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DENTAL AVULSION: ASSESSMENT OF DENTISTRY STUDENTS´ KNOWLEDGE IN SOUTHERN BRAZIL

AVULSÃO DENTÁRIA: AVALIAÇÃO DO NÍVEL DE CONHECIMENTO DE ESTUDANTES DE ODONTOLOGIA DO SUL DO BRASIL

Saulo Ancelmo de Souza Júnior[1*], Nair Narumi Orita Pavan[1], Maria Luisa Gomes Ferreira[1], Isabela Weber[1], Marcos Sergio Endo[1]

[1]State University of Maringá (UEM), Paraná, Brazil.

**Endereço para correspondência: Universidade Estadual de Maringá, Avenida Mandacaru, 1550 - Campus Universitário, Maringá - Paraná – Brazil, CEP 87080-000.*
Email: saulosjr@yahoo.com.br

ABSTRACT

This study aimed to investigate the level of knowledge of Dentistry students of State University of Maringá (UEM) about dental trauma and actions that must be adopted in emergency treatment of avulsed teeth. It is a cross-sectional quantitative study, with the participation of 87 first, third and fourth-year students of Dentistry course. Data, collected by a structured questionnaire, were statistically analyzed using Fisher's exact test. Results showed that the majority of interviewed students (69.3%) had some knowledge on dental trauma. Regarding the knowledge on the management of patients with avulsed teeth, results showed that students presented an increase in knowledge with the progress of the course. However, it was observed that some concepts remain flawed, even among more advanced level students. Therefore, results observed in this study suggest the need for adoption of new extracurricular training strategies or even a curricular adequacy in Dentistry courses, aiming to promote educational programs that lead to a better prognosis for treatment of dental avulsion cases.

Key Words: dentistry students; knowledge; dental trauma; avulsion.

RESUMO

Esse estudo teve como objetivo investigar o nível de conhecimento de estudantes de Odontologia da Universidade Estadual de Maringá (UEM) sobre traumatismo dentário e condutas que devem ser adotadas no tratamento emergencial de dentes avulsionados. Trata-se de um estudo transversal quantitativo, com participação de 87 alunos matriculados nos primeiro, terceiro e quarto anos do curso de Odontologia, utilizando um questionário estruturado como instrumento de coleta de dados. Os dados obtidos foram analisados estatisticamente por meio do Teste Exato de Fisher. Os resultados mostraram que a maioria dos estudantes entrevistados (69,3%) possuía algum conhecimento sobre traumatismo dentário. Com relação ao manejo de pacientes com dentes avulsionados, os resultados demonstraram que os estudantes apresentaram aumento no nível de conhecimento com o avanço do curso, entretanto, observou-se que alguns conceitos permanecem falhos, mesmo entre os estudantes de níveis mais avançados. Portanto, os resultados observados neste estudo sugerem a necessidade da adoção de novas estratégias de formação extracurricular ou de adequação curricular nos cursos de Odontologia, visando promover programas educacionais que levem a um melhor prognóstico dos tratamentos de casos de avulsão dentária.

Palavras-Chave: estudantes de Odontologia; conhecimento; traumatismo dentário; avulsão.

INTRODUCTION

Dentoalveolar traumas are frequent and represent a serious public dental health problem. Epidemiological studies have shown that annual incidence of dental trauma globally ranges from 1%–3%, and its prevalence is steady at 20%–30% (1). Among the most frequent causes of these lesions are falls; collisions against objects, surfaces or persons; automobile accidents; sports practices; episodes of violence and aggressive plays (1).

Dental trauma may cause damages that range from a simple enamel fracture to more severe lesions, which may lead to permanent tooth loss. These lesions may affect people live by compromising the aesthetics, speech and position of teeth. In this way, dental traumatic lesions may have functional, psychological and social consequences (2,3).

Avulsion, classified as a dental urgency, is considered the most severe type of dental trauma (4). However, in most cases, care that should be immediate is not effectively performed. In addition, the elaboration of treatment plan is a difficult task that requires from the professional who provides the first attention a permanent and up-to-date knowledge about dental trauma (5).

In cases of avulsion, prompt and appropriate management may significantly improve prognosis, especially in young patients (6). Thus, tooth replantation should be immediately performed (7), and, when executed in an adequate manner it favors the maintenance of both pulp and periodontal ligament vitality, improving the prognosis (8). However, if endodontic treatment is need, it should be promptly conducted aiming to prevent or reduce the occurrence of squeals as inflammatory resorption (9).

In addition, considering dental avulsion, besides the time elapsed from trauma to replantation, other factors such as root formation stage, contamination level of accident place, storage and transport medium of the avulsed tooth, occurrence of alveolar fracture and lack of information about first-aid perform a direct influence on prognosis (5).

Because it involves multidisciplinary care such as Endodontics, Periodontics, Surgery, Orthodontics and Restorative Dentistry the treatment of avulsion is considered complex (10). Thus, it is fundamental that the dental surgeon knows the indicated therapeutic behaviors and is prepared to treat this type of dental trauma (7).

In this way, the evaluation of Dentistry students' knowledge on dental trauma during graduation becomes important, since it allows verifying if the adopted curricular structure of teaching is effective in graduating prepared professionals to effectively treat cases of dental trauma.

Thus, considering that in literature there are few studies with this approach, this research aims to evaluate and compare the knowledge level of first, third and fourth-years Dentistry students of State University of Maringa (UEM) on dental avulsion, addressing the management and clinical conduct that should be adopted in face to this type of dental trauma.

MATERIAL AND METHODS

This quantitative cross-sectional study was performed using a structured questionnaire composed by 14 questions, formulated by the authors based on previous reports (11, 12, 13). The questions addressed informations such as age, sex, and knowledge of students on dental avulsion, such as influence of the extra alveolar period, storage medium of avulsed tooth and the conduct of dental surgeon related to this type of trauma (tables 1 and 2).

In UEM´s Dentistry Curse, the theme Dental Avulsion is approached in Surgery Discipline at third-year. Thus, a printed questionnaire was applied in 2019, during Endodontic classes, and data were collected from 87 students of UEM: 39 were first-year, 28 were third-year and 20 were fourth-year Dentistry students.

Sample was determined according to the following criteria: first-year students were included due to they would have knowledge similar to lay population, the third-year students were interviewed after the theme Dental Trauma had been approached in Surgery Discipline and, the fourth-year, in order to verify if the knowledge acquired in the previous year remains consolidated.

Ethical approval for this study was obtained from Ethical Research Committee of State University of Maringá (CAAE 13134419.3.0000.0104). All participants provided their consent prior to participation in the study. To ensure anonymity, no name or other personal information has been requested.

Data were analyzed by descriptive statistics and the statistical significance was calculated using a Fisher's exact test with BioEstat 5.3 software for Windows®.

RESULTS

The students' demographic characteristics are shown in table 1. In all, 87 Dentistry students were interviewed: 39 (10 men, 29 women) were first-year students, 28 (12 men, 16 women) were third-year students and 20 (4 men, 16 women) were fourth-year students.

Age of first-year students ranged from 17 to 23 years, with an average of 18.6 years

(standard deviation (SD) ± 1.69), third-year students were 19 to 33 years, average was 21 years (SD ± 2.59) and the age of fourth-year students were from 20 to 25 years with an average of 22 years (SD ± 1.58). Among the responders, 61 were female (70.1%) and 26 (29.9%) were male. The majority of students was aged from 17 to 21 years (75.9%) while the age of 20 students ranged from 22 to 25 years (Table 1).

Table 1. Distribution of gender and age among interviewed students.

	N (%)	Genger (%)		Age (%)	
First-year students	39/87 (44.8)	male	10/39 (25.6)	17~21	34/39 (87.2)
				22~25	5/39 (12.8)
		female	29/39 (74.4)	26~29	0/39 (0)
				30~33	0/39 (0)
Third-year students	28/87 (32.1)	male	12/28 (43)	17~21	25/28 (89)
				22~25	2/28 (7)
		female	16/28 (57)	26~29	0/28 (0)
				30~33	1/28 (4)
Fourth-year students	20/87(23)	male	4/20 (20)	17~21	7/20 (35)
				22~25	13/20 (65)
		female	16/20 (80)	26~29	0/20 (0)
				30~33	0/20 (0)
Total	87 (100)	male	26/87 (29.9)	17~21	66/87 (75.9)
				22~25	20/87 (22.9)
		female	61/87(70)	26~29	0/87 (0)
				30~33	1/87 (1.1)

Table 2 shows the experience and knowledge of students about dental trauma and dental avulsion. The percentages of correct responses were significantly higher among third-year and fourth-year students when compared to first-year students for all questions except for questions 6 and 7 ($P < 0.05$; Table 2). Results show that the majority of undergraduates (76.6%) had some knowledge about dental trauma before this approach.

Considering first-year students, 43.6% reported they had heard about dental trauma, while only 18% reported they had heard specifically about dental avulsion. Regarding the origin of first-year students' knowledge on dental trauma and dental avulsion, 18% and 15.4%, respectively, said they received information in Dentistry classes.

All of third-year and fourth-year students had heard about dental trauma and dental avulsion. For them the knowledge on dental trauma, acquired through courses, lectures and Dentistry classes, were 96% and 90%, respectively.

When asked about what they thought what a dental avulsion is, only 61% of first-year students gave the correct answer, while 100% of third-year and fourth-year answered correctly. The percentages of correct responses were significantly higher among third-year and fourth-year students when compared to first-year students ($P < 0.05$, Question 5, Table 2).

Considering classification of dental avulsion complexity, the majority of undergraduates (72%) classified it as of high complexity; 27% of medium complexity and 3% of first-year students chose low complexity option. Results also show that 3% of first-year students, 82% third-year students and 100% fourth-year students had received information on dental avulsion first-aids.

Table 2. Experiences and knowledge of students about dental trauma (N = 87).

Question	Answer	1st Yr (%)	3rd Yr (%)	4th Yr (%)
3. Have you ever heard about dental trauma before this approach?	Yes, with dentists	4 (10)	1 (4)	2 (10)
	Yes, at internet or TV (Social Networks, YouTube, Search)	6 (15)	0 (0)	0 (0)
	Yes, with the family	0 (0)	0 (0)	0 (0)
	Yes, in courses, classes, lectures	$7^{a,b}$ (18)	27^{a} (96)	18^{b} (90)
	Yes, case of known fracture	0 (0)	0 (0)	0 (0)
	No	22 (56)	0 (0)	0 (0)
4. Have you ever heard about dental avulsion before this approach?	Yes	$7^{a,b}$ (18)	28^{a} (100)	20^{b} (100)
	No	32 (82)	0 (0)	0 (0)
5. What do you think a dental avulsion is?	**A.** Displacement of the tooth into its socket;	4 (10)	0 (0)	0 (0)
	B. Displacement of the tooth to one side of the socket;	2 (5)	0 (0)	0 (0)
	C. Partial displacement out of socket;	9 (23)	0 (0)	0 (0)
	D. Total displacement out of socket	$24^{a,b}$ (61)	28^{a} (100)	20^{b} (100)
6. In which complexity degree do you think that dental avulsion is classified?	**A.** Low complexity	1 (3)	0 (0)	0 (0)
	B. Medium complexity	12 (31)	10 (36)	3 (15)
	C. High complexity	26 (67)	18 (64)	17 (85)
7. Do you believe that dental avulsion may cause any squeal?	**A.** Yes	36 (92)	27 (96)	20 (100)
	B. No	3 (8)	1 (4)	0 (0)
8. Did you have any information about first aid for avulsed teeth?	**A.** Yes	$1^{a,b}$ (3)	23^{a} (82)	20^{b} (100)
	B. No	38 (97)	5 (18)	0 (0)

All data were analyzed by Fisher's exact test. ^{a,b} indicate statistical difference $p<0.05$.

Table 3 shows students' knowledge on actions that should be taken in case of dental avulsion. The percentages of correct responses were significantly higher among third-year and fourth-year students when compared to first-year students only for questions 9 and 10 ($P < 0.05$; Table 3). None first-year, 14% third-year and 15% fourth-year students reported they would immediately replant the tooth in the same place that it was knocked out the mouth after a trauma (question 9, correct alternative J).

For 52.7% of all students, an avulsed tooth should be placed in physiological saline medium until it could be replanted. Only 25% of interviewed students chose milk, while 3.2% interviewed students chose saliva as ideal transport medium (question 10, correct alternatives D and I).

When asked what students would do if they decide to replant the tooth back at its location, 2.6%, 25% and 5% of first-year, third-year and fourth-year students, respectively, had correctly answered they would rinse the tooth with running water (question 11, correct alternative A).

About the optimal timing for replantation, 46% of third-year students had chosen the correct alternative A (perform immediate implant), while 28% of first-year and 30% of fourth-year student gave the correct response (question 12). Only 15% of first-year, 36% of third-year and 45% of fourth-year students answered they were able to carry on the tooth´s replant (question 13). The majority of interviewed students (91%) would correctly hold an avulsed tooth by its crown (question 14, correct alternative A).

Table 3. Students' knowledge about management of dental avulsion (N=87).

Question	Answers	1st Yr (%)	3rd Yr (%)	4th Yr (%)
9. What would you do if there was a case where the tooth completely fell out of the mouth after a trauma?	**A.** Nothing, I would throw the tooth out	0 (0)	0 (0)	0 (0)
	B. Will guard the tooth but would not look for a dentist	0 (0)	0 (0)	0 (0)
	C. Would not reposition the tooth in the socket, but would take the tooth in hand to the dentist	0 (0)	0 (0)	0 (0)
	D. Would not reposition the tooth in the socket, but keep it wrapped in a paper / cloth / dry gauze and then take it to the dentist	$9^{a,b}$ (23)	0^{a} (0)	0^{b} (0)
	E. Would not reposition the tooth in the socket, but keep it wrapped in a paper / cloth / moist gauze and then take it to the dentist	$10^{a,b}$ (26)	0^{a} (0)	0^{b} (0)
	F. Would not reposition the tooth in the socket, but would keep the tooth in a dry container and then take it to the dentist	$8^{a,b}$ (20.5)	0^{a} (0)	0^{b} (0)
	G. Would not reposition the tooth in the socket, but would keep the tooth in a liquid container and then take it to the dentist	$8^{a,b}$ (20.5)	19^{a} (68)	14^{b} (70)
	H. Would not reposition the tooth in the socket, but would keep the tooth in a container wrapped in ice and then take it to the dentist	3 (7.7)	0 (0)	0 (0)
	I. Would not reposition the tooth in the socket, but would keep the tooth in the victim's mouth until going to the dentist	1 (2.6)	5 (18)	2 (10)
	J. Reposition the tooth in the same place	$0^{a,b}$ (0)	4^{a} (14)	3^{b} (15)
	Did not answer	0 (0)	0 (0)	1 (5)
10. If it was placed in a liquid medium, what would it be?	**A.** Tap water	0 (0)	1 (4)	0 (0)
	B. Filtered or distilled water	13 (33)	3 (11)	1 (5)
	C. Physiological saline	23 (59)	8 (29)	14 (70)
	D. Milk	$0^{a,b}$ (0)	14^{a} (50)	5^{b} (25)
	E. Sanitary water	0(0)	0 (0)	0 (0)
	F. Detergent	0 (0)	0 (0)	0 (0)
	G. Alcohol	1 (2.6)	0 (0)	0 (0)
	H. Coconut water	0 (0)	0 (0)	0 (0)
	I. Saliva	1 (2.6)	2 (7)	0 (0)
	J. Hydrogen peroxide	0 (0)	0 (0)	0 (0)
	Did not answer	1 (2.6)	0 (0)	0 (0)
11. What would you do if you decide to reposition the tooth back at its location?	**A.** Rinse tooth in tap water	1 (2.6)	7 (25)	1 (5)
	B. Wash the tooth in filtered tap water	3 (7.7)	2 (7)	2 (10)
	C. Wash the tooth with saline solution	15 (38.5)	15 (54)	16 (80)
	D. Wash the tooth with toothpaste, soap or detergent	0 (0)	0 (0)	0 (0)
	E. Wash the tooth with toothpaste, soap or detergent and water	0 (0)	0 (0)	0 (0)
	F. Wash the tooth with toothpaste, soap or detergent and filtered water	1 (2.6)	0 (0)	0 (0)
	G. Wash the tooth with toothpaste, soap or detergent and saline solution	1 (2.6)	0 (0)	0 (0)
	H. Brush the tooth gently with a toothbrush	1 (2.6)	0 (0)	0 (0)
	I. Brush the tooth gently with a toothbrush and water / filtered water / saline solution	13 (33.3)	0 (0)	0 (0)
	J. Brush the tooth gently with a toothbrush and filtered water / water / saline and toothpaste / soap or detergent	1 (2.6)	0 (0)	0 (0)
	K. Would reposition the tooth in the alveolus without doing anything	2 (5)	4 (14)	1 (5)
	Did not answer	1 (2.6)	0 (0)	0 (0)
12. What is the optimal timing for replantation?	**A.** Perform Immediate Implant	11 (28)	13 (46)	6 (30)
	B. Perform the replantation within 60 minutes	13 (33)	14 (50)	14 (70)
	C. Wait 60 minutes to replant the tooth	2 (5)	0 (0)	0 (0)
	D. Wait 1 day to perform the implant	10 (26)	1 (4)	0 (0)
	Did not answer	3 (8)	0 (0)	0 (0)

*Table 3 continued.

Question	Answers	1st Yr (%)	3rd Yr (%)	4th Yr (%)
13. Do you think you are able to reposition the tooth?	**A.** Yes	6 (15)	10 (36)	9 (45)
	B. No	32 (82)	18 (64)	11 (55)
	Did not answer	1 (3)	0 (0)	0 (0)
14. By where would you manipulate a tooth that came out of mouth?	**A.** Crown	32 (82)	27 (96)	19 (95)
	B. Root	3 (7.7)	0 (0)	0 (0)
	C. Crown and root	3 (7.7)	1 (4)	1 (5)
	Did not answer	1 (2.6)	0 (0)	0 (0)

All data were analyzed by Fisher's exact test. [a,b] indicate statistical difference $p<0.05$.

DISCUSSION

Information acquired by the students will guide them in their attitudes as future professionals, thus, the analysis of dentistry students' knowledge level on management of patients with avulsed teeth is necessary for verifying the evolution of this theme in Dentistry course curriculum.

This study shows data of Dentistry students' previous knowledge on dental trauma, dental avulsion complexity and first-aids in case of dental avulsion (Table 2). In all questions, the majority of third-year and fourth-year students had shown knowledge on these themes, while first-year students showed a lower percentage of correct answers. Similar result was obtained in a study carried out in Rio Grande do Sul, which demonstrated a low degree of knowledge on dental avulsion by first-year students of a Faculty of Dentistry (14). This outcome was already expected, as first-year students still did not have undergone the teaching-learning process about how to behave in this situation. These results are consistent with previous surveys which have demonstrated that prevention and management of dental trauma´s knowledge of first-year students could be compared to that of lay population (15).

However, in this study a low knowledge about management of dental avulsion for third-year and fourth-year students were also observed (tables 3 and 4).

To improve the prognosis of an avulsed tooth, the immediate replantation is recommended by International Association for Dental Traumatology (IADT), 2020 (16). However, when immediate replant cannot be carried out, the avulsed tooth should be stored in a liquid medium able to maintain the vitality of periodontal ligament fibers. Knowledge of correct measures regarding storage media was not satisfactory. The results showed that none of first-year students, 50% of third-year students and 25% of fourth-year students (62% average) would use milk as storage medium until replantation (question 10). A previous study conducted with Dentistry students in Santa Catarina, Brazil, showed that 28.8% of initial years students and 95.45% of graduating students (62% average) would use milk as storage medium (17). Higher values were observed among dental students in Saudi Arabia, among which, 77% correctly identified milk as transportation medium of an avulsed tooth (12). On the other hand, lower values were observed in Japan, where among interviewed dental students, 26.4% of third-year and 57.4% of sixth-year students had chosen fresh milk as the best medium for transporting an avulsed tooth (average of 42%) (4).

Several media have been suggested for the physiological transport of avulsed teeth. Literature data show that fresh milk has several favorable characteristics that make it, among the alternatives presented in the questionnaire, the most suitable mean for keeping avulsed teeth (18, 19, 20).

Favorable characteristics of milk that preserve the viability of cells in the root surface of avulsed tooth include approximately neutral pH and physiological osmolarity, low bacterial content, presence of growth factors and nutrients essential for cells, low cost and easy availability (19, 20). Data on avulsed teeth storage medium obtained in the present study demonstrate an increase in the level of knowledge when are compared first-year and third-year students. However, a reduction in knowledge level of fourth-year students is observed in this study, which may be justified due to the fact the

theme Dental Trauma is approached in third-year at Surgery classes.

In most cases, the tooth has contact with debris found on its fall location after an avulsion but, this fact, does not contraindicate tooth´s replantation. However, it is necessary to perform a careful cleaning on tooth surface, attempting that this process does not cause damage to cells that cover the root surface. According to the IADT guidelines of 2020, this washing must be carried out with gentle jets of saline solution or cold running water (16). In this study, when asked how students would clean an avulsed tooth before its replantation, 38%, 54% and 80% of first-year, third-year and fourth-year students respectively (57% average) correctly selected the use of saline jets (question 11). Similar results were observed for dental students in Santa Catarina, Brazil, where 57.4% reported that washing the tooth with saline would be the best option (17). In Japan, the results of a research showed that 43.4% and 64.7% of first-year and sixth-year students (55.4% average), respectively chose to use saline jets to wash avulsed teeth (4).

Another factor that should be observed in the treatment of avulsed teeth is extra-alveolar time. The longer elapsed the time between tooth avulsion and replantation, the greater the risk for resorption by replacement or inflammatory reaction. Despite its importance, only 28%, 46% and 30% students of the first, third and fourth-year (34.7% media), respectively, knew that immediate replantation is the ideal conduct to be adopted (question 12). This fact demonstrates a lack of knowledge about the negative influence of extra-alveolar time on the prognosis of dental replantation. These results were worse than that found in previous studies. Habekost and collaborators demonstrated that 55% of last-year students of a Dentistry course in Rio Grande do Sul, Brazil, knew that the extra-alveolar time is a crucial factor for success after tooth replantation (15). In Saudi Arabia, were verified that 67.5% of dental students, correctly answered the question regarding the period within which the tooth must be replanted (12). In Japan, 28.3% of first-year dental students and 55.9% of sixth-year dental students (43.8% average) suggested the immediate transportation of the tooth to a dentist for replantation (4).

Regarding the ability to perform the replacement of an avulsed tooth (question 13), the results showed a statistically significant difference when comparing first-year, third-year and fourth-year students (15%, 36% and 45%, respectively). Considering that both third-year and fourth-year students already had classes about management and treatment of dental avulsion, this data demonstrates an evolution in students' learning curve.

Another important factor for success in replantation is the correct manipulation of avulsed teeth. It is highly recommended to take the tooth by its crown and avoid contact with the root, aiming for preserve the viability of periodontal ligament cells. It was seen that 91% of interviewed students knew that dental crown is the more suitable structure for manipulate the tooth (question 14). In first, third and fourth-year, 82%, 96% and 95% of the students, respectively, indicated the correct answer. This result was superior to that found by Oliveira and Gil (17), who observed that 68% of students of Federal University of Santa Catarina Dentistry course knew that dental crown is the most suitable structure for tooth´s manipulation. Lower results were also found by Fujita and collaborators, (4) in Japan, where approximately 70% of dental students had given the correct answer.

The management of dental trauma is one of the sensitive areas in Dental Surgeon´s formation. The present study demonstrated, as expected, that knowledge of first-year students is similar to that of lay population (15). It was also observed that although third-year students are attending and fourth-year students have already attended Surgery discipline, they do not have satisfactory technical knowledge about dental avulsion. This finding was also identified by previous studies in different locations, such as Japan and Saudi Arabia, as well as in different Brazilian States, such as Rio Grande do Sul and Santa Catarina, which showed a lack of confidence and competence in the management of dental trauma by graduating Dentistry students (4, 12, 14, 17).

In agreement with these studies, this research demonstrates the need for actions that improve students' knowledge level about dental trauma, since a part of these students are finishing graduation.

CONCLUSION

The process of knowledge dissemination begins with the instruction of students, even during undergraduate studies. The application of new teaching strategies associated with changes in curricular organization could consolidate the knowledge acquired during undergraduate classes (21). Thus, acquired knowledge would not be lost over time, allowing the formation of professionals who effectively know how to prevent and treat the complications of dentoalveolar trauma.

Thus, within the limitations of this cross-sectional study, results suggest that the knowledge about management of dental injuries is insufficient among first-year dental students. Nevertheless, with the evolution of the undergraduate course, students acquire new knowledge; however, some concepts remain flawed, even in more advanced levels, demonstrating that management of dental avulsion is a sensitive topic in dental training. Data suggest that dental education should be enhanced with ongoing assessment with new extracurricular training strategies or even in curriculum design of Dentistry Courses to promote educational programs that lead to a better prognosis for dental replantation.

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