Editorial

Issues of importance in phasing out dental amalgam

Msafiri N. Kabulwa
Principal Dental Officer,
Oral Health Section, Ministry of Health and Social Welfare
P.O. BOX 9083, Dar es Salaam, Tanzania

Dental caries is the most prevalent disease affecting 60-90% of school children and almost every adult person worldwide (1). In the course of restoring the decayed tooth to its functional state, restoration materials of varied strengths are used. The choice of material to be used depends on a tooth, site and size of a lesion, whether it releases fluoride, its wear resistance, strength and how ease it can be used (2, 3). The commonly used material for over 150 years is dental amalgam which is used for restoring decayed posterior teeth. With advances in research in the arena of restorative materials, dental amalgam alternatives were developed and these includes composite resins, glass ionomer cements, gold foil filling, compomers and giomers (3-6).

Dental amalgam is a combination of metals, about 50% of mercury in elemental form and the other metals being silver, tin, copper, and other trace metals. It has been used for over 150 years for dental restoration due to its mechanical properties and the long term familiarity of dentists with its use (3, 5). Despite these facts, there have been increasing awareness and recognition of implications caused by mercury release to the environment. This resulted into a series of international negotiations which later led to signing of a legally binding agreement called Minamata Convention in October 2013 [7]. In this convention, the fourth article, Annex A; part II, emphasizes phasing down the use of dental amalgam meanwhile promoting the use of mercury free alternatives for dental restoration. According Erdal 2012 (3) measures that need to be taken to facilitate phasing down use of dental amalgam in tooth restoration are: (i) availing alternative materials (ii) ensuring availability of equipments needed to utilize non-mercury alternatives, (iii) training of dental personnel to use these alternatives, (iv) reduce the costs of alternative materials to the patient and society at large. The provision of continuing education and technology can be done jointly through partnership between the National Dental Association and dental schools (8). The dental training faculties could facilitate phasing down of dental amalgam by altering their training curricula and put emphasis on alternatives rather than amalgam as it has been shown in South East Asian countries to have positive impact (5).

The use of alternative dental materials varies in all the WHO regions; in African countries there is no formulated policy on how well the alternative restorative materials should be used. In these countries composites are commonly reported to be used in the private dental clinics. In South Eastern Asia countries, much composites are used while in Europe 66% of all restorations done uses mercury free alternatives (5). As dental amalgam has started being phased out in some countries or phased down in other countries, the manufacturers of dental restorative materials have to ensure alternative materials to dental amalgam are developed and made available. The phasing out of amalgam may take long time to be realized as it needs to address issues like safety consideration but also each country has its own criteria for adoption of materials like safety, effectiveness, availability, easy to use and longevity of the materials chosen (9,10). Therefore, the determining factors whether a country adopts amalgam phase out or not are local economies, health care system and government policies (5). When compared to dental amalgam, mercury free alternatives are costly (30% higher than amalgam), user friendly in small to moderate lesion and need an operator who have skills in manipulating them (5).

Even though it is advocated to use mercury free restorative materials, it is evident that none of the restorative materials is without toxicological hazards and clinical limitations (3, 11). Compared to dental amalgam, the adverse effects of the alternative materials remain unclear thus suggesting further research (2). Therefore for safety reasons dental personnel and their supporting staff handling these materials need to take proper exposure control measures (3).

Though during treatment of decayed teeth, a decision as to whether a tooth should be restored or not depends on various factors - dentist and patient being the most important. Furthermore, it is documented that a health care system in any country plays a great role on material selection (10) as well as adoption of dental amalgam alternatives. It is also documented that a health care system influences the timing, procedural steps to be followed (methodology) and how quickly these alternatives are introduced and adopted. Therefore in ensuring that environmental contamination from mercury is minimized in the countries that willingly signed the Minamata Convention and the ones that will do so in the future, all stakeholders involved need to have a joint plan for phasing out use of dental amalgam.

References:

1. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S and Ndiaye C. The global burden of oral diseases and risks to oral health. Bulletin of the World Health Organization 2005;83:661–669.
2. SCHER preliminary scientific opinion on the environmental risks and indirect health fects of mercury from dental amalgam, 28 June 2013. http://ec.europa.eu/health/scientific_committees/environmental_risks/docs/scher_o_164.pdf (Accessed in October 2013).
3. Erdal S. Mercury in dental amalgam and resin based alternatives. A comparative health risk evaluation. 2012. http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/Documents/INC4/Submissions%20from%20NGOs/Mercury_in_Dental_Amalgam.pdf (Accessed in May 2014)
4. Alternative to dental amalgam http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DentalProducts/DentalAmalgam/ucm171108.htm (Accessed in May 2014)
5. Petersen PE, Baez R, Kwan S, Ogawa H. Future use of materials for dental restoration: Report of the meeting convened at WHO HQ, Geneva 2009.
6. Review of Norwegian experiences with the phase out of dental amalgam use:2012http://www.miljodirektoratet.no/old/klif/publikasjoner/2946/ta2946.pdf (Accessed in May 2014)
7. Minamata conventionhttp://www.mercuryconvention.org/Portals/11/documents/conventionText/Minamata%20Convention%20on%20Mercury_e.pdf (Accessed in May 2014)
8. Yamalik N, Mersel A, Cavalle E, Margvelashvili. Collaboration between dental faculties and National Dental Associations (NDAs) within the World Dental Federation, European Regional Organization Zone; an NDAs perspective. Int Dent J 2011;61:307-313
9. Rekow ED, Bayne SC, Calvalho RM, Steele JG. What constitutes an ideal restorative materials. Adv Dent Res 2013;25:18-23
10. Rekow ED, Fox CH, Watson T, Petersen PE. Future innovation and research in dental Restorative materials. Adv dent Res 2013;25:2-7
11. SCHER (2008). SCHER scientific opinion on the environmental risks and indirect health effects of mercury in dental amalgam, 6 May 2008