Rules for survival

(of restorations & teeth)

Thanks to

Simplyhealth Professionals

Oral-B®

It’s not as expensive as I thought!

History is on Oral-B’s Side:
Cochrane Collaboration Confirms Superiority of Oscillating-Rotating Power Brush Technology Over Manual Brushing

In a recent historical review of clinical studies, the independent, not-for-profit Cochrane Collaboration concluded that oscillating-rotating – the technology used in Oral-B power toothbrushes – was the only type of power brush that consistently reduced plaque and gingivitis more effectively than a manual toothbrush in both the short- and long-term. This result was derived from a larger review that concluded power brushes outperform manual toothbrushing.*

This is an important conclusion that will help consumers and professionals make better oral care choices" said Dr. Paul Warren, vice president, Professional and Scientific Relations at Procter & Gamble. "Consumers and some professionals may be skeptical about the benefits and safety of power brushes. An independent confirmation of the effectiveness of Power and specifically oscillating-rotating brushes adds to Oral-B’s own evidence that consumers can benefit by shifting from a manual to an oscillating-rotating power brush."

These results echoed those in the Cochrane Collaboration’s 2003 and 2005 reviews, which looked back at over 50 years of published research on power toothbrushes versus manual toothbrushes.** The reviews concluded that powered toothbrushes reduce plaque and gingivitis overall more than manual toothbrushes. The authors specifically found that oscillating-rotating technology was the only type that consistently outperformed manual toothbrushes in the reduction of plaque and gingivitis.

The conclusions of this most recent report, published in June 2014, were derived from reviews of 51 studies published from 1964 to 2011 and included no less than seven types of power brush technologies, based on brush head movement. Over 50 percent of the studies reviewed, focused on oscillating-rotating technology, reinforcing the robustness of Oral-B’s body of scientific evidence.

Oral-B is continually innovating to improve consumers’ oral health. This summer, Oral-B launched 2 key innovations: the new CROSS ACTION brush head – its most advanced power brush head to date that has perfectly angled bristles for a superior clean*, as well as the SmartSeries electric toothbrush – the world’s first interactive electric toothbrush with Bluetooth 4.0 connectivity. The new toothbrush connects to the Oral-B App to provide real-time guidance while brushing – recording brushing activity as data – which patients can then share with their dental professional, helping to create a smarter and more personalized brushing routine. And consistent with our track record of superior results, clinical research shows that the newest Oral-B Pro 5000 with CrossAction reduces plaque and gingivitis more than Sonicare’s® best brush.

The Cochrane Collaboration is an international, independent, not-for-profit organization staffed by a volunteer network of health practitioners, researchers, patient advocates and others. It produces high-quality, relevant and up-to-date synthesized research evidence that is free from commercial sponsorship and other conflicts of interest to assist in the educated decisions patients and professionals make on product purchasing and promotion. Its work is internationally recognized as the benchmark for high quality information about the effectiveness of health care.

*Yaacob M, Worthington HV, Deacon SA, Deery C, Walmsley A, Robinson PG, Glenny A. Powered versus manual toothbrushing for oral health. Cochrane Database of Systematic Reviews 2014, Issue 6. Art. No.: CD002281. DOI: 10.1002/14651858.CD002281.pub3.
**Heanue M, Deacon SA, Deery C, Robinson PG, Walmsley AD, Worthington HV, Shaw WC. Manual versus powered toothbrushing for oral health. Cochrane Review). In: *The Cochrane Library*, Issue 1, 2003. Robinson P, Deacon SA, Deery C, Heanue M, Walmsley AD, Worthington HV, Glenny AM, Shaw BC. Manual versus powered toothbrushing for oral health. Cochrane Database of Systematic Reviews 2005, Issue 2.
†vs. regular manual toothbrush
Sonicare is a registered trademark of Koninklijke Philips N.V.

COCHRANE REVIEWS SUMMARY

2014 Cochrane Report: Power versus Manual

In a recent historical review of clinical studies, the independent, not-for-profit Cochrane Collaboration concluded that oscillating-rotating – the technology used in Oral-B power toothbrushes – was the only type of power brush that consistently reduced plaque and gingivitis more effectively than a manual toothbrush in both the short- and long-term.

COCHRANE REVIEWS SUMMARY

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In a recent historical review of clinical studies, the independent, not-for-profit Cochrane Collaboration concluded that oscillating-rotating – the technology used in Oral-B power toothbrushes – was the only type of power brush that consistently reduced plaque and gingivitis more effectively than a manual toothbrush in both the short- and long-term.

"I am not paid by any company to promote their products"

"Some manufacturers fund my research"

"I will try to be evidence-based rather than anecdotal"

Why is restoration longevity important?

- Managing patient expectations (or not)
- Clinical Governance
- Third party funders want to know if they are getting value for money
- In the past, UK Government wanted to know!
- Avoidance of adverse medicolegal situations
- Dentists might want to audit their performance
- Keeping faith in the profession

What I plan to talk about

- Choosing a reliable material
- Choosing the “right” material
- Bonding to dentine and survival of resin composite materials, including bulk fill and optimum matrix systems
- A brief Kaplan Meier statistical analysis lesson
- Applying that to clinical decision making

Cost

- Materials' costs in an average practice are 5% to 7% of total expenses
- Always speak to a sales rep before purchasing a material from a major manufacturer, as they know the deals
- While there is variety in pricing, the only materials that are significantly cheaper are the "Own Label" brands

You can save £40 by buying a 5ml bottle of “own label” bonding agent, but……

There is no evidence base for “own label” Glass Ionomer materials

DentalMaterials

Steffen Mickenautsch

How Well are GIC Product Labels Related to Current Systematic Review Evidence?

Abstract: Systematic reviews have been recommended as providing the best source of evidence to guide clinical decisions in dentistry. They appraise evidence from trials focused on investigating clinical effects of dental material categories, such as conventional glass-ionomer cements (GIC) or resin-modified GIC. In contrast, the general dental practitioner is introduced to these categories of materials in the form of branded or private product labels that are marketed during dental conventions or through advertisements. Difficulties may arise in recognizing material categories that have been subjected to systematic reviews, because of the multitude of product labels on the current market. Thus, the value and relevance of published systematic review evidence concerning the material categories represented by these labels may remain obscure. Based on a systematic literature search, this article identifies glass-ionomer cement product labels used during clinical trials which, in turn, were subsequently reviewed in systematic review articles (published between 15 April 2009 and 14 April 2011). This article further clarifies how these product labels relate to the systematic review conclusions. The results show that the conventional and resin-modified glass-ionomer cements that were used in most trials were marketed by GC and 3M ESPE, respectively. The conventional GICs used in most of the reviewed trials were Fuji III and Fuji IX, while Vitremer was the most commonly used resin-modified GIC. Evidence from the reviewed trials suggests that GIC provides beneficial effects for preventive and restorative dentistry. However, more trials of higher internal validity are needed in order to confirm (or disprove) these findings. Only GIC products of branded labels and none of private labels were identified, suggesting that private label GIC products have little or no research back-up.

Clinical Relevance: Dental products, such as glass-ionomers cements (GIC), can only be judged as effective when they are based on sufficient research back-up. Systematic reviews of clinical trials provide such back-up at the highest level. Thus clinicians must be able to identify GIC products for which reliable evidence from systematic reviews of clinical studies is available and know about what such evidence contains.

Dent Update 2011; 38: 634–644

FJ Trevor Burke

Me Too 3

Welcome to another year of *Dental Update*, a special 40th Anniversary year which will see the publication of a 40th Anniversary issue which will reflect upon the contents of the first issue from May 1973. I hope that you will enjoy it all.

I have previously written on the subject of own label adhesives,[1,2] questioning the wisdom of purchasing cheaper materials which may not have been researched in the way that materials should be. A paper which I presented at a recent research meeting concludes my 'evidence' on this subject.

References
1. Burke FJT. Me too. *Dent Update* 2010; **37**: 137.
2. Burke FJT. Me too 2. *Dent Update* 2011; 38: 586-592.

The evidence base for 'own label' resin-based dental restoratives

Abstract: There is anecdotal evidence that sales of 'own-label' (OL) or 'private label' dental products is increasing, as dentists become more cost conscious in times of economic downturn. However, the purchase of such (less expensive) products could be a false economy if their performance falls below accepted standards. So, while the examination of a resin-based product under research conditions alone may not guarantee success, it could be considered that a material which has been subjected to testing under research conditions will demonstrate its effectiveness under laboratory conditions or reveal its shortcomings; either of these being better than the material not being examined in any way. It was therefore considered appropriate to determine the materials on which research was carried out, with particular reference to OL brands.
Objective: To determine whether there is a research base behind OL resin-based restorative dental materials.

Methods

The abstract memory stick for the IADR meeting in March 2011 in San Diego was examined. All abstracts included in the 'Dentine adhesives' and 'Composite' sections were read in full and examined in order to identify the names of products mentioned in the abstracts. These were recorded and tabulated. Any product which did not state the manufacturer was further investigated by an internet search.

Product Name	Number of Mentions in Research Abstracts
Clearfil SE Bond (Kuraray)	40
Scotchbond Multipurpose (3M ESPE)	29
Adper Easy Bond (3M ESPE)	17
Optibond Solo (Kerr)	17
Prompt L Pop (3M ESPE)	10
Optibond FL (Kerr)	10
Optibond all-in-one (Kerr)	10

Table 1. Most frequently mentioned dentine-bonding agents in the 'Bonding agent' research abstracts.

ZERO evidence base for "own label" resin-based materials

Some own label materials performed as well in testing as those from manufacturers in the field

However, greater batch to batch variation in several mechanical & physical properties of the own-label materials was noted

European Journal of Prosthodontics and Restorative Dentistry (2016) 24, 122-129

'Own-Label' Versus Branded Commercial Dental Resin Composite Materials: Mechanical And Physical Property Comparisons

Keywords
Filler
Degree of Conversion
Own-Label
Private-Label
Resin Composite
Flexural Modulus

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(BMedSci, MPhil, PhD, MSc, FADM)

ABSTRACT

A majority of dental materials are manufactured by companies who have experience in the field. However, a number of "own label" materials have become available, principally marketed by distributors and other companies with little or no experience in the field. These materials are attractive because of their reduced cost, but they may have a poor research on which clinicians might base their potential performance. It is therefore the purpose of this work to compare the performance of different batches of a number of "own-label" dental materials with a similar number from manufacturers with experience in the field, using a variety of laboratory test regimes which include filler determination, degree of conversion, flexural strength and flexural modulus. In order to evaluate key material properties. The results indicated that own-label dental resin composites produced similar results to materials from established companies in terms of flexural strength characteristics and degree of conversion. However, a greater batch-to-batch variation in several mechanical or physical properties of the own-label materials was noted.

Two own brand label (OBL) materials tested against 3M Z250

Journal of Dentistry 56 (2017) 84–98

Contents lists available at ScienceDirect

Journal of Dentistry

journal homepage: www.intl.elsevierhealth.com/journals/jden

Own brand label restorative materials—A false bargain?

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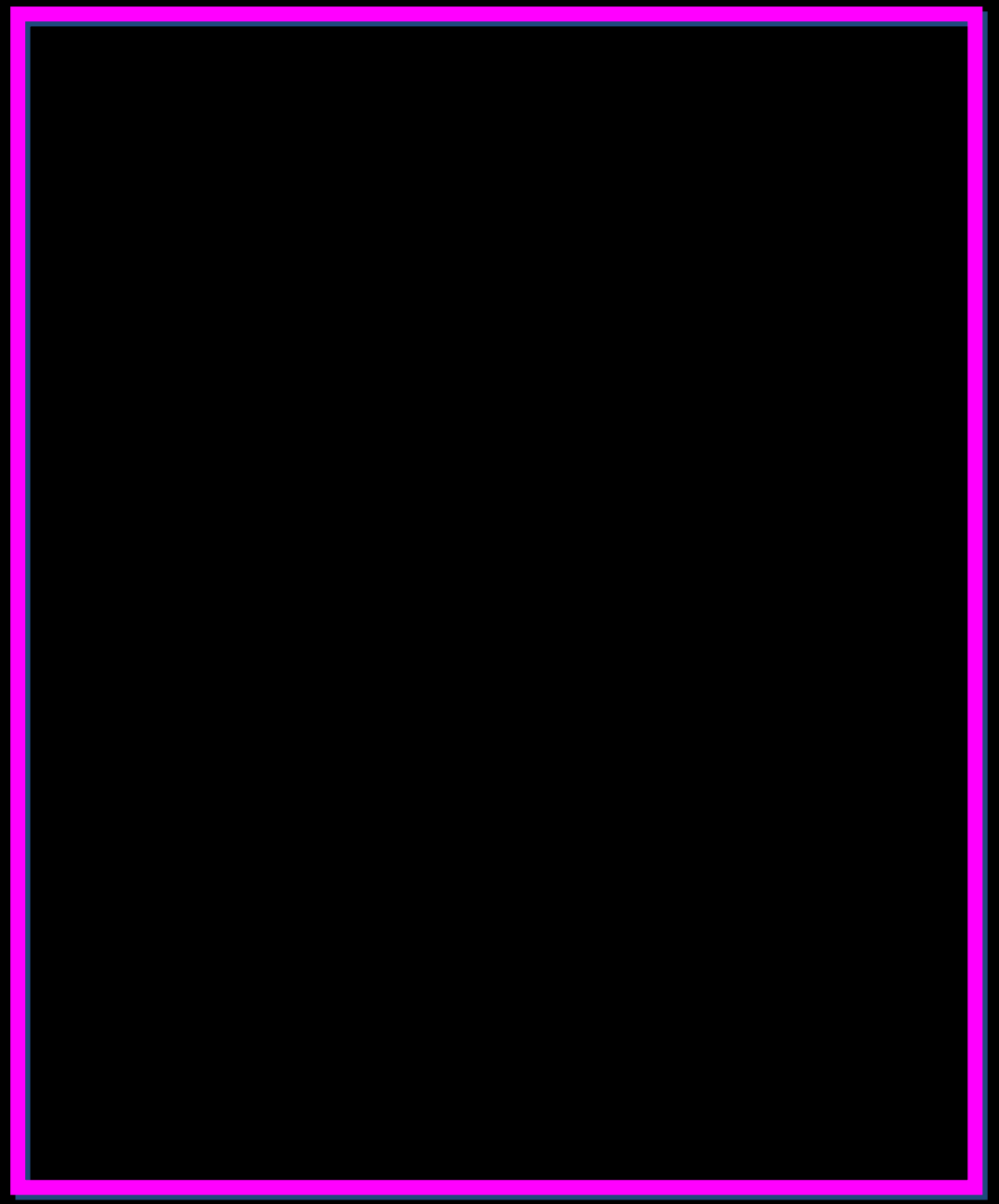
Flexural strength
Residual monomers
Degree of conversion
Cytotoxicity

ABSTRACT

Objectives: This study aims at evaluating and comparing mechanical, chemical, and cytotoxicological parameters of a commercial brand name composite material against two 'own brand label' (OBL) composites.
Methods: Parameters included depth of cure, flexural strength, degree of conversion, polymerization shrinkage, filler particle morphology and elemental analyzes, Vickers hardness, surface roughness parameters after abrasion, monomer elution, and cytotoxicity.
Results: The conventional composite outperformed the OBLS in terms of depth of cure ($p < 0.001$), degree of cure at the first and last time intervals ($p < 0.001$), hardness ($p < 0.001$), and post-abrasion roughness ($p < 0.05$). The polymerization volumetric shrinkage ranged from 2.86% to 4.13%, with the highest shrinkage seen among the OBLs. Both Monomer elution from the OBLs was statistically significantly higher ($p < 0.001$). Statistically significantly higher cytotoxicity combined with altered morphology and loss of confluence was detected in the cells exposed to extracts from the OBLs.
Conclusions: The OBLs were in general outdone by the conventional composite.
Clinical significance: OBLs restorative materials have become pervasive in the dental market. Manufacturers often promise equal or better characteristics than existing brand-name composites, but at a lower price. Dentists are highly recommended to reconsider utilization of OBLs lacking sound scientific scrutiny, and our findings underscore this recommendation.

The “evidence” for Own Label Brands



Patients care more about dental materials than I suspected!

A practice-based assessment of patients' knowledge of dental materials

F. J. T. Burke*[1,2] and R. J. Crisp[1,2]

IN BRIEF

- Suggests that dental practice should be the prime location for clinical dental research.
- Discusses patients concerns regarding which dental materials are used.
- Demonstrates that patients care strongly that the materials are of a high quality and have been thoroughly researched.

RESEARCH

Aims It is the aim of this study to determine, by means of a questionnaire completed by patients attending ten UK dental practices, patients' level of knowledge on dental materials and techniques. **Materials and methods** Members of The PREP (Product Research and Evaluation by Practitioners) Panel were asked to recruit patients to participate in a questionnaire-based assessment of their knowledge of dental materials. **Results** Two hundred and forty-nine patients took part in the questionnaire. Sixty-three percent (n = 157) of the respondents were female and 92% (n = 229) of the respondents stated they were regular attenders at the dental practice. The respondents were asked how important the quality of dental materials used in their mouth was, and on a Visual Analogue Scale (VAS) where 1 = not important and 10 = very important, the result was 9.6. The same score was recorded when they were asked how important it was that the materials used in their mouth were supported with relevant clinical research evidence and long term data of the success of the material. They were also questioned on the subjects of price, manufacturer, source or material and type of filling material. A significant amount of respondents demonstrated that they had concerns over the use of amalgam. **Conclusions** Respondents expressed strong views that the materials used on their teeth should have a robust evidence base and they care about the materials that are used in their mouths.

Refereed Paper
Accepted 9 November 2015
DOI: 10.1038/sj.bdj.2015.956
*British Dental Journal 2015; 219: 577-582

BRITISH DENTAL JOURNAL VOLUME 219 NO. 12 DEC 18 2015

CONCLUSIONS:

- Patients feel that materials should have a robust evidence base, produced by manufacturers with experience in the field
- Patients care about the materials that we use
- Almost half did not wish “own label” materials to be used in their mouths
- One third expressed anxieties regarding the use of amalgam in their teeth

Rules for survival

(of restorations & teeth)

There is no (economic) sense in buying a material with no research to back it up. Patients care!

Also on the subject of dental materials, an easy to use material may allow us to produce better results

- Choosing a reliable material
- Choosing the “right” material
- Bonding to dentine and survival of resin composite materials, including bulk fill
- A brief Kaplan Meier statistical analysis lesson
- Applying that to clinical decision making

For this, we need “evidence”

Black or white?

Non-adhesive	Adhesive
Tooth destructive	Non-destructive
Non-aesthetic	Aesthetic
Technique friendly	Difficult
Longlasting	Longlasting

Are success rates for posterior composite as good as for amalgam?

A quick summary of studies from general dental practice

Do you want to read more?

144 studies identified, 24 included

Dent.Update. 2019:46: 523-535

Mean Annual Failure Rate from these studies: *circa* 2%

Liner or base in Glass Ionomer had negative effect on survival
Overall, AFR (Annual Failure Rate) of 1.8% at 5 years and 2.4% at 10 years

Amalgam AFR similar/worse than composite

The physical properties of amalgam and resin composite are suitable for restoration of loadbearing cavities in back teeth, but what about the “evidence” for glass ionomer?

…because, after Minamata, dentists may be tempted to use GIC in posterior teeth?

FJ Trevor Burke

Dental Materials- What Goes Where? The Current Status of Glass Ionomer as a Material for Loadbearing Restorations in Posterior Teeth

Abstract: Glass ionomer materials have been available for 40 years, but have not been indicated for loadbearing restorations, other than when used in the ART concept. However, there is anecdotal evidence that dentists are using the reinforced versions of this material in posterior teeth, possibly as a result of demands from patients to provide them with tooth-coloured restorations in posterior teeth at a lower cost than resin composite. This paper reviews the existing literature on reinforced glass ionomer restorations in posterior teeth, concluding that, under certain circumstances (which are not fully elucidated) these materials may provide reasonable service. However, the patient receiving such ...orations and the potential need for the...

8 papers on GI in posterior teeth included

Burke FJT. Dent.Update: 2013:40(10):840-844.

Burke FJT. Dent.Update: 2013:40(10):840-844.

Conclusions

In clinical situations where there are no adverse situations at work (such as high occlusal loading or an acidogenic plaque), certain restorations in reinforced GI materials (such as Fuji IX) may provide reasonable longevity.

However, the conditions for longevity are not readily identified.

Two of the studies (Scholtanus and Huysmans, 2007: Basso, 2013) demonstrate higher than desirable failure rates for GI restorations in posterior teeth, especially in the longer term.

Trevor's view

Until more high quality evidence becomes available, for practitioners using reinforced GI materials in loadbearing situations in posterior teeth, it is prudent to advise patients of the relative paucity of good quality evidence for the success of the restorations that they are placing.

GC Equia doing well at 4 years

100% success of GC Equia at 4 years, 40 Class I, 30 Class II

©Operative Dentistry, 2015, 40-2, 134-143

Four-year Randomized Clinical Trial to Evaluate the Clinical Performance of a Glass Ionomer Restorative System

S Gurgan • ZB Kutuk • E Ergin
SS Oztas • FY Cakir

Clinical Relevance

The clinical effectiveness of Equia and Gradia Direct Posterior was acceptable in Class 1 and Class 2 cavities subsequent to four-year evaluation.

SUMMARY

Objective: The aim of this study was to evaluate the clinical performance of a glass ionomer restorative system compared with a microfilled hybrid posterior composite in a four-year randomized clinical trial.

Methods: A total of 140 (80 Class 1 and 60 Class 2) lesions in 59 patients were either restored with a glass ionomer restorative system (Equia, GC, Tokyo, Japan), which was a combination of a packable glass ionomer (Equia Fil, GC) and a self-adhesive nanofilled coating (Equia Coat, GC), or with a microfilled hybrid composite (Gradia Direct Posterior, GC) in combination with a self-etch adhesive (G-Bond, GC) by two experienced operators according to the manufacturer's instructions. Two independent examiners evaluated the restorations at baseline and at one, two, three,

Do amalgam substitutes exist?

Are reinforced glass ionomers an alternative?

Not really, *at present,* because their wear resistance isn't good enough and they are soluble in dilute organic acids

But, reinforced glass ionomers are a Godsend to special care dentists

Equia Forte (GC) holds promise

Equia Forte:Differences from Fuji IX

New ultrafine highly reactive glass particles added

Higher molecular weight polyacrylic acid

20% improved flexural strength, 21% improvement in acid resistance, 40% wear resistance

Improved fluoride release

data

Rules for survival

(of restorations & teeth)

There is a need for an improved
Glass Ionomer: if we get that,
it could be our amalgam substitute

- Choosing a reliable material
- Choosing the “right” material
- Bonding to dentine and survival of resin composite materials, including bulk fill
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- Applying that to clinical decision making

COMPOSITION OF DENTINE

70% Inorganic

20% Organic

10% Water

Bonding to dentine is therefore more difficult

It is a vital substrate

Why do dentists need adhesion?

- Cervical restorations
- Build up of fractured or worn anterior and posterior teeth
- Short clinical crown for full or partial coverage restorations
- Resin retained bridges

Also.....

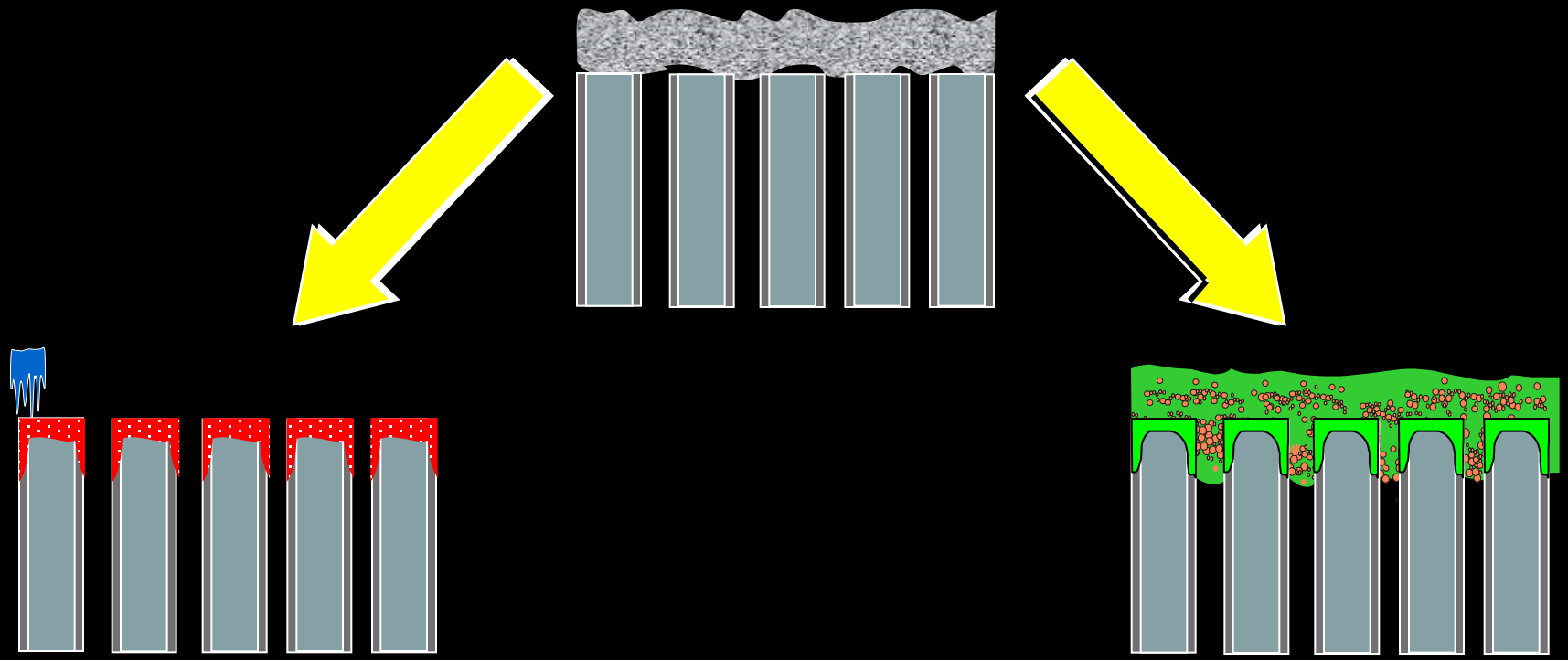
- Seals dentinal tubules to reduce post operative sensitivity
- Seals restoration margins to reduce the risk of marginal staining and recurrent caries (and also, post-operative sensitivity).

Problems in bonding to dentine

Smear Layer

- Thickness:
  0.5 - 5.0 microns
- Will not wash off
- Weak bond to tooth
  – 2 – 3 MPa
- Very soluble in
  weak acid

Previous strategies to treat the smear layer



Etch & Rinse/

Total etch, 4 steps

Self etch/

No Rinse, 1 step

The hybrid layer

….introducing

a new group of dentine bonding agents

Universal bonding agents

Treatment of the smear layer

- REMOVE (Etch & Rinse/Total etch)
- LEAVE/PENETRATE (Self etch)
- UNIVERSAL MATERIALS (Etch & Rinse, Selective enamel etch, Self etch) (use for direct and indirect)

Bonding agents: The first “Universal”

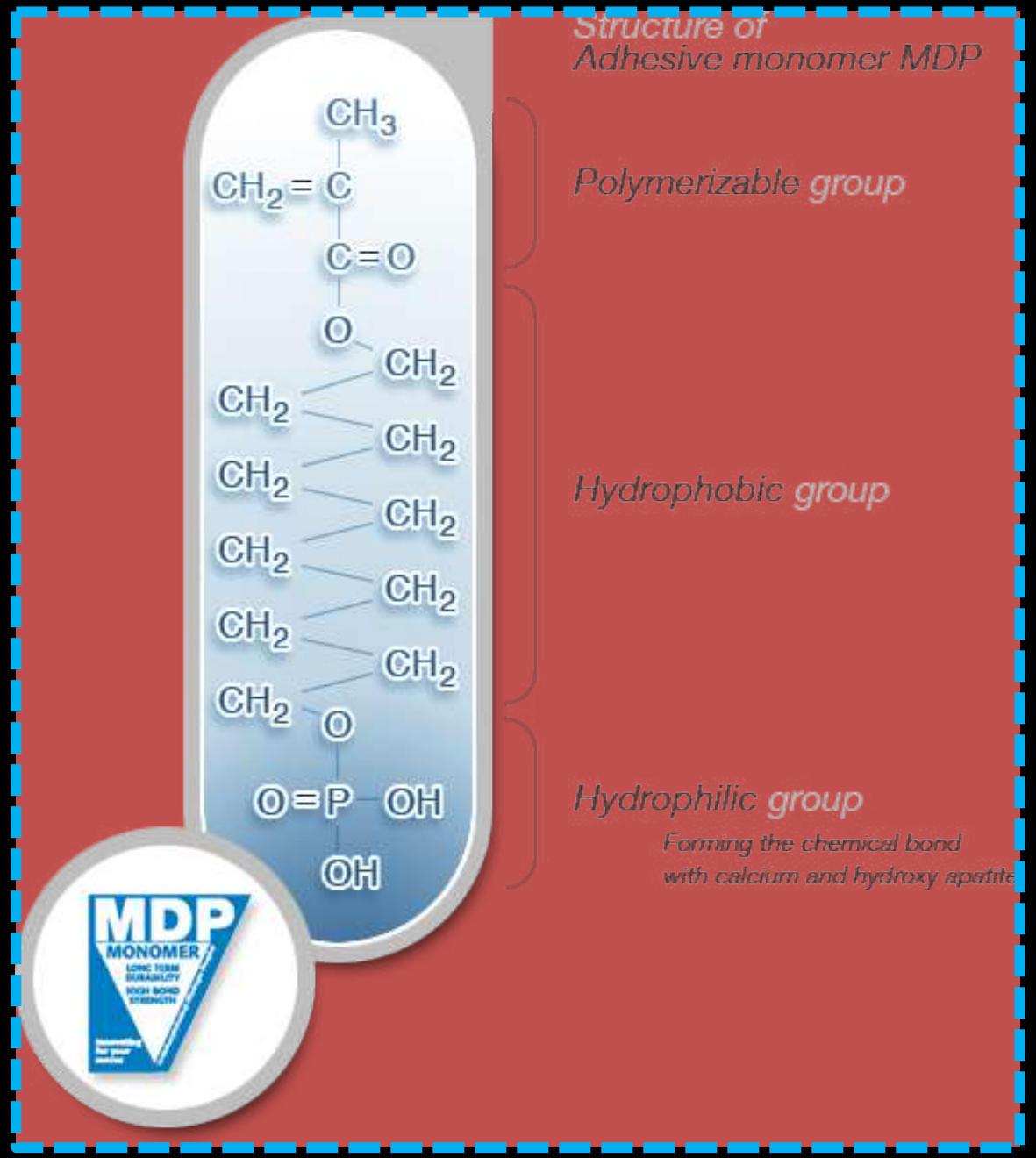
Scotchbond Universal Adhesive

Scotchbond Universal Adhesive: Composition

- BisGMA
- MDP
- Vitrebond Copolymer
- HEMA
- Ethanol
- Water
- Filler
- Silane
- Initiators

Universal bonding agents

new additions are on the way!



10-MDP is important for the status of the bond reaction with HAP

SUMMARY: Universal bonding agents:

Can be used in total etch, self etch, selective enamel etch modes

Are compatible with direct & indirect procedures

Can be used with self & dual cure luting materials (with separate activator)

Are suitable primers for silica & zirconia

Can bond to different substrates (e.g.metal)

Rules for survival

(of restorations & teeth)

New “Universal” dentine bonding agents hold great promise.

Incisal edge reattachment: indications for use and clinical technique

D. F. Murchison,[1] F. J. T. Burke,[2] and R. B. Worthington,[3]

This article presents an overview of the evolution of the incisal edge reattachment procedure. Case reports are described of patients presenting with traumatised teeth in which the reattachment procedure was performed. A review is provided of present *in vivo* studies detailing long-term success rates in the clinical application of this procedure. Finally, a recommended technique for diagnosis and treatment is offered to improve success in this procedure which may benefit a significant segment of the paediatric and adolescent populations.

Recent investigations into the incidence of dental trauma, especially in the paediatric and adolescent populations, have made it clear that this particular injury is of a significant nature and effects up to one-third of patients in this age group.[1] Prior studies have reported estimates that about one out of every four persons under the age of 18 will sustain a traumatic dental injury in the form of an anterior crown fracture.[2,3] More recent investigations through clinical examinations of large adolescent populations and surveys of lay knowledge on the management of avulsed teeth provide dentoalveolar trauma incident estimates ranging from 6–34%.[1,3–6] These reports confirm that dentists are confronted with managing dental trauma and restoring fractured teeth on a regular basis. Techniques that speed and simplify treatment, restore aesthetics, and improve long-term success rates are therefore of potential value and should be considered. The recent investigation by Hamilton *et al.* however, revealed high failure rates for treatments extended to adolescents experiencing dentoalveolar trauma, as well as a low knowledge level concerning management of specific traumatic injuries.[5]

A review of 25 published case reports indicates that 85% of traumatised incisors fracture in an oblique fashion from the labial to lingual aspects with the fracture line proceeding in an apical direction. This tendency has been confirmed in an *in vitro* investigation by Stokes.[7] This study demonstrated that the presence of this unfavourable fracture pattern, once restored, exhibits a low resistance to labially applied forces which mimic trauma force vectors, but may exhibit higher resistance to horizontal traction forces which occur with incising or tearing food. Other laboratory investigations have been published using models addressing a variety of materials and preparation designs in an attempt to optimise the strength and consistency of the reattachment procedure.[8–13]

The dental profession has attempted to educate the lay public to the prompt and appropriate management of avulsed teeth.[2,14] Numerous international campaigns to improve the emergent response necessary to optimise the prognosis in replantation cases have been carried out in Australia, Denmark, Brazil, Argentina, and the United States.[14] These educational attempts may result in patients (or parents) presenting with intact avulsed teeth, as well as fractured coronal tooth fragments. This article will address the treatment regimen for incisal edge reattachment, a treatment option that offers advantages of simplicity, immediate aesthetics, and conservatism in cases of dental trauma.

In brief

- Anterior crown fractures are commonplace in children and adolescents and may affect up to 25% of this patient population.
- If an intact tooth fragment is present after trauma, the incisal edge reattachment procedure presents a conservative, simple and aesthetic treatment.
- Clinical trials and long-term follow-up have reported that reattachment using modern dentine bonding agents or adhesive luting systems may achieve functional and aesthetic success for up to 7 years.
- Reattachment failures may occur with new trauma, parafunction, or horizontal traction. Athletic soft mouthguards and patient education may enhance clinical success.

Historical perspective

The first published case reattaching a fractured incisor fragment was reported in 1964 by paediatric dentists at Hebrew University, Hadassah School of Dentistry.[15] In an era of dentistry prior to commonplace acid-etching and bonding, the authors termed this treatment a temporary restoration. Other reports espousing a variety of preparation design features and materials for reattachment have appeared in the literature restoring teeth presenting with and without pulpal or periodontal complications.[16–43] Though some *in vitro* investigations attempted to define optimised materials and reattachment regimens, the majority of design features had been chosen empirically.

Reattachment techniques have been described in demanding clinical situations,[34,38] including one case reported by Simonsen in which an incisor fragment was reattached and the tooth subsequently subjected to orthodontic treat-

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REFEREED PAPER
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British Dental Journal 1999; 186: 614–619

Read more!
Br.Dent.J.1999:186:
614-617

It's not perfect, it's pragmatic aesthetics!

Filtek Supreme XT

43 year old male

Message:
The restorations require maintenance

The literature on “Dahl” treatment of tooth wear is now extensive

Journal of Dentistry 44 (2016) 13–19

Contents lists available at ScienceDirect

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journal homepage: www.intl.elsevierhealth.com/journals/jden

The survival of direct composite restorations in the management of severe tooth wear including attrition and erosion: A prospective 8-year study

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Composite survival
Tooth wear
Attrition

ABSTRACT

Objectives: Survival of directly placed composite to restore worn teeth has been reported in studies with small sample sizes, short observation periods and different materials. This study aimed to estimate survival for a hybrid composite placed by one clinician up to 8-years follow-up.
Methods: All patients were referred and recruited for a prospective observational cohort study. One composite was used; Spectrum® (DentsplyDeTrey). Most restorations were placed on the maxillary anterior teeth using a Dahl approach.
Results: A total of 1010 direct composites were placed in 164 patients. Mean follow-up time was 33.8 months (s.d. 27.7). 71 of 1010 restorations failed during follow-up. The estimated failure rate in the

Preventive advice for patients with an erosive element to their diet

- Reduce the amount & frequency of intake
- Avoid “frothing” or swishing drinks
- Avoid brushing teeth at least 30mins after drinking
- Chill the drink
- Avoid such drinks before bedtime or during the night

Preventive advice for patients with an erosive element to their diet

- Explain that there is increasing evidence that some toothpastes may help

"..the papers in this supplement detail the research techniques used to **confirm the positive effects of stabilised stannous fluoride on tooth erosion**"

What's new in polishing?

3M Science. Applied to Life.™

Polish with diamonds. Skip the paste.

Sof-Lex™ Diamond Polishing System

How much time and effort do you spend creating beautiful smiles? Whether you currently use a rubberized finishing and polishing system or an intraoral diamond polish, the process can be time-consuming. And, even with your best effort, the gloss may not last. 3M has a simple solution for both problems, using two of our innovative technologies.

Restore with Filtek™ Supreme Ultra Universal Restorative. Unsurpassed esthetics is just one reason why doctors use this nanocomposite. Thanks to 3M's true nanotechnology, it is easy to polish and offers unsurpassed polish retention.

Polish with the Sof-Lex™ Diamond Polishing System. Forget the messy paste. Our pre-polishing spiral prepares the restoration for final gloss, while our diamond-impregnated polishing spiral gives your restorations that gorgeous paste-like gloss. The system offers the convenience of a rubberized system while also adapting to all tooth surfaces.

You'll be happy to know that while the spirals are effective, they're also kinder to gingival tissues*—and maintain the integrity and anatomy of your restorations!

When patients leave your office smiling, you'll marvel at how simple it's become to create beautiful, natural-looking esthetics.

*Compared to other finishing and polishing tools.

A difference that you can see!

Filtek™ Supreme Ultra Universal Restorative polished with Sof-Lex™ Diamond Polishing System (left) vs. TPH Spectra® Universal Composite polished with Enhance® Finishing System and PoGo® Polishing System (right). Notice a clearer reflection with the Sof-Lex™ Diamond Polishing System.

You can create a diamond paste-like gloss with just two steps.

Summary of advantages

- Imparts paste-like gloss in the convenience of a rubberized system
- Unique, flexible shape adapts to all tooth surfaces
- Fast and easy to use
- Multi-use, can be sterilized and reused
- High, long-lasting gloss when used with Filtek™ Supreme Ultra Universal Restorative

I think that the Soflex Diamond Spiral is terrific!

Take home messages

Dentine bonding is now reliable and effective

Self etch adhesives do not produce bond strengths as high as etch & rinse systems

Selective etching of enamel is a good idea

Universal bonding materials with MDP are now the business

- Choosing a reliable material
- Choosing the “right” material
- Bonding to dentine and survival of resin composite materials, including bulk fill
- A brief Kaplan Meier statistical analysis lesson
- Applying that to clinical decision making

The database

- SN7024, available from UKDataService.ac.uk contains anonymized longitudinal data on patients attending the General Dental Services in England and Wales (UK)
- Over three million different patients
- Over 25 million courses of treatment, between 1990 & 2006
- Modified version of Kaplan-Meier methodology used to plot survival curves for different sub-groups

Because of the vast size of the dataset, we can now look at the effect of the restoration on *survival of the tooth*

“it is unrealistic to
expect controlled
longitudinal studies
to last more
than ten years”

Mjor et al, 1990

Therefore, large scale administrative data

The big numbers game

But some things are lost

First, a brief lesson in Kaplan Meier

The goal is to estimate a population survival curve from a sample.

If every patient is followed until death, the curve may be estimated simply by computing the fraction surviving at each time.

However, in most studies patients tend to drop out, become lost to follow up, move away, etc.

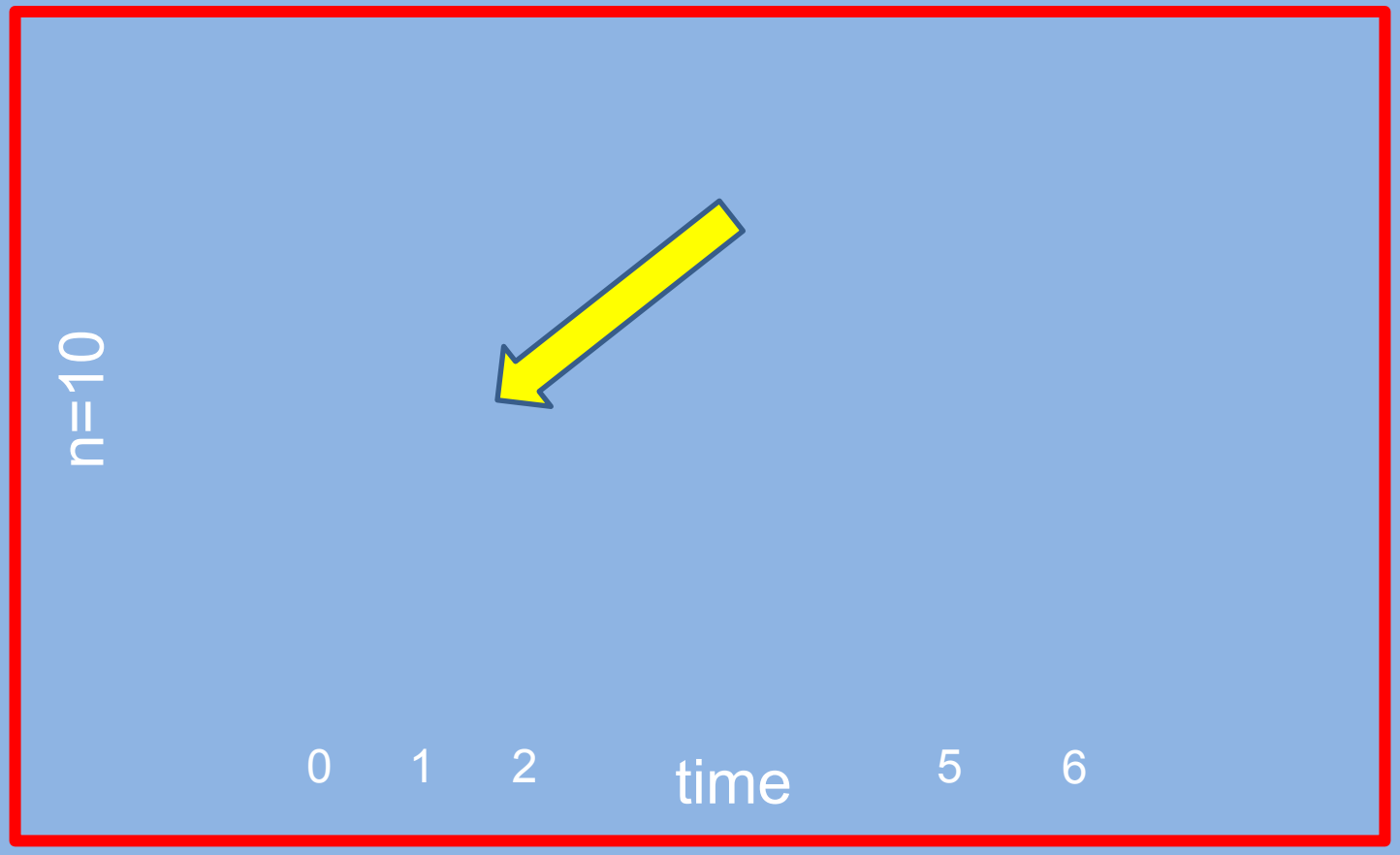
A Kaplan-Meier analysis allows estimation of survival over time, even when patients drop out or are studied for different periods of time.

First, a brief lesson in Kaplan Meier

For restorations, the observation time starts at time 0 in the graph.
Restorations that fail result in a drop in the graph.
Restorations that have not failed by the end of the study are called *censored* observations and these are included for only as long as they are observed.
Since information of both failed and non-failed restorations is used, the Kaplan Meier method is considered the gold standard in longevity assessment.

n=10 hypothetically

Kaplan Meier



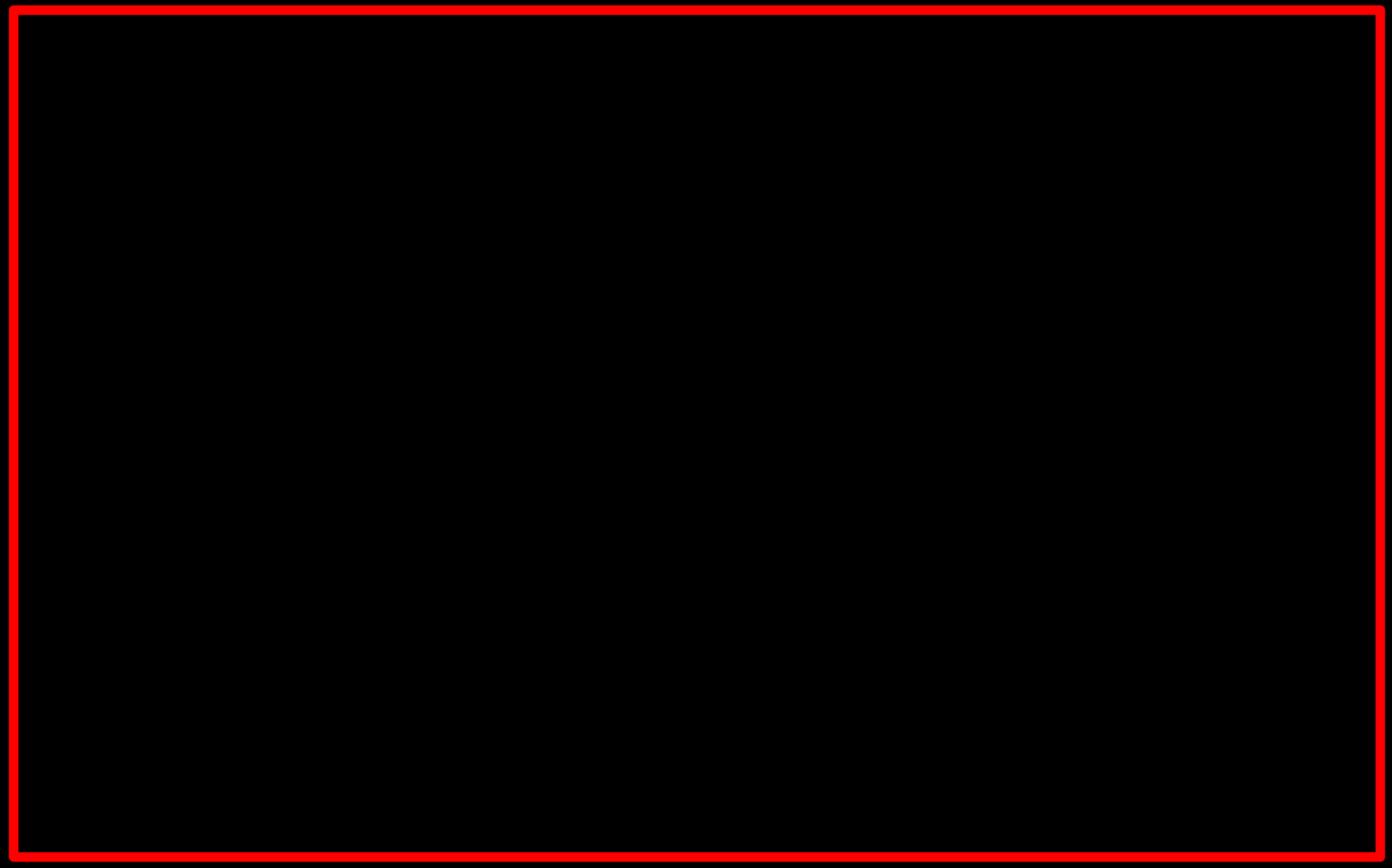
Vertical axis represents estimated probability of survival for a hypothetical cohort, not actual % surviving.

Looking at what has happened will give us a handle on how well restorations (and restored teeth) might survive

This is important when advising patients on how well their treatment might perform, because patients are sueing dentists more each year

Molar teeth: 6,311,720 restorations

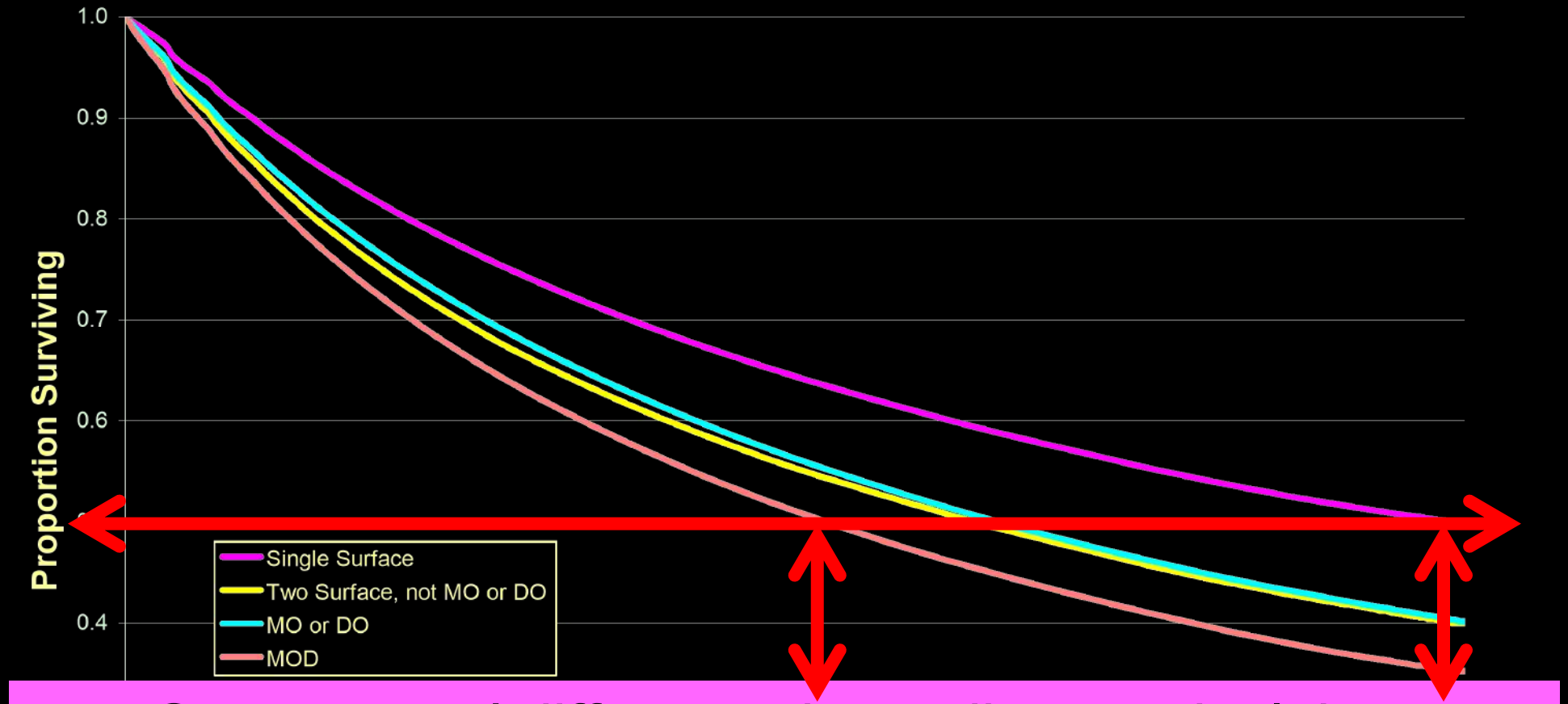
The effect of cavity design on amalgam restoration survival



Direct placement restorations: amalgam

7,425,049 amalgam cases included, of which 2,537,331, of which had a re-intervention

Amalgam Restoration Survival by Type of Cavity



Seven years' difference in median survival time between MOD restorations and class I restorations

Take home message

Keeping restorations as small as possible is therefore important

We can only do this with adhesive dentistry

Rules for survival

(of restorations & teeth)

Size matters – big fillings last less well than small.
Keeping fillings as small as possible is therefore important.

IN BRIEF

- One hundred and eighty dental surgeries were tested for environmental mercury.
- Sixty eight per cent had environmental mercury readings over the occupational exposure standard.
- Greater emphasis is needed in the safe handling of mercury.
- Dentists were more likely to have suffered a kidney disorder than the control group.

Mercury vapour levels in dental practices and body mercury levels of dentists and controls

K. A. Ritchie,[1] F. J. T. Burke,[2] W. H. Gilmour,[3] E. B. Macdonald,[4] I. M. Dale,[5] R. M. Hamilton,[6] D. A. McGowan,[7] V. Binnie,[8] D. Collington[9] and R. Hammersley[10]

Aim A study of 180 dentists in the West of Scotland was conducted to determine their exposure to mercury during the course of their work and the effects on their health and cognitive function.

Design Data were obtained from questionnaires distributed to dentists and by visiting their surgeries to take measurements of environmental mercury.

Methods Dentists were asked to complete a questionnaire including items on handling of amalgam, symptoms experienced, diet and possible influences on psychomotor function such as levels of stress significantly associated with their level of mercury exposure as measured in urine. One hundred and twenty two (67.8%) of the 180 surgeries visited had environmental mercury measurements in one or more areas above the Occupational Exposure Standard (OES) set by the Health and Safety Executive. In the majority of these surgeries the high levels of mercury were found at the skirting and around the base of the dental chair. In 45 surgeries (25%) the personal dosimetry measurement (ie in the breathing zone of dental staff) was above the OES.

CONCLUSIONS

- Dentists short-term memory worse than controls
- Periodic health surveillance of DHCWs indicated
- Kidney disorders not correlated with surgery Hg vapour levels
- Safer handling of amalgam needed
- Further studies indicated on all members of the dental team

Contemporary UK dental practice 2015/16: Comparison with previous results: premolars

Amalgam for Class II, 2002….86%

Amalgam for Class II, 2008….59%

Amalgam for Class II, 2015….40%

25% of respondents stated that amalgam should continue to be used freely, 41% considered that it should be phased down or out

Burke FJT, Wilson NHF, Brunton PA, Creanor S.BDJ 2019

The Minamata Convention

Final agreement, 10th & 11th October 2013, 147 countries signed up

From 1st July 2018, amalgam banned in children under 15 and pregnant/nursing women

"Worldwide reduction and ultimate ban on mercury containing products"

And, don’t forget that patients seem to like tooth-coloured restorations in their back teeth!

Dent.Update.1989: 16.114-116

Rules for survival

(of restorations & teeth)

Amalgam has maintained dental public health in the developed world for 125 years, but its days are numbered

Are success rates for posterior composite as good as for amalgam?

YES - and we aren't even comparing composite in its best situation

Time taken for posterior composites =X2.5 time for amalgam

Burke F.J.T.

Attitudes to posterior composite filling materials: A survey of 80 patients.

Dent. Update. 1989:16:114-120.

Alternatives for the restoration of posterior teeth Christensen, 1989

	COST
Amalgam	1X
Cast gold	6X
Direct-placement composite	2.5X
Direct resin inlay	5X
Composite inlay	6X
Ceramic inlay	8X
Metal-ceramic crown	8X

Rules for survival

Perhaps the new bulk fill materials are the answer?

Longevity of posterior composite restorations is at least as good as amalgam, but they take longer to place

BULK FILL IS IN!

My new classification for **BULK FILL** materials:

BULK FILL BASE MATERIALS
(which need a capping because their wear resistance isn't good enough)

BULK FILL RESTORATIVE MATERIALS
(satisfactory wear resistance)

BULK!

These need a topping because their wear resistance wasn't good enough

So, the original bulk fill base materials are now history!

NOW!

New bulk fills that don’t need a topping!

Today there are several bulk fills which do not need a “topping”

.. more are appearing!

Advantages of Bulk Fill *Restorative* materials

- Time saving, no need for complex layering technique
- Easier handling
- Fewer increments, fewer voids
- Simpler shade selection, due to fewer shades

BULK FILL IS IN!

European Journal of Prosthodontics and Restorative Dentistry (2016) 24, 152-157

A Practice-Based Clinical Evaluation of a Bulk Fill Restorative Material

Keywords

Evaluation
Composite Resins
Bulk Fill
Handling Properties

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ABSTRACT

Objective: To evaluate the handling, by a group of practice-based researchers, of a recently introduced bulk fill resin-based composite restorative material, Filtek Bulk Fill Restorative (3M ESPE). Methods: The twelve selected evaluators were sent explanatory letters, a pack of the material under investigation to use for 8 weeks, and a questionnaire. Results: The evaluators rated the ease of use of the bulk fill restorative the same as the previously used posterior composite material. The provision of one shade only for evaluation may have compromised the score for aesthetic quality. No post-operative sensitivity was reported. Conclusions: The bulk fill material was well received as indicated by the high number of evaluators who would both purchase the material and recommend it to colleagues. Clinical relevance: A recently introduced bulk fill restorative material achieved a rating for handling which was similar to the evaluators' previously used resin composite, although there were some concerns regarding the translucency of the material.

INTRODUCTION

PRACTICE BASED RESEARCH

The value of practice-based research has been previously discussed,[1] with the arena of general dental practice having been considered the ideal environment in which to carry out evaluations of the handling of dental materials and their clinical effectiveness. In this regard, a wide variety of research projects may be considered to be appropriate to general dental practice, including[1] assessment of materials, devices and techniques, clinical trials of materials, assessment of treatment trends and, patient satisfaction with treatment.

A UK-based group of practice-based researchers is the PREP (Product Re-

How do manufacturers do it?

SUMMARY

More potent/efficient initiator systems (Ivoclar)

Increasing the translucency of the filler (all)

For some, improved resin systems (3M)

Avoiding post-op sensitivity with posterior composites

- Use a so-called self etch or Universal Material, AND do not etch the dentine
- Use a low shrinkage stress composite
- Ensure good adaptation at the gingival margin
- Ensure adequate light luring
- Use a reliable manufacturer’s material

An amalgam substitute should:

Be self adhesive

Have 5mm depth of cure

Have low shrinkage stress

Have good physical properties and good wear resistance

Be quick & easy to place

Be non toxic

In addition, today, adequate aesthetics for back teeth

Rules for survival

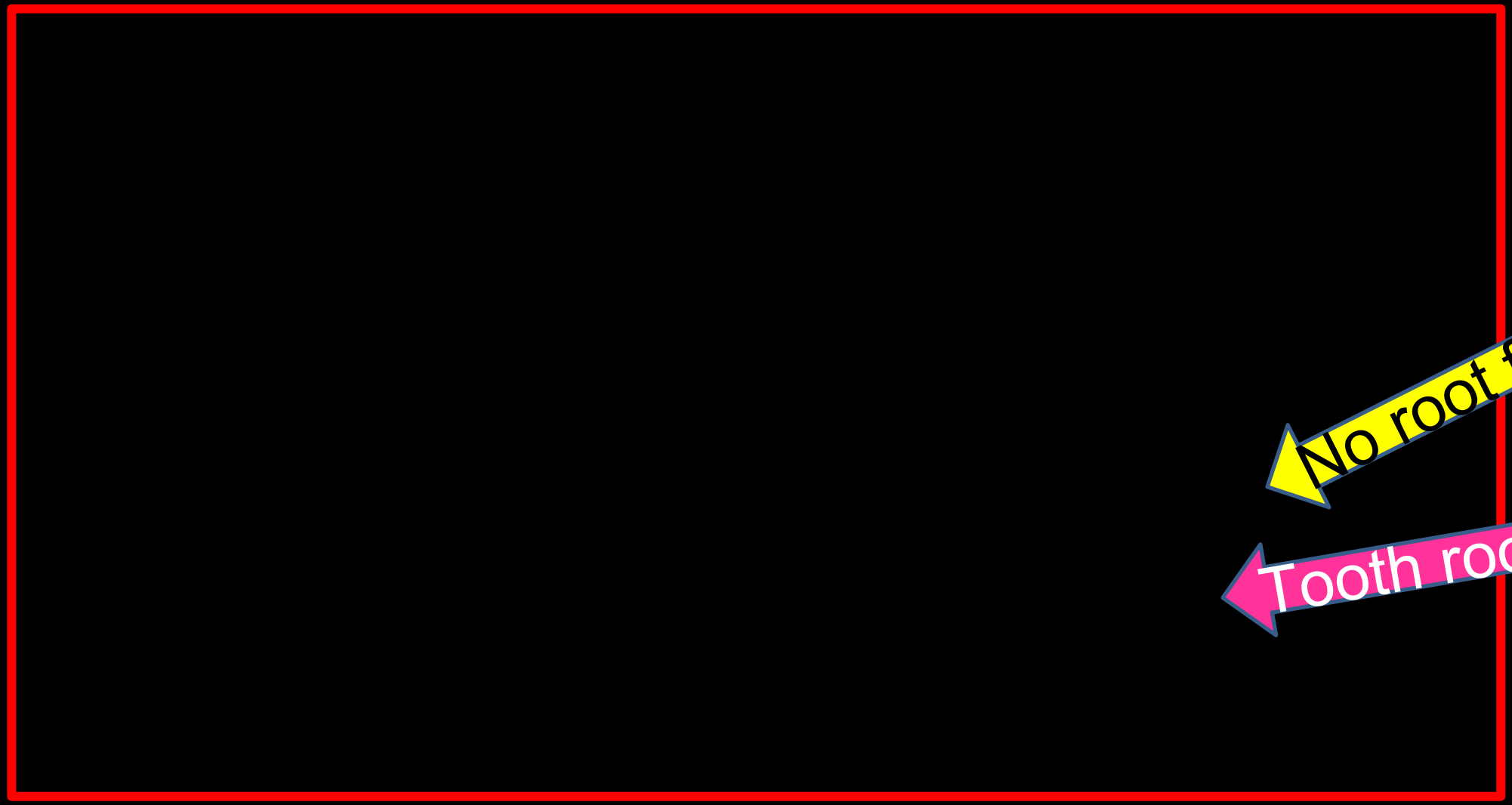
(of restorations & teeth)

Perhaps the new bulk fill materials are the answer for restorations in back teeth, at least in the medium term

General Rules for survival

(of restorations & teeth)

The effect of root filling ***on restoration survival***



No root filling

Tooth root filled

…with apologies to my endodontist friends!

The effect of root filling ***on survival of the restored tooth*** is even more dramatic

The message therefore is… prevention, and educating patients that restoring a tooth before the pulp is involved is a good idea!
Or, sealing in caries in a vital, asymptomatic tooth.

Edwina Kidd's paper in Dental Update on this topic is essential reading

Cariology


Edwina Kidd


Ole Fejerskov


Bente Nyvad

Infected Dentine Revisited

Abstract: Dentine becomes infected as a result of caries lesion formation on root surfaces and when lesions progress following cavitation of enamel lesions. However, this infection is unimportant because the driving force for lesion formation and progression is the overlying biofilm. This explains why root surface caries can be controlled by mechanical plaque control and fluoride, and restorations are not needed to arrest these lesions. Similarly, the infected dentine in cavitated coronal lesions does not have to be removed to arrest the lesion. If the lesion is either accessible or opened for cleaning by the patient or parent, the lesion can be arrested. Sealing of infected dentine within the tooth, either by a Hall crown in the primary dentition or by partial caries removal prior to placing a well-sealed filling, will also arrest the lesion. When restoring deep lesions in symptomless, vital teeth, vigorous excavation of infected dentine is likely to expose the pulp and make root canal treatment necessary. Thus 'complete excavation' is not needed and should be avoided.

CPD/Clinical Relevance: Root surface caries can be arrested by cleaning and fluoride application. Restorations are not essential. Vigorous excavation of softened dentine in deep cavities of symptomless, vital teeth is contra-indicated. It is not needed and increases the risk of

Kidd E, Fejerskov O, Nyvad B. Infected dentine revisited. Dent.Update.2015:42:802-809.

CONCLUSIONS

When restoring deep caries lesions in vital, asymptomatic teeth, vigorous excavation is likely to expose the pulp. This complete excavation is not needed and should be avoided.
Always produce a sound cavity margin for bonding.

Another way of managing deep caries in a vital tooth

Biodentine™

Bioactive Dentine Substitute

ACTIVE BIOSILICATE TECHNOLOGY

septodont

The  evidence base is building

Bioactivity of Biodentine

"The local bioactivity of the calcium silicate materials has been shown to produce mineralisation within the dentine substrate, extending deep into the tissues"

"Local ion-rich alkaline environment is more favourable to mineral repair compared with glass ionomer materials"

"The advantages of this re-mineralisation phenomenon for minimally invasive management of carious dentine are self-evident"

Bioactivity of Biodentine

CONCLUSION:

“There is a clear need to improve the bioactivity of restorative dental materials and calcium silicate systems offer exciting possibilities in achieving this goal”

Biodentine *vs* Theracal

The leaching of Calcium ions was much lower in Theracal than in Biodentine

Theracal did not exhibit any formation of $Ca(OH)_2$ on hydration

The presence of a resin matrix modifies the setting mechanism and calcium ion leaching of Theracal

The clinical implications of these findings need to be investigated

Biodentine™

Advantages & disadvantages

Advantages	Disadvantages
Maintains pulp vitality	
Biocompatibility	Technique sensitive
Long working time	Long working time
Suitable for use with the “thumb” technique	Idiosyncratic handling
	Mixing sensitive

How to make the sealed caries concept work in your practice

- Make sure that the patient understands the PIL (consent)
- Advise the patient that (s)he is having a therapeutic (healing) filling
- That (s)he will have to pay for that and again in 9-12 months to have it resurfaced

General Rules for survival (of restorations & teeth)

Root filling a tooth reduces the life of the filling and the tooth, but……

The effect of patient age on *survival of restorations*

We must be careful what we promise when restoring teeth for older patients

Restorations in older patients perform less well than those in younger patients

Rules for survival

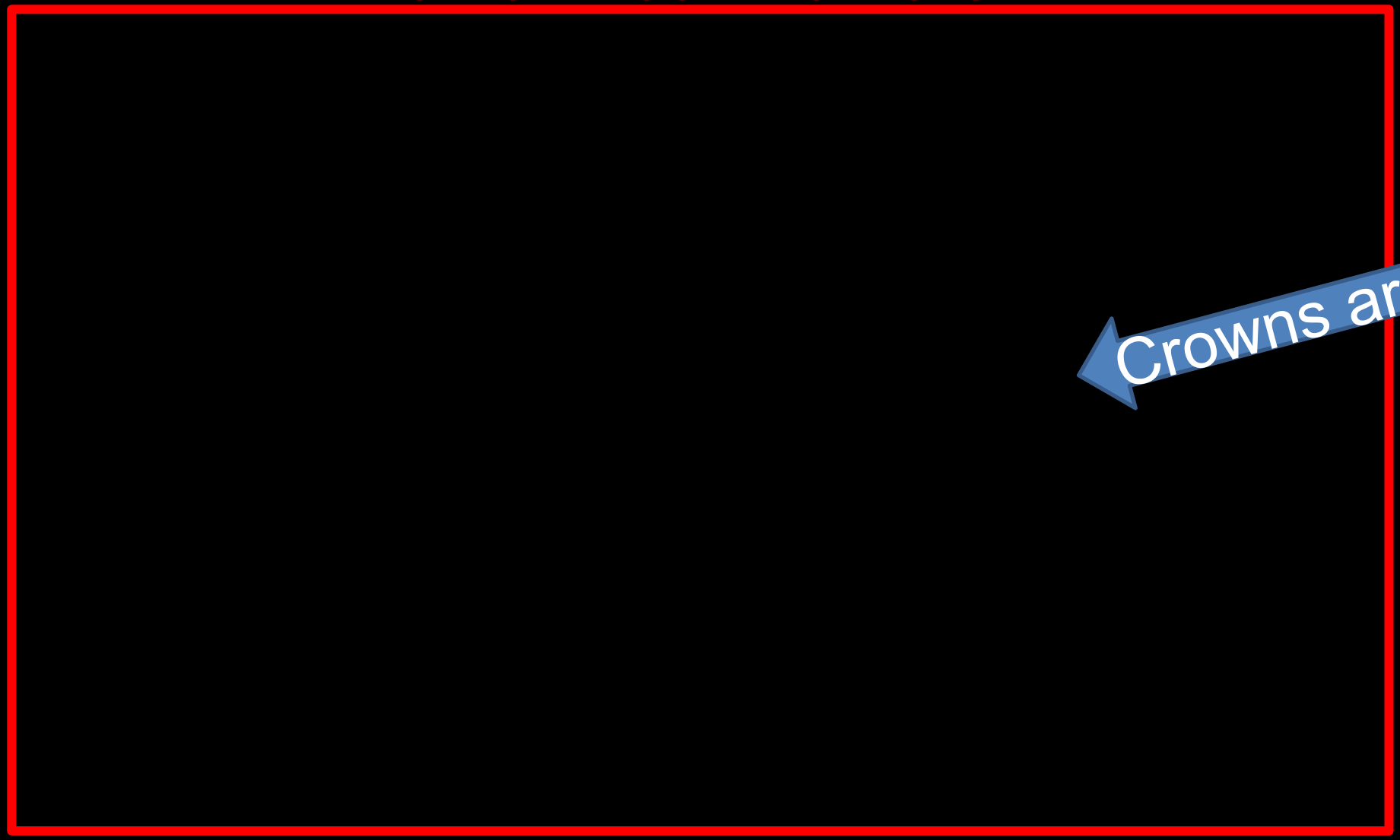
Whichever way we look, Glass Ionomer restorations perform less well than any other restoration type

Therefore use in compromise situations where we need adhesion but not strength

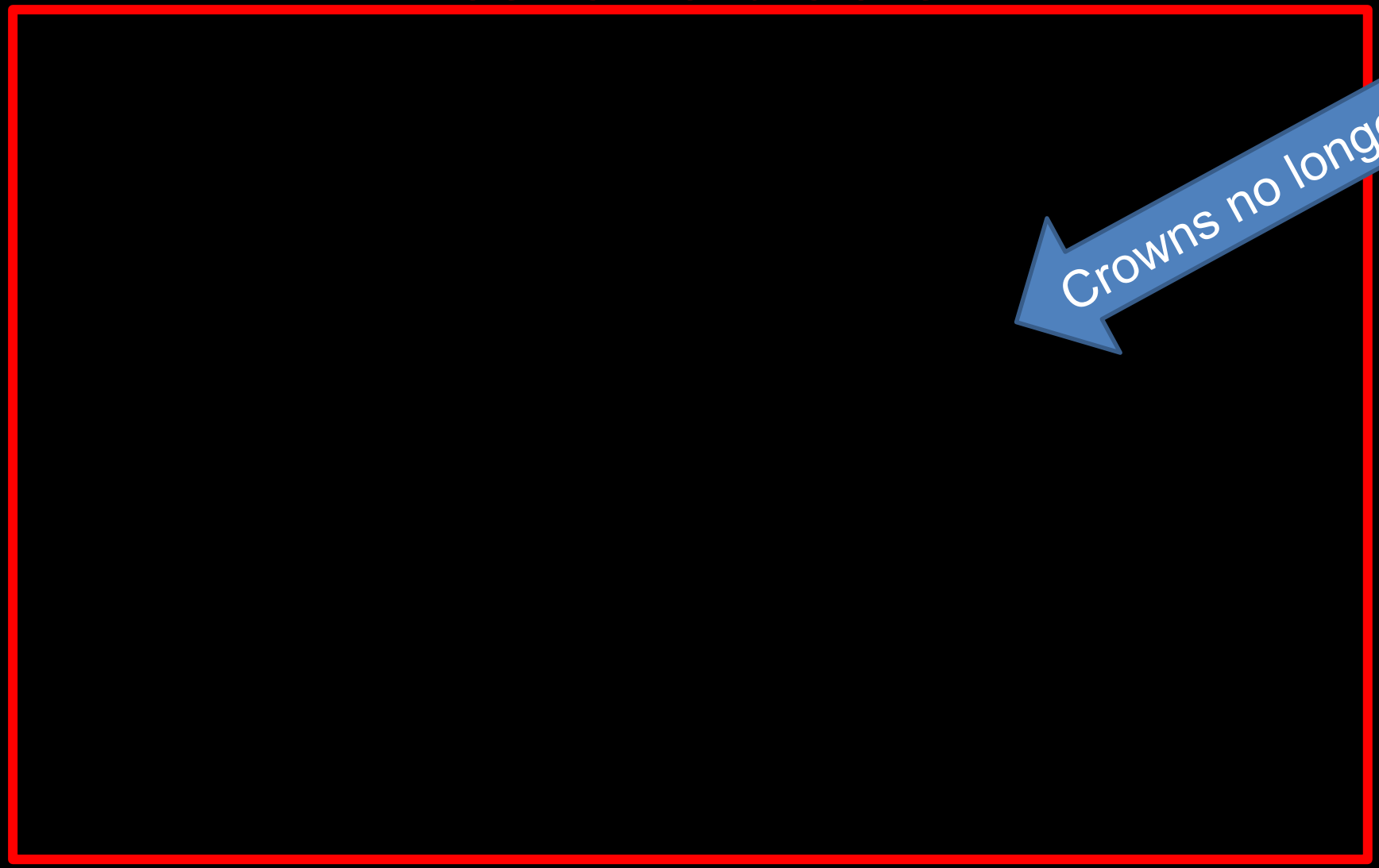
Molar teeth: 6,311,720 restorations

The effect of crowns

Molar teeth: ***restoration survival to next intervention***



Molar teeth: ***survival of the restored tooth to extraction***



Crowns no longer are best!

Time to extraction of crowned teeth, with regard to tooth notation

Crowns perform worst on canine teeth

The difference in time to extraction between the worst performing crowned teeth and the best being *circa* 18 percentage points in cumulative survival.

Crowns: Conclusions

- While crowns provide a patient with a restoration which requires the least number of re-interventions, they perform poorly (indeed, as poorly as GI) when time to extraction is examined.
- Factors influencing crown survival are patient age and patient treatment need, with patients with high treatment need having crowns which perform suboptimally.

Crowns: Conclusions

- Factors influencing crown survival also include dentist age, but, in comparison with direct restorations in which younger dentists out-perform older dentists, for crowns, dentists in the 30 to 60 age group provide crowns with optimum performance.
- Crowns placed on upper canine teeth perform worse than crowns placed on any other tooth: crowns perform best on first molar teeth
- Placing a pinned core appears to enhance the longevity of the subsequent crown, whereas the placement of a root filling or a metal post does not.

Rules for survival

(of restorations & teeth)

It’s only in older patients that crowning a molar tooth is a good idea!

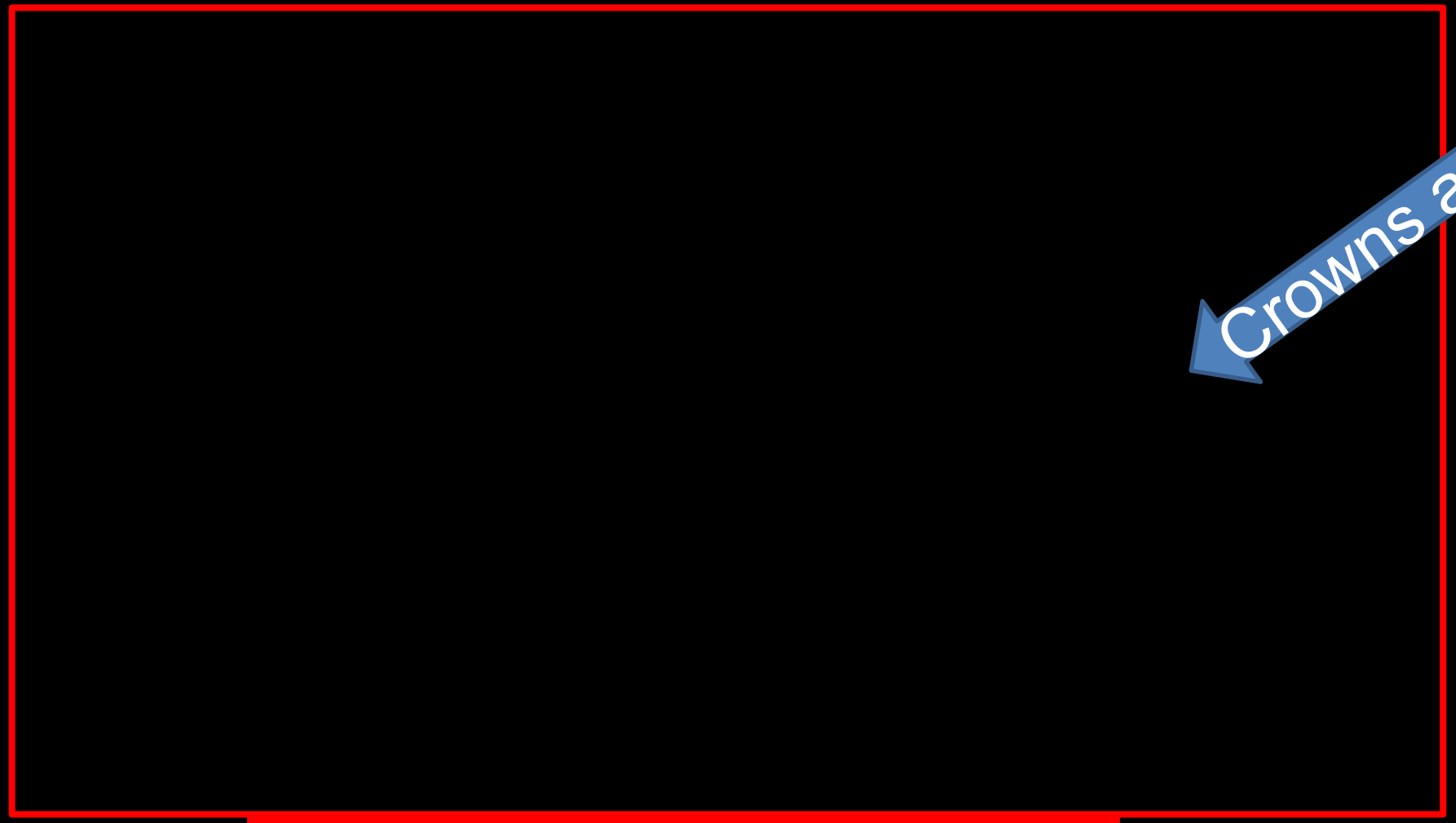
Crowns: Time to extraction

post *vs* no post

Conclusion!
Avoid posts if possible!

Incisor teeth: 2,526,575 restorations:

Restoration survival to next intervention



Crowns perform best!

Incisor teeth: ***Survival of the restored tooth***

Rules for survival

(of restorations & teeth)

In general, keeping an incisor tooth going with a direct placement filling is a a better option than reducing a tooth for a crown. The same applies to tooth wear cases.

Survival without re-intervention:

- 89% at 1 year
- 67% at 5 years
- 53% at 10 years

Is this good enough for an elective restoration?

Burke FJT, Lucarotti PSK. Ten-year outcome of porcelain laminate veneers placed within the General Dental Services in England and Wales. J.Dent.2009:37: 31-38.

Rules for survival

(of restorations & teeth)

Actual longevity of veneers is poor, but the life of the tooth is not compromised

Premolar teeth: the effect of MODs

MOD restorations in premolars don’t do well, no matter how you look! Therefore..

Avoid cusp fracture by…….

Canine teeth:1,232,041 restorations

Regarding re-intervention, veneers and crowns outperform other restoration types, with 45% and 40% respectively surviving to re-intervention at 15 years and with glass ionomer restorations performing least well.

However, regarding to time to extraction of the restored canine tooth, veneers continue to perform optimally (around 93% cumulative survival at 15 years) but crowns represent the worst performing restoration at 15 years (66% cumulative survival),

Canine teeth: effect of root fillings

Root fillings in upper canine teeth perform worse than in any other tooth!

Root fillings

WHY?

Rules for survival

(of restorations & teeth)

Crowning a canine tooth leads to a reduced lifespan of the crowned tooth.
Root fillings perform worse in canines than in any other tooth.
Patients must be told!

Overall conclusions on crowns

Crowning a tooth leads to an earlier demise of the tooth than placing direct restoration/s

For youngest age groups, crowns perform worst

Avoid crowns in back teeth, except in the oldest age groups

Try to avoid placing a post

“The patient’s need is the continued preservation of what remains of his chewing apparatus rather than the meticulous restoration of what is lost, since what is lost is irretrievably lost”

deVan, 1952 Reprinted 2006

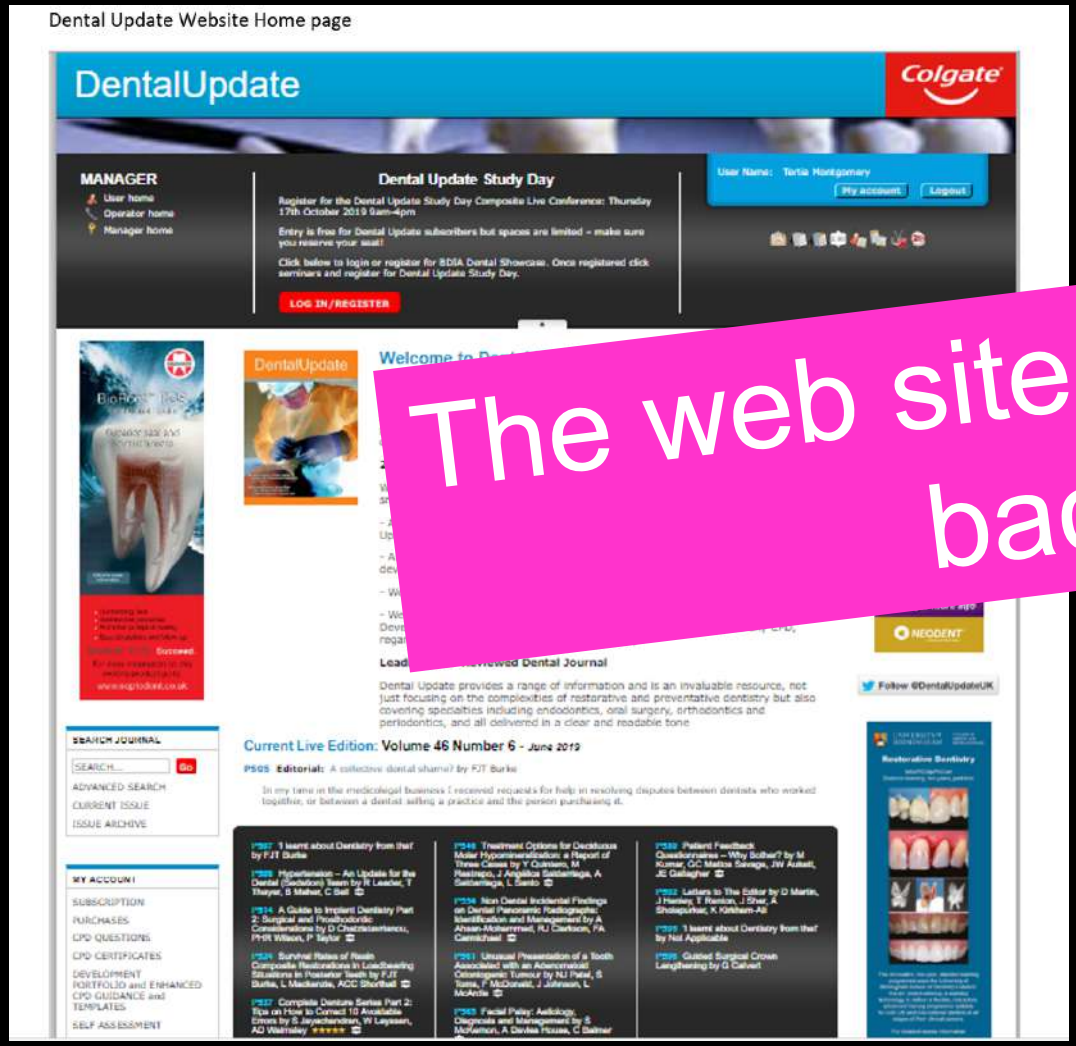
DeVan MM Basic principles of impression taking. J.Prosthet.Dent.1952:2:26-75
DeVan MM. Basic principles of impression taking.J.Prosthet.Dent.2006:93:503-508

If you
want to
read it
rather than
listen to it…
Dent.Update 2017,
BDJ, series of 10 papers, 2018

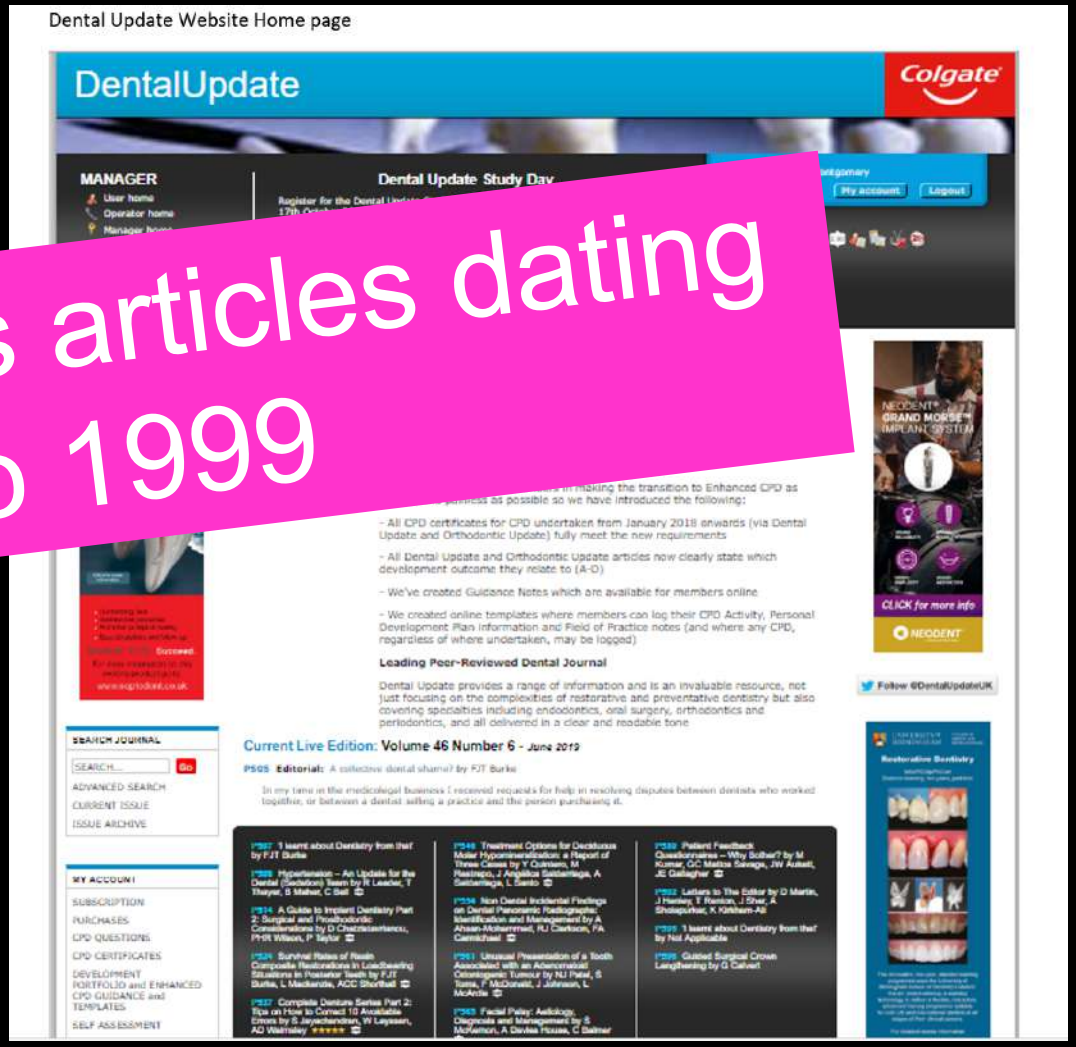
45 years of evidence-based publishing!

www.dental-update.co.uk

Dental Update Website Home page



Dental Update Website Home page



The web site has articles dating back to 1999

Hope that these notes have been useful

And, thanks again to my sponsors