

*Dent Amalgam Lecture at UCLA
1964 - Peda Lecture*

I Introduction to Amalgam

Webster defines the word amalgam as "any alloy of mercury with another metal or metals". This alloying is known as amalgamation. Now we have known that mercury which is a liquid at room temperature will combine with many metals but the union we in the dental profession are interested in is the amalgamation of an alloy consisting primarily of silver and tin. This matrimony is responsible for 80% of the restorations placed today. This marriage has served the dental profession for more than a hundred years and will continue to do so.

II History of Amalgam

Amalgam was first used in England and France in the early 1800's. The Crawcour brothers brought amalgam from France to the United States in 1833. Their ethical reputation was somewhat nebulous. In 1840 the amalgam war started.

Chronology of Amalgam War

1. Chapman Harris, President of Baltimore Dental College, the first dental college, spoke against amalgam in regards to mercuric poisoning in 1840.
2. 1841--amalgam war committee to study problem
3. 1843--committee reported amalgam as very bad making its use malpractice.
4. 1845--all dentists had to submit to open inspection to make sure they were not using amalgam and sign a pledge to that effect.
5. 1847--to remain a member of the society all dentists had to sign that they did not recommend the use of amalgam
Numbers quit the society in support of amalgam.
6. Motion eventually was cancelled and the amalgam war ended in 1850

2.

There is still some prejudice against the use of amalgam today.

III Mercury Poisoning

1. As we know today mercury poisoning is almost invariably due to the absorption of the highly soluble toxic mercuric ion. It is estimated that as little as one-tenth of a gram will cause tissue damage and one gram will cause death.
2. Metallic mercury is highly insoluble and therefore without toxic effects. This is why there is no reason for alarm if a thermometer is broken in the mouth and the patient happens to ingest a small amount of mercury.
3. Naturally there are some precautions for the handling of mercury.
 - a) As we know the mercury will combine with other metals. Care should be taken when wearing rings and watches in the handling of mercury.
 - b) Investigators have re-evaluated problems connected with mercury poisoning in view of recent changes in dental procedures utilizing a mercury vapor detector and urine analysis.
 - c) The established safeguards of covering mercury containers, including waste receptacles, were re-emphasized.
 - d) For protection while mulling amalgam, a surgical mask and cap was recommended.
 - e) And it was further suggested that air evacuation equipment should discharge exhaust outside the dental office

The individual steps that are included in the fabrication of amalgam

1. Cavity preparation
2. Matrix application
3. Proportioning of mercury and alloy
4. Tituration
5. Expression of mercury
6. E Condensation
7. carving
8. Finishing

IV Composition of Amalgam

1. There are some 60 alloys which have been recognized by the American Dental Association as acceptable. The ADA specification for dental amalgam alloys set up chemical requirements as follows:

silver	65%, min
tin	29%, max
copper	6%, max
zinc	2%, max.

2. Those acceptable for ideal formula are:

silver	68%
tin	26%
copper	4%
zinc	2%

3. The composition of alloy is important for each component metal imparts certain properties to the materials and one must be balanced the other to get the desired combination.

Silver

1. Silver is the major component of dental amalgam alloys and imparts high strength hardening, high expansion and high lustre to amalgams.
2. These desirable properties are offset to some extent by the fact that in high percentages it is slow to amalgamate, easily tarnished and causes excessive expansion to the amalgam.