BDA Fact File

Dental amalgam safety November 1996

This fact file summarises current thinking on the use of dental amalgam. To date no epidemiological links have been established anywhere in the world between amalgam use and general ill-health. Those countries which are limiting the use of amalgam are doing so to lower the environmental mercury levels. Most dentists are continuing to use amalgam for cavities where a very durable material is needed - especially in the chewing surface of posterior teeth.

Can mercury from amalgam fillings reach the rest of the body?
Like most bio-materials, dental amalgam is not inert. Amalgam fillings release mercury vapour, especially when teeth are chewed on or brushed. Some of the vapour is exhaled but some reaches the rest of the body through inhalation. Some also dissolves in saliva and is swallowed. The amount of mercury which reaches the rest of the body is very small, though related to the number of teeth with amalgam fillings.

What is amalgam?
A dental amalgam is produced by re acting the liquid metal, mercury, with metal alloys. Conventional silver-tin amalgam usually also contains small amounts of copper and zinc. High copper amalgams are prepared from either a mixture of silver-tin and silver-copper alloys or from a silver-copper-tin alloy. High copper amalgams have better clinical properties with a higher resistance to corrosion and marginal breakdown. In many respects amalgam is an ideal filling material. As well as being very durable, it expands and contracts with temperature change at the same rate as the surrounding natural tooth. At their current level of development, and except for more expensive gold restorations, alternatives to amalgam do not perform so well in parts of the teeth which are subject to a lot of wear. Filling materials need to last as long as possible because replacement weakens the remaining natural tooth and may make more complex treatment necessary. Dental health is improving, however, so the number of amalgam fillings being inserted in the UK is falling.

Much of the mercury entering the body is excreted but some accumulates in certain organs - especially the kidneys but also in the brain, lungs, liver and gastrointestinal tract. However, experts do not believe that the levels of mercury exposure resulting from amalgam fillings are of any general

health significance. In 1986 the Department of Health's Committee on Toxicity reviewed the evidence and concluded: 'In our opinion the use of dental amalgam is free from risk of systemic toxicity and only a very few cases of hypersensitivity occur.

Since 1986, more has been learnt about the rate of release of mercury from fillings and about its destination in the body but there is still no epidemiological evidence to associate general health problems with amalgam fillings. The Department of Health stands by the 1986 conclusion of the Committee of Toxicity, telling the BDA in November 1995: 'The subsequent research findings and recent evaluations by several authoritative national and international expert committees are consistent with that advice'.

Do dentists say that amalgam is safe?

Whether amalgam can be called 'safe' is a matter for manufacturers of amalgam and for the Department of Health, and for the toxicologists and other scientists who advise them. Dentists comment on the dental properties of the material. If amalgam was found to harm general health dentists would stop using the material immediately. Dentists and their staff are concerned about their own safety too and research into their health can give insights into the likely safety of amalgam for patients.

It is never possible to say categorically that anything is safe in all circumstances. With amalgam, as with all bio-materials, there are risks and benefits to be balanced. Until all dental decay can be prevented, decayed teeth either have to be filled or, ultimately, extracted. Loss of natural teeth impairs eating, speaking and socialising. Also, use of an alternative to amalgam may raise the possibility of other Die-incompatibilities, and if the alternative is less durable it will fail more quickly and need to be replaced more often.

All dentists can do is keep abreast of the research and be prepared to change prescribing practices if new evidence emerges. However, it is worth pointing out that the establishment of a link between amalgam use and a condition such as dementia in elderly people is a relatively simple matter to research, especially if long-term dental records are available. An important long-term study of ageing is currently taking place in an American convent. Initial findings show no link between mental cognitive performance and numbers of amalgam fillings1.

But mercury is toxic, isn't it?

Yes, but at a much larger dose level than arises from its use in filings. Many substances are toxic at certain dose levels and for certain people, depending on individual susceptibility. Some people are even allergic to ingredients in foods such as bread and milk. About 3% of the population are estimated to suffer from mercury sensitivity2.

Reactions sometimes occur in the soft tissues of the mouth next to fillings, not only with amalgam but with other restorative materials too. Amalgam is not especially allergenic and true sensitivity reactions are very rare. They may resolve spontaneously or after a change of restorative material. Suspected allergies are investigated by dermatologists/allergists, on referral from the dentist.

Who regulates dental filling materials?
The Department of Health's National Health Service approval systems are now giving way to European regulatory systems. Manufacturers of dental amalgam can volunteer their products for "CE marking" to demonstrate manufacturing consistency and compliance with international standards.

From June 1998 it will be a requirement that they do so. However, a CE mark is not a quality mark or a safety mark. European (CEN) and international (ISO) standards are only written for established products so bio-compatibility tests are not required.

There is no regulatory requirement that dental amalgam undergoes bio-compatibility testing but there is no guarantee that such testing will uncover hazards, either. Breast implants, for example, were the subject of successful litigation, even though they had been bio-compatibility tested and approved for use by regulatory authorities. Where the safety of a material is challenged it is the courts which ultimately decide the issue.

How much of our day-to-day mercury intake comes from dental fillings and how much comes from other sources?
Exposure to mercury depends on diet, any occupational exposure, and environmental mercury levels, as well as on amalgam fillings. On average, a UK adult absorbs about 9 millionths of a gram of mercury a day from all sources. About a sixth of this amount comes from amalgam fillings. Certain foods have high mercury content - fish, for example. Baseline mercury levels in Icelanders are about ten times higher than in the UK population because of the amount of fish eaten there.

How can patients find out about mercury exposure?
The mercury content of urine, hair or finger nails can be measured and dentists and their staff can monitor their own exposure by sending specimens for laboratory testing. Patients concerned about exposure to mercury could ask dentists to arrange testing in the same way but the test could not be provided under National Health Service dental arrangements so the dentist would have to charge a private fee.

Is it possible to remove mercury absorbed into the body?
Patients are sometimes prescribed 'chelating agents' which combine with mercury to produce a substance which can be more readily excreted. However, there is no evidence that removal of mercury through chelation has any beneficial effect. Indeed, there can be no proof that chelation is a safe procedure; just as there can be no proof that amalgam is safe.

How should amalgam fillings be removed?

While there is no proof of a toxic effect during removal of amalgam fillings, there are the risks associated with the removal of any filling material - namely, inhalation of particles. Risks should be minimised with copious use of water and adequate suction. The turbine spray can be supplemented with a 3 in 1 syringe plus suction with a high volume wide bore tube. A rubber dam may also be used. Removal by piecemeal sectioning also helps to minimise risks.

Because the risk during amalgam removal is concerned mainly with particle inhalation, there is not an additional risk in removal of many amalgams at one session. However, subsequent restoration may be made more difficult because of occlusal contact problems, so removal of amalgams may take place over several visits.

Vitamin C is sometimes given, in high doses for patients having amalgam fillings removed but there is no evidence that this has any benefit.

Should amalgam be used during pregnancy?
It is known that mercury can cross the placenta from mother to foetus and can also be detected in breast milk but this does not mean that amalgam fillings should be avoided during pregnancy or breastfeeding. There is no evidence of any link between amalgam use and birth defects or still births. Generally, it is sensible to minimise health interventions during pregnancy and breastfeeding, where this is clinically feasible. Dentists would approach the placement or removal of amalgam fillings from the same precautionary standpoint.

Should amalgam be used for children?

Children who have a good diet and oral hygiene can usually be treated successfully using sealant resins and glass ionomer cements. But once a posterior cavity approaches a certain size (one third of the occlusal width any mesial or distal extension not bound by enamel) glass ionomer fillings are not normally recommended and amalgam is an acceptable restorative material.

Is there any group for whom amalgam should not be used?

Patients with proved amalgam sensitivity are the only group for whom the placement of new amalgam fillings is not advised.

Should amalgam fillings be kept below a safe maximum related to body weight?

Safety thresholds apply in many areas of health care and were considered for amalgam fillings last year by a report commissioned for the Canadian Government3. The concept is logical but the data available about rates of mercury release and about potential toxicity do not permit an amalgam filling safety threshold to be reliably identified. The Canadian Government has since said that 'current evidence does not indicate that dental amalgam is causing illness in the general population' and no safety threshold has been approved.

What do other governments and health bodies say?

No government or reputable scientific medical or dental body anywhere in the world accepts, on present published evidence, that amalgam is a hazard to general health. The World Health Organisation agrees that amalgam should continue in use. In America, the Public Health Service, the National Institute for Dental Research and the American Dental Association all support continued use. The Swedish Medical Research Council found no connection between health problems and amalgam use and the phasing out of amalgam in that country is for environmental reasons.

Should dentists explain current concerns about amalgam safety when suggesting Its use?

Law and medical ethics require that patients are told enough about a proposed treatment and any associated material risks to enable them to reach an informed decision on whether to accept the treatment. The information given by the dentist will be a matter for personal judgement. In the case of a child with multiple allergies, the possibility of mercury or amalgam hypersensitivity might be raised, for example.

It is in the end for the courts to decide what a reasonable level of information is. However, based on recent legal decisions about the requirements for consent, and in the light of current scientific opinion and statements by the Department of Health, the BDA's advice to dentists is that it is not necessary to discuss the alleged links between amalgam use and health problems with generally healthy patients. Until there is a reputable body of opinion which believes that there are material risks in amalgam use, consent given without discussion of side-effects can be regarded as 'informed'. Dentists should, of course, be prepared to answer patients' questions about the safety of dental amalgam.

References

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