

Evaluation of dentistry undergraduate students' knowledge about tooth avulsion

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ABSTRACT

Objective: to evaluate, through a questionnaire, the knowledge of undergraduate students of dentistry at Veiga de Almeida University about dental avulsion. **Material and Methods:** a structured questionnaire with academic background, previous experience on the subject, and multiple choice questions about knowledge of tooth avulsion was applied to undergraduate students of dentistry from the 2nd to the 8th semester. **Results:** 98.2% of students knew what is dental avulsion and 54.5% have studied or had some kind of education on the subject, 92% answered that dental replantation is the best procedure in case of avulsion. However, only 31% effectively knew how to proceed and proper care of the avulsed tooth (41%). Regarding tooth storage, 61% would store in a bottle of fresh milk. 81% of participants believe that the avulsed tooth, after replantation, should be immobilized. **Conclusion:** undergraduate dentistry students at Veiga de Almeida University present knowledge about the definition of tooth avulsion and that replantation is the best option for treatment. However, it is observed that due to the care of the avulsed tooth and the care protocol, students' knowledge is scarce.

Keywords: Tooth avulsion; Tooth Injuries; Knowledge; Undergraduate students of dentistry.

Introduction

Dental trauma is characterized as any injury to the tooth, supporting structures and adjacent tissues. Prevalence studies reveal that in primary dentition there is a higher prevalence in the age group of 2 to 3 years old, affecting about 9.4% to 62.1%, and in permanent dentition between 9 to 12 years old, affecting about 8.0% to 58.6%, with a higher incidence in males.¹⁻³ Dental trauma is considered by the World Health Organization (WHO) to be a public health problem and during the last decades its occurrence has become increasing.²

Among traumatizations, tooth avulsion is characterized by the total displacement of the tooth out of its socket, causing damage to dental and supporting tissues.^{4,5} Avulsion can result in severe injuries to the periodontium and pulp necrosis, mainly due to rupture of insertions of the periodontal ligament.⁶ Studies show that avulsion corresponds to 11.64% of cases of alveolus-dental trauma, with a higher incidence in the upper central incisors, as they are teeth that have their favored exposure to trauma.⁷⁻¹¹ In addition to provide functional damage, avulsion causes aesthetic and psychological damage, causing enormous impact to the lives of the patients involved, and the correct conduct and treatment in these cases is extremely important.²

The treatment of choice consists of replanting the avulsed element, and the specific care with the element and the time elapsed between avulsion and replantation is extremely important for its prognosis.⁷ According to the International Association of Dental Trauma (IADT), the recommendable

would be replantation at the accident site and immediately seek the dentist or dental emergency service.¹² However, studies show that the knowledge of the population and dentists about how to proceed in cases of dental trauma is scarce and this lack of knowledge can negatively affect the prognosis of the case.^{13,14}

The objective of this research was to evaluate, through a questionnaire, the knowledge of undergraduate students of dentistry at Veiga de Almeida University about dental avulsion.

Material and Methods

This research was approved by the Human Research Ethics Committee of Veiga de Almeida University under protocol 2.899.020. A questionnaire (Chart 1) was prepared based on previous studies,¹³⁻¹⁵ structured with academic background, experiences in the subject, containing multiple choice and multiple selection questions about knowledge of dental avulsion. The questionnaire was applied to students from the 2nd to the 8th semester of the undergraduate course in Dentistry at the Veiga de Almeida University, from January to July 2019.

Data analysis was obtained by means of a final tabulation performed using Excel from Microsoft. Then, the data were transferred to the SPSS program and evaluated in relation to frequency (%). A general analysis and a group analysis were carried out considering the 2nd to the 8th semester, before (from the 2nd to the 5th semester) and after (from the 6th to

Chart 1. Questionnaire

Knowing the interviewee	
Which semester of the course?	
Questions about dental trauma	
<p>1. What do you understand by dental avulsion?</p> <p><input type="checkbox"/> Fracture of part of the crown of the tooth.</p> <p><input type="checkbox"/> Fracture of part of the crown and root of the tooth.</p> <p><input type="checkbox"/> Fracture of the bone surrounding the tooth.</p> <p><input type="checkbox"/> Tooth movement within the implantation site.</p> <p><input type="checkbox"/> Tooth displacement outside the implantation site.</p>	<p>2. Have you ever seen a case of tooth avulsion?</p> <p><input type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No.</p>
<p>3. Have you studied or had any type of instruction on issues related to dental trauma in recreational-sports practices during graduation?</p> <p><input type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No.</p>	<p>4. Faced with a person suffering from dental avulsion due to sports practice, the best procedure would be:</p> <p><input type="checkbox"/> Dental reimplantation.</p> <p><input type="checkbox"/> Dental restoration.</p> <p><input type="checkbox"/> Prosthesis rehabilitation.</p> <p><input type="checkbox"/> Suture the affected region.</p>
<p>5. What to do in cases of tooth avulsion?</p> <p><input type="checkbox"/> Give a towel to the person to bite and control the bleeding.</p> <p><input type="checkbox"/> Search for the tooth, wash it and deliver the person to take home.</p> <p><input type="checkbox"/> Search for the tooth, wash it, and put it back inside the tooth socket.</p> <p><input type="checkbox"/> Search for the tooth, wash it, store the tooth in a liquid and take it home.</p> <p><input type="checkbox"/> Search for the tooth, wash it, store the tooth in a liquid and immediately take it to the dentist.</p> <p><input type="checkbox"/> Search for the tooth, store the tooth in a liquid and take it home.</p> <p><input type="checkbox"/> Search for the tooth, store the tooth in a liquid and immediately take it to the dentist.</p> <p><input type="checkbox"/> Search for the tooth, wash it, store the tooth in the person's mouth and immediately take it to the dentist.</p> <p><input type="checkbox"/> Search for the tooth, store the tooth in the person's mouth and immediately take it to the dentist.</p> <p><input type="checkbox"/> Go to the dentist immediately without taking the tooth as it will no longer be useful.</p> <p><input type="checkbox"/> Throw the tooth in appropriate trash to avoid contamination.</p> <p><input type="checkbox"/> Throw the tooth in common trash.</p>	<p>6. What time do you think is ideal to seek care?</p> <p><input type="checkbox"/> Immediately</p> <p><input type="checkbox"/> Within 30 minutes.</p> <p><input type="checkbox"/> Within de 1 hour.</p> <p><input type="checkbox"/> Within 6 hours.</p> <p><input type="checkbox"/> Within 24 hours.</p> <p><input type="checkbox"/> There is no specific time.</p>
<p>7. What would you do if an individual showed up with a tooth in hand after an accident?</p> <p><input type="checkbox"/> I would call the emergency.</p> <p><input type="checkbox"/> I would take to the Doctor.</p> <p><input type="checkbox"/> I would take to the dentist.</p> <p><input type="checkbox"/> I would take to the Emergency Medical Service in a hospital.</p> <p><input type="checkbox"/> I would take to the Emergency Dental Service in hospital.</p> <p><input type="checkbox"/> I would contact the person's guardian or family.</p>	<p>8. If you decided to put the tooth back in the original place, but it had fallen in a dirty place, what would you do?</p> <p><input type="checkbox"/> I would brush the tooth gently with a toothbrush.</p> <p><input type="checkbox"/> I would wash the tooth by hand and remove all the tissue and dirt present.</p> <p><input type="checkbox"/> I would wash the tooth gently with running solution.</p> <p><input type="checkbox"/> I would replace the tooth in the socket without doing anything.</p> <p><input type="checkbox"/> Would throw the tooth in trash.</p> <p><input type="checkbox"/> I wouldn't know what to do.</p>
<p>9. If you washed the tooth, which liquid would you choose?</p> <p><input type="checkbox"/> Tap water.</p> <p><input type="checkbox"/> Fresh milk.</p> <p><input type="checkbox"/> Alcohol.</p> <p><input type="checkbox"/> Saline.</p> <p><input type="checkbox"/> Antiseptic solution.</p> <p><input type="checkbox"/> None.</p>	<p>10. If you chose to keep the tooth, where would it be?</p> <p><input type="checkbox"/> Glass or plastic container without liquid.</p> <p><input type="checkbox"/> Container containing saline.</p> <p><input type="checkbox"/> Container containing antiseptic solution.</p> <p><input type="checkbox"/> Container containing tap water.</p> <p><input type="checkbox"/> Container containing fresh milk.</p> <p><input type="checkbox"/> Container containing fruit juice.</p> <p><input type="checkbox"/> Container containing alcohol.</p> <p><input type="checkbox"/> Clean napkin.</p> <p><input type="checkbox"/> In the person's mouth.</p> <p><input type="checkbox"/> I would throw the tooth in the trash.</p>
<p>11. Do you believe that the avulsed tooth, after reimplantation, should be retained?</p> <p><input type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No.</p>	<p>12. Do you believe that the individual should use a mouthguard when practicing physical activity?</p> <p><input type="checkbox"/> Yes.</p> <p><input type="checkbox"/> No.</p>



the 8th semester) addressing the theme in graduation.

Results

The questionnaire was answered by 110 participants, 2 students from the 2nd semester, 16 students from the 3rd semester, 21 students from the 4th semester, 21 students from the 5th semester, 20 students from the 6th semester, 6 students from the 7th semester and 24 students from the 8th semester. A total of 60 participants from the 2nd to the 5th period and 50 students from the 6th to the 8th period answered the questionnaire.

When asked about what they understood by tooth avulsion (Figure 1A), in the general analysis, 98.2% of the students answered that it consists of displacing the tooth outside the implantation site. This percentage was similar among students from the 2nd to the 5th semester (98.3%)

and from the 6th to the 8th semester (98%).

Regarding the experience in cases of dental avulsion, in general analysis, 22.7% of the students witnessed at least one case. Among students from the 2nd to the 5th semester, 15% answered that they had witnessed it, while from the 6th to the 8th semester, 32% witnessed it.

When asked if they studied or had any type of instruction on dental trauma at graduation, in the general analysis 54.5% answered yes. Among students from the 2nd to the 5th semester, 38.3% replied positively, contrasting with 74% of students from the 6th to the 8th semester.

When asked about the best treatment for an individual who suffered a tooth avulsion, in the general analysis 91.8% of the students answered that it would be the dental replantation. This answer was given by 85% of students from the 2nd to the 5th semester, and by 100% of the students from the 6th to

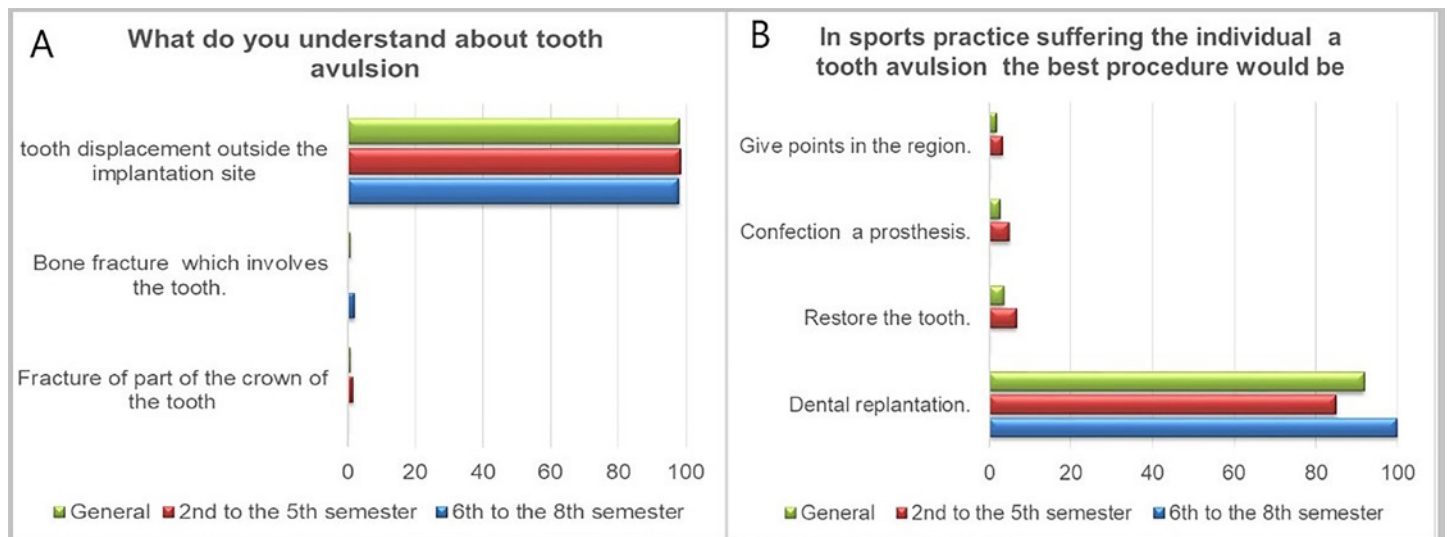


Figure 1. Graphs showing the responses of the participants (%) in relation to the definition of avulsion (A) and the best procedure to follow in these cases (B).

the 8th semester (Figure 1B).

In view of the conduct of what to do in cases of avulsion (Figure 2) the answers most found in the general analysis were: “Search for the tooth, store the tooth in a liquid and immediately take it to the dentist”, answered by 20% of the students (23, 3% of students from the 2nd to the 5th semester and 17% of students from the 6th to the 8th semester answered this option); while 19.1% answered that they would “look for the tooth, wash, store the tooth in a liquid and immediately take it to the dentist”, this answer was given by 23.3% of students from the 2nd to the 5th semester and by 14 % from the 6th to the 8th semester; another 19.1% replied “look for the tooth, store the tooth in the patient’s mouth and immediately take it to the dentist” (18.3% of students from the 2nd to the 5th semester and 20% of the students from the 6th to the 5th 8th semester answered this option). The least answered alternatives were: “Search the tooth, store the tooth in a liquid and take it home” and “go to the dentist

immediately without taking the tooth as it will no longer be useful”, both answered by 0.9% of students , being answered only by students from the 2nd to the 5th semester (1.7% of the participants answered these options). Still, 3.6% of the students in the general analysis answered the follow: “to give a towel to the patient who suffered an avulsion to bite and control the bleeding”, all of whom were students from the 2nd to the 5th semester.

Regarding the time considered ideal to seek care after avulsion (Figure 3A), in the general analysis the most frequently found answers were: immediately, answered by 77.3% of students; within thirty minutes, by 11.8%; and within an hour by 7.3%. In the grouped analysis from the 2nd to the 5th semester, 83.3% students said that the seeking for care should be immediately, while from the 6th to the 8th semester, 70% considered this option. For the option of within 30 minutes, 6.7% of students from the second to fifth semester gave this answer and from the 6th to the 8th semester, 18%

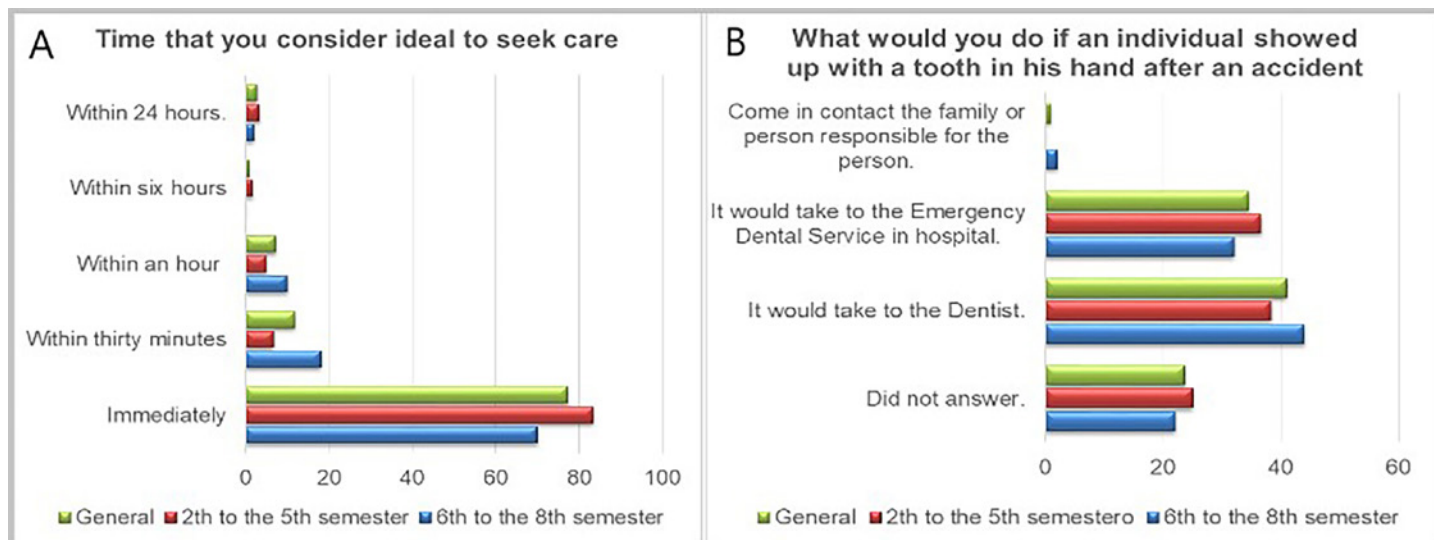


Figure 2. Students' answer (%) on what to do in case of dental avulsion.

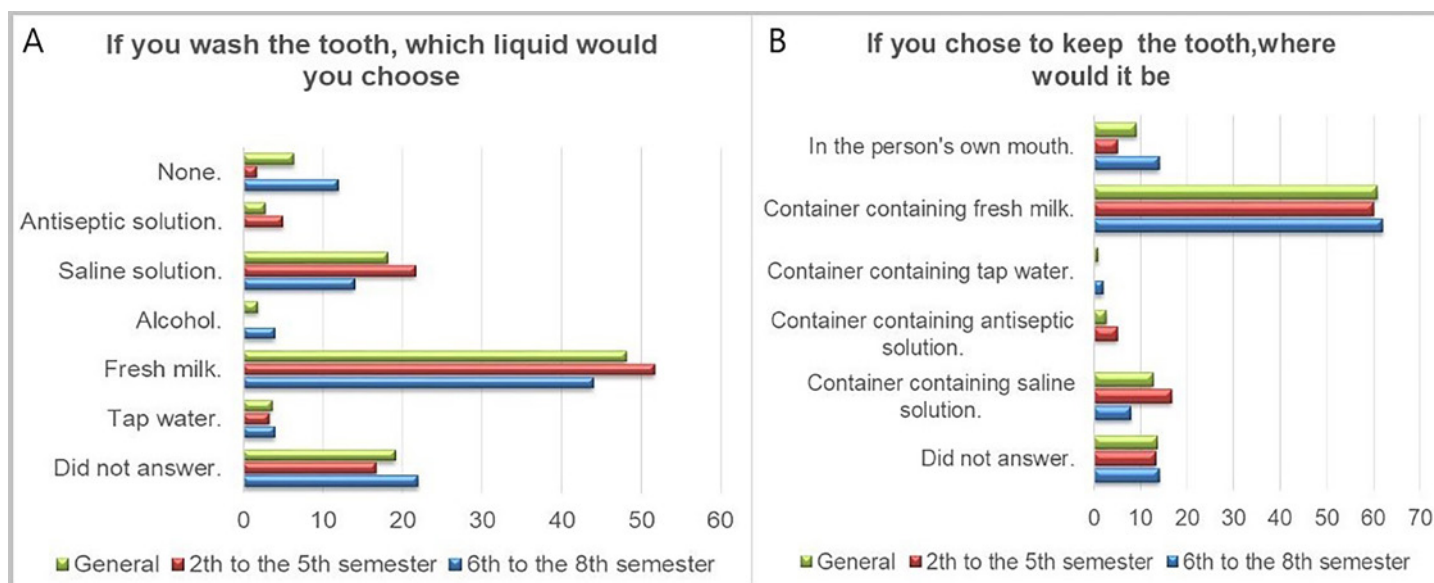


Figure 3. Graphs showing the students' responses (%) about the time considered ideal to seek care after dental avulsion (A) and about the conduct if an individual appeared with the tooth in hand (B).

considered this period of time the ideal. On the other hand, for the period of one hour, only 5% of students from the 2nd to the 5th semester and 10% from the 6th to the 8th semester considered this option.

When asked what they would do if an individual appeared with a tooth in his/her hand after an accident (Figure 3B), in the general analysis 40.9% would take the patient to the dentist, while 34.5% would refer to the emergency dental service. Students from the 2nd to the 5th semester, 38.3% answered that they would take them to the dentist and 36.7% to the emergency service, and 44% and 32%, from the 6th to the 8th semester, would take them to the dentist and the emergency service, respectively.

Also, they were asked what they would do if they decided to put the tooth back in the place of origin, but the dental organ had fallen in a dirty place. In the general analysis,

78.2% would wash the tooth in running solution (78.3% of the answers from the 2nd to the 5th semester and 78% from the 6th to the 8th semester). Contrastingly, 6.4% of all students answered that no solution should be used. Brushing the tooth gently with a toothbrush accounted for 2.7% of the total of answers (1.7% of responses from the 2nd to the 5th semester and 4% from the 6th to the 8th semester). Less than 5% of students considered the option of washing the tooth and remove all the tissue and dirt (6.7% of the answers from the 2nd to the 5th semester and 2% from the 6th to the 8th semester). Regarding replace the tooth in the socket without doing anything was answered by 4.5% of the students in the general analysis (1.7% from the 2nd to the 5th semester and 6.5% from the 6th to the 8th semester).

Regarding the liquid of choice for washing the tooth (Figure 4A), in the general analysis, the most common



answer was fresh milk (48.2%) with 51.7% of the students' responses from the 2nd to the 5th semester and 44% from the 6th to the 8th semester.

When asked about whether they chose to keep the tooth, where they would store it, in the general analysis 60.9% responded that would store in a container with fresh milk. The same answer was the most found among students from the 2nd to the 5th semester and from the 6th to the 8th semester (60% and 62%, respectively), as seen in Figure 4B.

When asked whether the avulsed tooth, after reimplantation, should be immobilized, in the general analysis 80.9% of the students answered yes, 73.3% students from the 2nd to the 5th semester and 90% from the 6th to the 8th semester.

Regarding the use of a dental mouthguard when practicing physical activity, in the general analysis 93.6% answered that an individual should use a plate, 91.7% of whom were students from the 2nd to the 5th semester and

96% of the 6th to the 8th semester.

Discussion

Although dental trauma is considered a public health problem, studies show that the professionals involved in dental trauma, whether they are present in the place where the trauma occurred, or participate in their treatment, show little knowledge about the subject.^{17,18} Having in mind the importance of how to proceed, as well as immediate and mediate care in cases of avulsion, the objective of the present study was to evaluate the knowledge of undergraduate students of the dentistry of Veiga de Almeida University about dental avulsion.

In order to do so, in this research, the methodology consisted of the use of a questionnaire containing multiple choice and multiple selection questions. This methodology was used in previous studies, with the same purpose.¹³⁻¹⁵

In this study, when asked about what they understood by tooth avulsion, 98.2% of students knew what tooth avulsion

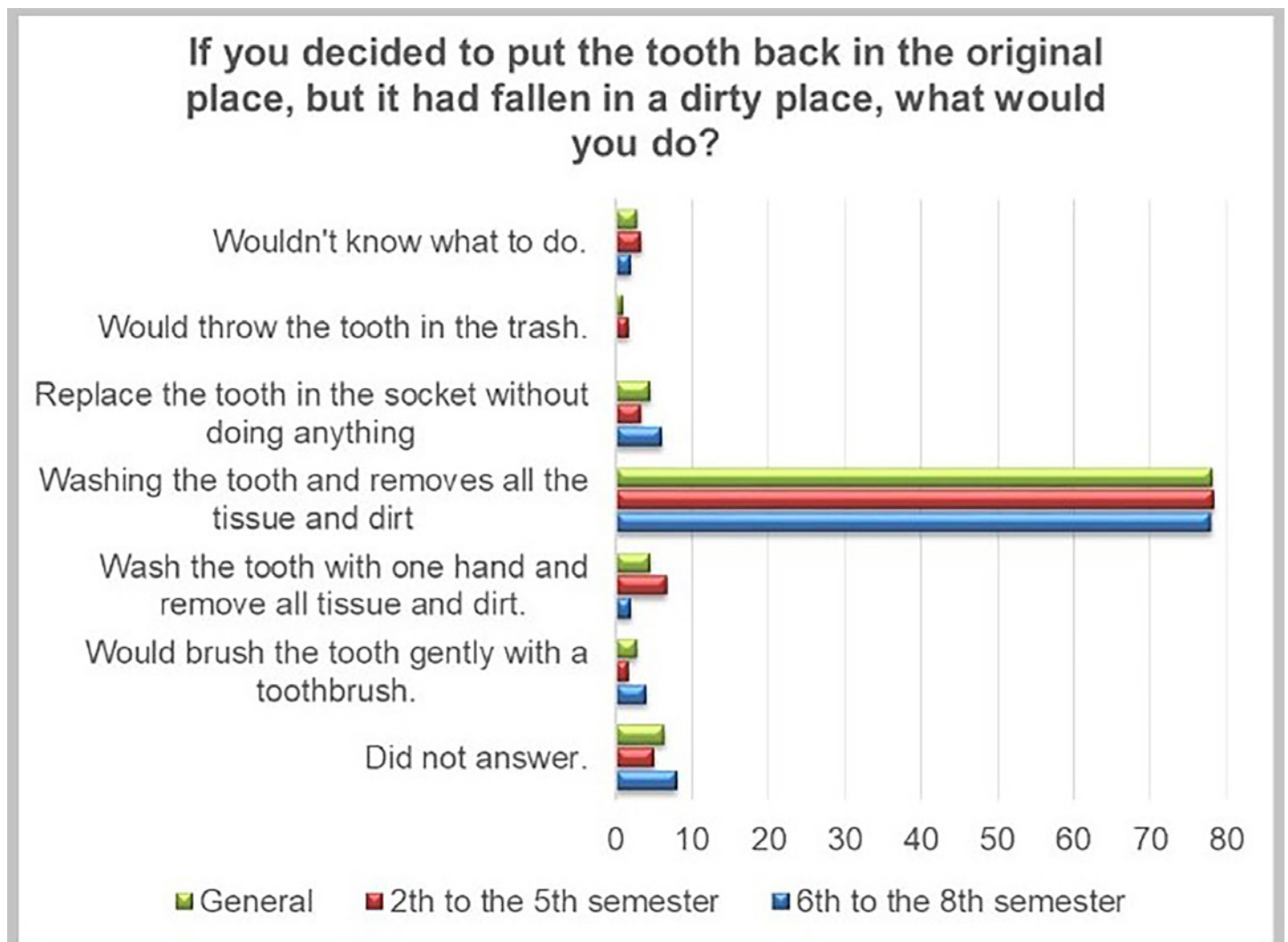


Figure 4. Graphs showing the participants' responses (%) about the liquid of choice (A) and location (B) for the storage of the avulsed dental element.



is, answering that it consists of displacing the tooth outside the implantation site. This result is similar to the finding of the study by Souza *et al.*¹⁷ with students of dentistry from the 1st to the 10th semester, who had 97.1% the correct concept of tooth avulsion.

When asked if they had already seen a case of tooth avulsion, 77.3% of the students answered no, being 85% of students from the 2nd to the 5th semester and 68% students from the 6th to the 8th semester. This lower percentage of the second group may be associated with the external internship practiced by students from the last periods. In agreement with the high percentage of negative responses, Fujita *et al.*,¹⁸ in a study with 121 dental students in Japan, found that 79.3% answered that they had never witnessed an avulsion case. This result shows that students do not frequently see cases of avulsion as a routine at the university.

Faced with the question of whether they have studied or had any type of instruction on issues related to dental trauma in recreational-sports practices during graduation, 61.7% of students from the 2nd to the 5th semester answered no, while only 26% of students from the 6th to the 8th semester answered the same. This result can be justified by the fact that in the undergraduate dentistry course at Veiga de Almeida University the subject about dental trauma is taught in the 6th semester. When analyzed from the 6th semester, it is noted that there are still students who do not know how to proceed in cases of avulsion, this can be explained because the students may not have attended the class, they were transferred from other Universities or due to forgetfulness due to the fact of not frequently experiencing cases of tooth avulsion. This result shows the importance of continued study on the subject. Souza *et al.*,¹⁷ evaluating dentistry students from the 5th to the 8th semester, found that 89% said they had received instruction on the subject, through classes (69%), through books (19%) and with a dentist or another professional (6.7%).

The recommended and most practiced conduct in cases of dental avulsion is reimplantation, which must be carried out even if the conditions are not favorable, always with the intention of saving the tooth.¹⁷ When evaluated on the conduct regarding tooth avulsion during sports practice, 91.8% of students (similar percentage among students from the 2nd to the 5th semester and from the 6th to the 8th semester) answered that the tooth should be reimplanted, showing that most students have knowledge about the correct conduct in face of dental avulsion cases. This result is similar to the study carried out with dental surgeons by Garcia *et al.*¹⁹ that shows dentists having knowledge about the correct conduct in cases of dental avulsion.

When asked what to do in cases of dental avulsion, 23.3% of students from the 2nd to the 5th semester answered that they would look for the tooth, wash it, store it in a liquid and

take it immediately to the dentist. This result differs from the group from 6th to the 8th semester since only 14% of them would adopt the same conduct. This result shows that most academics do not know the correct conduct on how to proceed with the affected tooth before dental replantation. Re *et al.*²⁰ showed similar results when evaluated the knowledge of dental surgeons about this subject, reporting the lack of knowledge about the correct conduct with avulsed teeth, in which 60.6% of the dentists' answers were incorrect about the ideal conduct.

After the tooth has suffered an avulsion, it must be reimplanted as soon as possible²¹ in order to reduce the risk of ankylosis and root resorption, the inflammatory response, managing to maintain the vitality and integrity of the periodontal ligament. Faced with the question about the ideal time for seeking assistance, 95% of students from the 2nd to the 5th semester and 98% of the students from the 6th to the 8th semester answered the time of up to one hour. Percentage of 99.1% was found for the same period of time in the study by Sumita *et al.*,²² which showed that 61.8% of dentists consider that reimplantation should be performed within 20 minutes, while 37.3% consider 30 to 60 minutes. It is important to note that the guidelines for the management of dental trauma from the IADT and the American Academy of Pediatric Dentistry (AAPD) recommend immediate tooth reimplantation.¹² A study by Trope *et al.*²¹ showed that when the tooth remains in an extra oral medium for more than 60 minutes, the possibility of root replacement by bone is high, generating root resorption, thus demonstrating that the ideal time for replantation is up to an hour, being preferable if immediately repositioned. In the present study, not all students knew that the ideal time for reimplantation is immediately but responded that it should occur within 1 hour.

When asked about facing a situation of an individual with a tooth in hand after an accident, 38.3% of students from the 2nd to the 5th semester would take the person to the dentist and 36.7% to the emergency dental service in a hospital, while 44% of students from the 6th to the 8th semester considered the first option and 32% would prefer the second one. In general, the initial care of avulsion cases does not occur in dental offices, and the patient arrives at the office to treat the sequelae, to carry out the endodontic treatment of the avulsed element, or even for its preservation.²¹

In view of the care with the avulsed tooth, when asked about the case of a replacement of tooth that had fallen in a dirty place, 78.3% of students from the 2nd to the 5th semester and 78% of students from the 6th to the 8th semester would wash the tooth gently with running solution. This result differs from the study by Cohenca *et al.*²³ carried out with dental surgeons which shows that 45.67% of professionals would wash the tooth with current solution and 54.33% was not

sure about the correct way to perform the cleaning. According to the guidelines of IADT,^{12,24} the washing must be carried out with gentle jets of serum or cold running water for a maximum of ten seconds.

When evaluating the liquid of choice to wash the tooth, most students, 51.7% from the 2nd to the 5th semester and 44% from the 6th to the 8th semester, responded they would choose fresh milk. This result differs from the research carried out with dental surgeons by Cohenca *et al.*²³ in which the majority (90%) answered that they would wash the contaminated surface with fresh milk.

Different liquids can be used to store the tooth, including Hank's balanced salt solution, saline and milk.²⁶ When asked if they chose to keep the tooth, where it would be, in general, 60.9% answered fresh milk, being 60% students from the 2nd to the 5th semester and 62% from the 6th to the 8th semester. In this sense, Jain *et al.*²⁵ found that 77.2% of dentistry students opted for milk, 12% for saline and 3.6% for water. Milk is recommended due to its osmolarity and pH, and it is biologically acceptable. Saliva, as it is a contaminated and slightly hypotonic medium, is not a recommended medium, as it may favor bacterial penetration, pulp contamination may occur, and the establishment of inflammatory external root resorption, which is the main factor that should be avoided on a dental reimplantation. Water is not recommended because the hypotonic environment causes cell lysis and increased inflammation in reimplantations.^{26,27}

The use of semi-rigid retainer is indicated for avulsed teeth as it allows some mobility and excellent healing of the periodontal ligament, improving the prognosis. In the present study, when asked whether the avulsed tooth, after reimplantation, should be immobilized, in the general analysis 80.9% of the students answered yes. In a study with dental surgeons, Garcia *et al.*¹⁹ found that 73% of dentists reported that they would use semi-rigid content after reimplantation.

The use of mouthguards is recommended during the practice of physical activities to avoid or minimize

dental trauma.²⁸ When asked if the individual should use a mouthguard when practicing physical activity, in the general analysis, 93.6% of students answered yes. This result shows that most academics believe that the use of mouthguards in sports practices would minimize or even avoid cases of dental trauma, such as avulsion, and its use is extremely important. However, this result differs from the findings by Costa *et al.*,²⁹ that points out that only 30% of students believe in the importance of using mouthguards during sports practice.

The present research showed that although students have knowledge about the definition of dental avulsion and that reimplantation is the best option for treatment, students' knowledge regarding the care with avulsed teeth and the care protocol is insufficient. In view of the fact that dental avulsion negatively affects the patient, with psychological and aesthetic impact,⁷ it is necessary to raise awareness among students and dental professionals so that they are always up-to-date and scientifically based on the management to be taken in cases of trauma. Thus, the importance of continuing education is emphasized, to reinforce the knowledge already acquired and to improve techniques and conduct, through lectures, seminars, congresses, courses and training.

Conclusion

Based on the responses to the questionnaire, it can be concluded that undergraduate students of dentistry of Veiga de Almeida University had knowledge about the definition of dental avulsion and that reimplantation is the best option for treatment. It was observed that in view of the care with the avulsed tooth and the care protocol, students' knowledge was scarce.

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