

# Dental avulsion: experience, attitudes, and perception of dental practitioners of Caruaru, Pernambuco, Brazil

## Avulsão dentária: experiência, atitudes e percepção de cirurgiões-dentistas de Caruaru, Pernambuco, Brasil

### Abstract

**Purpose:** To evaluate the level of knowledge of Brazilian dental practitioners on dental avulsion and replantation.

**Methods:** A 14-item structured interview was used to collect data from 148 dentists, members of a dental association in the city of Caruaru, Pernambuco, in the Northeast region of Brazil. Data were analyzed by descriptive and inferential statistics (Fisher's exact test and Pearson's chi-square test) at the 0.5 level of significance.

**Results:** In this sample, 49.3% of the dentists had up to 10 years of professional experience, 46.1% worked in public and private institutions, and 50.7% reported graduate education. For avulsed deciduous teeth, 40.3% of the dentists would not perform dental replantation, but most practitioners (92.3%) would do it for permanent teeth, and the professional experience was not a significant factor. Semi-rigid wiring was the most frequent type of dental splinting indicated by dentists with short- and long-term professional experience (74.7% and 64.1%, respectively).

**Conclusion:** In this sample, most dentists were aware of the basic procedures to be followed in case of dental avulsion of deciduous and permanent teeth independently from their professional experience.

**Key words:** Dental avulsion; dental trauma; knowledge

### Resumo

**Objetivo:** Avaliar o conhecimento sobre avulsão e replante dentário entre cirurgiões-dentistas brasileiros.

**Metodologia:** A amostra foi constituída por 148 cirurgiões-dentistas, membros de uma entidade de classe do município de Caruaru, Pernambuco. Para a coleta dos dados utilizou-se um questionário estruturado com 14 itens. Os dados foram analisados por estatística descritiva e inferencial (Teste exato de Fisher e teste qui-quadrado de Pearson), ao nível de significância de 5%.

**Resultados:** Nesta amostra, 49,3% dos cirurgiões-dentistas possuíam até 10 anos de experiência profissional, 46,1% trabalhavam em instituições públicas e privadas e 50,7% eram pós-graduados. Quanto à avulsão de dentes decíduos, 40,3% dos dentistas não realizariam replante; a maioria dos profissionais (92,3%) optaria pelo replante no caso de dentição permanente, não sendo a experiência profissional fator significativo. A contenção semirrígida foi citada por 74,7% e 64,1% dos entrevistados com menor e maior experiência profissional, respectivamente.

**Conclusão:** A maioria dos cirurgiões-dentistas desta amostra tem conhecimento dos procedimentos básicos a serem seguidos em caso de avulsão de dentes decíduos e permanentes, independentemente de sua experiência profissional.

**Palavras-chave:** Avulsão dentária; traumatismos dentários; conhecimento

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## Introduction

Dental trauma has become a serious problem of public health due to the increase of violence, traffic accidents, and participation of children in sports with risk for trauma in recent years (1). Epidemiological studies have shown that the prevalence of dental trauma ranges from 10.5% to 41.6% in deciduous teeth (2-4) and from 10.5% to 18% in the permanent dentition (5-7). One of the most severe types of dental injury is dental avulsion, which emotionally affects both parents and victims, especially when permanent teeth are involved. This complex type of trauma affects multiple tissues, such as enamel, dentin, periodontal ligament, alveolar bone, cement, gingiva, and pulp (8-10). Prevalence of dental avulsion ranges from 1% to 16%.

The traditional treatment of avulsed permanent teeth is replantation, but the time elapsed between the traumatic event and professional intervention is decisive for the treatment success. The best prognosis is obtained with immediate dental replantation, but when this is not possible the recommended procedure is to keep the avulsed tooth in the mouthfloor, under the tongue, to preserve the viability of the periodontal ligament. Otherwise, immersion of the tooth in saliva, milk, or saline solution is also recommended. In addition, the patient should seek professional dental assistance as soon as possible because the longevity of the replanted tooth is related to the emergency procedures adopted (11-14). A successful dental replantation depends on the dentist's knowledge on dental trauma emergency procedures, extra-alveolar period of time, storage and contamination of the avulsed tooth, which may hinder root resorption (15). The prevalence of deciduous teeth avulsion is around 10% (5,16). Avulsed primary teeth should not be replanted because of the potential subsequent damage to developing permanent tooth and pulpal necrosis (17).

Dentists are technically qualified for treating dental avulsion (18), but few studies addressed how dentists are acquainted with this subject (14,15,19-21). Therefore, the objective of this study was to evaluate the experience, attitudes, and perceptions of Brazilian dental practitioners concerning dental avulsion in the deciduous and permanent dentitions.

## Methods

This cross-sectional study was performed in the city of Caruaru, Pernambuco state, in the Northeastern region of Brazil. The study protocol was approved by the Committee of Ethics in Research of the *Associação Caruaruense de Ensino Superior* (Caruaru Association of Higher Education), under the protocol number 71/2006.

A previously validated structured interview with 14 objective questions was applied to 148 dental practitioners, which were members of a local dental association (Brazilian Association of Dentistry/Caruaru-PE). The sample size was estimated from a population of 296 dentists using a statistical program (Epi Info Software). All subjects signed an informed consent form before the interview. Data were collected in the city of Caruaru, PE, in 2006.

The reliability of the structured interview was tested by "face validation" in 10% of the subjects. This technique consists in requesting the interviewee to explain each question in his own words (22). The interviews were conducted at the work place (private clinic or basic unit of health) and, as far as possible, an attempt was made not to interfere with the subjects' daily activities.

The SPSS (Statistical Package for the Social Sciences) Version 11.0 was used for data analysis. Absolute and relative frequencies (descriptive statistics), and Pearson chi-square test and Fisher's exact test were used (inferential statistics). A level of significance of 5.0% was set for all statistical tests.

## Results

In this sample, 50.7% of the dentists had over 10 years of professional experience and 49.3% had up to 10 years. Most dentists worked at both public and private institutions (46.1%); 43.4% and 10.5% worked at private or at public institutions, respectively. Approximately half of the sample (50.7%) reported graduate education, and the most frequent specialties were Oral and Maxillofacial Surgery and Implantology (24.0%), Orthodontics and Endodontics (21.0%) (Fig. 1).

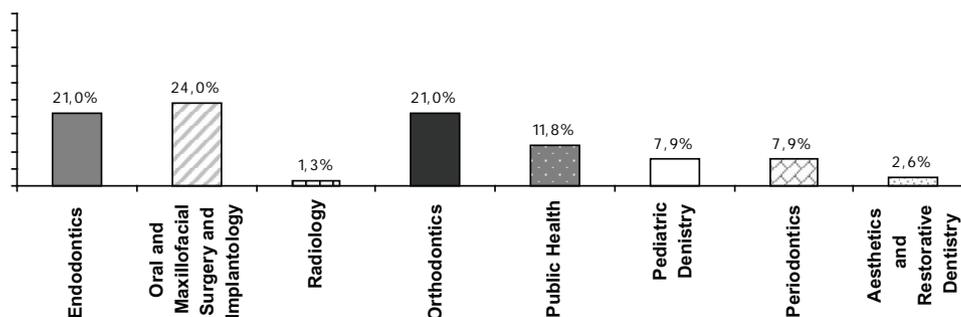


Fig. 1. Distribution of the interviewees according to their graduate education courses.

Table 1 shows the interviewees' opinion on dental avulsion. Dentists with more than 10 years of professional experience (58.7%) already had assisted in a case of dental avulsion ( $P < 0.05$ ). Most dental practitioners (92.3%) already had performed replantation of avulsed permanent teeth. In cases of avulsed deciduous teeth, 69.4% of them preferred not to use this procedure.

**Table 1.** Opinion of the interviewees about dental avulsion according to their professional experience.

Variable	Professional experience (years)						P-values
	Up to 10		More than 10		Total group		
	N	%	N	%	N	%	
Experience of dental avulsion							
Yes	22	30.1	44	58.7	66	44.6	$P^{(2)} = 0,0005^*$
No	51	69.9	31	41.3	82	55.4	
Total <sup>(1)</sup>	73	100,0	75	100,0	148	100,0	
<sup>(1)</sup> For 2 interviewees we do not have this information.							
Management of dental avulsion of deciduous teeth							
Reimplantation	34	46.6	24	33.8	58	40.3	$P^{(2)} = 0.118$
Dental Prosthesis/Orthodontology	17	23.3	10	14.1	27	18.7	$P^{(2)} = 0.157$
None	46	63.0	54	76.1	100	69.4	$P^{(2)} = 0.089$
Base <sup>(1)</sup>	73	–	71	–	144	–	
<sup>(1)</sup> For 6 interviewees we do not have this information.							
Management of dental avulsion of permanent teeth							
Reimplantation	68	93.2	70	93.3	138	92.3	$P^{(3)} = 1.000$
Dental Prosthesis/Orthodontology	4	5.5	4	5.3	8	5.4	$P^{(3)} = 1.000$
Follow-up	31	42.5	35	46.7	82	55.4	$P^{(2)} = 0.607$
Base <sup>(1)</sup>	73	–	75	–	148	–	
<sup>(1)</sup> 2 interviewees did not provide this information.							
<sup>(2)</sup> Using Pearson chi-square test; <sup>(3)</sup> Using Fisher's exact test.							
* Significant association at the level of 5.0%; ** not determined due to low frequency.							

**Table 2.** Opinion of interviewees about dental replantation according to professional experience.

Variable	Professional experience (years)						P-values
	Up to 10		More than 10		Total group		
	N	%	N	%	N	%	
Which alternative is more important for the success of this procedure?							
Extraoral time	61	83.6	62	83.8	123	83.7	$P^{(2)} = 0.971$
Storage medium	64	87.7	62	83.8	126	85.7	$P^{(2)} = 0.501$
Periodontal ligaments	46	63.0	51	68.9	97	66.0	$P^{(2)} = 0.450$
Rhizogenesis	48	65.8	49	66.2	97	66.0	$P^{(2)} = 0.953$
Base <sup>(1)</sup>	73	–	74	–	147	–	
<sup>(1)</sup> 3 interviewees did not provide this information.							
In cases of replantation of permanent teeth, what is the ideal storage medium during the extraoral period?							
Tap water	9	12.3	10	13.5	19	12.9	$P^{(2)} = 0.830$
Distilled water	8	11.0	9	12.2	17	11.6	$P^{(2)} = 0.820$
Saliva	53	72.6	45	60.8	98	66.7	$P^{(2)} = 0.129$
Milk	34	46.6	30	40.5	64	43.5	$P^{(2)} = 0.461$
Physiologic saline solution	34	46.6	45	60.8	79	53.7	$P^{(2)} = 0.083$
Fluoride	6	8.2	2	2.7	8	5.4	$P^{(3)} = 0.166$
Hank's balanced salt solution	7	9.6	4	5.4	11	7.5	$P^{(2)} = 0.335$
All	6	8.2	2	2.7	8	5.4	$P^{(3)} = 0.166$
Base <sup>(1)</sup>	73	–	74	–	147	–	
<sup>(1)</sup> 3 interviewees did not provide this information.							
What is the ideal extra-alveolar time for the dental replantation success?							
Up to 30 minutes	27	38.0	27	36.5	54	37.2	$P^{(3)} = 0.124$
Up to 2 hours	30	42.3	29	39.2	59	40.7	
Up to 4 hours	–	–	2	2.7	2	1.4	
Up to 24 hours	14	19,7	11	14.9	25	17.2	
Not certain	–	–	5	6.8	5	3.4	
Total <sup>(1)</sup>	71	100.0	74	100.0	145	100.0	
<sup>(1)</sup> 5 interviewees did not provide this information.							
<sup>(2)</sup> Using Pearson chi-square test; <sup>(3)</sup> Using Fisher's exact test.							
* Significant association at the level of 5.0%; ** not determined due to null frequency.							

The interviewees' opinion about dental replantation is shown in Table 2. Most dentists cited that the most important procedure for the success of dental replantation is ideal storage medium and extra-alveolar time (more than 80%). Most interviewees answered that the ideal extra-alveolar time is up to 2 hours (40.7%) and that the ideal storage medium is saliva (66.7%). There was no statistically significant difference among the variables studied.

**Table 3.** Opinion of dental practitioners about the type of splinting, need for endodontic treatment and systemic medication.

Variable	Professional experience (years)						P-value
	Up to 10		More than 10		Total group		
	N	%	N	%	N	%	
Do you find the use of splint necessary in cases of dental reimplantation?							
Yes	72	100.0	72	97.3	144	98.6	$P^{(2)}=0.497$
No	–	–	2	2.7	2	1.4	
Total <sup>(1)</sup>	72	100.0	74	100.0	146	100.0	
<sup>(1)</sup> 4 interviewees did not provide this information.							
Type of splinting							
Semi-rigid	51	79.7	41	64.1	92	71.9	$P^{(3)}=0.049^*$
Rigid	13	20.3	23	35.9	36	28.1	
Total	64	100.0	64	100.0	128	100.0	
Should the endodontic treatment of permanent teeth be accomplished immediately after dental reimplantation?							
It depends on the extraoral time	18	26.1	20	27.4	38	26.8	$P^{(3)}=0.860$
It depends on the rhizogenesis	32	46.4	35	47.9	67	47.2	$P^{(3)}=0.852$
After some days	25	36.2	30	41.1	55	38.7	$P^{(3)}=0.552$
It should not be accomplished	1	1.5	–	–	1	0.7	$P^{(2)}=0.486$
BASE <sup>(1)</sup>	69	–	73	–	142	–	
<sup>(1)</sup> 8 interviewees did not provide this information.							
How necessary is systemic medication and in which cases should it be applied?							
In infectious places	21	28.8	18	24.7	39	26.7	$P^{(3)}=0.514$
In all cases	50	68.5	55	75.3	105	71.9	
In no cases	1	1.4	–	–	1	0.7	
It depends on the child's age	1	1.4	–	–	1	0.7	
Total <sup>(1)</sup>	73	100.0	73	100.0	146	100.0	
<sup>(1)</sup> For 4 interviewees we do not have this information.							

<sup>(2)</sup> Using Fisher's exact test; <sup>(3)</sup> Using Pearson chi-square test.  
\* Significant association at the level of 5.0%.

Table 3 shows the opinion of dental practitioners about the type of splinting, the need for endodontic treatment and systemic medication. A statistical significant difference was observed regarding the type of splinting, and the semi-rigid splint was cited by 71.9% of the interviewees.

## Discussion

The present study showed that most dentists were aware of the basic procedures to be followed in case of dental avulsion of deciduous and permanent teeth independently from their professional experience. In this sample, almost half of the dentists had up to 10 years of experience and reported graduate education, in contrast with the findings by De França et al. (19), who reported that 58% of the dentists had up to 10 years of professional experience and 67% did not have any specialization.

For cases of avulsion of primary teeth, most dentists answered that they would do nothing, which is in agreement with the American Academy of Pediatric Dentistry (17) guidelines. These guidelines contraindicate the replantation of avulsed deciduous teeth to prevent pulp necrosis and further injury to the developing permanent teeth.

When asked about the treatment of choice for avulsed permanent teeth, most dentists recommended dental replantation similarly to previous studies (10). The patient follow-up is part of the protocol of dental replantation (4) but was mentioned by less than half of the interviewees. The items most cited for a successful dental replantation were

ideal extra-alveolar time and integrity of the periodontal ligament (83.7% and 66.0% of answers, respectively), which are known to be very important factors (12). Most dentists answered that the ideal extra-alveolar time is up to 2 hours and the ideal storage medium is saliva. Westphalen et al. (21) reported that the ideal storage medium was saliva in 46% of the cases and that the ideal extra-alveolar time was less than 30 minutes in 86% of the cases. Dentists knew that the ideal extra-alveolar time should be within 30 min and that milk or saline solution are the best storage medium for avulsed teeth (15). Other studies showed that if the tooth is transferred to a liquid medium, such as the patient's saliva, milk or saline within the first 15 minutes of avulsion, some of the cells in the periodontal ligament and cementum will survive and may help tissue regeneration (17,23). In this study, 47.2% of the dental practitioners answered that the need for endodontic treatment depends on the rhizogenesis. This frequency was lower than that reported by Westphalen et al. (21), who found that the need for endodontic treatment depended on extra-alveolar period and root formation stage in 77% of the cases. The hypothetical decisions of most dentists in the present sample were generally correct. They stated that no endodontic treatment would be initially necessary for teeth with an open apex and extra-alveolar time under 60 minutes (24). For teeth with open apex and extra-alveolar time longer than 60 minutes the recommendation was to follow apexification procedure, and endodontic treatment should be initiated 7 to 10 days after the closing of the root apex.

Most of the interviewees, especially those with less professional experience (71.9%), reported the use of a semi-rigid splint, which are in agreement with Westphalen et al. (21), who reported the use of semi-rigid splint in 73% of the cases. The semi-rigid splint allows the traumatized teeth to have some mobility and optimal periodontal ligament healing (5), and is recommended for teeth with both closed and open apex (25).

Antibiotics have been prescribed in cases of replantation for tetanus prevention when the avulsed tooth is contaminated (10,11). In the present study, this systemic medication was suggested by the majority of the dentists (71.9%) irrespective of their professional experience, in

contrast with the findings by Manfrin et al. (15) (79.4%) and Westphalen et al. (21) (89%), where the majority of respondents reported a criterious prescription of medication.

## Conclusions

The findings of this study suggest that the knowledge and attitudes of dentists about dental avulsion and replantation of permanent teeth are adequate in this sample. However, dental practitioners should have continuing education on the subject to improve the quality of life of patients with dental trauma.

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