I J Pre Clin Dent Res 2014;1(4):12-14
October-December

International Journal of Preventive & Clinical Dental Research

Evaluation of Mercury Hygiene Practices among Practicing Dentists and Undergraduates in Maharashtra, India

Abstract

AIM: Amalgam is used as a restorative material for more than 150 years. It can be hazardous to patients, environment and more to the clinicians. Even after knowing the hazards and toxicity of mercury, disposal of it is not done properly. This research will help analyzing the waste management techniques followed. **Objective:** 1) To determine mercury hygiene techniques carried out by practicing Dentists and undergraduates and to reduce its toxicity. 2) To determine amalgam waste disposal technique. **Material and Methods:** 1) List of 20 questionnaires will be given to practicing Dentists and undergraduates. 2) Analysis will be made on methods used in amalgam waste management. **RESULTS:** Results revealed that neither a dentist nor the dental students follow proper mercury hygiene practices as recommended by ADA. **CONCLUSION:** Threat of mercury toxicity is to the dentist as well as to the patient. ADA recommendations for mercury hygiene should be brought in practice. Periodic checking should be made by the authorities regarding the mercury hygiene practices been followed.

Key Words

Mercury hygiene; dentistry; amalgam

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INTRODUCTION

Amalgam is used as a restorative material for more than 150 years. Mercury forms an important component of amalgam.[1] Long term exposure to mercury can cause birth defects, mental disorder, chronic illness, autoimmune disorder etc. If disposal of this amalgam containing mercury is not done properly, it can cause environmental interactions. There is more threat to the dentist than the patient. If not handled properly, mercury vapors arises which enter into blood stream through lungs.[1,2] Osborne [3] reported mercury vapors in breath of the patient who had done amalgam restorations. Mercury vapour in breathing zone of dentist was minimal when high volume evacuator was used, without it mercury vapour rate increased 2-15 times more as defined by WHO.[4] In vitro study by Engle showed that dry polishing of amalgam restoration resulted in release of 44 micro grams of mercury vapors per restoration.[5] Removal of amalgam in vivo initiated the release of 15-20 micro grams of mercury vapors per restoration.[6] Studies have demonstrated that 90% of the vapors are generated during restorative procedure. A study done in UK to compare the health effects of mercury in dentists and the people, showed that the urinary mercury excretion level was high in dentists and where more likely to have disorder of kidney than the general population.[7] Where some studies have relieved that side effects of mercury to the dentist is decreasing, this may be due to improved mercury hygiene techniques.[8,9] Studies have also relieved that concentration of mercury generated during restorative procedures are 90% eliminated by using high suction.[4] The findings showed that dentist will be able minimize the exposure to mercury by following the hygiene recommendations given by American Dental Association (ADA).[10,11] The aim

Table1: Preventive measures taken by dentists and students while working with amalgam

		Students	Practicing Dentists
1)	Wearing gloves, mouth mask, high volume evacuation.	82%	86%
2)	Use of rubber dam	2%	6%
3)	Use of pre-amalgamated capsule	42%	41%
4)	Educating people regarding mercury toxicity	72%	71%

Table2: Clinical set up made to prevent and control mercury contamination

		Students	Practicing Dentists
1)	Use of vacuum cleaners	8%	13%
2)	Amalgam separators to suction tips	6%	12%
3)	Collection of waste amalgam in specific colored bags.	34%	29%
4)	Use of sterilium	15%	35%
5)	Disposal of amalgam through water	26%	24%

of this study is to assess mercury hygiene practices and to determine if any difference exists in hygiene practices among dental students and practicing dentists of Karad city Maharashtra.

MATERIALS AND METHODS

A questionnaire of 20 questions was designed to assess the dental students and practicing Dentists perception for mercury hygiene practices as recommended by ADA. Questionnaire consisted of 2 parts. First part intended to assess measures taken in clinical set-up to prevent and control mercury contamination. This included number of amalgam restorations done per day, technique of manipulation, sterilization of instruments, disposal of remaining mercury, cleaning of clinics. Second part intended to assess measures taken by care giver himself while working with amalgam. This included use of suction tips, rubber dam isolation, use of gloves and mouth mask. Target sample size was 1000, which included 500 students and 500 practicing dentists, both from Maharashtra state who used amalgam as a restorative material. Questions left unanswered where rendered incomplete and where excluded from the study. Data was collected. Chi-square analysis was used to analyze the data.

RESULTS

Results relieved that neither the dentists nor the dental students where following the recommended guidelines while working with amalgam. When the number of amalgam restorations done per day where concerned 56% of students and 50% of private practitioners did 2-5 restorations per day. When mixing of silver powder and mercury was concerned hand trituration method was followed by 54% of students and 55% of dentists. Use of pre-amalgamated capsule was done by 42% of students and 41% of dentists (0.7111). Regarding the collection of chair side mercury 66% of students and 65% of dentists used wet cotton while 28% of students and 26% of dentists collected it by swiping (0.7135).

DISCUSSION

Amalgam restorations are practiced today even after knowing the toxic effects of mercury. It is more practiced by the students as it is included in undergraduate curriculum. This research has limitations as the sample size was only 1000. There is a controversy concerning potential adverse health effects on dentist and the patient due to chronic exposure to mercury released from amalgam. It also depends on the extent of daily exposure. Studies have relieved that mercury vapors released from amalgam restorations are absorbed and then reaches blood.[12] It was observed that all the dentist and students made use of gloves, mouth mask but the use of rubber dam was made less. Amalgam separators where not attached to the suction tips. It was good to notice that 90% of students and 95% of dentist cleaned there instruments contaminated with amalgam (e.g. Condenser) and then autoclaved. If not cleaned then during autoclaving high vapors of mercury are produced.[13] During the removal of old amalgam or polishing heat is generated and vapors will be released. In order to avoid this, use of coolants is recommended.[14] A study done in Swedish twins came to the conclusion that there are no negative effects of dental amalgam on physical and mental health.[15] Chronic exposure of mercury can lead to insomnia, anxiety, fatigue, depression, headache, weight loss, psychological distress.[16] Amalgam can be safe only after taking compete

precautions and following all rules and recommendations of ADA. The use of vacuum cleaners was done by 31% of dentists. It should not be done as it can lead to generation of vapor. Waste amalgam should be collected in scrap bottle or specific colored bags, so that it can be sent for recycling. It was followed by 34% of students and 29% of dentist. Amalgam from the extracted teeth can be recycled, but only 2% of students and 3% of dentist do this. ADA has given recommendation to remove the old amalgam and then dispose the tooth. Bags should be labeled during disposal as they can help to segregate the waste. Recycling of amalgam was done by 26% of students and 30% of dentist. People undergoing amalgam restorations should be educated by the dentist regarding the toxic effects of mercury. Such type of education was given to the people by 72% of students and 71% of dentist.

CONCLUSION

Exposure of mercury is harmful to the patient and dentist. If it is not disposed properly, it is harmful to the environment. It can be made safe by following proper practices. Recommendations of ADA for mercury hygiene should be followed. Specific authorities should be allotted to keep a check with the practices followed.

ACKNOWLEDGEMENT

The authors would like to acknowledge Dr. Neelima Malik; Principal, Dr. Renuka Pawar; Vice Principal, Dr. Shivakumar KM; Head of Department of Public Health Dentistry, Dr. Adish Saraf; Senior Lecturer Department of Conservative and Endodontics, School of Dental Sciences, Karad, Dr. SB Javali; Statistician, Dentists of Karad and Students of School of Dental Sciences, Karad, for their kind support in conducting the study.

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