

# Knowledge, attitudes and practices of emergency care practitioners in the management of common dental emergencies in the eThekweni District, KwaZulu-Natal.

SADJ August 2022, Vol. 77 No. 7 p394 - p399

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## ABSTRACT

### Introduction

It is essential to provide timely and appropriate treatment in cases of dental emergencies. First responders such as Emergency Care Practitioners (ECPs) usually provide this prehospital care. The successful management of casualties experiencing common dental emergencies is dependent on two fundamental factors; the first responder's knowledge and ability to render the appropriate level and standard of medical care, and; secondly, the time that expires between the onset of the incident and the initiation of definitive emergency medical treatment. Delayed or inappropriate management can have long term physiological and psychological effects.

### Objectives

This was an exploratory and descriptive study, using quantitative and qualitative methods to determine the knowledge and attitudes of Emergency Care Practitioners of the eThekweni District of KwaZulu-Natal, South Africa, in the management of dental emergencies.

### Results

The results revealed that Emergency Care Practitioners had inadequate knowledge, training, and understanding

of the management of common dental emergencies by ECPs. There was limited initial training, with a significant portion of the participants (44.9%,  $p = 0.233$ ) having not received any training at all in the management of orofacial traumas, and with a significant majority (78.3%,  $< 0.001$ ) having no further education and training. Most ECPs indicated a desire to receive such training.

### Conclusion

This study indicated that ECPs lacked confidence in managing dental emergencies, which highlighted a need for specific dental awareness and training programs to further empower ECPs in the management of such emergencies.

**Keywords:** Common dental emergencies, Emergency Care Practitioners, Emergency Medical Management, Knowledge, attitudes and practices

## INTRODUCTION

Dental emergencies are fast becoming an oral health issue due to its increased prevalence.<sup>1</sup> Dental emergencies, including dentoalveolar fractures, maxillary and mandibular fractures, and complications of untreated tooth infections require immediate management.<sup>1</sup> Any delay or improper management thereof can have long-term and adverse health outcomes.<sup>1</sup> Moreover, orofacial trauma including anterior tooth avulsion, may lead to various psychological effects such as the loss of confidence and, possible loss of a job or inability to obtain work, especially in fields where physical appearance is regarded as being important (such as frontline sales and retail jobs). In addition, there may be a negative aesthetic consequence of these injuries, as they occur on the part of the body that is almost always exposed and visible. Effects such as facial scarring, disfigurement and deformation, loss of function, and paralysis may occur and often cannot be disguised or hidden. Additionally, casualties may require extensive and expensive plastic and reconstructive surgery to restore some aesthetics and function.<sup>2</sup> There may also be significant social interaction difficulties and even social avoidance<sup>3</sup>, which could be ascribed to embarrassment and a fear of rejection.<sup>4</sup> This delay may be related to access to

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|-------------------------|-----|
| 1. Lucy Reddy:          | 60% |
| 2. Ilana Moodley:       | 30% |
| 3. Tufayl Ahmed Muslim: | 10% |

immediate care, financial costs of treatment, fear of pain, and suffering.<sup>1</sup>

Therefore, it is essential to provide timely and appropriate treatment in cases of orofacial trauma.<sup>5</sup> This is well known to dental professionals and is deeply embedded in their training. However, they may not be the first responders to such orofacial injuries due to serious vehicle accidents, work or sports injuries, interpersonal violence, or other miscellaneous activities.<sup>6,7</sup>

This prehospital care is usually provided by first responders such as emergency care providers attending an accident scene.<sup>8</sup> Several studies show that management of orofacial trauma is often not included in medical courses and first aid training nor in first-aid textbooks and training manuals of first responders to trauma such as ECPs.<sup>9,10</sup>

While research on an international level regarding orofacial trauma and the knowledge of ECPs in managing such trauma is substantial, in South Africa, there is a lack of epidemiological studies on the understanding of emergency care providers in managing these conditions.

## OBJECTIVES OF THE STUDY

The study aimed to determine the knowledge, attitudes, and practices among emergency care providers' in managing dental emergencies.

## METHODOLOGY

This was an exploratory, descriptive study employing quantitative and qualitative methods to achieve the objectives. The researcher obtained ethical approval from the Social Sciences and Humanities Research Ethics Committee (SSHREC Reference number: 068/16) and the KZN Department of Health (Reference number: 26/16 KZ-2015RP12-306). This study was completed in 2018.

The quantitative aspect involved participants (ECPs), employed by the local public sector Emergency Medical Services in the eThekweni Health District of KwaZulu-Natal, to complete a self-administered questionnaire on their knowledge, attitudes, and practices in the management of casualties presenting with orofacial trauma. A random sampling method, through the SurveyMaker<sup>®</sup> software, was used to obtain the sample size. The sample size was calculated using a power calculation method with the following parameters: Sample size of 1138, Coefficient Index of 95% and, Standard Deviation of 0.96%, yielding a final sample size of 288. Using convenience sampling, participants were recruited at the start of their shifts in their workplaces and were informed about the study. All qualified ECPs registered with the Health Professional Council of South Africa (HPCSA), both male and female, employed by the provincial Department of Health Emergency Medical Services in the eThekweni District were included in the study. At the same time, those engaged in the private sector and student ECPs were excluded.

After obtaining informed consent from participants, the questionnaires were distributed to them to complete, in private, during their break times. The questionnaire

included open and closed-ended questions and comprised four sections (demographics, knowledge, attitudes, practices, and further training needs). Sample questions included: Demographics (How many years of operational experience do you have in your profession?); Knowledge (Would you consider re-implantation of a primary (deciduous) avulsed tooth?); Attitudes (I am confident and comfortable treating common traumatic orofacial injuries and orofacial medical emergencies?); Practices (I know how to manage a tooth that is completely knocked out). The responses on attitudes and practices were rated on a Likert scale ranging from strongly agree to strongly disagree. Construct validity was used in the construction of the questionnaires to maintain validity of the quantitative data. The researcher collected the questionnaires at the end of their shifts, and all completed questionnaires were coded to maintain participant anonymity.

The qualitative part of the study involved conducting semi-structured interviews with a purposively selected sample of ECPs, the managers from 7 bases (Tongaat, Phoenix, KwaMashu, Marianhill, R K Khan, Wentworth, and Umlazi) in the eThekweni Health District. The interviews were conducted using an interview schedule to gain an in-depth understanding of training and curriculum content regarding the emergency management of common orofacial trauma and dental emergencies. Sample questions include: Do you think there is adequate education and training offered to ECPs to manage common orofacial traumatic injuries and medical emergencies? and in your opinion, is further training required for ECPs in training to manage common orofacial trauma and medical emergencies efficiently? The interviews were conducted at the participants' convenience, in their offices, and lasted approximately 30 minutes. The researcher recorded the interviews with the participants' consent.

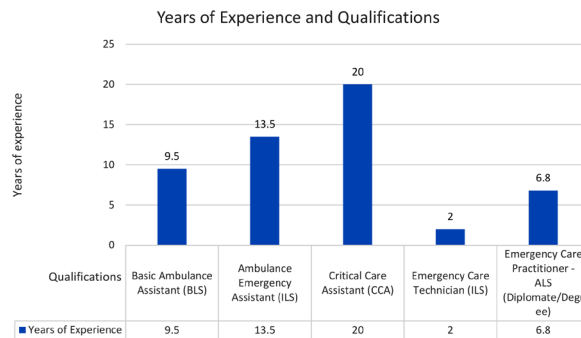
The quantitative data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 24<sup>®</sup> IBM 2016. Data analysis included descriptive statistics such as frequency and mean distribution and were presented as graphs and tables. Inferential statistical techniques, the Chi-Squared test, and the ANOVA Statistical test were used to determine associated relationships between the independent and dependent variables (knowledge, attitudes, and practices). The qualitative data obtained from the digital voice recordings were transcribed verbatim onto a Microsoft Word<sup>®</sup> document. In ensuring credibility, the researcher sent the data transcripts to the participants for verification to maintain dependability. Confirmability was established by quoting the participants' actual dialogue. The researcher analyzed the primary data manually to search for common patterns, which later emerged as themes and sub-themes according to Braun and Clark, 2010.<sup>11</sup>

## RESULTS

Of the 237 questionnaires distributed, only 138 were returned, yielding a 57.5% response rate. The majority of the study population were male (n=104, 75.4%) with most being within the age categories of 40-50 years (n= 54, 39.1%) and 30-40 years (n=50, 36.2%). Most (n=104, 75%) of the ECPs had a secondary medical

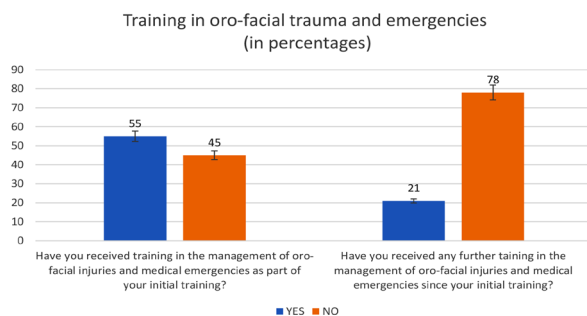
qualification, such as a rescue qualification, in addition to their basic paramedical qualification. The basic ambulance assistants had an average of 9.5 years of operational experience, in contrast to the higher qualified Critical Care Assistant, who had, on average, 20 years of experience. Those ECPs with a basic rescue qualification had over 21 years, while the more advanced medical rescue qualification holders had 10.8 years of experience, as reflected in Figure 1 below.

**Figure 1: Operation experience of ECPs – medical and rescue qualifications**



The differences observed in determining the ECPs training in the management of common orofacial injuries and medical emergencies during initial training was not significantly different (55% vs 45%), but significantly more respondents (78%) indicated that they did not receive any further training post-qualification, as shown in Figure 2.

**Figure 2: ECP's training in dealing with orofacial medical emergencies**



### Knowledge of Oro-facial Trauma

A large number of respondents reported dealing with patients who presented with some type of dental injury (soft-tissue lacerations; 63.8%, Mandible fractures; 50%), yet just about half (n= 73, 53%) were able to identify the different teeth in the oral cavity. A significant number (n= 88, 64%) of the participants did not know when to re-implant an avulsed tooth, and 41% (n=57) did not know the proper process to preserve and implant an avulsed tooth.

When asked about the management of the potentially life-threatening orofacial condition of Ludwig's Angina, more than half of the study population (n=77, 55.5%) were unaware of this condition. Only 14% (n= 19) of the participants recognized that the most critical sequel of Ludwig's angina is airway obstruction. Only 8% (n= 11) realized that Ludwig's angina is a bilateral swelling submandibular, sublingual and submental spaces.

### Attitudes and Practices in Management of Oro-facial trauma

Just over 50% of participants agree (n=61, 44%) and (n= 13, 9.4%) strongly agree that they feel confident and comfortable when treating common traumatic orofacial injuries and medical emergencies (Table 1). Less than 50% (n=29, 21%) of the study population agreed that they could recognize severe complications from a dental abscess such as Ludwig's angina, and n=65 (47%) were confident in the management of post-op bleeding. Moreover, only 61 participants (44%) agreed that they were confident in assessing dental trauma, 58 (42%) were confident in the initial management of dental fractures. Only 41 participants (29.7%) agreed that they were confident in managing an avulsed tooth. Most of the respondents believed that they needed further training in the management of dental emergencies (n=79, 57.2% agreed and n=23, 16.7% strongly agreed).

When asked about their need for further training, a significant two-thirds (74%,  $p < 0.001$ ) of the respondents agreed with the need for additional training. Interestingly, 80% of the respondents wanted this training to be offered by a dental practitioner, and 67.3% wanted training to be delivered at a formal lecture or workshop rather than online. Most (69%) of the participants wanted this training regularly (between 6 months to annually), and a significant number (n=91, 66%) wanted this training to be of a day's duration.

The emergent themes obtained from the analysis of the qualitative data pertained to mainly the training of ECPs as noted in an interview with an EMS base manager:

*"We are trained to deal with life-threatening emergencies, and unfortunately this does not include orofacial emergencies like an avulsed tooth. We tend to patch people up, and not really manage the emergency with a focus on the long-term effects and consequences. Our basic training has not equipped us to deal with things like bleeding following a dental extraction."*

[Interview with EMS base manager A]

This could lead to the lack of confidence in the management of orofacial injuries as noted by participant B:

*"I was not confident when treating orofacial injuries as this was the role of the dental practitioner, but if I had received more training in both my basic training at college, and in further training after qualifying then perhaps, we would be more confident in dealing with these emergencies"*

[Interview with EMS Base manager B]

### DISCUSSION

In a country like South Africa, plagued with high levels of criminal and interpersonal violence and high rates of motor vehicle and pedestrian accidents, there is an increased likelihood that ECPs will respond to several incidents wherein casualties present with orofacial traumas and injuries.<sup>12</sup> With a warm climate, many South Africans are active sports participants. This presents an additional risk to participants sustaining orofacial traumas, especially in aggressive contact sports such as rugby, boxing, and martial arts.<sup>9</sup> An adequate understanding

**Table 1: ECP's knowledge, attitudes and confidence to deal with medical emergencies**

		Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Chi Square
		Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	p-value
I am confident and comfortable treating common traumatic orofacial injuries and medical emergencies	C1	12	8.7%	8	5.8%	44	31.9%	61	44.2%	13	9.4%	< 0.001
I have adequate knowledge on how to manage common traumatic orofacial injuries and medical emergencies.	C2	14	10.1%	19	13.8%	39	28.3%	57	41.3%	9	6.5%	< 0.001
I feel that I do require further training in the management of common traumatic orofacial injuries and medical emergencies.	C3	14	10.1%	4	2.9%	18	13.0%	79	57.2%	23	16.7%	< 0.001
I am confident in identifying a significant complication of a dental abscess such as Ludwig's Angina	C4	21	15.2%	24	17.4%	52	37.7%	29	21.0%	12	8.7%	< 0.001
I am confident in the management of post-extraction bleeding.	C5	19	13.8%	15	10.9%	30	21.7%	65	47.1%	9	6.5%	< 0.001
I am confident in the assessment of dental trauma.	C6	14	10.1%	16	11.6%	41	29.7%	61	44.2%	6	4.3%	< 0.001
I am confident in the initial management of dental fractures.	C7	18	13.0%	14	10.1%	41	29.7%	58	42.0%	7	5.1%	< 0.001
I am confident in the initial management of a partially dislodged tooth.	C8	17	12.3%	25	18.1%	37	26.8%	49	35.5%	10	7.2%	< 0.001
I am not confident in the initial management of a completely dislodged (avulsed) tooth.	C9		15		10.9%	34	24.6%	38	27.5%	41	7.2%	< 0.001

and knowledge of dealing with these types of injuries are essential for ECPs and first responders.<sup>12</sup> Inadequate knowledge of the management of orofacial injuries can have devastating and expensive consequences and lead to poor prognosis and outcomes.

This study demonstrated that ECPs have insufficient knowledge, skills, and confidence to render appropriate emergency management to casualties presenting with dental trauma and other dental emergencies. Just over 50% of participants agree (n=61, 44%) and (n=13, 9.4%) strongly agree that they feel confident and comfortable when treating common traumatic orofacial injuries. ECPs who indicated that they had higher levels of knowledge were more optimistic in treating orofacial trauma. While noting the effect of seniority, both in terms of qualification and experience, it is of concern that the younger and often lower-qualified ECPs, have minimal confidence in managing such orofacial injuries. Yet, it is most likely that the younger ECPs would respond to a more significant number of incidents involving casualties with orofacial trauma, as they often work longer hours and have many years left in their careers. The prevalence of dental trauma worldwide ranges from 10% to 51%.<sup>13</sup>

Dental professionals are not the first responders for dental trauma, nor do they work in emergency rooms in healthcare facilities. Therefore it is inevitable that emergency care workers and medical professionals in emergency rooms will be required to provide emergency

dental treatment before professional dental contact. These first responders need to be as confident in managing dental injuries as they would be in managing other injuries sustained elsewhere in the body. However, the literature indicates that even medical professionals are not confident or comfortable managing traumatic dental injuries, further widening the medical-dental divide. A study by Trivedy et al. (2012), conducted in the United Kingdom, found that most (88%) of the physicians were not confident in managing dentofacial emergencies.<sup>14</sup>

This lack of confidence stems from insufficient training or knowledge regarding the management of dental trauma. The study findings indicate that only 57 participants (41, 3%) agreed that they had sufficient knowledge of managing dental trauma and other dental emergencies. These findings were consistent with a recent report by Cruz-da-Silva et al. (2016), which showed that first responders had inadequate knowledge when dealing with cases of dental trauma, and Ulusoy et al. (2016), who reported that 41% of the respondents assessed their knowledge and management of dental trauma as insufficient.<sup>15,16</sup>

The prognosis of an avulsed tooth is dependent on the preservation of the tooth and the re-implantation time<sup>17</sup>, yet in this study, 64% of the participants did not know when to re-implant an avulsed tooth, and 41% did not know the proper process to preserve and implant

an avulsed tooth. These findings were consistent with other studies by Joybell et al., 2019 conducted among emergency care workers in India.<sup>18</sup> The authors found that more than three-quarters of the 100 emergency care workers interviewed did not know the re-implantation procedures of avulsed teeth. Lack of knowledge can negatively affect the primary care of avulsed teeth and the management of other dental trauma or dental emergencies.

This lack of knowledge stems from not receiving adequate training in managing dental emergencies as medical and dental training occur separately. In this study, more than half the respondents (55 %) indicated that they did not receive any formal training on dental trauma, while 78% stated that they did not receive any further training. This finding is similar to another study by Aren et al., 2018, in which 72.22% of the participants (first responders to trauma) did not receive any training on oral and dental health, and 97.62% did not attend any further dental trauma management training; however, over 80% were willing to participate in training on this subject.<sup>19</sup> In this study, almost three quarter (73.9%) of the respondents expressed the need and desire for more education on managing dental emergencies. This was also reiterated by the managers interviewed. Continuing education, knowledge sharing by dental professionals, postgraduate programs, and interdisciplinary seminars will further enhance knowledge on the emergency management of dentoalveolar tooth injuries and other dental emergencies.

#### Limitations of the Study

The study was only conducted in the eThekweni district, which may affect the generalizability of the study findings. Another possible limitation is that the study population included only ECPs employed by the public sector; however, this decision was taken in the light that many private EMS have comparatively smaller work caseloads than public EMS. Further research is required to determine the knowledge, attitudes, and practices of ECPs in the private sector and other provinces in South Africa.

#### CONCLUSION

The findings of this study indicate that ECPs lack confidence in managing dental emergencies and suggest a need for specific dental awareness and continuing training programs to empower ECPs in the management of casualties better presenting with such emergencies.

#### Acknowledgments

The researchers would like to acknowledge the University of KwaZulu-Natal for funding to conduct this study.

Conflict of Interest: All authors declare there are no conflicts of interest.

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