Managing the phase-down of amalgam: part II. Implications for practising arrangements and lessons from Norway

C. D. Lynch*[1] and N. H. F. Wilson[2]

IN BRIEF

- Looks at the impact of the Minamata Convention on the use of amalgam in dentistry and its phase-down in the UK.
- Reviews the phase-out of amalgam in Norway to understand how changes can be best implemented in the UK.
- Stresses the importance of strong leadership, together with engagement and joined up working by all relevant stakeholders, including patients, for the successful phase-down of amalgam.

OPINION

The announcement of the Minamata Convention has triggered the lead into a phase-down in the use of dental amalgam. This paper considers aspects of this development in the context of the experience of banning the use of dental amalgam in Norway. It is suggested that strong top-down leadership and joined-up working by all relevant stakeholders, including patients, may be one of the most important keys to an effective, seamless transition to the provision of preventatively orientated, patient-centred, minimally interventive operative dentistry, based on state-of-the-art selection and application of tooth-coloured restorative materials. The benefits of such a transition are considered to be an important goal for dentistry in the UK.

INTRODUCTION

Implementation of the Minamata Treaty will significantly impact on the practice of dentistry in the UK, given the extent to which dental amalgam has been, and continues to be, used in the provision of dental care.[1,2] A related paper has commented on the agreed changes in the use of mercury containing products, as well as noting an agreed strategy to phase-down the use of dental amalgam fillings.[3] Such developments will impact on UK dental practice arrangements with an overall trend towards a reduction and elimination in the use of dental amalgam fillings. Notwithstanding this, the transition to amalgam-free practice, both the phasing-down and the subsequent phasing-out of amalgam, will pose a number of challenges. In addressing these challenges, lessons may be learnt from the experience gained in Norway where a 'general ban' on the use of amalgam was introduced in 2008, followed by a 'total ban' from the beginning of January 2011.[4]

[1]Reader/Honorary Consultant in Restorative Dentistry, School of Dentistry, Cardiff University, Cardiff; [2]Professor of Dentistry, King's College London Dental Institute, London
*Correspondence to: Dr Christopher D. Lynch
Email: lynchcd@cardiff.ac.uk

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NORWEGIAN PROCESS

The ban on the use of dental amalgam in Norway was part of a national ban on the use of mercury, driven by environmental concerns.[4] The process began in 1991 with the introduction of a 'precautionary principle', included in guidelines published by the Norwegian Directorate of Health, intended to reduce the use of dental amalgam. In 1994 the use of amalgam separators became mandatory in dental surgeries. In 2003 national clinical guidelines on the use of dental filling materials were introduced. These guidelines provided new encouragement to restrict the use of dental amalgam, stating that amalgam was no longer the material of choice for the restoration of posterior teeth. If practitioners decided to place an amalgam restoration informed consent had to be obtained and the clinical justification for the selection of amalgam recorded in the clinical records of the patient. In 2007 regulations on the control of mercury emissions from crematoria were introduced. In 2008 a general ban on the use of mercury in dental products was imposed. This ban provided a three-year exemption for the placement of amalgam while operating under general anaesthesia and in the provision of care for patients found to be allergic to one or more components of alternate materials. A complete ban on the use of amalgam was introduced on 1 January 2011, with opportunity for dentists to apply for exemptions. Very few applications have been made, let alone approved. As a consequence the clinical practice of dentistry in Norway has essentially been 'amalgam free' for more than two years.[4]

EXPENDITURE ON AMALGAM

In 2010/11, the NHS in England and Wales spent an estimated £266 million providing 12 million restorations as part of the primary dental care provision. Taking into account NHS expenditure on restorations in Scotland and Northern Ireland and the cost of restorations provided in secondary care, the salaried dental services and restorations provided on a private basis, the total annual expenditure on dental restorations is estimated to reach £300 million. The majority (59-75%)[5] of posterior restorations continue to be of dental amalgam. Regrettably, the survival of restorations placed in NHS funded care is less than optimal: 11% fail within one year, 20% failing within three years and 50% have failed by ten years, with larger fillings of any material exhibiting higher failure rates.[6] This raises questions as to whether – as widely believed – the use of amalgam can continue to be considered exceptionally good value for money in the NHS.

As a consequence of the relatively high failure, more than 50% of restorations placed in clinical practice are replacements

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of existing restorations, rather than restorations placed in the management of new (primary) lesions of caries.[7] As such the financial burden on the NHS associated with dental restorations is significant and set to continue for the foreseeable future, especially given the needs and growing expectations of the ageing 'heavy metal generation'.[8] The anticipated costs to the health service and patients in delivering amalgam alternative treatments are likely to be much increased when compared to the current arrangements. However, in the longer term cost reductions can be expected given declining caries rates in younger patients, increased focus on prevention and through the maintenance of existing restorations via refurbishment and repair rather than the escalating costs of replacement dentistry as practised presently.[9–14] The solution to the complex, multifaceted question of managing increased costs may in part be provided by the arrangements found to be necessary in Norway. In summary, these arrangements included increased expenditure which it is hoped will diminish over time.

Whatever the way forward in the UK, it is suggested that the profession should enter into early discussions with the Departments of Health, the new National Commissioning Board in England and other funders of dental care provision to plan and agree a strategy to effect a seamless transition to amalgam-free practice. Such arrangements, which will need to take account of educational issues as discussed in our earlier paper,[3] are necessary in the interests of protecting the public, who should be consulted in the process. An important aspect of the engagement of the public will be advising and reassuring existing 'amalgam patients' that their existing restorations will not need to be replaced until such times as there may be good clinical justification to remove them.

VIEWS OF PRACTITIONERS

Within the report from Norway[4] information is provided on the views of dental practitioners. It is reported that a survey in 1998 revealed substantial scepticism among dental practitioners over the use of posterior composites, in particular in the management of large cavities – a situation that is considered to be somewhat akin to current attitudes among many UK dental practitioners.[15] Interestingly, views appeared to change in Norway between 1998 and 2002, when it was reported that the majority of dentists favoured the placement of composite over amalgam, evidenced by a significant reduction in the placement of amalgam restorations in children and younger patients. This change of opinion coincided with, among other developments, a marked increase in the teaching of posterior composites in Scandinavian dental schools, including the dental schools in Norway. Studies of the attitudes of dental students to the use and placement of posterior composites reveal those in Scandinavia (Sweden) are much more positive than those in the UK and Ireland. The majority of dental students in Sweden responding to one survey reported greater confidence in placing posterior composite restorations than those of amalgam.[16] Furthermore, a long running project conducted by the authors has demonstrated a marked increase in the experience among dental students in the placement of posterior composites.[17–32] Currently, UK dental students gain more experience at placing posterior composites than amalgam (55% posterior composites:45% amalgam).[24] Supported by specialist teaching organisations such as the British Association of Teachers of Conservative Dentistry,[33] developments such as this are to be welcomed as newly-qualified dentists bring some expertise in this area to their practice.

The substantial diversity of views held presently among practitioners in the UK on the subject of posterior composites may reflect the extent to which UK dental services continue to rely on the use of dental amalgam, leaving existing amalgam users uncertain and uncomfortable about the prospect of change.[5,15] Notwithstanding growing evidence of the efficacy of posterior composites in general dental practice settings, the change to the use of alternative materials, in particular, resin composites, is necessary if a modern, preventatively orientated, patient-centred, minimally interventive approach is to be adopted in the future management of caries.[34–37] The minimally invasive approach avoids traditional amalgam cavity preparations that require relatively wide access and often destruction of sound tooth tissue to allow effective condensation of amalgam. A further suggestion is to avoid the creation of another generation of 'amalgam patients' that amalgam is no longer used in the restoration of teeth (deciduous, or newly-erupted permanent premolars or molars) in children and adolescents.

Despite some concerns, composite can be used with confidence in the restoration of larger cavities, subject to proper selection and handling. However, when one or more cusps have been lost or an onlay is required, some form of indirect, all-ceramic restorations may, in time, be shown to be the preferred option. Operative dentistry has changed, requiring practitioners to reflect and, where necessary, adopt new views and approaches, as clearly occurred in Norway some ten or so years ago. Time in the UK, however, is now of the essence, as the phase-down clock has already begun to tick and changing customs and practice originally drummed into existing practitioners at dental school can take time to change. As discussed in the related paper,[3] the necessary change in behaviour among the existing dental workforce must be underpinned by increased levels of continuing professional development, including hands on training in state-of-the-art placement techniques for, in particular, posterior composites.

ADVERSE REACTIONS

The report from Norway[4] highlights how the Norwegian Dental Biomaterials Adverse Reaction Unit was established in 1993 initially as part of the Directorate of Health to monitor adverse reactions to dental materials, in particular, resin-based materials, the use of which was increasing dramatically at the time. Specifically, there were concerns among practitioners regarding potential adverse effects of leachants from composite restorations. The relevant section of the report concludes that while restorations of composite leach various substances and ions, the amounts released do not reach levels associated with adverse health outcomes. Furthermore, while there has been an increase in the number of reports of adverse reactions to dental resins, the increase has not been in proportion to the increase in the placement of composite restorations, indicating causation other than a simple cause-and-effect relationship. Overall, dentists in Norway were reported to consider alternative materials such as composites subject to appropriate handling and placement, to be as safe

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as amalgam, albeit more challenging to successfully place restorations when using composites. Critical to such successful outcomes, including avoidance of unnecessary leaching from composite restorations, involves proper polymerisation including use of a light activating unit operating to specification for effective polymerisation of composite restorative systems.

LEADERSHIP

It is clear in the report from Norway[4] that of the many factors that influenced the success of the Norway experience, strong leadership from the Directorate of Health, acceptance of the need to change by the profession, and effective collaborative working, involving all relevant stakeholders, including patients, was of paramount importance. This leadership that dated back to 1991, twenty years before the eventual ban in 2011, showed insight, vision and clarity of purpose, with a strong emphasis on the best interests of patients. It is to be hoped that similar leadership and collaborative working will occur in the UK, possibly through the creation of a task group, with wide stakeholder representation, charged with planning, directing and overseeing the necessary transition. Based on the experience in Norway, such a group would have its work cut out for them, given that the potential lead time to amalgam-free practice could be a matter of a few years. In the interests of patients if nothing else, the sooner a group such as the proposed task group gets to work and provides the necessary leadership the better.

IMPLICATIONS FOR PATIENTS

Based on the experience in Norway, patients may benefit considerably from a shift to the provision of preventatively orientated, patient-centred, minimally interventive operative dentistry that relies on, among other factors, the preservation of tooth tissues and the effective application of modern materials. The benefits will be all the greater if, in the process of shifting to this style of care, patients, families and communities can be persuaded to assume ongoing responsibility for maintaining high levels of oral health conducive to good service performance of any existing restorations and prostheses. Preventatively orientated, patient-centred, minimally interventive operative dentistry has much to be commended, but as with traditional forms of operative dentistry, its success is largely dependent on the level and sufficiency of oral healthcare maintenance practiced by the patient. The factors critical to its success as a measure to manage caries continue to be accurate diagnosis, the material(s) selected, the sufficiency of the application, the operator and the patient. Assuming good quality in delivering such approaches, patients may look forward to a greatly increased possibility of 'teeth for life', maintained by means other than traditional 'drill-and-fill', with the added advantage of aesthetically pleasing restorations as and when operative intervention may be indicated clinically. Will these benefits come at an increased cost to patients who pay for, or at least contribute to the cost of their oral healthcare? Overall, it is believed that lifetime expenditure on dental and oral healthcare should not increase, with possible increases in the costs of operative interventions being offset by a reduced need for such procedures. With further advances in relevant materials and techniques the possibility of cost containment, if not reductions in costs, should be increased.

IMPLICATIONS FOR PRACTICES

Nothing is more certain than change. In the face of the many other changes that are anticipated to occur in dental practice over the next five to ten years, many may view the inevitable shift to amalgam-free operative dentistry as one of the less demanding challenges to be addressed. Others, which have to date stood back from extending the use of composites to include the provision of posterior composites may view the phasing-down and the long-term phasing-out of dental amalgam as a daunting prospect. Implications for practices will therefore vary, according to present attitudes and style of care. Assuming the challenge, whatever form it may take, is addressed with a positive attitude and underpinned by relevant education and training, the transition to new ways of working may be relatively seamless as tended to occur in Norway. Although based on anecdote, it is understood that the profession in Norway would not wish to turn the clock back and return to 'old style' care based on the predominant use of dental amalgam, as is presently still the case in the UK. It is further understood that there is a growing sense of relief among the dental profession in Norway that it is no longer contributing, albeit in a relatively small way, to an important and pressing environmental issue.

CONCLUSIONS

The Minamata Treaty necessitates a phase-down in the use of dental amalgam. With overall plans to ban the use of certain mercury containing products by 2020, such as light bulbs and cosmetics, the likely trend towards a phase-out of amalgam in coming years is obvious. This development will have a significant effect on the clinical practice of dentistry in the UK. In shifting to preventatively orientated, patient-centred, minimally interventive care, based on modern approaches to the application of tooth-coloured restorative systems, much can be learnt from the experience of banning the use of dental amalgam in Norway. A key message from this experience is the need for strong top-down leadership, together with engagement and joined up working by all relevant stakeholders, including patients, possibly through the creation of an all-party transition task group. Assuming a positive approach to the inevitable change in oral healthcare provision and the availability of the necessary continuing professional development, it is suggested that, as in Norway, there will be a beneficial outcome to dental practice in the UK transitioning to become amalgam-free.

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