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## Original Research Article

# Evaluation of graduate dental students' knowledge on the therapeutic approach of dental avulsion

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**Keywords:** tooth avulsion; tooth replantation; health knowledge, attitudes, practice.

## Abstract

**Introduction and Objective:** The present study aimed to evaluate the knowledge level of students graduate in Dentistry of São Leopoldo Mandic/SP – Porto Alegre/RS on the therapeutic approach in cases of dental avulsion. **Material and methods:** For this, we applied a questionnaire to graduate students. Of the 214 students enrolled at the institution, 159 (74%) answered the questions. **Results and Conclusion:** Through analysis of the responses, it could be observed that, while 99.37% of participants have already received instructions about the subject, there was significant variability of opinions. With the application of Chi-square test, at a significance level of 5%, it could be observed that there was no significant difference in responses regarding to the time of graduation. As for the type of splinting, the professionals who graduated between 5 to 10 years were associated with the use of semi-rigid splint and those who graduate after more than 10 years with the rigid splint.

## Introduction

Tooth avulsion is one of the dental situations of more complex, diagnosis, treatment and follow-up because the approach should always be well

planned in the context of limiting the risk of infection in the root canal, minimizing the extent of the inflammation surrounding the region of the supporting tissue, and maintaining the aesthetic pattern of the patient.

Successful replantation is closely related to several factors, such as extra-alveolar time and the form of management of the avulsed tooth [20]. Thus, the treatment of avulsion, when performed in adverse conditions may result, over time, in tooth ankylosis, and inflammatory or replacement root resorption [5, 10].

Therefore, prior knowledge about an effective approach in accordance with proper care related to tooth replantation is a key factor.

Some studies have been conducted to assess the knowledge of parents or guardians [14, 22, 25], professors [2, 18], Dentistry undergraduates [13] and health professionals [9, 12] on the therapeutic approach of avulsed teeth.

França *et al.* [12] applied a questionnaire to 93 dentists in the city of Tubarão, and found that 36.6% of participants chose the answer considered correct for a situation of tooth avulsion of a 12 year old patient who took his tooth at the time of the appointment.

On the other hand, Díaz *et al.* [9] conducted a survey on doctors and paramedics in Chile, through the application of a questionnaire, and found that, of the 82 participants, 43.9% claimed that they do not replanted an avulsed tooth because the dentist is responsible for this procedure and only 9.8% answered correctly on storage methods.

In 2010, Zhao and Gong [31] evaluated the knowledge on the treatment of avulsion of 274 dentists from 15 hospitals in Beijing (China), and concluded that there is no consensus on the storage medium, dental splinting technique and type of intracanal medication used.

Because of the variety of responses observed in different studies and because the dentist is the professional technically qualified for the treatment of this type of injury, this study aimed to evaluate the level of knowledge of dental graduates from São Leopoldo Mandic (SP) Post-Graduation Center - Porto Alegre (RS) unit on the therapeutic approach in cases of tooth avulsion.

## Material and methods

A quantitative research was conducted through an objective questionnaire on the students enrolled in the Dentistry Post-Graduation Program, *lato sensu*, of São Leopoldo Mandic (SP) Post-Graduation Center - Porto Alegre (RS) unit, in October 2012.

The students participating in the study were enrolled in the specialization courses in Endodontics, Prosthodontics, Implant Dentistry, Orthodontics and Radiology.

Initially, the students were informed on the study objectives to let them know the importance and the relevance of their responses to the questionnaire to assess the knowledge of dentists on how to approach in cases of tooth avulsion.

The questionnaire (Figures 1 and 2) was applied to all students voluntarily. It was assured the participants that their identity would be kept secret. All respondents signed a free and clarified consent form before answering the questionnaire.

Graduation time:

( ) up to 5 years ( ) 5 to 10 years ( ) more than 10 years

Which specialization course are you enrolled?

During your graduation, have you ever received any instruction on how to proceed in tooth avulsion cases? ( ) yes ( ) no

Have you ever treated any tooth avulsion case? ( ) yes ( ) no

**Figure 1** - Questionnaire regarding the professionals' data and knowledge level on dental avulsion

If a child accidentally fall on the street and the maxillary right permanent central incisor (tooth #11) is avulsed without bone fracture and the patient is referred to you, answer the following questions:

1) Concerning to avulsed tooth socket, you:

( ) would not clean it

( ) would only clean it with saline solution

( ) would perform the curettage and clean it with saline solution

2) In case of tooth replantation, you:

( ) would maintain the tooth without splinting

( ) would use semi-rigid splinting

( ) would use rigid splinting

3) For how long would you maintain the splinting?

( ) I would not use splinting

( ) 7 days

( ) 15 days

( ) more than 30 days

(Continues on the next page)

4) Considering the avulsion of the maxillary right permanent central incisor, the splinting should include, at least:

- ( ) one tooth at each side of the avulsed tooth
- ( ) two teeth at each side of the avulsed tooth
- ( ) up to the maxillary second premolars
- ( ) all maxillary teeth

5) How would you manage the avulsed tooth elapsed two hours after the trauma:

- ( ) would not replant
- ( ) would replant without prior endodontic treatment
- ( ) would perform endodontic treatment before replanting
- ( ) would remove all periodontal tissues adhered to root surface, treat the root surface, treat the root canal before replanting

For you, which would be the most important factor for tooth replantation success?

- ( ) extra-alveolar time of avulsed tooth
- ( ) periodontal ligament condition
- ( ) rhizogenesis stage
- ( ) storage of the avulsed tooth

Facing the avulsion of a maxillary primary central incisor, with 2/3 of sound root, what would you do?

- ( ) tooth replantation and follow-up
- ( ) would not replant

**Figure 2** - Questionnaire to evaluate the knowledge on the treatment of avulsed teeth

The students were asked to mark only one answer per question, not being allowed to consult the scientific literature on the subject.

After collection, the data were tabulated and verified statistically by using the Chi-square test at a significance level of 5%.

## Results

Of 214 dental graduates enrolled in São Leopoldo Mandic (SP) Post-Graduation Center – Porto Alegre (RS) unit, 159 graduates participated in this present study (74%).

Table I shows the graduates' distribution according to the graduation time, specialty and level of previous knowledge on tooth avulsion.

**Table I** - Distribution of the graduates regarding to professional data and level of previous knowledge on tooth avulsion

Variables	Frequency (n)	Percentage (%)
Graduation time		
Up to 5 years	112	70.44%
5 to 10 years	31	19.49%
More than 10 years	16	10.06%
Post-graduation Course		
Endodontics	23	14.46%
Implant Dentistry	9	5.66%
Orthodontics	73	45.91%
Dental Prosthesis	46	28.93%
Radiology	8	5.03%
Previous knowledge on avulsion		
Yes	158	99.37%
No	1	0.62%
Treatment of tooth avulsion		
Yes	30	18.86%
No	129	81.13%

Concerning to tooth avulsion approach and treatment, the results are seen in figures 3 to 9.

			Time		
			Up to 5 years	5 to 10 years	More than 10 years
Situation	Would not clean	Counting % inside the time	14 12.5%	4 12.9%	6 37.5%
	clean with saline	Counting % inside the time	79 70.5%	23 74.2%	7 43.8%
	curettage + clean with saline	Counting % inside the time	19 17%	4 12.9%	3 18.8%
Total		Counting % inside the time	112 100%	31 100%	16 100%
<b>Chi-square test</b>					
		Value	df	Asymp sig (2-sided)	
Pearson's chi-square		7.871 <sup>a</sup>	4	.096	
Likelihood ratio		6.560	4	.161	
linear by linear association		2.083	1	.149	
N of valid cases		159			

a. 3 cells (33.33%) expected counting lower than 5. The minimum expected counting is 2.42.

**Figure 3** - Results regarding to the procedure performed in the socket of the avulsed tooth in function of the graduation time

Through Chi-square test, with  $p = 0.096$ , it was verified no association between the graduation time and the response on the procedure carried out in the socket of the avulsed tooth.

			Time		
			Up to 5 years	5 to 10 years	More than 10 years
Situation	no splinting	Counting % inside the time	0 0%	0 0%	1 6.3%
	semi-rigid splinting	Counting % inside the time	82 73.2%	27 87.1%	6 37.5%
	rigid splinting	Counting % inside the time	30 26.8%	4 12.9%	9 56.3%
Total		Counting % inside the time	112 100%	31 100%	16 100%
<b>Chi-square test</b>					
		Value	df	Asymp sig (2-sided)	
Pearson's chi-square		19.909 <sup>a</sup>	4	.001	
Likelihood ratio		15.431	4	.004	
linear by linear association		.773	1	.379	
N of valid cases		159			

a. 4 cells (44.4%) expected counting lower than 5. The minimum expected counting is .10.

**Figure 4** - Results regarding to the splinting type in function of the graduation time

Through Chi-square test, complemented by the Analysis Of Adjusted Residuals, at level of significance of 5%, it was verified that the professional who graduated from 5 to 10 years were locally associated with the use of semi-rigid splinting and those who graduated from more than 10 years with rigid splinting.

			Time		
			Up to 5 years	5 to 10 years	More than 10 years
Situation	no splinting/up to 7 years	Counting % inside the time	8 7.1%	2 6.5%	2 12.5%
	15 days	Counting % inside the time	58 51.8%	16 51.6%	3 18.8%
	more than 30 days	Counting % inside the time	46 41.1%	13 41.9%	11 68.8%
Total		Counting % inside the time	112 100%	31 100%	16 100%
<b>Chi-square test</b>					
		Value	df	Asymp sig (2-sided)	
Pearson's chi-square		6.304 <sup>a</sup>	4	.178	
Likelihood ratio		6.784	4	.148	
linear by linear association		1.343	1	.246	
N of valid cases		159			

a. 2 cells (22.2%) expected counting lower than 5. The minimum expected counting is 1.21

**Figure 5** - Results regarding to the splinting time in function of the graduation time

Through Chi-square test, with  $p = 0.178$ , no association was verified between the graduation time and the response on the splinting time.

			Time		
			Up to 5 years	5 to 10 years	More than 10 years
Situation	one tooth at each side	Counting % inside the time	25 22.3%	9 29%	6 37.5%
	two teeth at each side	Counting % inside the time	84 75%	22 71%	9 56.3%
	up to 2 <sup>nd</sup> premolar area/ all maxilla	Counting % inside the time	2 2.7%	0 0%	1 6.3%
Total		Counting % inside the time	112 100%	31 100%	16 100%
<b>Chi-square test</b>					
		Value	df	Asymp sig (2-sided)	
Pearson's chi-square		3.881 <sup>a</sup>	4	.422	
Likelihood ratio		4.322	4	.364	
linear by linear association		1.411	1	.235	
N of valid cases		159			

a. 4 cells (44.4%) expected counting lower than 5. The minimum expected counting is .40.

**Figure 6** - Results regarding to the splinting extension in function of the graduation time

Through Chi-square test, with  $p = 0.422$ , no association was verified between the graduation time and the splinting extension.

			Time		
			Up to 5 years	5 to 10 years	More than 10 years
Situation	would do nothing	Counting % inside the time	6 5.4%	3 9.7%	1 6.3%
	would only replant	Counting % inside the time	54 48.2%	12 38.7%	7 43.8%
	replantation + endodontics	Counting % inside the time	20 17.9%	8 25.8%	7 43.8%
	replant + surface treat + endodontics	Counting % inside the time	32 28.6%	8 25.8%	1 6.3%
Total		Counting % inside the time	112 100%	31 100%	16 100%
<b>Chi-square test</b>					
		Value	df	Asymp sig (2-sided)	
Pearson's chi-square		8.437 <sup>a</sup>	4	.208	
Likelihood ratio		8.697	4	.191	
linear by linear association		.480	1	.489	
N of valid cases		159			

a. 4 cells (33.3%) expected counting lower than 5. The minimum expected counting is 1.01

**Figure 7** - Results regarding to the procedure performed 2 hours after the avulsion in function of the graduation time

Through Chi-square test, with  $p = 0.208$ , no association was verified between the graduation time and the response on the procedure performed 2 hours after the avulsion.

			Time		
			Up to 5 years	5 to 10 years	More than 10 years
Situation	extra-alveolar time	Counting % inside the time	59 52.7%	19 61.3%	11 68.8%
	periodontal ligament condition	Counting % inside the time	13 11.6%	2 6.5%	2 12.5%
	rhizogenesis stage	Counting % inside the time	6 7.1%	2 6.5%	2 12.5%
	storage	Counting % inside the time	32 28.6%	8 25.8%	1 6.3%
Total		Counting % inside the time	112 100%	31 100%	16 100%
<b>Chi-square test</b>					
		Value	df	Asymp sig (2-sided)	
Pearson's chi-square		4.797 <sup>a</sup>	6	.570	

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Likelihood ratio	5.801	6	.446
linear by linear association	2.456	1	.117
N of valid cases	159		

a. 5 cells (41.7%) expected counting lower than 5. The minimum expected counting is 1.21

**Figure 8** – Results regarding to the most important factor for replantation success in function of the graduation time

Through Chi-square test, with  $p = 0.570$ , no association was seen between the graduation time and the response on the most important factor for replantation success.

		Time			
			Up to 5 years	5 to 10 years	More than 10 years
Situation	would replant the tooth	Counting % inside the time	37 33%	7 22.6%	3 18.8%
	would not replant the tooth	Counting % inside the time	75 67%	24 77.4%	13 81.3%
Total		Counting % inside the time	112 100%	31 100%	16 100%
Chi-square test					
		Value	df	Asymp sig (2-sided)	
Pearson's chi-square		2.273 <sup>a</sup>	2	.321	
Likelihood ratio		2.381	2	.304	
linear by linear association		2.154	1	.142	
N of valid cases		159			

a. 1 cell (16.7%) expected counting lower than 5. The minimum expected counting is 4.73

**Figure 9** – Results regarding to execution of primary tooth replantation in function of the graduation time

Through Chi-square test, with  $p = 0.321$ , no association was verified between the graduation time and the response on the primary tooth replantation.

## Discussion

The care provided immediately or the first care attitudes to the patient injured with dentoalveolar trauma, especially in cases of avulsed teeth, can decide either the success or failure in clinical prognosis [24]. Therefore, it is necessary that the population and health professionals are better informed on the emergency care for these types of injuries.

Thus, this study was conducted with a group of graduate students in dentistry in order to verify the knowledge on avulsion treatment, similarly to the studies of Kostopoulou and Duggal [16], França

*et al.* [12], Westphalen *et al.* [29], Vasconcellos *et al.* [28], and Zhao and Gong [31], who also applied a questionnaire to dentists.

The definition of the target group was based on the fact that the dentists educate and make the population aware about this subject.

Although 81.13% of the participants never treated an avulsion case, – as observed in the study of Pacheco *et al.* [23] in which 88.3% of the professors never treated tooth avulsion and Mori *et al.* [21] with 77% –, of the 159 graduates answering the questionnaire, 99.37% reported they had already received instruction on tooth avulsion,



corroborating the studies of Díaz *et al.* [9] and Krastl *et al.* [17].

Concerning to the treatment of the socket of the avulsed tooth, most of the respondents only would clean it with saline solution. This information was also observed in the study of Vasconcellos *et al.* [28], in which 64.1% of the dentists would also clean the tooth socket.

With regard to the splinting type, although without statistically significance in relation to the graduation time, most of the dentists would execute the semi-rigid splinting, similarly to the studies of Westphalen *et al.* [29] (73%) and Vasconcellos *et al.* [28] (82.2%). On the other hand, in the study of Zhao and Gong [31], of the 258 dentists, 49% would use rigid and 45.1% semi-rigid splinting.

According to Diangelis and Bakland [8], Flores *et al.* [11] and Trope [27], semi-rigid splinting favors pulp and periodontal healing and stabilizes the tooth during the healing period, providing the regeneration of the periodontal ligament, consequently reducing the chances for ankylosis and resorption.

In this present study, no difference was seen between splinting time for 15 and 30 days. This was also verified by the studies of Kostoupoulou and Duggal [16], Westphalen *et al.* [29], and Vasconcellos *et al.* [28].

According to Andreasen and Andreasen [4], a period of one week is enough to assure a proper periodontal support because the gingival fibers would be already repaired within this time interval.

Concerning to the most important factor for replantation success, most of the students identified the extra-alveolar time, similarly to the study of Zhao and Gong [31], in which 78.8% of the dentists considered the time factor as mandatory for the success of avulsion cases.

The survival of the periodontal ligament present on the root surface is related to short extra-alveolar period and several studies [6, 15, 30] have reported this as the most important factor for replantation success. When the tooth is not replanted at the time of avulsion, the patient should be instructed to store it in appropriate media and search a dentist as soon as possible. The storage, according to Trope [27], aims at minimizing the post-replantation inflammatory response because it avoids dryness and keeps the periodontal ligament cell viability for longer time.

In the case of avulsed teeth with complete root formation that remained in dry medium for more than 2 hours, the treatment of choice consists in

removing the periodontal ligament of the tooth, treating the root surface, performing the endodontics prior to replantation [26, 27].

With regard to the replantation of primary teeth, the vast majority of dentists would not replanted the tooth in its socket, which agrees with the data obtained in the studies of Cohenca *et al.* [7] (85.3%), Al-Asfour *et al.* [1] (71%), and Zhao and Gong [31] (87.1%).

According to the American Academy of Pediatric Dentistry [3], the replantation of avulsed primary teeth is contraindicated due to possible consequences for the development of the permanent tooth.

## Conclusion

Based on the results obtained, it could be verified a variability of opinion on the subject. It is important to highlight that although 99.37% of the participants had already been instructed on the treatment of avulsed teeth during graduation, their knowledge could be improved regardless of the graduation time.

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