

# KNOWLEDGE AND ATTITUDES OF FINAL YEAR MEDICAL STUDENTS TO FIRST AID MANAGEMENT OF TRAUMATIC TOOTH AVULSION: A CROSS-SECTIONAL SURVEY

ENABULELE JOAN EMIEN<sup>1</sup>, OMO JULIE OMOLE<sup>1</sup>

## Abstract

This was a descriptive cross-sectional study aimed at assessing the knowledge of final year medical students at the University of Benin regarding emergency management of traumatic tooth avulsion. Data collected were information on demographics, knowledge and practice regarding emergency management of traumatic tooth avulsion. Results showed that majority (83.0%) knew what an avulsed tooth was while only (16%) knew the best emergency treatment for an avulsed tooth. Only 7.5% opted to replant a tooth at an avulsion site whereas majority 64 (68.1%) preferred to refer a patient with an avulsed tooth to the dentist at the site of an avulsion. Most (51.1%) of the respondents selected saline as their preferred medium for preservation of an avulsed tooth. The findings of this survey shows that majority of the final year medical students had little or no awareness about the emergency management of avulsed teeth.

## Introduction:

Traumatic tooth avulsion (TTA) means total displacement of an intact tooth out of the socket as a result of trauma<sup>1,2</sup>. It represents 16% of dental injuries<sup>3,4</sup> and the most commonly avulsed teeth are the maxillary incisors. Tooth avulsion usually occur during sports, physical violence, road traffic accidents, falls and other physical impacts<sup>2</sup> with the peak age reported to be 7 to 9 years, a time when the permanent incisors are erupting<sup>2,5,6,7</sup>. Immediate re-implantation of the avulsed teeth is the treatment of choice, giving the significant role that anterior tooth plays in aesthetics, speech, mastication, and

health of the supporting tissues, psychological and mental health of the affected individual<sup>1,2,3</sup>. The success of such re-implantation is dependent on factors such as extra alveolar period, storage media in which the tooth is transported before re-implantation, viability of the periodontal ligament left on the root prior to re-implantation, type of retention employed, time of endodontic intervention, type of drug prescribed, oral hygiene status as well as general health of the patient<sup>1,2,4,8,9,10</sup>. Although extra-oral time is a factor, newer physiologically compatible storage solutions are available to maintain and/or replenish periodontal ligament cell metabolites. Two of such solutions include Hank's balanced salt solution (HBSS) and ViaSpan also known as University of Winconsin solution<sup>11,12</sup>. Other temporary storage media for an

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*\*Correspondence*

Omo Julie Omole  
<sup>1</sup>Department of Restorative Dentistry  
University of Benin  
omole70@yahoo.com  
08066164845

avulsed tooth are milk, saliva, contact lens solution and saline<sup>13</sup>. However, their ability to replenish cellular metabolites has not been documented.

Many avulsed teeth are lost due to lack of proper first aid procedures<sup>3</sup>. Dentists rarely administer first aid at the scene of accidents for avulsed teeth<sup>1,14</sup> because medical doctors are often the first to provide primary treatment following trauma incidents. Dental health education is imperative in reducing the negative consequences of such injuries<sup>15</sup>. Previous surveys conducted on medical professionals showed lack of adequate knowledge regarding management of tooth avulsion<sup>15,16</sup>. To ensure proper and appropriate management, it is essential that medical professionals are equipped with adequate knowledge and sufficient training in the basic principles of emergency management of traumatic injuries<sup>3,16</sup>. Consequently, it is important that final year medical students are knowledgeable about dental emergencies before they become qualified medical doctors.

There is a paucity of related studies in Nigeria and among medical students. This study therefore aims to assess the knowledge of medical students regarding emergency management of traumatic tooth avulsion.

**Methods:** This was a descriptive cross-sectional study of final year Medical students at the University of Benin, Nigeria. Ethical approval was sort before commencement of this study from the College Ethical Committee of the College of Medical Sciences, University of Benin. The target population was all final year medical students at the University of Benin in 2013 that were present for a class lecture. The students were told about the

objective of the study and those who gave informed consent were recruited for the study.

Prior to the actual study, pre-testing of the questionnaire was done on ten semi-final year medical students to enable the researchers determine the appropriateness of the questionnaire as a tool for collecting the required information.

The data collected were information on demographics, knowledge and practice regarding emergency management of TTA and their self-assessment of their knowledge of TTA.

The data so collected was analyzed using Statistical Package for Social Sciences (SPSS) version 17.0. The analysis was done using frequency distribution, cross tabulations, test of significance with chi square.  $P < 0.05$  was considered statistically significant.

**Results:** Out of the 120 students present in class on the day of the survey only 96 agreed to participate giving 80% response rate. However, two of the questionnaires were not properly filled. The study was carried out using 94 valid questionnaires. The respondents' age ranged from 23 to 37 with a mean age of  $26.3 \pm 3.4$  years and a male female ratio of 1:0.54 (Table 1). Majority 78 (83.0%) knew what an avulsed tooth was with more of the males being knowledgeable although this was not statistically significant ( $p > 0.05$ ). Only 15 (16%) of the respondents knew that the best emergency treatment for an avulsed tooth was replantation of the tooth in the socket with more of the females being knowledgeable although it was not statistically significant ( $p > 0.05$ ). A quarter 25.5% of the respondents reported that an avulsed tooth should be

**Table 1: Demographic characteristics of the patients**

Characteristics	Frequency n	Percent %
<b>Age (years)</b>		
21-25	41	43.6
26-30	45	47.9
31-35	6	6.4
Above 35	2	2.1
<b>Gender</b>		
Male	61	64.9
Female	33	35.1
Total	94	100.0

**Table 2: Respondents' preference of what to do at the site of an avulsed tooth**

What to do	Frequency n	Percent %
Replant the tooth	7	7.5
Place in a medium	18	19.1
Refer to a dentist	64	68.1
Do nothing	4	5.3
Total	94	100.0

**Table 3: Respondents' preferred preservation medium for avulsed tooth**

Medium	Frequency	Percent
	n	%
Milk	1	1.1
Water	14	14.9
Saline	48	51.1
Patient's saliva	5	5.3
Handkerchief	4	4.3
Cotton wool/Gauze	1	1.1
Tissue paper	2	2.1
Antiseptic solution	14	14.9
No selection	5	5.4
<b>Total</b>	<b>94</b>	<b>100.0</b>

**Table 4: Willingness to undertake replantation of an avulsed tooth by gender**

Will you undertake to replant an avulsed tooth	Male	Female	Total
	n (%)	n (%)	n (%)
	Yes	25 (41.0)	7 (21.2)
No	36 (59.0)	26 (78.8)	62 (66.0)
<b>Total</b>	<b>61 (100.0)</b>	<b>33 (100.0)</b>	<b>94 (100.0)</b>

P=0.05

**Table 5: Knowledge/ training on traumatic tooth avulsion among the respondents**

Knowledge/training	Yes n (%)	No n (%)	Total n (%)
Aware of any protocol for management of avulsed teeth?	2 (2.1)	92 (97.9)	94 (100.0)
Prior training or knowledge of management of an avulsed tooth?	7 (7.4)	87 (92.6)	94 (100.0)
Are you well informed about emergency management of avulsed teeth?	1 (1.1)	93 (99.9)	94 (100.0)
Is there a need to receive education on traumatic tooth avulsion?	84 (89.4)	10 (10.6)	94 (100.0)

replanted within 20-60 minutes following avulsion however 2.1% felt tooth should be replanted any time it is convenient. Close to half 44 (47.8%) of the respondents thought that after 6-24 hours it becomes impossible to replant an avulsed tooth while 27 (28.7%) claimed not to have an idea of when it becomes impossible to replant an avulsed tooth.

Only 7.5% (7) opted to replant a tooth at an avulsion site whereas majority 64 (68.1%) preferred to refer a patient with an avulsed tooth to the dentist at the site of an avulsion (Table 2). Most 48 (51.1%) of the respondents selected saline as their preferred medium for preservation of an avulsed tooth while those that selected water and antiseptic solution each accounted for 14 (14.9%) (Table 3).

A third 34 (36.2%) of the respondents knew that an avulsed tooth that is dirty should be cleaned with 44 (46.8%) of the respondents agreeing that the crown part of the tooth should be held during cleaning. Also a third of the respondents claimed they would undertake to replant an avulsed tooth with more of males in this category and it was statistically significant (Table 4). Majority 91.5% of the respondents felt that the type of tooth whether primary or permanent was important while undertaking emergency treatment of an avulsed tooth.

A few 24 (25.5%) of the respondents had come across a patient with an avulsed tooth however 12 (50%) of them did nothing about the avulsed tooth, while 10 (41.6) referred the patient to the dentist and 2 (8.3%) claimed to have replanted the avulsed tooth. There was no statistically significant association between previous encounter with a patient with avulsed tooth and medium

selected for preservation of an avulsed tooth.

Only 7 (7.4%) reported receiving prior knowledge or training on management of an avulsed tooth (Table 5) with 3 (42.9%) claiming that their source of information was from discussion with dentists, 2 (28.6%) from the internet and the remaining from textbooks and seminars. Only 1 (1.1%) of the respondents felt they were well informed about the emergency management of avulsed teeth however, 84 (89.4%) admitted to the need to receive education on traumatic tooth avulsion.

Discussion: There is limited access to information about oral health care due to shortage of oral health care providers in Nigeria. Medical students are said to be able to play a role in oral health care<sup>17</sup>. It has been reported that for a questionnaire based study to be effective it requires a good response rate<sup>18</sup> with 64% suggested as an acceptable rate<sup>19</sup>. This study achieved an 80% response rate which is far above the acceptable. The medical students in this study had a mean age of  $26.3 \pm 3.4$  years with a male female ratio of 1:0.54. The mean age is comparable to that of a previous study done on final year medical students in Lagos<sup>20</sup>. The male preponderance in this study is similar to studies in Jos<sup>21</sup> and Lagos<sup>22</sup> reflecting the usual gender distribution of medical students in Nigeria despite reports of increasing female entrance into the medical profession<sup>23</sup>.

Majority of the final year medical students knew what an avulsed tooth was. This agrees favourably with a previous study<sup>2</sup> done on medical doctors. However it differs from that of another,<sup>1</sup> where only 56.6% of the medical doctors knew what an avulsed tooth was<sup>1</sup>. This is encouraging

as the final year medical students who are potential medical doctors are likely to be the first to see these patients, hence would be able to recognise TTA.

The root maturation, the extra-oral time, and the general health of the tooth pre-injury determine the treatment options. The idea of early or immediate re-implantation should be adopted<sup>24</sup>. Re-implantation of an avulsed tooth preferably should be done in order to minimize extra-alveolar time and to keep the periodontal cells viable for healing and a possible pulp revascularization,<sup>25</sup> only 16% of the respondents knew that the best emergency treatment for an avulsed tooth was re-implantation in the socket. Time is an important factor in the preservation of the vitality in a re-implanted avulsed tooth<sup>26</sup>. A delay in providing emergency dental treatment may worsen the prognosis of an avulsed tooth<sup>3</sup>. Thus an attempt should be made to replant the avulsed tooth immediately. A few of the respondents had actually come across patients with avulsed teeth however, half of them did nothing about the avulsed tooth, while less than a half referred the patients to the dentist and only 8.3% claimed to have replanted the avulsed tooth.

Re-implantation of an avulsed tooth preferably should be done at the site of injury in order to minimize extra-alveolar time<sup>24</sup>. For optimal treatment outcome, it is desirable to re-implant and stabilize avulsed teeth within two hours (120 minutes) as periodontal ligament cells become irreversibly necrotic after this time frame<sup>27</sup>. Attempt should be made to salvage avulsed teeth, even if the critical two hours period has passed, although the prognosis becomes progressively worse. However, when an extra-oral time of up to

6 hours is expected, the avulsed tooth should be kept in a suitable medium<sup>28</sup>. It was observed that a quarter of the respondents reported that an avulsed tooth should be re-implanted within 20-60 minutes following avulsion. This corroborates the findings of a previous study<sup>2</sup>. However 2.1% felt tooth should be re-implanted any time it was convenient. Close to half of the respondents thought that after 6-24 hours it becomes impossible to re-implant an avulsed tooth while 28.7% claimed not to have an idea of when it becomes impossible to re-implant an avulsed tooth.

The respondents as potential first contact with patients, now or as qualified medical doctors should be knowledgeable about TTA. Majority preferred to refer a patient with an avulsed tooth to the dentist at the site of an avulsion. This compares with that of a previous study where majority of the respondents felt they would refer the patients to a dentist while a few were confident enough to re-implant the avulsed tooth<sup>2</sup>. It was very encouraging that they felt the dentist can manage the situation better. However, prognosis of an avulsed tooth is enhanced by immediate and appropriate measures taken preferably at the site of injury<sup>1</sup>.

An appraisal of literature revealed that the appropriate storage media that permit periodontal and pulpal cells healing are Hank's balanced salt solution, ViaSpan, milk, saline, water and saliva<sup>11,12,25</sup>. Most of the respondents selected saline as their preferred medium for preservation of an avulsed tooth. Saline has been shown to be a short term storage media because of its physiologic osmolarity<sup>2,28</sup>. This agrees with findings of a previous study<sup>1</sup> conducted on medical doctors and differs from that of another<sup>2</sup> where most of the

respondents choose milk as the ideal storage media. Milk is a readily available medium for the lay person, and because time is of the essence, it is the medium of choice in the absence of HBSS or ViaSpan. Milk will only prevent further cellular demise; thus, it is used specifically when teeth have been out of the oral cavity for less than 20 minutes. Periodontal ligament extra-oral exposure time of more than 15 minutes will deplete most of the cell metabolites; for this reason, a longer period of extra-oral time limits milk's effectiveness to maintain cellular viability<sup>24</sup>. Tap water has been shown to be the one with the least desirable results, though it protect the tooth from dehydration,<sup>1,28</sup> it was selected by 14.9% of the respondents. Andreasen and Andreasen elucidated 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<sup>2,4</sup>.

The knowledge to clean the avulsed tooth is very important as most of the avulsed teeth would fall on the ground and become dirty<sup>1</sup>. A third of the respondents were aware of the need to clean an avulsed tooth prior to re-implantation, while 46.8% of the respondents agreed that the crown part of the tooth should be held during cleaning. This is in agreement with a previous study where 50% of the respondent claimed they would hold the tooth by the crown when cleaning it<sup>1</sup>.

Deciduous teeth should not be replanted as it may injure the developing permanent tooth bud,<sup>4</sup> while teeth with open apices > 1mm diameter have a better prognosis than teeth with closed apices<sup>24</sup>. Majority of

the respondents recognised the need to distinguish between primary and permanent dentition while undertaking emergency treatment of an avulsed tooth. Most of the respondents had never attended any formal seminar or lecture or received printed instructions on the management of avulsed teeth; only 7.4% reported to have had prior knowledge or training on management of an avulsed tooth, of which about half claimed their source of information was from discussion with dentists. However more than three quarter admitted that it was essential to receive education on traumatic tooth avulsion.

**Conclusions:** The result of this survey reflects the fact that majority of the final year medical students had little or no awareness about the emergency management of avulsed teeth. Their opinion may have been influenced by their educational experiences, clinical and academic exposures and their personal interest and research into health issues. It is imperative therefore that the management of dental emergencies such as TTA be incorporated into undergraduate curriculum of medical students as they could play a crucial role in the provision of primary health care following dental trauma, especially for population groups with limited access to dental care.

**Recommendation:** The medical students should be compulsorily mobilized to undergo two weeks posting in the dental clinics to improve on their ability to manage minor oral emergencies.

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