

## **Knowledge of Hospital Emergency Unit Staff About the First-Aid Management of Traumatic Tooth Avulsion in A Tertiary Hospital in Nigeria**

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**Received:** September 29, 2016; **Published:** October 25, 2016

### **Abstract**

**Background:** Avulsion of permanent teeth is one of the most serious dental injuries requiring prompt and appropriate emergency management and treatment plan to ensure good outcome. Emergency hospital staff have a role to play in cases of avulsion of permanent teeth in order to minimize late complications associated with such injuries.

**Objective:** To assess the knowledge and awareness regarding the emergency management of traumatic tooth avulsion among emergency unit staff of a tertiary hospital in Nigeria.

**Methods:** This was a descriptive cross sectional study of the Accident and Emergency Unit staff of the University of Benin Teaching Hospital. A structured questionnaire was administered to doctors, nurses and emergency medical technicians at the accident and emergency unit. Collected information included demographics, knowledge, practice and experience regarding emergency management of traumatic tooth avulsion as well as self-assessment and need for training with regards to traumatic tooth avulsion by the participants. Data was analysed with SPSS version 21.0, using frequency distribution, cross tabulations and Chi square.  $P < 0.05$  was considered statistically significant.

**Results:** A total of 62 questionnaires were administered to staff of the emergency Unit however, only 59 were properly filled and returned giving a response rate of 95.2%. The male to female ratio of the respondents was 1:1.95. The overall knowledge of TTA among the respondents was found to be poor in 22.0%, fair in 39.0% and good in 39.0%. Majority (81.4%) of the respondents selected normal saline as preferred medium to preserve an avulsed tooth.

**Conclusion:** There exists a deficiency in knowledge about TTA among all cadre of professionals in the emergency room.

**Keywords:** *Traumatic; Tooth avulsion; Emergency; Management*

### **Introduction**

Traumatic tooth avulsion (TTA) is a complete dislodgement of a tooth from its socket in the alveolar bone owing to trauma. It accounts for approximately 0.5 - 3% of all dental trauma [1]. It is one of the most common oral injuries that occurs in children and adolescents [2]. Avulsion of permanent teeth is one of the most serious dental injuries requiring prompt and appropriate emergency management and treatment plan to ensure good outcome [1]. Avulsion presents a challenge with regards to its proper emergency management [3]. Replantation in most cases, is the treatment of choice, but may not always be carried out immediately [1]. Clinical outcome of avulsed tooth is unduly compromised if adequate emergency treatment is not rendered [4].

Worldwide there are 5.8 million cases of trauma per year with emergency room visits increasing by 300-fold [2]. Therefore, hospital emergency departments are confronted with managing dental emergencies of both traumatic and non-traumatic origin [5]. Many of these

TTA injuries occur after work hours or weekends when most dental practices are shut [2]. Practice of modern medicine has become a joint effort of many groups of health workers both medical and paramedical [6]. It is incumbent on the medical staff to have an understanding on how to diagnose dental injuries, manage them and make appropriate referrals [2].

It has been reported that treatment needs of persons suffering from traumatic dental injuries are not properly met [7]. Many patients will often present to their general medical practitioner or the accident and emergency department [4]. Emergency hospital staff have a role to play in cases of avulsion of permanent teeth in order to minimize late complications associated with such injuries [7]. When traumatic dental injury occurs, the patient expects competent treatment from the emergency department personnel [7].

Studies [3,7,8] have shown that medical hospital emergency physicians have insufficient knowledge treatment regarding for TTA. Several studies [3-5,7-10] have reported the knowledge of TTA among different cadres of health care providers but there is a paucity of such studies in Nigeria.

This study therefore was designed to assess the knowledge and awareness regarding the emergency management of traumatic tooth avulsion among emergency unit staff of a tertiary hospital in Nigeria.

**Methods**

This was a descriptive cross sectional study of the Accident and Emergency Unit staff and of the University of Benin Teaching Hospital. Ethical approval was obtained from the College Ethical Committee of the College of Medical Sciences, University of Benin before commencement of this study. Written informed consent was obtained from all participants in this study.

The data collection instrument was used in a previous study [11]. It elicited information on demographics, knowledge, practice and experience regarding emergency management of TTA as well as self-assessment and need for training with regards to TTA by the participants. Ten questions were used to assess knowledge of TTA among the respondents. Every correct answer was given a score of 1 and every wrong answer no score. The highest total score attainable was 10 while the lowest was 0. The scores were graded as follows: 7 - 10 good knowledge, 4 - 6 fair knowledge and 0 - 3 poor knowledge.

The data so collected was analysed using Statistical Package for Social Sciences (SPSS) version 21.0. The analysis was done using frequency distribution, cross tabulations and Chi square. P < 0.05 was considered statistically significant.

**Results**

A total of 62 questionnaires were administered to staff of the emergency Unit however, only 59 were properly filled and returned giving a response rate of 95.2%. The male to female ratio of the respondents was 1:1.95. The age group of the respondents varied with 31 – 35 years recording the highest frequency (22.0%) and most (61.0%) of the respondents were nurses while medical doctors accounted for 27.1% (Table 1).

Characteristics	Frequency	Percent
Gender	20	33.9
Male		
Female	39	66.1
Profession	16	27.1
Medical Doctor		
Nurse	36	61.0
EMT	7	11.9
Age (years)	5	8.5
21-25		

26-30	12	20.3
31-35	13	22.0
36-40	10	16.9
41-45	10	16.9
46-50	6	10.2
51-55	2	3.4
56-60	1	1.7
Total	59	100.0

**Table 1:** Socio-demographic distribution of the respondents.

EMT= Emergency Medical Technician

Majority (89.8%) knew an avulsed tooth is a tooth that has been completely dislodged from its socket in the alveolar bone. The best emergency treatment for an avulsed tooth reported by 74.6% of the respondents was “refer the patient with the tooth to a dentist” (Table 2). However, this was not statistically significant with the profession of the respondents.

Best emergency treatment	Frequency	Percent
Throw avulsed tooth away and refer patient to a dentist	3	5.1
Replant the tooth in its socket	9	15.3
Refer patient with avulsed tooth to the dentist	44	74.6
Don't know	2	3.4
No response	1	1.7
Total	59	100.0

**Table 2:** Best emergency treatment for TTA reported by the respondents.

More than half (62.7%) of the respondents affirmed that an avulsed tooth should be replanted however, only 47.5% of them agreed they would undertake replantation of an avulsed tooth. A higher percentage of EMTs were willing to undertake replantation of an avulsed tooth, although this was not statistically significant (Table 3). More than half (62.7%) of the respondents preferred to refer a patient with an avulsed tooth to a dentist at the site of an avulsed tooth.

Profession	Willingness to undertake replantation of an avulsed tooth			Total n (%)
	No n (%)	Yes n (%)	Uncertain n (%)	
Medical Doctor	8 (50.0)	7 (43.8)	1 (6.3)	16 (100.0)
Nurse	17 (47.2)	15 (41.7)	4 (11.1)	36 (100.0)
EMT	1 (14.3)	6 (85.7)	0 (0.0)	7 (100.0)
Total	26 (44.1)	28 (47.5)	5 (8.5)	59 (100.0)

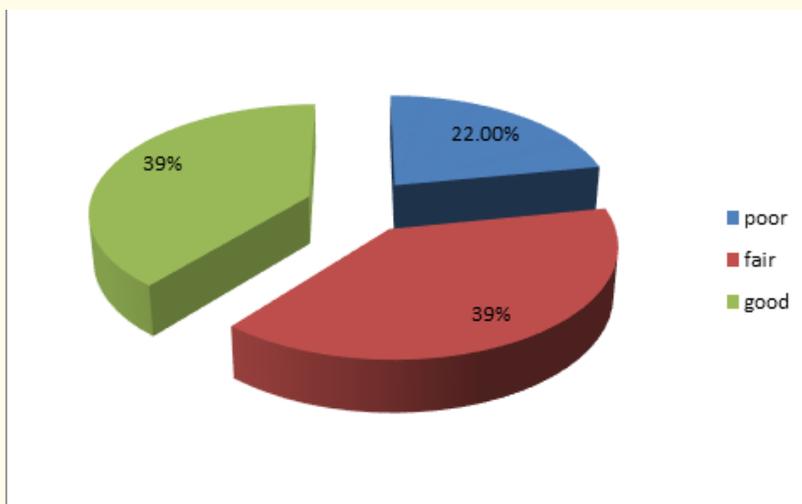
**Table 3:** Willingness to undertake replantation of an avulsed tooth by profession of the respondents.

P=0.28

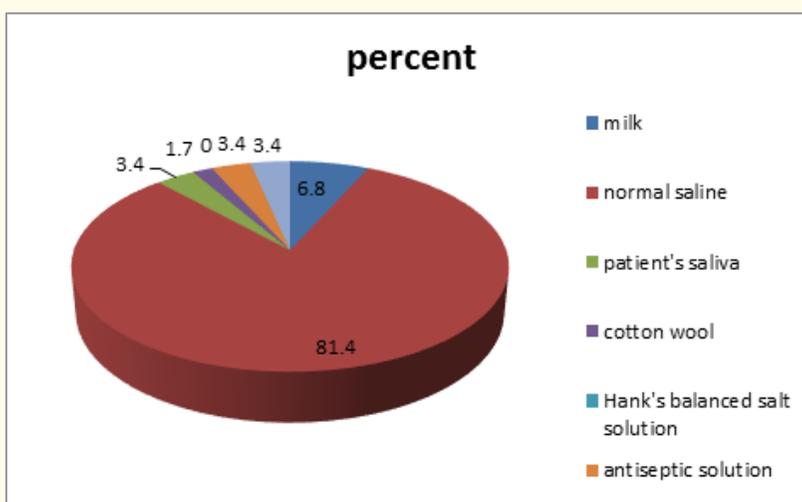
Varied responses were noted with regards to timing of replantation of an avulsed tooth: 20 - 60 minutes after avulsion was noted in 35.6% of the respondents while 16.9% of them felt anytime convenient enough for replantation. Only a few (17.1%) of the respondents knew that it would not be viable to replant an avulsed tooth 2 hours after the traumatic incident.

The type of tooth whether milk or permanent tooth was affirmed by 88.1% of the respondents to be an important consideration while replanting an avulsed tooth with 72.9% of the respondents reporting that an avulsed milk tooth should not be replanted.

The overall knowledge of TTA among the respondents was found to be poor in 22.0%, fair in 39.0% and good in 39.0% (Figure 1). More than half of the total number of nurses had good knowledge of TTA. However, there was no statistically significant association between overall knowledge of TTA and profession of respondents as  $p = 0.46$  (Table 4).



**Figure 1:** Knowledge of TTA among the respondents.



**Figure 2:** Preferred media for preservation of an avulsed tooth among the respondents.

Profession	Knowledge of TTA			Total n (%)
	Good n (%)	Fair n (%)	Poor n (%)	
Medical Doctor	4 (25.0)	8 (50.0)	4 (25.0)	16 (100.0)
Nurse	17 (47.2)	11 (30.6)	8 (22.2)	36 (100.0)
EMT	2 (28.6)	4 (57.1)	1 (14.3)	7 (100.0)
Total	23 (39.0)	23 (39.0)	13 (22.0)	59 (100.0)

**Table 4:** Knowledge of respondents about TTA by profession.

*P* = 0.46

Majority (81.4%) of the respondents selected normal saline as preferred medium to preserve an avulsed tooth (Figure 2). The need to clean an avulsed tooth that acquires dirt was recorded in 61.0% of the respondents. Of those that agreed there was a need to clean, 69.2% knew how to hold the tooth (crown) during cleaning.

Profession	Prior training on management of TTA		Total n (%)
	No n (%)	Yes n (%)	
Medical Doctor	15 (93.8)	1 (6.3)	16 (100.0)
Nurse	23 (63.9)	13 (36.1)	36 (100.0)
EMT	3 (42.9)	4 (57.1)	7 (100.0)
Total	41 (69.5)	18 (30.5)	59 (100.0)

**Table 5:** Prior training on management of TTA by profession of the respondents.

*P* = 0.02

Less than half (44.1%) of the respondents had come across a patient with an avulsed tooth with 92.9% of them referring the patient to a dentist while only one respondent admitted to replanting the avulsed tooth.

A significant number of respondents (67.8%) were not aware of any protocol for management of TTA. Sixty-nine and half percent of the respondents had no prior training on management of TTA and this was statistically significant with the profession of the respondents, with more EMTs reporting that they had prior knowledge (Table 5) (*p* = 0.02). Overall, 78.0% of the respondents thought they were not well informed about the emergency management of TTA while almost all (94.8%) of the respondents reported a need to receive education on TTA.

**Discussion**

Previously, traumatic dental injuries were perceived to be low priority for emergency room physicians and first responders in emergency rooms (ER) [7,13,14]. However, recent literature seems to show a shift in this perception as worldwide documentation illustrates the need to educate ER staff on traumatic dental injury and acceptance of the importance of early treatment of traumatic dental injury [8,14,15].

ER personnel consist of ER doctors, nurses and EMTs and this was depicted by the distribution of personnel in this study. Majority knew an avulsed tooth is a tooth that has been completely dislodged from its socket in the alveolar bone. This is not surprising as the respondents may have come across other avulsion injuries.

The personnel with the greatest knowledge to manage TTA is most likely to be the last person to see the patient, while the first person to see the patient would have the least knowledge [16]. As the best emergency treatment for an avulsed tooth observed by majority of the

respondents was “refer the patient with the tooth to a dentist” This finding supports the fact that most casualty personnel lack knowledge of the appropriate emergency treatment for TTA so prefer to refer patients with an avulsed tooth to a dentist inspite of the obvious delay such action was bound to cause before replantation was eventually undertaken [8].

Previous studies [17-20] reported that majority of patients with traumatised teeth worldwide are not provided with the appropriate emergency care. This can be inferred from the findings of this study as more than half of the respondents affirmed that an avulsed tooth should be replanted however, only 47.5% of them agreed they would undertake replantation of an avulsed tooth.

Extra oral time is paramount in determining the success of tooth replantation. A delay in providing emergency care may jeopardize the prognosis of the avulsed tooth. Varied responses were noted with regards to timing of replantation of an avulsed tooth with few (17.1%) of the respondents knowing that it would not be viable to replant an avulsed tooth 2 hours after traumatic tooth avulsion. This shows a deficiency in the knowledge of the respondents about emergency management of TTA.

The type of tooth whether milk or permanent tooth was affirmed to be an important consideration while replanting an avulsed tooth in this study. An avulsed primary tooth should not be replanted due to the high potential to damage the developing tooth germ of the succedaneous tooth [21,22].

Emergency room personnel have been shown to demonstrate poor knowledge of management of traumatic dental injuries with knowledge poorest among EMTs [16]. This is in contrast to findings of this study where medical doctors had poorest knowledge.

The success of replantation depends on a number of factors that may either accelerate or minimise the occurrence of complications such as root resorption or ankylosis. One of these factors is the storage medium for storing the avulsed tooth when immediate replantation is not feasible. There are several options for storage and transport of the avulsed tooth to a clinic where replantation can be undertaken [23]. Maintaining the tooth in an adequate medium that can preserve the vitality of the periodontal ligament cells remaining on the root surface is essential for successful outcome. A storage medium that produces conditions that closely resemble the original socket environment with respect to adequate osmolality (cell pressure), pH, nutritional metabolites and glucose is ideal [24]. If the avulsed tooth is kept in a suitable medium, the extra-oral time may be extended up to 6 hours [25]. Storing an avulsed tooth in a suitable medium compatible with cell viability until replantation is a critical step in its preservation [26]. Despite several research on storage media for avulsed teeth, there is not yet a single medium that is ideal [24]. Majority of the respondents in this study selected normal saline as preferred medium to preserve an avulsed tooth. This may be because normal saline is a physiological solution however normal saline is not the most appropriate storage media. Saline has been presented as a short-term storage media because of its physiologic osmolality [3,25]. It has been observed that when saliva is used as a storage medium, the extra-alveolar period must be limited to a maximum of 2 hours due to the slightly hypotonic nature of the medium and the fact that bacteria present in saliva may also have a detrimental effect on later healing [3,21]. A review of the literature by Poi, *et al.* [24] noted that regular pasteurised whole milk was the most frequently recommended with best prognosis among the readily available media such as water, saline and saliva.

The respondents had little or no experience with emergency management of traumatic tooth avulsion as less than half of the respondents had come across a patient with an avulsed tooth. It is encouraging to notice that those who had encountered patients with TTA referred the patient to a dentist, as this lends credence to the fact that the respondents believe the dentist is better qualified to handle such cases. However, given the fact that time is of the essence in ensuring favourable prognosis for the tooth immediate reinplantation is the emergency treatment of choice after which the patient is referred to the dentist to continue management.

The findings of this study was similar to previous studies [7,8] that reported that medical hospital emergency physicians assessed their knowledge regarding emergency treatment of TTA injuries as insufficient and saw a need for further education.

## **Conclusion**

This study identifies a deficiency in knowledge about TTA among all cadre of professionals in the emergency room. This brings to fore the need for inclusion of management of dental emergencies in the curriculum of all personnel involved in attending to patients with emergencies.

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**Volume 5 Issue 3 October 2016**

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