

Summary of: An audit of the quality of base metal cast restorations provided within the restorative department of a UK dental institute

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VERIFIABLE CPD PAPER

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Background Gold alloy has long been used in dentistry for the fabrication of cast restorations due to its material and clinical properties and known excellent longevity over long-term follow-up. The cost of gold has increased dramatically in recent years (by 450% in the past 10 years). The use of base metal alloys as an alternative would lead to a considerable cost saving: a cobalt chromium alloy is around 98% cheaper than gold alloy at the time of writing. NHS regulations state which alloys are permissible for use in cast restorations in dentistry, and certain 'non-precious gold' alloys should not be used. **Materials and methods** A prospective audit was carried out in our unit into the standard of cast restorations in cobalt-chromium alloy. The standard set before the audit was established by a prior audit of gold alloy restorations with measures of clinical and technical factors. **Results** Base-metal alloy restorations were considerably cheaper; but were of a poorer clinical standard than gold-alloy and required more frequent adjustment and remake (17% compared to 5%).

EDITOR'S SUMMARY

I think it is fair to say that dental materials was not my favourite subject as a student. I was not alone. The problem was that it seemed very much to be harking back to sixth form organic chemistry, esters, carbon rings, hydrogen bonds and the like. We could of course understand why the science behind it was important, at least for the chemists who devised the substances and for the purposes of safety and so forth but what we really wanted to do was to get out of the lecture theatre and into the clinic to use them.

Therein I think lies our love-hate relationship with dental materials, for us they are about the application to our patients rather than the science that defines their properties and drives their characteristics. But the dichotomy continues with the two parties involved with the placement of the products, ourselves and our patients.

For us the important factors are the techniques required for manipulation, functionality and longevity, while for our patients aesthetics and functionality play the greatest roles. Overall too, cost is an important consideration and marks the

impetus behind this research paper which, while neatly encompassing all these factors, has as its core the rising price of gold for cast restorations.

Although not a large study, and essentially an audit in nature, it nevertheless is a valuable piece of work which, as the authors state, forms a starting point for discussion of the complex series of considerations that arise in attempting to substitute other materials for the all-precious gold. While its price is a movable feast, being based on its 'safety' as a universal currency, with the world in a continuing turmoil of war, aggression and uncertainty there seems little immediate prospect of substantial falls in its cost.

This being the case the quest for alternatives is a very worthy one but the authors have considered a wide range of implications in substituting materials including those at the laboratory stages of fabrication. We are often told that price and value are quite different measures and although the cost of the material might be cheaper since the ultimate restorations were of a poorer clinical standard than gold-alloy and required more frequent adjustment and remake one has

to ask, when patient inconvenience and chair-time are added in whether ultimately it may be a false economy.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 217 issue 6.

Stephen Hancocks
Editor-in-Chief

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IN BRIEF

- Provides an understanding of alloys used in dentistry.
- Outlines NHS regulations relevant to the use of materials in cast restorations.
- Discusses cost and material differences between alloys used in dentistry.
- Provides an awareness of appropriate alloys to use in dental restorations.
- Compares clinical and technical qualities of different alloys to aid treatment planning.

COMMENTARY

This is a timely review of the relative merits of precious and non-precious metal fixed prosthodontic restorations. As a small scale clinical audit in a single dental teaching institution, it serves as little more than a pointer to similar activity in the wider NHS, but in these days of austerity and fiscal prudence is very pertinent.

Dental hospitals and schools are subject to regular cost improvement targets and accordingly staff are increasingly required to look closely at the cost effectiveness of what they provide for patients in their care. This has obviously been the case in this institution and the relative cost savings per restoration are stark. Reduced cost must be balanced with technical and clinical ease of manufacture, placement and clinical serviceability and this has been effectively considered as part of this audit project. While it accepts that there is a potential need for further higher level research into the relative effectiveness of such restorations, this small project shows that while, as with most new materials, there is a learning curve in terms of their handling, this can be overcome and reduces the apparent differences between the established and the new material.

Two different aspects of the use of the new materials are highlighted. One is the aesthetic acceptability commented upon by a small number of patients. Clinical experience suggests that gold restorations may often produce equally polarised views on aesthetic acceptability from patients. Gold seems acceptable more often possibly as a result of patient recognition of its value, whereas it is possible that the aesthetic acceptability of these newer alloys may be

tempered by the suggestion that a less valuable alternative is being provided. Similarly the question raised by the authors with regard to laboratory governance of materials used, particularly with an increase in use of overseas non-CE mark regulated services, is well made and the responsibility of clinicians as end users and suppliers of such 'devices' to their patients is therefore very important. This is perhaps particularly so in the significant private sector of the profession where there is less contractual regulation of the types and quality of material that may be used.

It is likely that there will continue to be an ongoing interest in achieving a greater balance between cost effectiveness and clinical efficacy of dental materials and accordingly further work of this nature both in the hospital and general dental services would seem entirely appropriate.

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AUTHOR QUESTIONS AND ANSWERS**1. Why did you undertake this research?**

The price of gold has increased dramatically in recent times, with an attendant cost relating to cast restorations affecting all dentists and technicians, and the shift to the use of non-precious metals is occurring widely in both general practice (particularly NHS practice) and in the dental hospital setting.

In our institute, a shift away from gold alloy would result in a saving of tens of thousands of pounds per year. This was suggested on a purely financial basis. Before making a decision to move to non-precious alloy, we endeavoured to determine whether there was a discernible difference in quality from a technical and clinical perspective. There is little available literature on the use of base-metal alloys in comparison to gold, particularly where used in all-metal restorations. It is obviously important that decisions made on a financial basis do not adversely affect patient care. Whilst we were aware that the level of evidence from an audit is low, we nonetheless feel that this forms a starting point for discussion.

2. What would you like to do next in this area to follow on from this work?

An audit can only provide low-level evidence; this was not a randomised controlled trial (RCT). In this audit, the restorations were fabricated and assessed by a number of technicians, and clinicians ranged from undergraduate students to consultants in restorative dentistry. There was no attempt to look at quality of tooth preparation or to standardise assessment. There was the potential for bias, since technicians and clinicians graded their own work. To improve the validity of the results, the above factors should be controlled. Long-term RCTs would obviously provide better evidence on which to base decision-making, and would be the next stages of this work.