Compomer versus glass ionomer restorations: which material performs better in primary molars?

Clinical evaluation of paired compomer and glass ionomer restorations in primary molars: final results after 42 months by R. R. Welbury, A. J. Shaw, J. J. Murray, P. H. Gordon, and J. F. McCabe Br Dent J 2000; 189: 93-97

Objectives
To undertake a clinical trial comparing the efficiency of a compomer restoration with a glass ionomer restoration in the management of caries in primary molar teeth.

Design
Subjects were admitted to the trial if they required at least one pair of restorations in primary molar teeth.

Setting
Department of Child Dental Health, Newcastle Dental Hospital and School.

Subject
Twenty nine children, aged 4–9 years, had 56 pairs of restorations placed between January 1995 and November 1997.

Method
The durability of the restorations was assessed during a 42-month follow-up period using modified United States Public Health Service criteria. Survival analysis and the McNemar paired test were used to compare the performance of the two restorative materials.

Results
The compomer restorations had a higher mean survival time (42 months, SE 1.40) compared with 37 months (SE 1.90) for the glass ionomer restorations and this was significant at the 5% level. The compomer also performed significantly better in terms of anatomical form, marginal integrity, cavo surface discoloration and maintenance of interproximal contact.

Conclusions
The present trial demonstrated that Dyract compomer performed significantly better than Chemfil Superior a glass ionomer cement for all modified United States Public Health Service criteria over a period of 42 months.

In Brief
- Dyract Compomer had a higher mean survival time than Chemfil Superior in occlusal and approximal cavities in primary molar teeth after 42 months
- Dyract performed significantly better than Chemfil for anatomical form, marginal integrity, cavosurface discolouration, recurrent caries, maintenance of interproximal contact, surface texture, and overall failure.

Comment

Restoring deciduous teeth is not easy. Apart from possible problems related to patient management, the aspect ratio of cavities is often remarkably unfavourable for restorative materials, with relatively shallow, but often quite wide cavities. Coupled with all of these factors are the significant occlusal loads that even young children can inflict on their teeth. It is therefore not surprising that there has been a search to find materials that are simple to use and sufficiently strong to withstand this environment.

Glass ionomer cements (GICs) have much to commend them in terms of simplicity of handling, especially when compared with complex dentine bonding agents and resin composites. I am a great fan of glass ionomer cements for many clinical applications. However, over a number of years in practice I have found that they have not always been as successful in children as they ought to have been, especially as they tend to show marginal ridge fracture. As with so many materials, there has been considerable evolution and improvement in properties of the GICs and it may be that the new generation fast-setting, quick-maturation materials may offer some potential advantages in this respect. The material tested in this study is not of that type and so there may be room for future investigations in this area.

The paper by Richard Welbury and co-workers shows unequivocally that the GIC chosen for this clinical trial does not survive well in the paedodontic test environment. The material that gave the best results was a polyacid modified resin composite or compomer, which was also superior to amalgam. The compomers were marketed some time ago as glass ionomer-like materials. This may be so, but it is perhaps more truthful to suggest that they are composites with a hint of GIC. What they generally possess is a simplified bonding system, good handling properties and reasonable mechanical properties. Long-term clinical data is still being amassed on the utility of this class of materials for restoring the adult dentition, but the properties mentioned above offer obvious attractions for paedodontic applications.

Using that powerful instrument, the retrospectoscope, the outcome of this clinical trial was almost predictable. The use of the compomer probably confers no great advantage in terms of fluoride release/caries resistance, but a simple adhesive handling/composite filling system with adequate mechanical and sealing capabilities most certainly does.

Tim Watson
Dept of Conservative Dentistry, Guy's Hospital, London