Top tips for the application of dental materials in primary dental care

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Keeping abreast of advances in dental materials is a challenge for even the most enthusiastic of clinicians. However, product development offers the dental team the opportunity of optimising their clinical skills and hence outcomes for patients in primary dental care. The present paper discusses some fundamental and some specific points with the intention of helping busy practitioners to make best use of dental materials in practice, although all the tips offered may be extended to the practice of restorative dentistry in general.

1. Know how beats guess how

It has long been said that know-how surpasses guess-how, and it is of utmost importance in using dental materials in order to get the most out of these often-expensive commodities. Clinical dentistry, and in particular restorative dentistry, involves a series of problem-solving steps each demanding an understanding by the clinician of the pathology and how this may be best managed by operative intervention. A critical factor in this treatment is the selection of the most appropriate dental material or materials for the situation. It therefore goes without saying that a thorough understanding of the properties, indications, contraindications and handling of each dental material or biomaterial is critical to the optimum outcome for the treatment in question.[1]

This knowledge and understanding may be gained by personal reading from textbooks or peer-reviewed literature, attendance at quality-assured postgraduate lectures and courses and by interaction with the materials companies themselves. Establishing, building and continuing a professional relationship with representatives of reputable companies is a very useful way of learning about dental materials and keeping this knowledge contemporary. These colleagues possess a wealth of knowledge and, in many cases, experience, which may be invaluable to the busy practitioner. Furthermore, should the representative not be in a position to answer any specific enquiries, then technical support is readily available from their company.

It is critical and obvious that all members of the dental team are involved in this education and training. Almost universally, the operator will be assisted in surgery by a dental nurse whose responsibility it will be to handle, mix (if necessary) and present the dental material or biomaterial to the treating clinician. The knowledge, understanding and skills of all members of the dental team must be current and of a high level in order to properly support the clinician in the treatment of the patient. Learning together as a team fosters excellent communication, trust and team-working skills, the importance of which can never be underestimated in the clinical environment.

2. Utilise the product instructions

Like the previous tip, reading the instructions or product directions for use (DFU) seems an obvious statement to ensure its appropriate and correct usage.[1] In the same way it is wise when assembling flat-packed furniture to read the instructions in their entirety before embarking on the construction of the product, the DFU should be consulted by all members of the dental team before clinical use (Fig. 1). Following these instructions fastidiously will yield consistent and predictable results every time. The DFU of each new batch of material should be studied as products may change with time due to evolution which may necessitate different usage or handling demands. It is good practice to retain a copy of the most recent DFU in a file in an area of the clinic accessible to all staff members for reference. This file can be maintained by the team member responsible for stock control.

Fig. 1 The directions for use file (DFU file)

Contained in the DFU of the material, the manufacturer will impart information which will inform the reader of the indications and contraindications of the product. It is important to stress that all materials should be used only in accordance with these instructions and the operator should never be tempted to 'ski off-piste' so to speak and use the product for an indication not explicitly stated in the DFU. This dangerous strategy will surely lead to failure and unfortunate medico-legal consequences should a complaint be pursued. Similarly, should there be any issues with treatment failure by the correct prescription and usage of the product, then the dental team will be supported by the manufacturer in whose commercial interests it is

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to find a solution to the problem. It is worth noting at this point that products such as bonding agents and resin composite materials which have been designed to be used together should be consistent in terms of their manufacturer, in other words from the same stable. Choosing products from different companies and attempting to use them together can lead to failure as they may be chemically incompatible. Furthermore, the manufacturer will not be in a position to offer assistance as discussed earlier should a problem arise.

Very often, products, particularly those which demand a more involved clinical protocol such as requiring many procedural steps (for example, dental bonding), are supplied with step-by-step pictorial guides for use at the chairside (Fig. 2). There is nothing to be ashamed of by using these guides to ensure that the clinical protocol is followed exactly and in fact it could be argued that this good practice should be encouraged to yield best clinical outcomes. It is wise to explain to the patient why this is being done and they will be reassured and grateful that the team are providing them with the best of care.

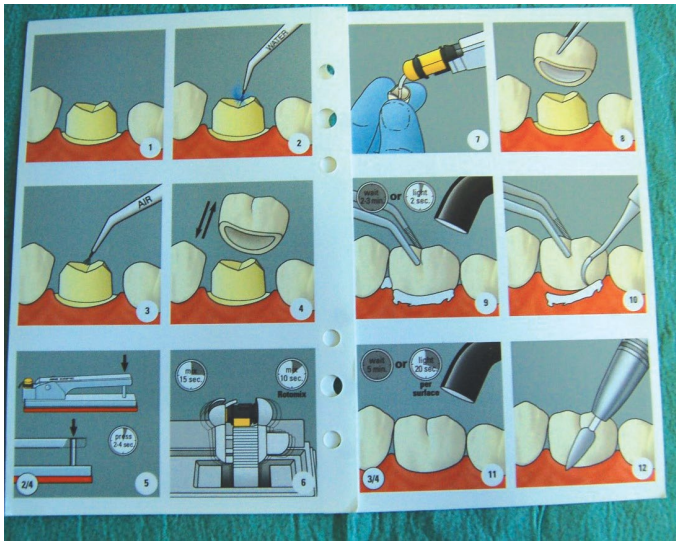

Fig. 2 Useful step-by-step pictorial guide

3. Spend to save – choose *bona fide* materials from reputable companies

Dental material and biomaterial manufacturing companies invest huge sums of money in research and development to ensure consistent and predictable performance of their products. This may not always be said for all materials which are available on the market, in particular 'own-label' products.[2,3] The clinical performance of these latter materials may not be supported by any robust scientific evidence with behaviour even varying between batches.[4,5,6,7] Premature failure of inferior products will invariably lead to reputational damage to the dentist[8] and their practice with an associated financial cost to remediate the treatment for the potentially unhappy patient. It is wise therefore to select products manufactured by reputable companies whose quality control and assurance procedures are of a high standard. Very often these products may be more expensive, but with this investment comes a reassurance that the product being used to treat the patient is of the highest quality with research data to support its use and clinical performance.

4. Putting it into practice

a. Using materials to their full extent

An example of a resin composite adhesive cementation system is Panavia V5 (Kuraray Noritake, Osaka, Japan) which is widely used for the cementation of resin-bonded bridges (RBBs)[9] and indeed for other restorations which require to be bonded to dental hard tissue such as lithium disilicate ceramics. Prior to its use clinically, it is essential to lay out the product and follow the instruction card, explaining to the patient this is a highly technical cementation process. It can be useful for the dental nurse to read out the instructions as this acts as a valuable checklist with good communication being the key throughout. This particular material is often not used to its full utility and it is important to remember five distinct shades which are available; namely, white, brown, universal, clear, and opaque. In the aesthetic zone, although an opaque resin cement is frequently selected, it is advisable to utilise the try-in pastes which are included in the kit to assess the effect of metal 'shine-through' before final bonding. This stage is one that can pay dividends as the aesthetics of the definitive restoration can often be enhanced. Prior to cementation, the surface of the tooth should be prepared by ultrasonic scaling followed by application of a pumice slurry on a bristle brush. If the tooth surface has previously supported a RBB retainer, or has been restored with resin composite, then the surface should be particle air abraded with 50 µm alumina under rubber dam isolation before undertaking the bonding stages. In order to facilitate excess cement removal post-bonding, it is wise to place polytetrafluoroethylene (PTFE) tape interproximally between the abutment tooth and the adjacent tooth.

b. Using a material for many indications

Glass ionomer cements (GICs) or, to use their proper chemical name, the glass polyalkenoate cements, are a versatile group of materials. While physically weaker than resin composites, they can be utilised to provide aesthetic outcomes and have a wide range of uses. These include definitive restorations in Class III and V restorations, temporary restorations including inter-appointment visits in endodontics, deep margin elevation, and definitive restorations in paediatric dentistry. They are also available to lute cast restorations such as crowns, although the powder-to-liquid ratio differs from those restorative products listed above.

GICs chemically attach to dental hard tissue via calcium chelation and subsidiary collagen bonding, which makes them particularly useful in the management of Class V cavities associated with non-carious tooth surface loss, especially where such lesions are associated with symptoms of dentine (hyper) sensitivity. For many Class V cavities, visibility and access to the gingival margin can be assisted by using retraction cord which, in addition, controls gingival crevicular fluid ingress into the treatment area which may compromise moisture control. As with most branches of restorative dentistry, the use of magnification when working clinically is strongly recommended.[10,11]

In endodontics and in the restorative stabilisation phase, Fuji Triage (GC, Leuven. Belgium) is a useful material as the orange colouring allows for ease of removal without risk of concomitant excessive tooth substance while maintaining coronal seal. The concept of colouring materials is not a new one and was used

by American military dentists in the Vietnam war where IRM (Dentsply, Konstanz, Germany) was coloured with a dye which indicated whether the tooth required restorative treatment (blue) or endodontics or extraction in which case the cement was coloured red.[12]

Further development of GICs in recent years has led to the appearance of products such as Equia Forte HT (GC), whose indications include the restoration of Class I and II cavities and to build up cores. This has been made possible by incorporating filler particles of different sizes, a so-called hybrid arrangement in addition to the utilisation of high-molecular weight polyacrylic acids and other polyacrylic acids. This product should be used in conjunction with a coating agent which is supplied in that after the material has cured, the coating is applied to its surface and light cured. It is claimed that this step increases the wear resistance and durability of the restoration.

As has been illustrated by the foregoing, dental materials are constantly developing and evolving to improve outcomes for patients and ease of use at the chairside for clinicians. It is hoped that these tips will provide food for thought for busy clinicians on how best to optimise use of dental materials across a range of disciplines. Given the broad topic area, further reading is essential to grasp more of this fascinating and critically important area of dentistry.[1] ■

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BSPD issues paediatric oral health blueprint to Liz Truss

Professor Claire Stevens CBE, BSPD spokesperson with a jar of extracted children's teeth

The British Society of Paediatric Dentistry (BSPD) issued a 'blueprint to improve children's oral health' to new Prime Minister Liz Truss, as she put her administration together and set out her policies.

The Society's message to the PM's new Secretary of State for Health and Social Care, Thérèse Coffey, lists the following ten steps:

1. Every child and young person (CYP) should have a dental home
2. Deliver a Dental Check by One (DCby1) before every baby's first birthday
3. Support vulnerable groups (asylum seeking children, looked after children and those in poverty) by expanding supervised toothbrushing schemes in early years settings, community water fluoridation and increasing the free school meals offer
4. Drive an equitable recovery of general anaesthetic (GA) services
5. Enable effective and funded Managed Clinical Networks (MCNs)
6. Oversee true integration of oral health, with initiatives such as Mini Mouth Care Matters (MMCM)
7. Ensure targeted, evidence-based intervention for vulnerable groups such as looked after children, CYP with learning disabilities and/or autism
8. Upskill and contractually enable primary dental care practitioners to provide evidence-based interventions using schemes such as Child Friendly/Focused Dental Practices (CFDP)
9. Support and develop the whole oral healthcare team
10. Expand the paediatric dental workforce – including provision of tier 2 services and recruiting community-based specialists and consultants.

The coming months will see BSPD focus attention on vulnerable groups in the community as the priority. These groups include neglected children, children living in poverty (an alarming percentage of the population will be less able to afford toothbrushes and toothpaste this winter), asylum seekers and refugees. If put into action, the Society's blueprint would ensure that those most in need will be supported.

Professor Claire Stevens CBE, BSPD's spokesperson (pictured), said: 'Our message to Liz Truss and Thérèse Coffey is – if you put the Society's blueprint into action, we will be ensuring those most in need will be supported. We have to remember that tooth decay remains the leading reason for hospital admissions among five-to-nine-year-olds. This is wholly unacceptable when we consider that dental caries is a largely preventable disease.'