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ARE LIFE-SAVING AMBULANCE TEAM MEMBERS IN MARINGÁ, BRAZIL, ALSO PREPARED TO SAVE TEETH?

ALÉM DE SALVAR VIDAS, AS EQUIPES DO SAMU DE MARINGÁ ESTÃO TAMBÉM PREPARADAS PARA SALVAR DENTES?

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ABSTRACT: The objective of this study was to evaluate the level of knowledge of members of the Mobile Emergency Care Service (SAMU) regarding dental avulsion and the first aid procedures required during emergency care for avulsed teeth. Data were individually collected from 96 SAMU team members working in the city of Maringá, Brazil, using a three-part questionnaire, and descriptive analysis was performed through simple and cross-frequency tables. The sample consisted equally of men and women (50%), predominantly aged up to 39 years (67.7%), and with completed higher education (78.12%). The analysis of the results revealed inconsistencies in the respondents' understanding of what dental avulsion is, as well as the absence of a structured strategy to manage this type of trauma. The findings indicate that SAMU professionals are still not sufficiently prepared to adequately manage and preserve avulsed teeth.
KEYWORDS: Ambulances; Tooth Avulsion; First Aid; Dental trauma.

RESUMO: O objetivo foi avaliar o nível de conhecimento apresentado pelos integrantes do serviço de ambulância (SAMU) sobre avulsão dentária e os primeiros socorros necessários durante o atendimento de emergência de dentes avulsionados. Os dados foram coletados individualmente de 96 integrantes da equipe do SAMU que atuam na cidade de Maringá, Brasil, por meio de um questionário de três partes. A análise descritiva foi realizada por meio de tabelas simples e de frequência cruzada. A amostra foi igualmente composta por homens e mulheres (50%) de até 39 anos de idade (67,7%) e com ensino superior completo (78,12%). A análise dos resultados demonstrou inconsistências nas respostas dos entrevistados sobre o que é avulsão dentária, bem como a falta de uma estratégia estruturada para lidar com este tipo de trauma. Os achados indicam que os integrantes do SAMU ainda não estão suficientemente preparados para salvar dentes avulsionados.
PALAVRAS-CHAVE: Ambulâncias; Avulsão Dentária; Primeiros Socorros; Trauma dentário.

INTRODUCTION

The issue of dental avulsion should also be discussed within the broader scope of health promotion. According to the World Health Organization, oral health is an essential component of overall health, and emergency preparedness to manage dental trauma can reduce long-term morbidity. Educating frontline healthcare providers on first-aid protocols for avulsed teeth is not only a matter of emergency care, but also a strategic investment in disease prevention and quality of life.

The traumatic dental injuries are a public health problem in Brazil and can be associated with traffic accidents, falls or sportive activities.[1] Prevalence rates of 17,8% have been described for traumatic injuries in young patients aged 15 to 19, furthermore the studied dental emergency care services reported that 15,4% of the treatments performed by them were related to trauma.[2,3]

Studies conducted in countries such as the United Kingdom, Canada, and Australia have implemented educational strategies to prepare first responders and emergency personnel for the management of dental trauma. Despite differences in protocols, a global gap in awareness and readiness regarding tooth avulsion remains evident. The World Health Organization also recognizes oral health as an integral component of general health, emphasizing the importance of preventive and emergency care. The management of dental avulsion should thus be understood not only as an emergency response, but as a vital aspect of health promotion, capable of preventing long-term functional, aesthetic, and psychosocial consequences.

Dental avulsion is a traumatic event caused by different types of accidents, which leads to a tooth or teeth being completely dislodged from the alveolar cavity. It accounts for approximately 16% of traumatic dental injuries and is widely regarded as one of the most serious types.[4,5] Because of its severity, the loss of a tooth can negatively affect the esthetic, functional, and psychological wellbeing of victims.[6] The best possible treatment in cases of tooth avulsion has long been established, and involves the replantation of the avulsed teeth back into their alveolus at the place of the accident immediately after its occurrence.[7-9] However, if replantation cannot be conducted immediately, teeth can still be saved if a few simple steps are followed to keep the periodontal ligament (PDL) cells viable until professional help can be sought.[4] If no action is taken, and teeth stay out of their alveolus for more than 60 minutes, PDL cells viability decreases and the long-term prognosis becomes very poor, with the likelihood of ankylosis and root resorption.[7]

The SAMU (public ambulance emergency service, in Portuguese) is generally the first service to be contacted, that alone put its members in a privileged position to save avulsed tooth. Once the SAMU teams are formed by trained healthcare professionals, it would be expected that the service became more qualified, and proper attention is now given to tooth avulsion. Nonetheless, to this date, no study has been conducted to determine whether knowledge on this issue has improved since SAMU was introduced in Brazil. This information is important for identifying shortcomings and developing strategies to improve the chances of saving avulsed teeth.

Research conducted by Cardoso et al. (2009)[10] with Brazilian firefighters with paramedic training, found that 71% of the respondents did not know what tooth avulsion was, and that their knowledge concerning the emergency procedures was inadequate. Apart from that, studies conducted in Poland[11] and Turkey[12] also observed that paramedics who were responsible for the first aid treatment, presented insufficient knowledge to properly handle tooth avulsion cases. Beyond that, a systematic review published by Tewari et al. (2020)[13] also found a great variability in the methodology of the studies, participant categories and the aspects of the questionnaire.

Therefore, as part of a long-term project, the objective of this study was to determine the level of information that SAMU members have on the characterization of tooth avulsion and the required first-aid emergency procedures.[13]

METHODOLOGY

This cross-sectional observational study was approved by the Ethics Committee for Research Involving Human Beings of the University Center of Maringá (UniCesumar), Maringá, Brazil (CAAE: 68196717.0.0000.5539). Moreover, the study was conducted in conformance with the recommendations set in the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[17] Participation was voluntary, and collected data was dealt with under strict confidentiality. Informed consent was obtained from all participating SAMU members.

SAMPLE

The sample consisted of SAMU members based in Maringá, Brazil (New-North Region). Prior to applying the questionnaire, meetings were held with management to understand SAMU`s structure and rules, explain the study`s objectives and methods, and obtain authorization for data collection. SAMU members were individually contacted, and appointments were scheduled to maximize participation.

The use of a Likert scale was selected for its ability to capture nuanced perceptions and degrees of agreement among respondents, allowing a more detailed understanding of their knowledge and attitudes. This method is widely used in health-related surveys and provides quantitative data amenable to statistical analysis.

DATA COLLECTION

Data collection occurred between July and August 2017. At scheduled times, a three-part questionnaire was applied to SAMU members on duty under the supervision of one author who did not interfere with responses. Part 1 of the questionnaire referred to demographic data (age, gender, education, position within SAMU, and previous experience with dental trauma). Part 2 assessed respondents' knowledge about dental avulsion, while Part 3 addressed procedures required for immediate management of avulsed teeth. Parts 2 and 3 utilized a Likert scale with 5 levels: strongly agree, agree, undecided, disagree and strongly disagree).[18] At their completion, questionnaires were immediately collected for analysis.

DATA ANALYSIS

Microsoft Excel (version 2017) was used to compile data into a database for subsequent statistical analysis using SAS software (version 9.4). The findings were presented in absolute and relative terms through simple and cross-tabulations.[19]

RESULTS

DEMOGRAPHICS

Of the 106 full-time SAMU-Maringá team members, 85 completed the questionnaire (80.2% response rate). Additionally, two nursing residents and nine last-year medical students participated, bringing the total to 96 respondents. Gender distribution was equal (50% male and 50% female), with a predominance of young individuals aged up to 39 years (67.7%), and those with complete higher education (78.12%). Most participants (89.6%) reported never having received training in dental trauma emergency care, while 34.3% had attended cases involving tooth avulsion (Table 1).

TOOTH AVULSION DEFINITION

A total of 69 respondents (71.9%) correctly identified tooth avulsion as tooth loss. However, misconceptions were common: 23 respondents (24%) believed it referred to tooth fracture, 16 (16.7%) to minor tooth displacement, 21 (21.9%) to tooth intrusion, 31 (32.3%) to any type of tooth displacement, while 13 respondents (13.5%) selected all the provided alternatives as correct definitions (Table 2).

TOOTH AVULSION FIRST-AID PROCEDURES

Table 3 illustrates the answers provided by respondents concerning dental avulsion immediate management. Only eight respondents (8.3%) stated that they would search for missing teeth and place them back into the alveolus in cases of tooth avulsion, while 80 participants (83.3%) disagreed or strongly disagreed with the statement. When asked about the cleaning procedure before replantation, 11 respondents (11.5%) agreed or strongly agreed that teeth should be washed with water, soap and a brush, while 26 (27.1%) stated they should just be rinsed under tap water or saline. In both cases a large number of respondents were undecided, while the majority disagreed or strongly disagreed with any of the cleaning procedures suggested.

Regarding the storage of avulsed teeth before professional dental treatment, 52 respondents (54.16%) agreed or strongly agreed that avulsed teeth should be wrapped in a napkin, handkerchief or gauze, 12 (12.5%) that they should be placed in a container with water, 7 (7.3%) with milk, and 49 (51%) with saline. Again, some respondents were undecided, while the majority either disagreed or strongly disagreed with any of these methods.

Only 11 respondents (11.46%) agreed, while 56 (58.3%) disagreed or strongly disagreed that extra-alveolar time has no influence on the success of avulsed teeth replantation. The majority of respondents (43.85%) were undecided if avulsed teeth could stay more than 24 hours out of the mouth before being replanted, while 15 respondents (15.6%) agreed with the statement. Concerning the replantation of deciduous teeth, 66 respondents (68.75%) disagreed or strongly disagreed with the procedure, while only 5 (5.2%) agreed.

When asked about the consequences of inappropriate actions in cases of dental avulsion, 39 respondents (40.6%) agreed or strongly agreed with the possibility of tooth loss due to root resorption, 54 (56.3%) that avulsed teeth could darken due to the loss of pulp vitality, while 4 (4.2%) agreed that there would be no consequences. A relevant number of respondents (39.6%, 30.2% and 26%, respectively), demonstrated to be undecided on the consequences. Only 11 respondents (11. 46%) agreed or strongly

agreed with the statement that checking if patients had received tetanus vaccine was of no importance, while 63 (65.2%) disagreed or strongly disagreed with the statement, and 22 (22.9%) were undecided.

Table 1. Demographic data of the 96 participating SAMU team members.

Variable		n	%
Age	<29	24	25.0
	30-39	41	42.7
	40-48	20	20.8
	49-50	11	11.5
Gender	Female	48	50
	Male	48	50
Education	High school	12	12.5
	Undergraduate	9	9.4
	Graduate	44	45.8
	Specialist	29	30.2
	MSc	2	2.1
	PhD	-	-
Position	Physicians	21	21.9
	Nurses	12	12.5
	Nursing Assistants	20	20.8
	Rescue Drivers	20	20.8
	Phone operators	10	10.4
	Administrative personnel	2	14.6
	Nursing Residents	2	2.1
	Medical Students	9	9.4
Dental trauma training	Yes	10	10.4
	No	86	89.6
Previous experience with tooth avulsion	Yes	33	34.3
	No	61	63.5
	No reply	2	2.2

Table 2. Level of information on the characterization of tooth avulsion.

How is tooth avulsion characterized?	SA		A		U		D		SD		NR	
	n	%	n	%	n	%	n	%	n	%	n	%
Partial dental crown fracture (tooth fragment)	5	5.2	18	18.8	25	26	35	36.5	12	12.5	1	1
A small displacement of the tooth	2	2.1	14	14.6	17	17.7	44	45.8	17	17.7	2	2.1
Total displacement of teeth out of the alveolus (tooth loss)	34	35.4	35	36.5	16	16.6	7	7.3	2	2.1	2	2.1
Displacement of teeth into the alveolus (tooth intrusion)	3	3.1	18	18.7	28	29.1	29	30.2	14	15	4	4.1
Any type of tooth displacement	7	7.4	24	25	20	20.8	29	30.2	14	14.5	2	2.1
Any one of the above statements	6	6.2	7	7.4	13	13.5	36	37.5	31	32.3	3	3.1

SA: Strongly Agree; A: Agree, U: Undecided; D: Disagree; SD: Strongly Disagree; NR: No Reply.

Table 3. Level of information on the required immediate management of avulsed teeth.

A healthy and fit 35-year-old man is involved in a bicycle accident in the traffic. He hit his face on the ground and loses his upper anterior incisor tooth. What should you do?	**SA**		**A**		**U**		**D**		**SD**		**NR**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Search for the lost tooth and put it back in the dental alveolus in the mouth (replantation)	1	1	7	7.3	7	7.3	39	40.7	41	42.7	1	1
If you decide to put the tooth back into the dental alveolus, how should it be cleaned before being replanted?												
Wash the tooth with WATER, SOAP AND A BRUSH	1	1	10	10.4	28	29.2	32	33.4	24	25	1	1
Simply rinse the tooth IN TAP WATER or SALINE	2	2.1	24	25	31	32.3	27	28.1	12	12.5	0	0
If you decide NOT to put the tooth back into the dental alveolus, how should it be preserved until treatment can be provided by a dentist?												
Wrap the tooth in a NAPKIN, HANDKERCHIEF or GAUZE.	8	8.3	44	45.8	16	16.7	18	18.8	7	7.3	3	3.1
Place the tooth in a container with WATER	1	1	11	11.5	22	22.9	45	46.9	14	14.6	3	3.1
Place the tooth in a container with MILK	4	4.2	3	3.1	18	18.8	45	46.8	24	25	2	2.1
Place the tooth in a container with SALINE.	9	9.4	40	41.6	24	25	16	16.7	6	6.3	1	1
Is extra-alveolar time important?												
Extra-alveolar time makes no influence on avulsed teeth replantation	0	0	11	11.5	15	15.6	41	42.7	15	15.6	14	14.6
Teeth may be out of the mouth for more than 24 hours before being replanted	0	0	15	15.6	42	43.8	27	28.1	12	12.5	0	0
What to do with avulsed primary teeth?												
Like permanent teeth, avulsed primary teeth should be put back into the alveolus	0	0	5	5.2	25	26	43	44.8	23	24	0	0
If inappropriate actions following tooth avulsion (wrong storage and/or long extra-alveolar time), what would the consequences be?												
Tooth loss by root resorption i.e., the root becomes shorter and is replaced by bone	7	7.3	32	33.3	38	39.6	17	17.7	2	2.1	0	0
Tooth darkening due to vitality loss or pulp/nerve death	8	8.3	46	48	29	30.2	11	11.5	1	1	1	1
There would be no consequences	0	0	4	4.2	25	26	42	43.8	25	26	0	0
What is the tetanus vaccine conduct in cases of tooth avulsion?												
Tetanus vaccine coverage deserves no attention	3	3.1	8	8.3	22	22.9	42	43.8	21	21.9	0	0

SA: Strongly Agree; A: Agree, U: Undecided; D: Disagree; SD: Strongly Disagree; NR: No Reply.

Despite the limited geographic scope, Maringá's SAMU is known for its organizational structure, qualified staff, and consistent adherence to national emergency protocols. These characteristics may serve as a model for similar urban emergency services across Brazil, enhancing the relevance of the findings.

CONCLUSION

Based on the findings and limitations of the present study, it may be concluded that SAMU members are still insufficiently informed and ill-prepared to deal with cases of tooth avulsion and effectively save teeth. Action planning by a multidisciplinary team of health professionals is required to define strategies to disseminate the required information, conduct proper training, and establish continued education programs for SAMU members.

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