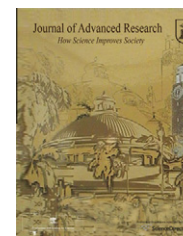




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**ORIGINAL ARTICLE**

Knowledge of emergency management of avulsed teeth among a sample of Egyptian parents

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KEYWORDS

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Abstract Traumatic dental injuries (TDIs) frequently occur in society and may occur at home. The ultimate prognosis of an avulsed tooth occurring in a child may depend on the parents' knowledge of appropriate emergency measures. Therefore this study aimed at evaluating the knowledge level of a sample of Egyptian parents in the management of a case of tooth avulsion in a child. A total of 985 parents attending a Pediatric Dental Clinic formed the sample of the study. A questionnaire comprising 13 questions in simple Arabic language was used. The parents were categorized into two groups according to their education level. The tabulated data were statistically analyzed using the Chi-square test. Markedly low knowledge levels were noted in both groups. This was evidenced in replanting the avulsed primary teeth, brushing and using antiseptics to clean the roots, holding the root instead of the crown, dry storage of the avulsed permanent teeth, and neglect over time from most of the parents. However, 24.3% of group 1 and 15.6% of group 2 chose milk as a transport medium. Therefore, educational programs would be necessary to improve awareness of the immediate management of avulsed teeth.

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Introduction

Epidemiological studies revealed that children from 8 to 12 years often suffer a dental injury [1]. Dental trauma may vary from minor tooth fracture to extensive dento-alveolar damage that involves the supporting structures and tooth displacement or avulsion [2]. The teeth most commonly avulsed in both the primary and the permanent dentition are the maxillary central and lateral incisors [3]. Oral factors (increased overjet with protrusion), environmental determinants (material deprivation) and human behavior (risk-taking children, children being bullied, emotionally stressful conditions, obesity, attention-deficit hyperactivity disorder and violence) were found to increase the risk for TDIs [4].

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Tooth avulsion is three times more frequent in boys than girls because of their active participation in sports and games and occurs most commonly from 7 to 9 years of age when permanent incisors are erupting. Andreasen et al. suggest that the loosely structured periodontal ligament surrounding the erupting teeth and elasticity of alveolar bone favors complete avulsion [3,5].

The permanent anterior teeth are not only important for aesthetics but are also essential for speech, mastication, health of the supporting tissues and psychological and mental health of children. Hence, immediate replantation of avulsed permanent incisors contributes to an improved self-image and enhanced self-esteem in children [6]. For the management of avulsed permanent tooth, immediate replantation is generally accepted as the treatment of choice [1,7]. Replantation in the primary dentition is contraindicated because such a procedure may damage the permanent successor [8–11]. The most important factor determining the prognosis of a replanted tooth is the viability of the periodontal ligament left on the root prior to replantation. To prevent dehydration of the root surface during transportation, the storage medium must be of correct osmolality and pH. Milk fulfils this requirement and is considered an excellent medium [5,12].

Dental traumatic injuries frequently occur in society [13], and some may occur at home. Therefore, the ultimate prognosis of an avulsed tooth occurring in a child may depend on the parents' emergency knowledge of this procedure [14]. Most studies on the management of avulsed permanent teeth indicate that the level of knowledge is low in several countries [15–20]. A recent study showed low level of knowledge of the studied children, so parents are considered as an important group since many dental injuries may occur when the child is in a home environment [21].

The purpose of this study was to evaluate in 2010, by means of a questionnaire, parents' awareness of the emergency management of avulsed primary and permanent teeth in a sample of 985 Egyptian parents with different education levels.

Material and methods

Parents of children aged from 6 to 12 years attending the Pediatric Dental Clinic of the Faculty of Dentistry, Mansoura University, were asked to take part in this study. The nature and the purpose of the study were explained to the parents in local language. Its voluntary nature was emphasized and strict confidentiality assured.

A questionnaire comprising 13 questions based upon that of Raphael and Gregory's study [15] was prepared in Arabic language for data collection. Questions concerning avulsion of a tooth in primary and permanent dentitions were formulated in simple Arabic language. A total of 1000 questionnaires were distributed on a daily basis among the selected parents according to their education level. In order to assess their knowledge of appropriate emergency management of avulsed primary and permanent teeth the respondents were asked to tick the most appropriate answer from a list. Each answer list included correct and incorrect information.

Completed questionnaires were collected from the parents on the same day, and they were then given the opportunity to make inquiries or comments about the questions. This was followed by distribution of information leaflets including the proper measures for managing avulsed teeth. The total number of completed questionnaires was 985 from university graduated and technical school graduated parents.

The data of the 985 questionnaires showed the number of people who responded to each question and the nature of the response. Responses obtained were tabulated and expressed as frequency distributions, and then computed in percentages. The parents were categorized into two groups according to the parent's educational level. Group 1 was university graduated, while group 2 was technical schools graduated. Statistical analysis was done using SPSS, release 15 for Windows Inc., 2006. *p* values ≤ 0.05 were considered significant.

Table 1 Comparison of the parental responses according the education level.

Knowledge	Responses	Group 1 (<i>N</i> = 530)		Group 2 (<i>N</i> = 455)	
		No	%	No	%
Previous received information	Yes	100	18.9	80	17.6
	No	430	82.1	375	82.4
Source of information	Dentist	60/100*	60	14/80*	17.5
	Physician	8/100	8	6/80	7.5
	Media	02/100	2	0/80	0
	Friends	30/100*	30	60/80*	75
Importance of primary teeth	Important	500	95.4	399	87.7
	Not important	30*	4.6	65*	12.3
Managing avulsed primary teeth	Searching for it	405	76.4	320	70.1
	Not searching	115*	23.6	135*	29.9
Dealing with avulsed primary teeth	Replanting	50*	10.5	40*	7.5
	Not replanting	380*	89.5	415*	92.5
Importance of permanent teeth	Important	530	100	455	100
	Not important	–	0	–	0
Managing avulsed permanent teeth	Searching for it	455*	85.9	350*	76.9
	Not searching	75*	14.1	105*	23.1

* Significant difference between the two groups within the same raw (≤ 0.05).

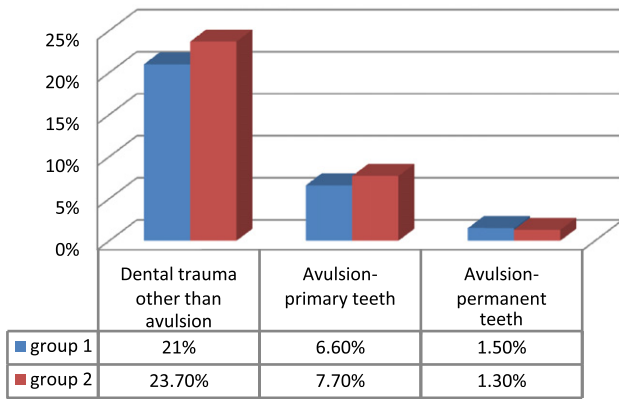


Fig. 1 Previous experience of dental trauma.

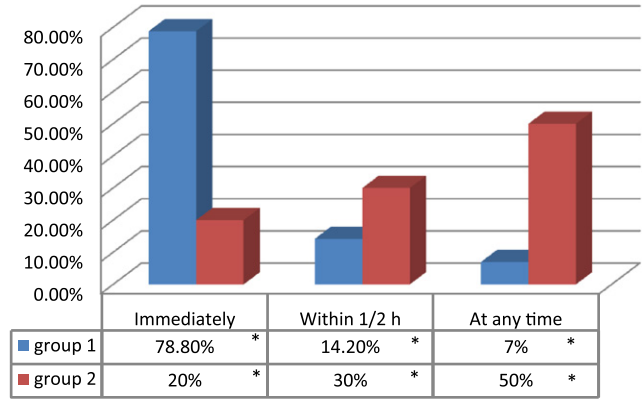


Fig. 4 Urgency of replanting the avulsed permanent teeth. *Significant difference at ≤ 0.05 .

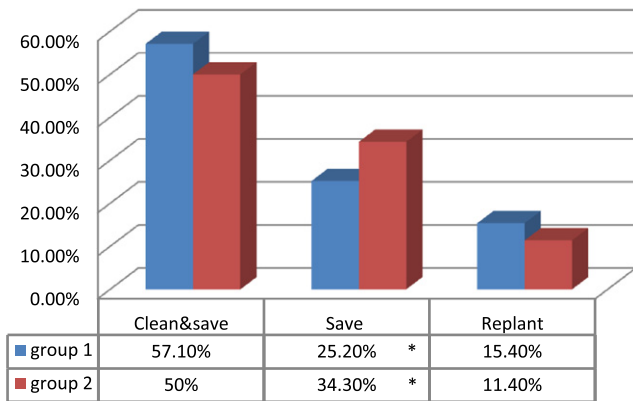


Fig. 2 Dealing with avulsed permanent teeth. *Significant difference at ≤ 0.05 .

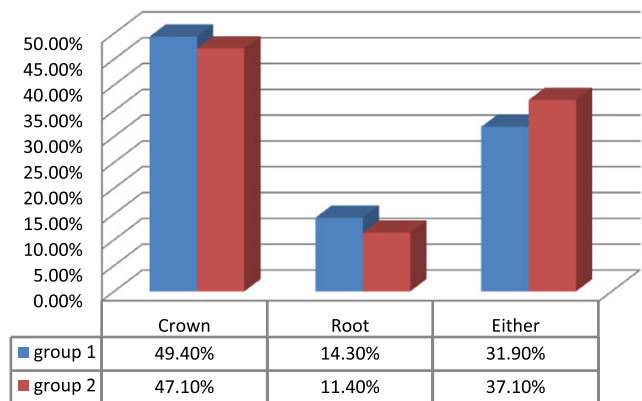


Fig. 5 Handling of the avulsed permanent teeth.

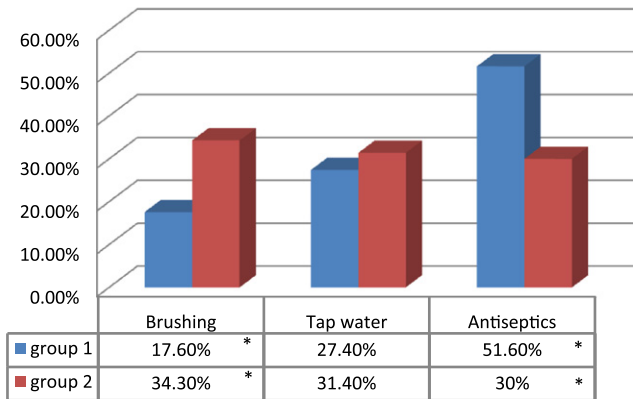


Fig. 3 Methods of cleaning avulsed permanent teeth. *Significant difference at ≤ 0.05 .

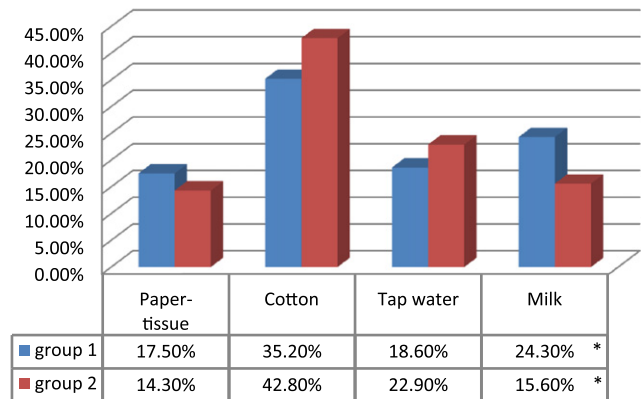


Fig. 6 Transporting media. *Significant difference at ≤ 0.05 .

Results

The tabulated data were analyzed statistically by using the Chi-square test and are presented in Table 1 and Figs. 1–6. In both groups, only a small number of parents had received previous information about dental trauma; 18.9% in the university graduated (group 1) and 17.6% in the technical school graduated (group 2). Permanent teeth are important, as agreed by all of the parents in both groups. In the rest of the variables,

there was a significant difference between the two groups ($p \leq 0.05$) (Table 1). Both groups reported a relatively similar experience of different types of dental trauma (Fig. 1).

When parents were asked about the method for dealing with the avulsed permanent tooth till reaching to the dentist's office, a few in both groups showed a tendency to want to return the tooth into the socket (Fig. 2).

A significantly higher number of parents in group 2 (34.3%) compared with group 1 (17.6%), reported that they would use a brush to clean the tooth. Antiseptics were significantly

chosen by 51.6% in group 1. However a considerable number of parents in both groups chose to wash the avulsed tooth with tap water (Fig. 3).

Regarding the urgency of replantation, a significant high number of parents in group 1 (78.8%) compared with group 2 (20%) revealed that they would replant the avulsed teeth immediately. On the other hand, a significantly higher number of parents in group 2 (30%) chose to replant the teeth within 30 min, while 50% of them did not consider the time factor and chose the answer 'at any time' (Fig. 4). For handling the avulsed permanent teeth, a high number of parents in both groups chose to hold the crown of the tooth. However, a considerable number of them chose to hold either the root or any of the root or the crown (Fig. 5). The majority of avulsed teeth will be stored and transported in an inadequate storing medium, as shown in Fig. 6.

Discussion

Questionnaires are good tools for screening provided they are carefully designed. For this study, a systematic questionnaire was used to check the level of parents' knowledge about tooth avulsion and management. We used a questionnaire comprising simple questions, and the answers were categorized according to the parents' direct selections. This was not based upon key questions developed and used by Al-Jame et al. [22]. Thus, not using the more recent scoring system may be considered as a weakness in this study as it would disable future comparisons. However, in this study there is no need to compare knowledge level over time, which is the major advantage of the Al-Jame system. Parents were given the opportunity to make inquiries or comments when questionnaires were collected. However, very few inquiries were made, indicating the appropriateness of the given questions.

The incidence of traumatic injuries and avulsions reported by parents in this study is comparable to that reported in other studies [23,24]. University graduated parents who had previous information regarding avulsion and replantation were few and nearly comparable to the technical schools graduated parents. However, they were higher than those reported by Al-Jame et al. [22]. Most of this information was derived from dental advice given to both groups, which may indicate the availability of dentists for people in the city. Fewer parents in both groups received information from physicians. Irrespective of the reliability of information retrieved from physicians, it seems likely it was less accurate or global rather than specific, as revealed from other studies [25,26].

Three quarters of the technical school graduated parents and about one quarter of the university graduated parents showed that they got the information from their friends. This means that it is vitally important to mount posters, leaflets and media campaigns to educate people in the recommended first aid measures for managing avulsed permanent teeth.

A large number of parents in both groups were willing to find the avulsed primary tooth. Although the reason is not clarified, this action should be encouraged as it helps to judge that the tooth is not swallowed or inhaled by the child [27].

A few parents in both groups showed their interest in primary tooth replantation. This may be related to the absence of knowledge about the hazards of replanting the primary teeth, as indicated by Andreasen et al. [6,28] and Al-Khayatt

and Davidson [29]. Most parents of the two groups did not show interest in permanent tooth replantation by themselves, which agrees with Santos et al. [30] and disagrees with the results of Raphael and Gregory [15], and Qazi and Nasir [13]. The reasons for the reluctance to replant avulsed teeth could be related to lack of knowledge, hurting the child or to the felt urge to stop the bleeding, which is perceived by most people as life-threatening [14,19].

On the other hand, a considerable number of parents showed their preference to clean and/or save the avulsed tooth to be replanted by a specialist. However, the knowledge of both groups regarding tooth cleaning methods before replantation or saving was poor. The use of antiseptics and brushing were preferred by parents in both groups. This accords with the study performed by Raphael and Gregory [15]. They showed that 15% of respondents would scrub a tooth that was dirty before replanting it, unaware that they would be severely decreasing the chance of successful replantation. Tap water which is the ideal cleaning method was chosen by a relatively few number of parents in both groups.

Although a small number of parents showed interest in replanting the avulsed permanent tooth by themselves in both groups, a considerably higher level of awareness was clearly detected among the university graduated parents about the importance of the time factor. They showed their interest in immediate replantation more than the second group. The educational level may act as an important factor in this regard, as it is well known that the single most important factor to ensure a favorable outcome is the 'speed' with which the tooth is replanted [5,31,32].

A relatively large number of parents in both groups preferred holding the avulsed tooth from the crown, and a relatively small number chose the root. However, a considerable number of them were not sure about the portion to hold and very few parents did not give any answer. Consequently it is expected that a large number of parents will hold the tooth from the root and disturb the periodontal ligaments. They are not aware that one of the most important factors for tooth replantation success is the integrity and viability of the periodontal ligaments of the avulsed tooth [33].

Storing the avulsed tooth in a solution compatible with cell viability until replantation is a critical procedure; however dry storage selection was prevalent among parents of both groups. Cotton was the most commonly chosen medium by a considerable number of them. Paper tissue wrapping was not far behind as this was selected by a number of parents in both groups in agreement with the study performed by Shashikiran et al. [14]. This concept of 'dry storage' among parents indicates that there is lack of knowledge in both groups on how avulsed teeth should be handled after an accident. They are not aware that dry storage during transport would seriously prejudice normal healing, and the prognosis is related to the injury of the periodontal membrane during the time the tooth is out of its socket [32,33].

Milk was the second most chosen transport medium by both groups (24.30% and 15.6%) for the avulsed permanent teeth as recommended in different studies [12,33]. This may be related to previous information gathered by the parents from dentists and doctors or to their inherent belief of the benefits of milk. This differs from the results of Raphael and Gregory [15], who showed that only 5% of respondents knew that milk was the medium of choice for both washing and trans-

porting avulsed teeth. Fewer respondents, 3%, knew the same in the study performed by Santos et al. [30]. Shashikiran et al. [14], reported that only 1.8% chose milk in their study.

This is followed by the tap water, although it is not recommended as it is of low osmolality hypotonic solution and causes PDL cells to swell and rupture. Dry storage of the tooth or storing it in water are not the proper media as this will lead to injury to the periodontal membrane with the result that the replanted tooth will be lost over time [33].

Within the limitations of the present study, the results indicate that the parents of the two groups have a low level of knowledge regarding tooth emergency management of avulsed permanent teeth. This finding is in accordance with other studies of parental knowledge performed in Singapore [18], Kuwait [20,22] and Nigeria [21,23].

An absence of knowledge will result in avulsed teeth not being replanted, improperly cleaned, or handled or stored in an inadequate medium prior to replantation, which will severely affect the prognosis for the compromised tooth. Although parents were well educated and more than half of them were qualified with university degrees, it is apparent that the level of education had no noticeable influence on their dental trauma knowledge. This is probably because very little or no information about tooth avulsion and replantation has been given to most of them [34]. However, they differed significantly in respect of the second group's knowledge of the importance of immediate replantation and of milk as a storage medium.

An avulsed permanent tooth can be replanted with success and the tooth retained for life. The prognosis depends on appropriate emergency management immediately after trauma [32,35]. Moreover, the prognosis is still largely determined in the first 15 min after trauma [36]. By acting quickly and effectively, an avulsed tooth can be successfully replanted and retained for life in most cases.

It is concluded that, regardless of the level of education, the two groups of parents in Mansoura City, Egypt were lacking most of the knowledge required for emergency management of avulsed teeth. Children and teenagers are especially sensitive about missing anterior teeth and there is often a conscious effort to avoid smiling. Therefore, educational programs should be developed for parents to encourage them to seek treatment immediately when a traumatic dental injury occurs to their children. These programs should also include teachers, nurses, coaches, receptionists and even physicians. Thus it would be beneficial if instructions in how to manage dental injuries would be more widespread in society. Further comparative studies before and after educational programs for Egyptian people will be required.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.jare.2011.01.002.

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