffer supernatant containing bacteria-produced acids, and 2) on essentially overnight cultures of *Streptococcus mutans* (cariogenic) and *Streptococcus sanguinis* (noncariogenic) using both a single species and dual species model. Apart from the conventional hybrid composite not exhibiting any buffering capacity, all materials, except for the resin composite, were associated with an increase in pH of the supernatant. In addition, in both the single and dual-species models, the composite shifted the microbial composition to one of higher cariogenicity.

DOI: 10.1038/sj.bdj.2016.729

Silver diamine fluoride – potassium iodide

Randomized clinical trial on arresting dental root caries through silver diamine fluoride applications in community-dwelling elders

Li R, Lo EC *et al.* *J Dent* 2016; **51**: 15–20

The immediate application of potassium iodide to dental root caries treated with silver diamine fluoride improved the colour of the lesion from black to bright yellow, but this colour change was only short lived.

'It would be a win-win situation if KI can prevent the staining associated with SDF (silver diamine fluoride) without reducing its effectiveness...'. Unfortunately, the aesthetic improvement with potassium iodide was only short-lived although it did not reduce the efficacy of SDF at arresting dental root caries. The efficacy of SDF was all the more remarkable, as this study was carried out in an area with water fluoridation (study carried out in Hong Kong whose water is fluoridated at an optimal concentration of 0.5 ppm). In this study, 83 elderly subjects with 157 root surfaces with active caries lesion were randomly allocated to one of the three following groups: placebo control (soda water), annual application of SDF, and annual application of SDF solution immediately followed by potassium iodide solution. Root surface caries was recorded at 6 monthly intervals for the duration of the study of 30 months only.

DOI: 10.1038/sj.bdj.2016.730

Bulk-filled resin composite

Posterior bulk-filled resin composite restorations: a 5-year randomized controlled clinical study

van Dijken JW and Pallesen U. *J Dent* 2016; **51**: 29–35

No better clinical outcome for bulk-filled resin composites.

During placement, the shrinkage of resin composite restorations has been associated with several problems; if the bond is suboptimal, marginal deficiencies may lead to sensitivity and in the long-term secondary caries, but if a bond has been achieved, this has been linked to cracked cusps. Several techniques and materials have been proposed to overcome such complications, the most common being 2 mm oblique incremental packing. More recently it has been claimed that bulk-fill resin composites have a lower polymerisation shrinkage. This is due to the inclusion of a patented modified UDMA with a reduced numbers of reactive sites per unit volume. In this randomised controlled study over 5 years, 38 pairs of Class I and 62 pairs of Class II restorations were restored using either a flowable bulk-fill resin composite (SureFil® SDR® flow) or a conventional nano-hybrid resin composite. Despite manufacturer hyperbole, there was no difference in the outcome between the annual failure rate for both restorative materials (<2% for both groups). No post-operative sensitivity was reported.

DOI: 10.1038/sj.bdj.2016.731

'dentine-embedded and salivary MMPs/cathepsins'

Ecological hypothesis of dentin and root caries

Takahashi N, Nyvad B. *Caries Res* 2016; **50**: 422–431

'...questionable whether bacteria play a role in the initial stages of the degradation of the organic components of teeth.'

At the heart of this commentary, these authors refine what they refer to as their 'ecological caries hypothesis'; acid formation favours 'bacterial acid-induced adaptation and selection' that tilts the balance from remineralisation towards demineralisation. In the shaping of the hypothesis to include dentine and root caries, bacterial acidification 'induces the exposure of organic matrix and the activation of dentin-embedded and salivary MMPs (matrix metalloproteinases)/cathepsins'. These proteases, embedded within the dentine, begin the degradation of the organic components. Yet this has to be reconciled with the optimal pH for MMPs lying around neutral, although cathepsins are active under acidic conditions. Proteolytic bacteria, particularly *Prevotella intermedia*, have been isolated from dentine caries and may also contribute to dentine matrix degradation. This putative role of MMPs and cathepsins in dentinal caries would suggest novel approaches for prevention. Examples of MMP inhibitors are modified tetracyclines, zoledronate, chlorhexidine, silver diamine fluoride and various metal ions such as zinc.

DOI: 10.1038/sj.bdj.2016.732