

THE FREQUENCY OF USE OF DENTAL AMALGAM IN PEDIATRIC DENTAL CLINICS IN JORDAN

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ABSTRACT

The aim of the study was to assess the frequency of the use of dental amalgam fillings in pediatric dental clinics in Jordan.

Retrospective file data for 500 Pediatric dental patients visiting Pediatric Dental Clinic in Prince Hashem Bin Abdullah in Aqaba in the South of Jordan in 2017 for routine dental visits, were collected. The types of dental fillings used were recorded.

The patients had 865 different dental fillings in their teeth.

Dental amalgam fillings formed 126/865 (15%) of the total fillings.

Dental amalgam fillings are still used frequently in Pediatric Dental practice in Jordan.

Key Words: Amalgam, fillings, frequency, use , Pediatric Dentistr, Jordan.

INTRODUCTION

Dental amalgam has been used in dentistry for a long time. It was considered as one of the most durable dental filling material; this is because of its ease of manipulation, economic acceptance, cost effectiveness, wear resistance, and its technique insensitivity. For these reasons, many researchers have recommended the use of dental amalgam fillings. Katja Antony et al claimed that amalgam fillings show a longer longevity than composite, and is more economic filling material compared to direct composite filling.¹

Diverse types of dental amalgam have been introduced in dentistry to face challenges, and to improve its properties. For example, high copper alloy has better corrosion resistance and strength. Bonded amalgam has chemical bonding to tooth structure to improve retention. Chadwick RG et al reported that bonded amalgam restorations demonstrated greater longevity over non bonded amalgam.² But others disagreed with this and stated that there is no evidence to claim that there is a difference in survival between bonded and nonbonded amalgam restorations.³

However, amalgam is not without adverse effects. These effects include poor esthetics, the need for non-conservative cavity preparation, and most importantly, its mercury release and hence, the health hazard. In many studies, it was shown that the use of dental amalgam was associated with a high level

of body mercury, which is in turn was claimed to be associated with many health hazards like toxicity, hypersensitivity, neurological deficits, and others. Fujii Y found that metals used in dental treatment such as mercury may cause systemic hypersensitivity or toxicity⁴ Hsu YC et al reported that the individuals who received amalgam filling had significantly higher risk of Parkinson disease afterward than those who didn't.⁵

Other researchers went to investigate whether the effect of dental amalgam on the health is reversible or not. Bjorkman L et al concluded that removal of amalgam restoration was followed by a long term reduction of general health complaints, which was associated with mercury concentration in urine before amalgam removal.⁶ Agreeing with this conclusion, Kristoffersen et al found that most of the patients reported improvement of health after amalgam removal.⁷

In pediatric dentistry dental amalgam has also been used frequently because of its properties mentioned previously particularly its technique insensitivity, which is important in the practice of pediatric dentistry especially in apprehensive and uncooperative children, where working conditions are away from ideal. Anna et al reported that dental amalgam has been widely utilized to restore posterior teeth in pediatric dentistry, and is still taught as the material of choice for class 1 and 2 restoration in many dental schools in the united states and Canada.⁸ In a study carried out by Bakhurji E et al said that 62% of general dentists and 56% of pediatric dentists reported using amalgam, and most dentists disagreed with banning amalgam.⁹

So, clinicians and researchers are divided in to two teams: one team goes with continuing use of amalgam, and the other claims that using amalgam should be banned. The same situation is applied in Jordan, where many general and pediatric dentists are still using amalgam, and many others has quit its use.

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But, the choice of restorative material depends on many factors: dentist's factors, patient's factors, and case-dependent factors. Dentist's factors usually appear in dentist's preferences, and the availability of the different types of materials in dental office. Patient's factors are those related to cost, cooperation, time availability, medical history, and patient's interests like esthetics. Case-dependent factors like restorability of the tooth, longevity of the tooth, and the role of the tooth in long term treatment plan. The aim of the study was to assess the frequency of the use of dental amalgam in pediatric dental clinics in Jordan.

METHODOLOGY

Retrospective file data for 500 Pediatric dental patients (aged between 4-12) visiting pediatric dental clinic in Prince Hashem Bin Abdullah in Aqaba in the south of Jordan in 2017 for routine dental visits, were collected, the types of dental fillings used were recorded. The patients had 865 different dental fillings in their teeth. The fillings were selected during the visits according to dentist's, patient's, and case-dependent factors. There were no exclusion criteria, any patient visited the clinic for dental restoration was considered, regardless the medical history, and either treated at chair side or under general anesthesia.

RESULTS

The patients had 865 dental fillings in their teeth. 721 had been placed in primary teeth, and 144 in permanent teeth. Forty-five patients were treated under general anesthesia with 325 fillings placed. The most common filling used in primary dentition was glass ionomer, while in permanent dentition was composite. Dental amalgam fillings formed 126/865 (15%) of the total fillings.

Statistical analysis

Composit filling was the most common filling material used for primary dentition treated under general anesthesia (formed 58.5% of the fillings), while amalgam was used in 15% of the cases. In permanent teeth treated under general anesthesia, compomer was also the material most commonly used (56.8% of cases), while amalgam wasn't used at all.

At clinic, glassionomer restorative material was the most frequently used filling material to treat primary teeth (12.2% of cases), while amalgam was the most frequent material used in permanent teeth (41.1%). This means that there is a statistical difference between the frequency of the use of different filling material used under general anesthesia.

TABLE 1: FREQUENCY OF DIFFERENT TYPES OF DENTAL FILLINGS

Type of tooth	Amalgam	Composite	Compomer (poly acid modified resin based composite)	Glass ionomer	Stainless steel crown	
Primary	82 (11%) (9.5%) of total	40 (6%) (4.6%) of total	237 (33%) (27.4%) of total	289 (40%) (33.4%) of total	73 (10%) (8.4%) of total	721 (83.4%)
Permanent	44 (31%) (5%) of total	55 (38%) (6.4%) of total	30 (21%) (3.4%) of total	12(8%) (1.4%) of total	3 (2%) (less than 1%) of total	144 (16.6%)
Total	126 (14.5%)	95 (11%)	267 (30.8%)	301(34.8%)	76 (8.9%)	865 (100%)

TABLE 2: FREQUENCY OF RESTORATIVE MATERIALS UNDER GENERAL ANESTHESIA

Type of tooth	Amalgam	Composite	Compomer	Glass ionomer	Stainless steel crown	Total
Primary	22 (9.6%)	15 (6.6%)	134 (58.5%)	11 (4.8%)	47 (20.5%)	229 (100%)
Permanent	(0%)	12 (32.4%)	21 (56.8%)	2 (5.4%)	2 (5.4%)	37 (100%)
Total	22 (8.3%)	27 (10.1%)	155 (58.3%)	13 (4.9%)	49 (18.4%)	266 (100%)

TABLE 3: TYPE OF TEETH & TYPE OF FILLINGS

Type of tooth	Amalgam	Composite	Compomer	Glass ionomer	Stainless steel crowns	
Primary	60 (12.2%)	25 (5.1%)	103 (21.0%)	278 (56.5%)	26 (5.2%)	492 (100%)
Permanent	44 (41.1%)	43 (40.2%)	9 (8.4%)	10 (9.3%)	1 (1.0%)	107 (100%)
Total	104 (17.4%)	68 (11.3%)	112 (18.7%)	288 (48.1%)	27 (4.5%)	599 (100%)

DISCUSSION

It is evident that despite the worries about the use of dental amalgam, this filling material is still used frequently in pediatric dental patients in Jordan and as it is apparent from the results, it was used more to treat permanent teeth at clinic (Table 3), this is because amalgam filling is less technique sensitive than other materials, needs less time for manipulation and setting, which makes it suitable for treating uncooperative children who form the majority of pediatric dental patients.

These results agree with those published by Yousef H et al who found that amalgam is still a choice for restoring deep occlusal and proximal carious lesions in Saudi Arabia, although 68% of pediatric dentists reported using tooth colored material more frequently than amalgam.¹⁰ Also Raquel Sano Suga et al found in their study that 66% of restorations were performed with amalgam in the basic health units in Brazil.¹¹

Under general anesthesia, amalgam was used much less, because under general anesthesia, cooperation is not an issue, and the treatment was shifted to tooth-colored restorations and stainless steel crowns.

Hassan S Halawany et al carried out a survey in Saudi Arabia to assess pediatric dentist's choice of restorative material and found that the prevalence of use of composite resin to restore primary teeth was higher compared to amalgam.¹² This means that although pediatric dentists are using amalgam less with the advance in tooth colored material technology, amalgam is still a valid choice for them. In Jordan no data is available which shows how often amalgam is being used in pediatric dentistry.

Jordan is one of the countries which has signed the Minamata Convention on mercury, which recognized that mercury is a chemical of global concern owing to its long-range atmospheric transport, its persistence in the environment once anthropogenically introduced, its ability to bio-accumulate in ecosystem and its significant negative effects on human health and the environment.¹³

The frequent and continuous use of amalgam by Jordanian pediatric dentists necessitates paying attention toward educating dentists who are in practice, and more importantly, pregraduate dental students in dental schools about the risk of using amalgam.

Al-Rabab'ah MA et al carried out a study in Jordan to assess the knowledge of Jordanian dentists toward phase down of dental amalgam. They found that only 13.8% knew about Minamata Convention, and only 17% had an undergraduate training in favor of placing composite in posterior teeth. Also they found that 28.1% were of the opinion of discontinuing the use of amalgam due to its alleged health and environmental hazards.¹⁴

Similarly, Mortazavi S et al carried out a research under the same title and ended up with a point that there is an urgent need for raising the awareness among

Jordanian dentists regarding the hazardous potential of amalgam.¹⁵

The findings of this research agree with the results of the previous two studies, i.e its necessary to start educating Jordanian dentists about the hazard of mercury in amalgam, and to train them to use alternative dental filling materials to minimize using dental amalgam to the minimum.

Also, since most of pediatric dental patients in Jordan have governmental dental insurance, the cost factor is not a major factor for the patient, so the factor mostly affecting the choice of restorative material is patient's cooperation, thus, shifting the treatment of uncooperative children to treatment under general anesthesia is recommended to allow the dentists to use amalgam less, and to direct them to use safer and more esthetic materials.

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