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COLLEGE OF HEALTH SCIENCES  
SCHOOL OF HEALTH SCIENCES  
DISCIPLINE OF DENTISTRY

# An Investigation of the Knowledge and Attitudes of Emergency Care Practitioners in the Management of Common Orofacial Traumas

A Dissertation submitted in requirement for the degree  
Master of Medical Science in Health Sciences

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Date Submitted : 15 November 2017

## ABSTRACT

### **Introduction:**

Some of the worst injuries suffered by patients are facial scars and disfigurement (Zadik, 2007). Whilst certain scars on a patient may be covered by clothing or other methods, facial scars, disfigurement and loss of function remain obvious to victims of serious vehicle accidents, sports injuries or other miscellaneous activities (Levin and Zadik, 2012 et al., Zadik, 2007). It is essential to provide timeous and appropriate treatment in cases of orofacial trauma, and this prehospital care is usually provided by first responders such as emergency care practitioners (Pozner et al., 2004). However; there is inadequate knowledge in the management of orofacial trauma amongst emergency care practitioners (ECPs). Moreover, orofacial trauma is often not included in medical courses and first aid trainings or in first-aid text books and manuals (Levin and Zadik, 2012 et al., Zadik, 2007). Research on an international level in regards to orofacial trauma and the knowledge of ECPs in managing orofacial trauma is substantial. However, in South Africa, there is paucity of epidemiological studies in the field of oral and facial trauma, and in an understanding of the knowledge of emergency care practitioners in the management of these conditions. Improved knowledge and treatment protocols could assist emergency care practitioners to improve in the management of casualties that present with orofacial trauma.

### **Aim:**

The aim of the study is to determine the knowledge and attitudes of ECPs of the eThekweni District of KwaZulu-Natal, South Africa in the management of patients presenting with common traumatic orofacial injuries and medical emergencies in order to identify any gaps in their training regarding management of these injuries.

**Methods:** This was an exploratory, descriptive study using both quantitative and qualitative methods. The advantage of using mixed methods is that it allows for triangulation of the literature and results, thus strengthening the reliability and validity of the study. The study was conducted in two phases, with each phase having a different data collection tool and process. In phase 1 the research participants, being a random sample of 288 Emergency Care Practitioners were given a self-administered questionnaire to complete. The questions were designed to elicit the required information, and simultaneously allow the research participants to forward any other information or comments that they may have wanted to.

In phase 2 of the study, an interview was conducted with the relevant ECPs using a structured interview schedule. A list of seven questions was posed to these participants, and they had the opportunity to provide additional input.

**Results:** The results revealed that there were poor levels of education, training, and understanding of the emergency medical management of common orofacial traumas by ECPs. There was poor 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. There was also a significant majority (78.3%,  $< 0.001$ ) having no further education and training. Most ECPs indicated a desire to receive such training.

**Conclusions:** The study suggests that there is inadequate knowledge, education and training levels of ECPs abilities to appropriately manage common orofacial emergencies. There is a need for a curriculum review to include basic and advanced training and education that would equip ECPs to deal with these emergencies.

**Keywords:** Common Oro-facial Traumas, Emergency care Practitioners, Emergency Medical Management, Knowledge, KwaZulu-Natal

## Declaration by Candidate

I, Lucy Reddy, declare that:

- (i) The research reported in this dissertation, except where otherwise indicated, and is my original work.
- (ii) This dissertation has not been submitted for any degree or examination at any other university.
- (iii) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as having been sourced from other persons.
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## **Declaration by Supervisor**

This is a thesis submitted to the Department of Dentistry, School of Health Sciences, University of KwaZulu-Natal, Westville, for the degree of Master of Medical Science.

This thesis, in which the chapters are written as a research publication, has followed the School of Health Sciences thesis by manuscript format with an overall introduction and final summary. Typically these chapters will have been submitted for publication in nationally or internationally recognized, peer-reviewed journals.

This is to certify that the contents of this thesis is the original research work of Mrs Lucy Reddy, carried out under the supervision of Mrs I Moodley, at the Discipline of Dentistry, School of Health Sciences, Westville campus, University of KwaZulu-Natal, Durban, South Africa.

Supervisor: Mrs I Moodley

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

## Declaration of Prior Publication

I, Lucy Reddy, hereby declare that this Dissertation has not been submitted for a degree at any other university.

NAME: Lucy Reddy

SUPERVISOR: Mrs I Moodley

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## Contribution of Authors and Co-Authors

I, Lucy Reddy, hereby declare that contributions of the authors to any conference posters, conference papers, manuscripts and journal publications that may arise out of this study are as listed below:

Author: Lucy Reddy

Contributions: Conceived and implemented the study design. Collected and analysed data. Wrote first and final drafts of the manuscripts. Made the major contribution in the formulation of the paper.

Co-Author: Illanavathie Moodley

Contributions: Assisted in the contextualisation of the paper. Helped conceive the study design. Provided field expertise, feedback on statistical analysis and early drafts of the manuscript. Provided comments on the manuscripts.

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## Manuscript Prepared for Publication

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**Lucy Reddy:** Conceived and contributed to the design of the project, performed the data collection and analysis, and wrote the paper. Made the major contribution in the formulation of the paper.

**Ilana Moodley:** Assisted in the contextualisation of the paper and provided comments on the paper.

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## LIST OF ABBREVIATIONS/TERMS

AEA:	Ambulance Emergency Assistant
ALS:	Advanced Life Support
BAA:	Basic Ambulance Assistant
BLS:	Basic Life Support
CCA:	Critical Care Assistant
ECPs:	Emergency Care Practitioners
ECT:	Emergency Care Technician
EMS:	Emergency Medical Services
EMRS:	Emergency Medical Rescue Services
HPCSA:	Health Professions Council of South Africa
KZN:	KwaZulu-Natal Province
KZN-DoH:	KZN Provincial Department of Health
NDP:	National Development Plan
ODTC:	Oral and Dental Training Centre
PBEMC:	Professional Board for Emergency Medical Care
RAF:	Road Accident Fund
SA:	South Africa
TDI(s):	Traumatic dental injuries
UK:	United Kingdom
UKZN:	University of KwaZulu-Natal
WHO:	World Health Organization
Knowledge:	Knowledge means to encompass training, skills, practices in the management of orofacial injuries.

## **CHAPTER 1:**

### **1.1 Introduction**

This chapter introduces the study, outlines the problem statement and provides a rationale for the study. The research question of the study is then presented, with the aim and objectives of the study outlined.

The successful management of a casualty experiencing a common orofacial traumatic injury or medical emergency is dependent on two fundamental factors; the knowledge of the first responders (first medically-trained or lay person to attend to the casualty) knowledge and ability to render the appropriate level and standard of medical care; and secondly the period of time that expires between the onset of the incident and the initiation of definitive emergency medical treatment (Andreasen, Andreasen and Andersson, 2007).

A delay or lack of treatment in trauma to facial bone structures, mild to moderate dental infections, dental trauma and associated dental pain often have persistent and negative effects on patients in terms of both cost and suffering. (Skapetis, Gerzina and Hu, 2011). This lack of pre-hospital emergency medical management and treatment can lead to a multitude of effects and disabilities in patients. Some of the worst injuries suffered by patients are facial scars and disfigurement. This may be in terms of both financial costs of treatment, and in terms of pain and suffering (Ebrahimpour, 2012; Skapetis, Gerzina and Hu, 2011; and Moore, De Wilte and De Bruyne, 2000).

An added negative outcome is the aesthetic effect of these injuries, as they occur on a 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 extensive and expensive plastic and reconstructive surgery may be required to restore some level of aesthetics and function to the casualty. Orofacial trauma and medical events also have considerable indirect negative outcomes; such as the loss of confidence that casualty may suffer; various psychological effects; and possibly the 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 (Ebrahimpour, 2012; and Skapetis, Gerzina and Hu, 2011). There may also be significant social interaction difficulties and even social avoidance which could be ascribed to embarrassment and a fear of rejection and being ostracized from society (Robinson, Rumsey and Partridge, 1996).

Whilst certain scars on a patient may disappear in time, facial scars, disfigurement and loss of function remain obvious to victims of serious vehicle accidents, sports injuries and other miscellaneous activities. It

is essential to provide prompt and proper treatment in cases of orofacial trauma. This pre-hospital care is usually provided by first responders such as emergency care practitioners (ECPs). However, there may be inadequate knowledge in the management of orofacial trauma amongst ECPs. Moreover, orofacial trauma is often not included in medical and paramedical training courses, first-aid training, or in first-aid textbooks and manuals. (Levin and Zadik, 2012; Auerbach, 2008; Zadik, 2007). A recent literature review conducted by Glendor (2009b), reviewed the literature around the knowledge of professional caregivers and lay people regarding the emergency medical care of patients who had suffered orofacial trauma and reported that there was a “*consistent failure in the educational process thereof*”.

## **1.2 Background**

ECPs play a significant role in the early management of orofacial trauma (Glendor, 2009a; Levin and Zadik, 2012; Johnson, 1975). Whilst it is argued that everybody and everyone, including laypersons, should be able to manage basic common orofacial traumas, these authors counter-argue that one cannot expect the untrained person to handle even basic traumas such as tooth avulsion. However, it is expected that medical personnel, including first responders such as ECPs, be educated and trained to manage such emergencies (Levin and Zadik, 2012). Failure to provide the appropriate emergency medical management and care can lead to premature loss of the teeth with aesthetic, psychological and functional consequences.

Research on an international level in regards to orofacial trauma and the knowledge of ECPs in the management of orofacial trauma is substantial. Orofacial trauma is common and may be more prevalent in certain high-risk populations such as children and young adult males (Levin and Zadik, 2012; Glendor, U, 2009a; Al-Majed, Murray, and Maguire, 2001). Other at-risk populations identified by these authors include: the patient with special needs/handicapped and sportsmen (Levin and Zadik, 2012). However many of these cases are easily preventable (Levin and Zadik, 2012; Laloo, 2003). However, in South Africa (SA), there is paucity of epidemiological studies in the field of oral and facial trauma, and in an understanding of the knowledge of ECPs in the management of these conditions. Improved knowledge and training could assist ECPs to improve in the management of casualties that present with orofacial trauma. Improved epidemiological (prevalence and incidence) studies related to traumatic orofacial injuries could inform policy-makers and other stakeholders in their oral and emergency medicine education, training and policy implementation plans.

## **1.3 Problem Statement**

Pozner et al., (2004) and Levin and Zadik (2012) argue that appropriate and early management of orofacial trauma can prevent adverse progression and future complications. The successful management, in the pre-hospital environment, of a casualty whom is suffering with or from a common traumatic orofacial injury or



medical emergency is dependent on two fundamental factors. Firstly the knowledge of appropriate emergency medical care that is rapidly initiated to manage the event. Secondly the time that is taken to respond to the event and initiate treatment (Andreasen, Andreasen and Andersson, 2007). It is essential that first responders and emergency medical care providers are appropriately equipped with adequate and appropriate medical knowledge related to the management of orofacial trauma that would lead to successful patient outcomes; limitation in pain and suffering; rapid return to full function; and a reduction in costs of treatment and hospitalisation or recovery time. It is standard practice that an emergency treatment and management protocol be followed. Knowledge is important because a lack of knowledge may lead to inappropriate attitudes and practices which may lead to detrimental effects in the field of oral and facial trauma.

The review of literature investigating the knowledge and attitudes of ECPs as well as other non-dental professionals, in the management of traumatic orofacial injuries is limited. To date, no study investigating the ECPs knowledge and attitudes in the management of the patient presenting with common orofacial traumas have been conducted in South Africa (SA) and the extension of similar studies in a South African setting is important. The problem being addressed in this study is that there is uncertainty as to whether ECPs in the eThekweni District have sufficient knowledge, and are suitably trained and educated, to manage patients who present with orofacial trauma. Therefore, this study seeks to understand the current knowledge, education and training status of ECPs, in order to suggest recommendations that would address this situation.

#### **1.4 Research question**

The research question to be answered in this study was: Are South African ECPs appropriately trained, equipped, display the correct attitude and management practices to ensure optimal and appropriate medical management of casualties presenting with orofacial trauma and medical emergencies?

#### **1.5 Purpose of the study**

The success rate of appropriately and optimally managing a casualty suffering traumatic orofacial injuries is dependent on two fundamental factors: the knowledge of proper emergency care to the traumatized casualty, as well as the orofacial injury and the time that is taken to respond and attend to an emergency request and call-out (Andreasen, Andreasen and Andersson, 2007). It is therefore essential that individuals, whom are most likely to be the first at an emergency scene, be adequately equipped with knowledge and training regarding proper management of traumatic orofacial injuries. Therefore, this research is designed to investigate the knowledge and attitudes of ECPs in regards to their attitudes and perceptions towards the management of common traumatic orofacial injuries.

The rationale of this work is to provide stakeholders and policymakers with evidence of the knowledge levels of ECPs regarding the emergency medical management of common orofacial traumas. Based on the results of this study, there may be evidence that emergency medical care practitioners have sufficient knowledge, education, training and skills to deal with common orofacial injuries, or it may be found that there is insufficient knowledge, education and training. The study will be able to extrapolate on the research findings from this study to ECPs throughout SA.

To the best of the researcher's knowledge, this study is the first in investigating the knowledge and attitudes of emergency care practitioners in the management of common traumatic orofacial injuries and medical emergencies in SA. Trauma related to the orofacial region mandates special attention, as often these injuries may be life-threatening, in that they compromise the airway (Glendor, 2009; Malikaew, Watt and Sheiham, 2006; Moghadam and Caminiti, 2002). It is important to understand the uniqueness of the orofacial region both in terms of anatomy and the neighbouring structures. The psychological impact of disfigurement is devastating. In emergency medicine, orofacial injuries are commonly encountered. Most patients with orofacial injuries suffer poly-trauma that requires coordinated management between ECPs, specialists in orofacial surgery, ophthalmology, trauma surgery and other healthcare practitioners. Early intervention is always needed to improve the prognosis. Early diagnosis and treatment of life-threatening orofacial injuries and compromised vital structures will improve the prognosis, rehabilitation and eventual outcome of the injury (Samaei et al., 2015; Glendor, 2009; Malikaew, Watt and Sheiham, 2006; Moghadam and Caminiti, 2002).

In a country such as South Africa, there are various factors that may contribute to the increased risk of people sustaining common traumatic orofacial injuries or experiencing orofacial medical emergencies. Contributing factors include the state of the economy (poverty, violence due to crime), the climate (our warm climate results in increased sport and recreation activities), our culture of loving sports (increased participation in sporting activities, lack of suitable orofacial protection such as face-shields and mouthguards when playing sport, and our high motor-vehicle and pedestrian accident rates (RMTC, 2016). The Road Traffic Management Corporation (RMTC) reported that for the period 1 December 2015 to 11 January 2016 (the 2015/2016 festive season), there were 1755 fatalities in SA (RMTC, 2016). This 6.7% increase over the previous year's statistics is especially concerning when one considers that the RMTC reported that the average vehicle population growth for this period was 3.3%.

The significance of this work is, therefore, in that there is a dire need for ECPs to be able to competently and swiftly deal with common orofacial trauma and orofacial medical emergencies in order to reduce the cost of treatment; improve patient outcomes; reduce time to heal; decrease rehabilitation costs; and

ultimately lead to improved population health outcomes. Thus, by investigating the knowledge of ECPs and their ability to render appropriate management of common orofacial trauma and medical emergencies, gaps can be identified and recommendations made towards improving their education and training. Thus, a significant contribution could be made by this study towards improved patient and population oral- and general health outcomes. The study also intends to make a contribution to ECPs treatment and patient management protocols, and training and education by highlighting the need for improved basic and continuous training of ECPs in the management of common orofacial injuries, should the results of the study provide proof of this need. The results of this study could also lead to the provision of advanced and continuous professional development (CPD) training in the management of common orofacial injuries, and therefore has the potential to influence ECPs training and education curriculums.

## **1.6 Aim and Objectives**

The aim of this study was to gain an understanding of, and to investigate the knowledge and attitudes of ECPs in the management of traumatic orofacial emergencies in the eThekweni District, KwaZulu-Natal (KZN), in order to identify any gaps in their education and training regarding the emergency medical management of such injuries.

### **The objectives of the study are:**

1. To determine the knowledge of emergency care practitioners in managing casualties presenting with common orofacial trauma and medical emergencies by engaging with them through a self-administered questionnaire.
2. To determine the attitudes of emergency care practitioners in managing casualties presenting with common orofacial trauma and medical emergencies by engaging with them through a self-administered questionnaire
3. To understand the knowledge of emergency care practitioners in managing casualties presenting with common orofacial trauma and medical emergencies by engaging with them through a self-administered questionnaire
4. To investigate the need for further training; policy reform; and curriculum reform that could enhance the training of ECPs in the management of common orofacial trauma and medical emergencies through a focus group interview schedule

## **1.7 Thesis Outline**

The study is presented in the following chapters. Chapter 2 is a Literature Review, and this chapter outlines the relevant local and international literature on ECPs knowledge of, and attitudes towards, the emergency medical management of common orofacial traumas and emergencies. In chapter 3, the methodology used to conduct the study is outlined. Chapter 4 presents the manuscript that has been submitted to an accredited journal for review. The thesis concludes with chapter 5 which presents the study limitations and recommendations, and establishes the extent to which the aims and objectives were achieved. It also presents some recommendations, and concludes the study.

## **1.8 Summary**

In summary this chapter introduced the research topic and provided relevant background information on the significance of early management of orofacial trauma and medical emergencies. It defined the problem statement and outlined the aim and objectives of the study. The following chapter will present a review of the literature pertaining to the literature related to the aetiology and management of orofacial trauma, the current education, training and curriculum of emergency care practitioners related to the emergency medical management of orofacial trauma.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Introduction

This chapter provides an overview of the available literature relating to the knowledge and training regarding the emergency medical management of common orofacial traumas by various caregivers such as teachers, firefighters and ECPs. The chapter provides an overview of the emergency medical care profession, the education and training of ECPs, and an overview of some of the common orofacial traumas and conditions.

The South African National Government, in its National Development Plan 2030 (NDP), announced the need for overall population health improvement and improved quality of healthcare delivery (NPC, 2016). In keeping with this, the KZN Provincial Department of Health (KZN-DoH) announced a number of strategic goals and goal statements as part of its 2015-2019 strategic plans (KZN-DoH, 2016). These goals are indicated in the table below.

**Table 2.1:** Strategic Goals of the National Development Plan (NDP) 2015-2019

Strategic Goal 1:	Strengthen Health Systems effectiveness
Strategic Goal 2:	Reduce the burden of disease
Strategic Goal 3:	Universal Health Coverage
Strategic Goal 4:	Strengthen human resources for health
Strategic Goal 5:	Improved quality of care

*Source:* National Development Plan 2030 – Programme of Action. National Planning Commission (2016).

Within this plan, there is a need to ensure improved patient management in all spheres of health and health-care. This includes the management of common orofacial traumatic injuries and medical emergencies.

Studies in various countries have indicated that common orofacial trauma is a public health concern. Al-Majed, Murray and Maguire (2001), have reported that on a study conducted in Riyadh, Saudi Arabia amongst 354 boys aged 5-6 years, in which a total of 116 boys (32.8%) had sustained dental trauma, and that only 2% of the participants were reported on having received definitive dental care. These authors also reported on studies conducted by Todd and Dodd, who found a prevalence of almost 30% of dental injuries amongst 12-year old boys in the 1983 in the United Kingdom (UK) National Survey. In addition Stocks, Blinks and Holm reported a 30% prevalence of dental injuries amongst 4-year-old children in Sweden. Glendor (2009a) reported that there is a major lack of treatment for traumatic dental injuries (TDIs). He

argued that in the 1990's in the UK  $\pm$ 80% of TDIs were untreated. Similar statistics were also reflected in studies conducted in Greece, Turkey, Brazil, and Jordan. Glendor (2009a), also reported on a study done in England by Maguire et al., (2001), wherein it was reported that that almost all types of medical practitioners (emergency medical physicians, paramedics, dentists) and lay persons (teachers, physical education trainers, parents) did not offer adequate and appropriate management of patients presenting with TDIs. This is clearly a major concern for South Africa, where there is a large young population that is susceptible to TDIs. A study by Hargreaves et al., (1999) in South Africa, reported that there was a prevalence rate of common orofacial traumas of 15% amongst a population of 1 466 children aged 1-5 years.

## **2.2 The Emergency Care Profession**

An emergency care practitioner is a healthcare professional, mainly employed in the pre-hospital and out-of-hospital environment, and working mainly as part of emergency medical services (EMS) (Glendor, 2009a). All emergency care workers are required to meet the standards equivalent to that of the public services with respect to their qualifications. However, training and education undertaken for qualifications seem to omit the management of orofacial trauma. Emergencies that are orofacial in nature include soft tissue lesions; jaw fractures; haemorrhage; infections; trauma; dental pain; lost restorations; and teeth injuries. Trauma to the facial skeleton is referred to as maxillofacial emergencies. The boundary between what can be classified as a 'dental' or a 'maxillofacial' emergency is often blurred and it may be useful to combine these emergencies under a unified description of 'orofacial emergencies'. Casualties may have their lives compromised if such orofacial emergencies are not attended to timeously.

In South Africa (SA) there are various categories and levels of ECPs. They are classified into two broad groups: paramedics and non-paramedics. Non-paramedics are further classified into the Basic Ambulance Assistants (BAA) and Ambulance Emergency Assistants (AEA). Paramedics are comprised of Critical Care Assistants (CCA), Emergency Care Technicians (ECT) and Advanced Life Support (ALS) practitioners. The ALS practitioners can make further advancements in their education and training, and are able to advance into a variety of Masters and Doctoral programmes (HPCSA, 2011). Table 2.2 tabulates the categories of ECPs.

**Table 2.2: Categories of ECPs in South Africa**

LEVEL	CERTIFICATION	REQUIREMENTS	TRAINING
Basic Ambulance Assistant (BAA)	Basic Life Support (BLS)	None	160 hours of lectures and practical simulations
Ambulance Emergency Assistant (AEA)	Intermediate Life Support (ILS)	1000 hours practical experience as BAA	240 hours of lectures and simulations; 230 hours experiential learning
Critical Care Assistant (CAA) / Diploma/degree qualified	Advanced Life Support (ALS)	1200 hour course; BAA and AEA qualifications	1 year post graduate study to obtain B Tech degree

*Source:* Health Professions Council of South Africa (HPCSA). (2016). Overview of registrations.

### **2.3 Scope of Practice**

The Health Professions Council of South Africa (HPCSA) is a statutory body that regulates the education and training of certain cadres of health care professionals (HPCSA, 2011). The Professional Board for Emergency Medical Care (PBEMC) has a sub-committee (the education committee) that focuses on setting standards for education and training, managing compliance of emergency healthcare providers with regards to education and training, as well as also protecting the public. The scope of practice for the profession of emergency medical care “the scope” is constructed by the PBEMC, in consultation with the Minister of Health, who also promulgates the scope in the Government Gazette (HPCSA, 2012). This is in alignment with the Health Professions Act, 1974 (Act No. 56 of 1974). The scope of the profession outlines the capabilities of ECPs, as well as the various tasks that they are legally allowed to carry out in the management of a patient. The scope of practice of the profession of the ECP is tabulated in Appendix 7 (Table 7.1), and this scope has been developed by the PBEMC in consultation with various stakeholders. The management of orofacial injuries does not feature in the scope of practice for the profession of Emergency Care at all qualification levels, however having knowledge of management of orofacial trauma can assist in appropriate emergency care and referral.

### **2.4 Knowledge of the Emergency Medical Management of Orofacial Injuries amongst Healthcare Workers and other First-Responders**

In a literature review done by Levin and Zadik (2012) it was reported that studies regarding healthcare workers knowledge of the management of orofacial traumas found that there was adequate to poor levels of knowledge amongst dental practitioners, emergency physicians, school nurses and paramedics. The study reported that dentists had a 70% knowledge of emergency medical management of orofacial traumas, as

assessed against the International Association of Dental Traumatology (IADT) guidelines for the management of traumatic dental injuries. A study conducted in Australasia amongst emergency physicians and specialist emergency physicians that fewer than half (42%, n=186) had received training in the management of orofacial traumas and injuries, and that only 62% had passed a knowledge test regarding orofacial injuries (Samaei et al; 2014).

## **2.5 Training of ECPs in the Emergency Medical management of Common Orofacial Traumas**

ECPs are usually the first at the scenes of accidents. In the event that the casualty had suffered a traumatic orofacial injury, competent treatment from the EMS is expected. Traumatic orofacial injuries, if attended to timeously, will avoid future complications. There is a lack of knowledge on how to handle orofacial trauma and ECPs have to be empowered with much more than just the basics (Skapetis, Gerzina and Hu, 2011; Glendor, 2009b). Studies conducted in various countries such as Hong Kong (Chan, Wong and Cheung, 2001), Brazil (Panzarini, Pedrini et al.), Israel (Holan and Shmueli, 2003), found that medical students, emergency medical technicians and physical education teachers have insufficient knowledge to deal with common orofacial trauma. Levin and Zadik (2011) argue that the management of dental trauma is rarely taught in first aid (and paramedical courses), despite the fact that very often these first responders are the only ones who deal with the initial management of potentially life-threatening orofacial traumas and injuries, prior to onward referral to a specialist medical care facility.

## **2.6 Orofacial Trauma**

Orofacial trauma refers to any physical injuries involving the areas of the face and the teeth. Whilst orofacial trauma affects a small part of the human anatomy, the types of injuries can be extensive. These injuries can range from damage to soft tissue; burns, lacerations and bruises to the skin, lips, tongue, cheek and underlying tissues, fractures to various facial bones, broken jaws and injuries to the teeth and one or both eyes. Orofacial trauma has the potential to cause disfigurement and loss of function of the various structures that make up the face (RAF, 2016; Skapetis, Gerzina, and Hu, 2011).

## **2.7 Aetiology and Classification of Orofacial Trauma**

Traumatic orofacial injuries are common in different age groups (KZN-DOH, 2016; Eilert-Petersson, Andersson, and Soˆrensen, 1997; Hamilton, Hill, and Holloway, 1997). Orofacial injuries may be intentional or unintentional in nature. The outcome of these two groups of injuries results in various common orofacial traumas. Intentional traumatic orofacial injuries include physical abuse, iatrogenic procedures such as intubation procedures. Unintentional traumatic orofacial injuries involve sports, falls and collisions, traffic accidents, inappropriate use of teeth, illness, limitations and learning difficulties.



(Andreasen, Andreasen, and Andersson, 2007 ). Traumatic orofacial injuries may be classified according to a number of different factors such as anatomy, aetiology, pathology, therapeutic considerations and severity. The most commonly used classification is based on a system that is adopted by the World Health Organisation (WHO, 1992). This classification is based on anatomical, therapeutic and prognostic considerations and can be applied to both permanent and deciduous dentitions. This classification includes injuries to hard and soft tissues. The orofacial injuries can be classified as follows:

**Table 2.3: Classification of traumatic orofacial injuries**

<b>Type of injury (code according to WHO)</b>	
<b>Injuries to hard dental tissues and pulp</b>	<b>Description</b>
Enamel infraction	An incomplete fracture (crack) of the enamel without loss of tooth structure.
Enamel fracture	A fracture confined to the enamel with loss of tooth structure.
Enamel-dentin fracture	A fracture confined to enamel and dentine with loss of tooth structure, but not involving the pulp.
Complicated crown fracture	A fracture involving enamel and dentine with loss of tooth structure and exposure of the pulp.
Uncomplicated crown fracture	A fracture involving enamel, dentine and cementum with loss of tooth structure but not involving the pulp.
Complicated crown-root fracture	A fracture involving enamel, dentine and cementum with loss of tooth structure but involving the pulp.
Root fracture	
<b>Injuries to the periodontal tissues</b>	
Concussion - Injury to the tooth supporting structures without increased mobility	Injury to the tooth supporting structures without increased mobility or displacement of the tooth, but pain to percussion
Subluxation	Injury to the tooth supporting structures resulting in increased mobility but without displacement of the tooth. Bleeding from the gingival sulcus confirms diagnosis.
Extrusive luxation	Partial displacement of the tooth out of its socket.
Lateral luxation	Displacement of tooth other than axially. accompanied by comminution of fracture of either the labial/ palatal/lingual alveolar socket.
Intrusive luxation	Displacement of the tooth into the alveolar bone. This injury is accompanied by comminution of fracture of the alveolar socket.

Avulsion	The tooth is completely displaced out of its socket. Clinically the socket is found empty or filled with coagulum.
<b>Injuries to supporting bone</b>	
Fracture of the maxillary alveolar process	Fracture related to the tooth bearing part of the maxillae.
Fracture of the mandibular alveolar process	Fracture related to the tooth bearing part of the mandible.
<b>Soft tissue injuries to the oral and facial structures e.g. lip, tongue</b>	
Laceration	A deep cut or tear in the skin or flesh.
Contusion	A region of injured tissue or skin in which blood capillaries have been ruptured; a bruise.
Abrasion	An area damaged by scraping or wear.

Source: Zaleckiene (2014). Traumatic dental injuries.

### **Maxillary fractures**

Fractures to the maxillae (upper jaw bone) can be complex and its management may be one that involves multi-specialty medical management and intervention. Injury can involve the skin and soft tissues, as well as resulting in fractures. Acute and long-term psychological problems can result from maxillofacial trauma and disfigurement (Auerbach et al., 2008).

The maxillae can be divided into three areas of which exhibit various maxillofacial fractures. These include the:

- The upper face - the frontal bone and frontal sinus.
- The midface - the nasal, ethmoid, zygomatic and maxillary bones.
- The lower face - the mandible.

### **Mandibular fractures**

Mandibular fractures occur more frequently than any other orofacial fractures (Alsarheed, Bedi and Hunt, 2003). There is no complete satisfactory classification of mandibular fractures. Mandibular fractures may be considered under the following three main headings, and classified according to:

- The type of fracture
- The location of the fracture
- The causes of fractures.

## **Type of fractures**

*Simple* - A simple fracture describes a complete transection of the bone with minimal fragmentation at the fracture site.

*Comminute* - The opposite of a simple fracture is a comminute fracture, where the bone has been shattered into fragments, or there are secondary fractures along the main fracture lines. High velocity injuries such as those caused by bullets, improvised explosive devices and so forth will frequently cause comminuted fractures.

*Compound* - A compound fracture is one that communicates with the external environment. In the case of mandibular fractures, communication may occur through the skin of the face or with the oral cavity.

## **Location**

- Classification by location is the most useful as both signs and symptoms presented by casualties as well as treatment are dependent upon the location of the fracture. The mandible is usually divided into the following zones for the purpose of describing the location of a fracture. This includes the condylar, coronoid process, ramus, angle of mandible, body (molar and premolar areas), para symphysis and symphysis areas.
- *Alveolar*  
This type of fracture involves the alveolar process of the mandible.
- *Condylar*  
Condylar fractures are classified by location compared to the capsule of ligaments that hold the temporomandibular joint (intracapsular or extracapsular), dislocation (whether or not the condylar head has come out of the socket as the muscles (lateral pterygoid) tend to pull the condyle anterior and medial) and neck of the condyle fractures, e.g. extracapsular, non-displaced, neck fracture. Paediatric condylar fractures have special protocols for management.
- *Coronoid* - Because the coronoid process of the mandible lies deep to many structures, including the zygomatic complex (ZMC), it is rare to be broken in isolation. It usually occurs with other mandibular fractures or with fracture of the zygomatic complex or arch. Isolated fractures of the coronoid process should be viewed with suspicion and fracture of the ZMC should be ruled out.
- *Ramus* - Ramus fractures are said to involve a region inferiorly bounded by an oblique line extending from the lower third molar (wisdom tooth) region to the postero-inferior attachment of the masseter muscle, and which could not be better classified as either condylar or coronoid fractures.

- *Angle* - The angle of the mandible refers to the angle created by the arrangement of the body of the mandible and the ramus. Angle fractures are defined as those that involve a triangular region bounded by the anterior border of masseter muscle and an oblique line extending from the lower third molar (wisdom tooth) region to the postero-inferior attachment of the masseter muscle.
- *Body* - Fractures of the mandibular body are defined as those that involve a region bounded anteriorly by the parasymphysis (defined as a vertical line just distal to the canine tooth) and posteriorly by the anterior border of the masseter muscle.
- *Parasymphysis* - Parasymphyseal fractures are defined as mandibular fractures that involve a region bounded bilaterally by vertical lines just distal to the canine tooth.
- *Symphysis* - These fractures are linear fractures that run in the midline of the mandible (the symphysis).

There is a special classification for facial fractures, and these are known as Le Forte fractures. Table 2.4 provides an overview of these fractures.

**Table 2.4: Le Forte Fractures**

<b>Maxillary Fractures</b>	<b>Description</b>
Le Forte 1	A horizontal fracture across the inferior aspect of the maxilla. May result from a direct blow on the maxillary alveolar rim in a downward direction. The alveolar process and hard palate become separated from the rest of the maxilla. The fracture extends through the lower nasal septum, the lateral maxillary sinus wall and into the palatine bones and pterygoid plates. It can present with facial oedema, loose teeth and a mobile hard palate.
Le Forte 2	A pyramidal-shaped fracture. It may result from a blow to the lower or mid-maxilla. The fracture extends from the nasal bridge through the frontal processes of the maxilla, through the lacrimal bones and inferior orbital floor and rim, through or near the inferior orbital foramen, and inferiorly through the anterior wall of the maxillary sinus. It then travels under the zygoma, across the pterygomaxillary fissure, and through the pterygoid plates. It can present with facial oedema, epistaxis, subconjunctival hemorrhage, CSF rhinorrhea, a mobile maxilla and telecanthus (widening and flattening of the nasal bridge).

Le Forte 3	A transverse fracture, also known as craniofacial dysjunction. It may follow a blow to the nasal bridge or upper maxilla. There is separation of all of the facial bones from the cranial base with simultaneous fracture of the zygoma, maxilla, and nasal bones. The fracture line extends through the ethmoid bones, orbits, and pterygomaxillary suture into the sphenopalatine fossa. It presents with massive facial oedema and facial flattening. There may be movement of all of the facial bones in relation to the cranial base.
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*Source:* Le and Woo. (2013). Management of Complications of Dental Extractions

## **2.8 Ludwig’s Angina**

In addition to these conditions, there are various non-injury related orofacial conditions. These include Ludwig’s angina, a serious potentially life-threatening cellulitis, or connective tissue infection of the floor of the mouth, usually occurring in adults with concomitant dental infections, which if untreated, could result in airway obstruction, necessitating tracheotomy. The infected area swells rapidly and results in swelling of the airways or may prevent the swallowing of saliva. Dental treatment may be needed for tooth infections that cause Ludwig’s angina.

## **2.9 Post-operative Bleeding following Dental Surgery**

Post-operative bleeding is one of the most common complications of all surgeries. Post-operative bleeding from a dental extraction is commonly due to venous bleed from nutrient blood vessels in the supporting bone but can also be due to an arterial source. There are other causes that results in post-operative bleeding, such as failure to debride all granulation from the socket, torn soft tissue and rebound vasodilation following the use of epinephrine- or adrenaline-containing anaesthetics. Patient factors which contribute to prolonged post-operative bleeding include failure to adhere to the instructions given by the dentist or dental therapist regarding post-operative care of the mouth. Other factors include the use of anti-coagulants and chemotherapeutic drugs. Patients who have uncontrolled hypertension, liver disease, platelet deficiency, haemophilia, von Willebrand factor deficiency, or vitamin K-deficiency, may also pose a significant risk of post-operative bleeding (Dimitroulis and Eyre, 1991).

There are a limited number of complications that can result from dental procedures. Post-operative bleeding if appropriately managed can result in preventable death. The most immediate danger for a patient with severe post-extraction bleeding is airway compromise. Active bleeding that is not controlled by local measures warrants the assistance of the ECPs so that the airway can be secured and the post-operative bleeding managed appropriately (Moghadam and Caminiti, 2002). It is essential that ECPs understand and know how to manage these emergencies.

## **2.10 Complications of orofacial trauma**

In the western world, trauma remains one of the principal causes of mortality among young adults, and this may be equally true for SA. Following maxillofacial trauma, the resultant airway obstruction may be one of the most serious, immediate and life-threatening complications that may occur. The onset of a complication can be sudden. The literature surrounding facial trauma appears to support the hypothesis that maxillofacial trauma alone is rarely life threatening, or will not lead to life-threatening conditions unless associated with airway compromise. There are some causes of life-threatening complications following trauma to the maxillofacial region such as aspiration, a compromised airway, permanent facial deformity, nerve damage that results in a loss of facial movement, smell, taste vision, chronic sinusitis, infection, malnutrition, malunion of fractures, mal-occlusion and haemorrhage. Some complications situations that may cause irreversible damage unless immediate medical management is undertaken (Traebert et al., 2009).

## **2.11 Conclusion**

This chapter provided an overview of the aetiology of orofacial trauma and the emergency medical management thereof. It also provided an overview of the education, training and curriculum of emergency care practitioners related to the management of orofacial trauma. The reviewed literature shows that, orofacial trauma has the potential to be life-threatening. It is therefore essential that appropriate, timely emergency medical care intervention is provided. This includes appropriate care for an avulsed tooth being properly managed, to saving a life through appropriate early intervention and management. Thus, it is evident that an early and appropriate response and medical emergency treatment intervention is required to improve the prognosis of full medical recovery and health outcomes. This can be provided by a knowledgeable, trained ECP. The following chapter provides a brief overview of the methodology used in this study. This overview is enhanced by the methods section of the journal article, as contained in chapter 4.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Introduction**

This chapter outlines the methods and materials used to conduct the study. The study was conducted at Emergency Medical Services (EMS) bases and the training college in the eThekweni Region of KwaZulu-Natal. Details about the methods used, the study design, study population, data collection, data analysis and other methods are outlined.

### **3.2 Study design**

The study used an exploratory, descriptive design with both quantitative and qualitative methods. The advantage of using mixed methods is that it allows for triangulation of the literature and results, thus strengthening the reliability and validity of the study. The study explored the knowledge and attitudes of ECPs in the management of common traumatic orofacial injuries. Quantitative methods in the form of self-administered questionnaires and its subsequent analysis were used to provide a deeper understanding of the knowledge and understanding in the management of common traumatic orofacial injuries (Creswell et al.; 2003; Tashakkor and Teddlia: 1998; Rossman and Wilson; 1985). The qualitative methods in the form of interviews were used to enhance and triangulate the data obtained from the questionnaires.

The study was conducted in two phases, and these phases are outlined below:

Phase 1 – A quantitative study method was used which involved the administration of a self-administered survey questionnaire to ECPs, employed by the KwaZulu-Natal Provincial Department of Health Emergency Medical Services, and based in the eThekweni District of KZN. The developed questionnaire addressed four objectives of this study, namely to determine ECPs knowledge and attitudes, need for further training; policy reform; and curriculum reform of the emergency medical management of common orofacial emergencies.

Phase 2 - A qualitative study method was conducted using interviews with ECPs employed by the KwaZulu-Natal Provincial Department of Health, and based in the eThekweni District of KZN. The focus group interviews sought to address objective four of the study, which was to investigate the need for further training; policy reform; and curriculum reform that could enhance the training of ECPs in the management of common orofacial trauma and medical emergencies. The results of phase 1 and phase 2 were triangulated in order to ensure validity and coherence.

### 3.3 Study Setting

The study took place in the eThekweni district of the KwaZulu-Natal province, South Africa and it included EMS bases in both urban and peri-urban areas.

### 3.4 Study Population and Study Sample

Phase 1 of the study included all qualified and registered ECPs who are employed by the provincial EMS in the eThekweni region. The participants of this study were adults, both male and female. A sample size was calculated to be a minimum of 100 participants and a maximum 390 participants. This sample size was decided upon by using a power calculation, and in consultation with a statistician from the University of KwaZulu-Natal (UKZN), School of Health Sciences. A final sample size of 288 was obtained. The sample was a convenience sample done across all local municipalities in the eThekweni District, as well as all the EMS bases, in order to avoid concentration of the study being confined to only parts of the district. In phase 2 of the study a purposive sample of one ECP from each of seven bases ( $n=7$ ) were selected to participate in the interview.

**Table 3.1: EMRS bases in the eThekweni District**

Base
1. Tongaat
2. Phoenix
3. KwaMashu
4. Marianhill
5. R K Khan
6. Wentworth
7. Umlazi

### 3.5 Inclusion Criteria

All ECPs employed by the provincial Department of Health Emergency Medical Services in the eThekweni District were eligible to participate in the study. Both male and female participants were included in the study. All participants had to have been qualified, and had to be registered with the HPCSA.

### 3.6 Exclusion Criteria

Emergency care students currently studying were excluded. All non-consenting eligible participants were excluded. Eligible participants presenting outside the data collection times and dates were excluded.

### 3.7 Pilot study

In order to ensure the reliability and validity of the study the researcher conducted a pilot study. A pilot study was conducted on 28 ECPs who are attached to a private Emergency Care Service provider, and who are based in the eThekweni Health District. The pilot study consisted of 10% of the main study population, with the sample size being 28 participants. These ECPs were purposively selected to ensure that they



represent both males and females; that they met the inclusion and exclusion criteria of the participants in the main study; and that they represented all the various levels of qualifications of South African ECPs.

The purpose of the pilot study was to inform the researcher of any difficulties experienced by the participants in understanding the contents of the questionnaires; any ambiguities in the questions; any technical and language difficulties; and any other issues that arose.

### **3.8 Data Collection Tools / Methods**

Data collection occurred in the period from February to July 2017. The questionnaire was made up of four sections; demographic factors, knowledge, and attitudes and further training needs.

#### Section A - Demographic and other factors:

The first section consisted of seven questions related to demographic and other factors like age, gender, qualification and experience.

#### Section B - Knowledge

Knowledge of the ECPs was ascertained in the form of six questions.

#### Section C – Attitudes and Practices

This section covered the attitudes of ECPs towards education, and the management of common orofacial traumas and their emergency medical management practices and knowledge.

#### Section D – Further Training

There were four questions on the need for further training, and the preferred delivery method of such training.

Questionnaires were hand-delivered to the selected EMS bases, and distributed to the ECPs, with the help of research assistants. Data was collected at the EMSs bases by the researcher, All consenting participants filled out a self-administered questionnaire. Confidentiality was maintained at all times, and only numbers were allocated to the questionnaires. However, those who could not fully understand the questionnaire were assisted in the completion of the questionnaire by the researcher who was present at the time, and who assisted participants by providing clarity on the questions.

### **3.9 Data Analysis**

#### **Phase 1**

Once all the questionnaires were collected, the primary data was extracted and captured onto a Microsoft Excel® spreadsheet using a data coding process. The captured data was checked for accuracy and correctness by both the researcher and the supervisor. Thereafter the data was analysed by a qualified and

experienced statistician using the Statistical Package for the Social Sciences (SPSS) version 24® IBM 2016. Upon analysis the data was presented in graphic and textual forms to reflect central tendencies such as average, mean and range, and other measures such as correlations and tendencies. The different variables were analysed using descriptive measures such as mean, median, mode, proportion, SD. These were determined using the Chi Square Test and the ANOVA Statistical test.

## **Phase 2**

In phase two of the study, the raw data obtained from digital voice recordings of the focus group interviews was transcribed onto a Microsoft Word® document. The transcripts were verified by both the data capturer and the researcher or supervisor. The data transcripts were then forwarded to the research participants for verification and/or adoption. Once the corrected and verified transcripts were received from the research participants the data was then thematically analysed and grouped using the NVivo version II® QSR International qualitative data analysis software tool. Themes were identified, and the primary data sourced was analysed around these themes, in order to determine patterns.

### **3.10 Data Management**

The questionnaires were stored in a locked cupboard at the University of KwaZulu-Natal, Westville campus. Only the researcher and study supervisors have access to the data. All the data will be stored for a period of 5 years, and thereafter destroyed by means of shredding all paper data or overwriting and deleting all electronic data. Data from phase 1 of the study was captured on a Microsoft Excel® spreadsheet, and data from phase 2 was captured digitally as a voice recording and Microsoft Word® transcripts. All the data (both hard and soft copies) is being stored either as hard copies, or on a password protected USB flash drive, and these are placed in a locked cupboard at the research supervisor's office for a period of 5 years post completion of the study. Thereafter the digital data will be double-deleted and overwritten, and the hard copies shredded and destroyed.

### **3.11 Reliability and Validity**

Construct validity was used to maintain validity. All participants were asked the same questions in the interviews. Reliability can be further ensured by utilising internal consistency, thus ensuring that the same clear, relevant and unambiguous questions were administered to the research participants in a similar manner, with the intention of yielding similar results. Reliability was measured using face value, which is the extent to which, on the surface, an instrument looks like it measures a certain characteristic; validity was ensured by using the concepts of triangulation, and internal consistency. Reliability was further ensured through the use of peer examination of data and accuracy checks which were conducted and cross-checked by the researcher and the research assistants. The researcher and the research assistants independently

verified the data entries, then cross-checked and re-verified the data as a collective. The researcher also ensured that triangulation of the data occurred. This was achieved by triangulating the data from the literature with the data obtained as part of the research, and then triangulating it with the results and outcomes.

### **3.12 Ethical considerations**

In research that involves human sample subjects, the researcher has certain responsibilities towards research participants. The researcher must protect the dignity and welfare of the research participants and these participants must have the freedom to withdraw from the study without penalty. The research participants' identities must be protected, and the confidentiality of research data maintained. The following ethical considerations were observed before and during the study.

Ethical approval was obtained from the Social Sciences and Humanities Research Ethics Committee (SSHREC) of UKZN Biomedical Research Ethics Committee (SSHREC Reference number: 068/16) (Appendix 7.2) and the KZN Department of Health (Reference number: 26/16 KZ-2015RP12-306) (Appendix 7.5). All participants were assured of privacy and confidentiality. The Department of Health was written to, and gatekeeper permission obtained to conduct the research at the various EMS bases and facilities (Appendices 7.2; 7.3 and 7.4). The researcher has completed a training course in research ethics (Appendix 7.10).

Written informed consent was obtained from all participants (Appendix 7.2). Separate consent was obtained from the participants to record the interviews. At all stages of the research project full and diligent consideration was given to ensuring full compliance with all principles, rules and regulations (both external and internal to the University) to ensure protocol.

### **3.13 Dissemination of results**

The results of the study will be made available to the Department of Health, KZN; The District manager of KZN-DoH EMRS and the various base managers. The results will also be disseminated via conference presentations and journal publications. The results of this study will be made available to all the relevant stakeholders in the following ways. A brief summary of the content, findings and recommendations will be provided to the necessary stakeholders and role-players. Publication of the results and findings will be sought in local and international health journals. Dissemination of the results, outcome and recommendations of this study will occur via a multitude of dissemination methods; including a journal article that has been submitted to a SAPSE peer-reviewed and accredited emergency care/patient management/medical journal. A copy of the research will be submitted to the KZN Provincial Health and

Research Ethics Committee (PHREC); in keeping with their requirements as contained in the research ethics proposal submission request.

A brief report, which would contain a summary of the research, findings and recommendations, will be made available to the participants (Emergency care practitioners) and the Health Professions Council of South Africa. The researcher will also seek to present the research at a local or national emergency care provider conference. At the end of the study the researcher will deliver a series of three one-hour CPD accredited talks to the participants so that they can gain knowledge in the management of common orofacial trauma and medical emergencies from the view of a dental professional.

### **3.14 Summary**

This chapter outlined the study methodology used. It described the study settings and the sample for the study. It further described the data collection tools used and the process for data collection and analysis of the data. This chapter also addressed ethical considerations. Chapter four that follows will present the research paper (manuscript) that has been submitted to an accredited emergency care patient management journal.

## **CHAPTER 4:**

### **4.1 Introduction**

This chapter presents the journal article (manuscript) that has been submitted to a SAPSE accredited journal, the Journal of Dental Traumatology, for review and publication. The manuscript has been submitted in the form of a journal article, and proof of submission to the journal is contained in Appendix 7.11.

### **An Investigation into the Knowledge and Attitudes of Emergency care practitioners in the Management of Traumatic Orofacial and Medical Emergencies in the eThekweni District, KwaZulu-Natal, South Africa**

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## **Abstract**

**Introduction:** The successful management of a casualty experiencing a common orofacial traumatic injury or medical emergency is dependent on two fundamental factors; the knowledge of the first responders (first medically-trained or lay person to attend to the casualty) knowledge and ability to render the appropriate level and standard of medical care; and secondly the period of time that expires between the onset of the incident and the initiation of definitive emergency medical treatment. (Andreasen, Andreasen and Andersson, 2007).

**Aim:** The study aimed to determine the knowledge and attitudes of emergency care Practitioners of the eThekweni District of KwaZulu-Natal, South Africa in the management of patients presenting with common traumatic orofacial injuries and medical emergencies in order to identify any gaps in their training regarding management of these injuries.

**Methods:** This was an exploratory, descriptive design using both quantitative and qualitative methods. The study was conducted in 2 phases, with each phase having a different data collection tool and process. In phase 1 the research participants, being a random sample of 288 Emergency Care practitioners (ECPs), were given self-administered questionnaires to complete. The questions were designed to elicit the required information, and simultaneously allow the research participants to forward any other information or comments that they may have wanted to.

In phase 2 of the study an interview was conducted with the relevant ECPs using a structured interview schedule. A list of seven questions was posed to these participants, and they had the opportunity to provide additional input.

**Results:** The results reveal that there inadequate levels of education, training, and understanding of the emergency medical management of common orofacial traumas by ECPs. There is inadequate 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.

**Conclusions:** The study suggests that there is inadequate knowledge, education and training levels of ECPs abilities to deal with common orofacial emergencies, and that there is a need for a curriculum review to include basic and advanced training and education that would equip ECPs to deal with these emergencies.

**Keywords:** Common Oro-facial Traumas, Emergency Care Practitioners, Emergency Medical Management, Knowledge, KwaZulu-Natal

## **Introduction and Background**

A delay in the initiation, or a lack of appropriate treatment and medical management, of traumatic injuries and medical emergencies to orofacial structures; dental infections and pathologies; and any other adverse events involving the orofacial and associated structures (such as the potentially life-threatening orofacial conditions such as post-operative bleeding and Ludwig's Angina) could lead to long-term and negative health outcomes for the casualty (Skapetis, Gerzina and Hu, 2011).

This may be in terms of both financial costs of treatment, and in terms of pain and suffering (Skapetis, Gerzina and Hu, 2011). An added negative outcome is the aesthetic effect of these injuries, as they occur on a 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 extensive and expensive plastic and reconstructive surgery may be required to restore some level of aesthetics and function to the casualty (Samaei et al., 2015). Orofacial trauma and medical events also have considerable indirect negative outcomes; such as the loss of confidence that a casualty may suffer; various psychological effects; and possibly the 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). There may also be significant social interaction difficulties and even social avoidance (Robinson et al. 1996) which could be ascribed to embarrassment and a fear of rejection (Zalackiene et al., 2014).

Some of the worst injuries suffered by patients are facial scars and disfigurement. Whilst certain scars on a patient may be covered by clothing or other methods, facial scars, disfigurement and loss of function remain obvious to victims of serious vehicle accidents, sports injuries or other miscellaneous activities. It is essential to provide timeous and appropriate treatment in cases of orofacial trauma (Traebert et al., 2009). This prehospital care is usually provided by first responders such as emergency care practitioners (Pozner et al., 2004). However; there is inadequate knowledge in the management of orofacial trauma amongst ECPs. Moreover, orofacial trauma is often not included in medical courses and first aid trainings or in first-aid text books and manuals (Levin and Zadik, 2012; Zadik, 2007).

There are various factors that are influential on the incidence of orofacial trauma. These factors are complex and often multifactorial (Laloo, 2003; Johnson, 1975). Factors that influence the health outcomes of these cases include local work and industries, the risk attached to the type of sport or the recreational activities, the number of motor vehicle and other accidents and the level of violence that exists within society. Studies regarding the incidence and causes of orofacial trauma have been reported from many countries with biases towards their social, sporting and cultural activities as causes of orofacial trauma.

Research on an international level in regards to orofacial trauma and the knowledge of ECPs in managing orofacial trauma is substantial. However, in South Africa, there is paucity of epidemiological studies in the field of oral and facial trauma, and in an understanding of the knowledge of emergency care practitioners in the management of these conditions. Improved knowledge and treatment protocols could assist emergency care practitioners to improve in the management of casualties that present with orofacial trauma.

### **Objectives of the Study**

The objectives of the study were to determine the knowledge, attitudes, management, education and further training needs of emergency care practitioners in managing casualties presenting with common orofacial trauma and medical emergencies.

### **Methods**

The study design was an exploratory, descriptive design using both quantitative and qualitative methods. The participants of this study were ECPs employed by the provincial public sector Emergency Medical Services in the eThekweni Health District of KwaZulu-Natal. A random sample of 288 ECPs were selected for phase 1 of the study, using Surveymaker® software. From a study population of 350, a sample size of 288 was calculated using a power calculation method with the following parameters: - Sample size: 1138, CI: 95%  $\pm$ 5%, SD: 0.96% and a sample size of 288 was calculated: For phase 2 of the study a purposive sample of one ECP from each of seven bases ( $n=7$ ) were selected to participate in the interview.

Ethical approval was obtained from the Knowledge Research Management Unit of the KZN Department of Health (DOH), and the Social Sciences and Humanities Research Ethics Committee of the University of KwaZulu-Natal. Informed consent was obtained from the participants.

### **Results**

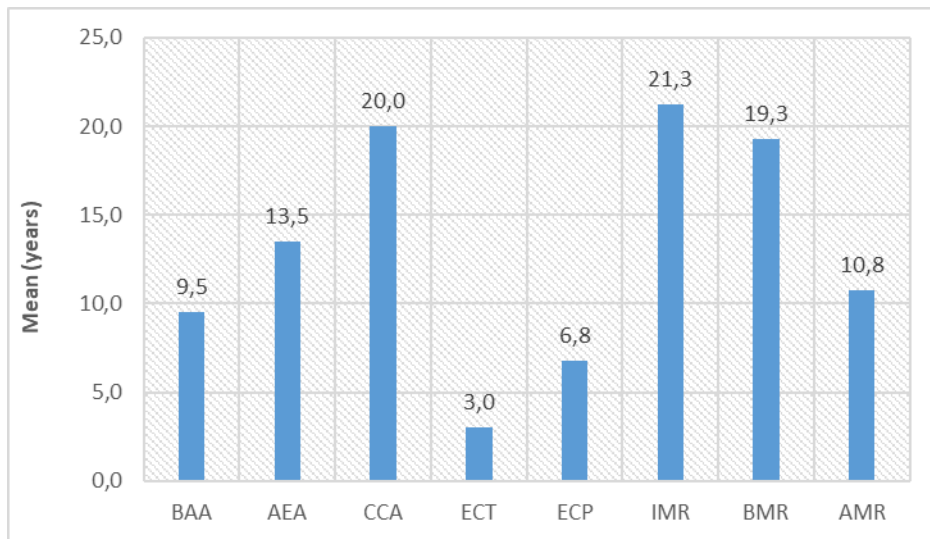
A total of 237 questionnaires were distributed and 138 were returned which gave a 57.5% response rate. The 28 items questionnaire was divided into four sections (demographics, knowledge, attitudes, management practices, and further training needs). Reliability was computed by using Cronbach's Alpha, with a score of 0.656 being recorded (a reliability coefficient of 0.60 or higher was considered as acceptable).

Overall, the ratio of males to females was approximately 3:1, with 103 males and 35 females (75.4%:24.6%). The majority of the ECPs were within the age categories of 30-40 years (36.2%), and between 40-50 years (39.1%). Males made up 75.4% of the study population. Most (75%) of the ECPs had



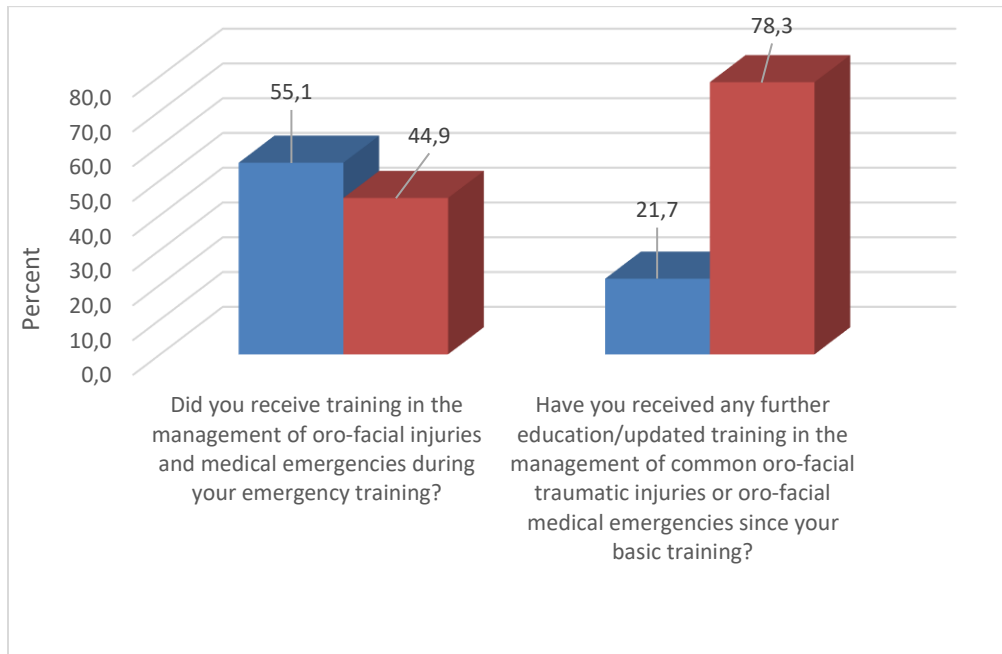
a secondary medical qualification, such as a rescue qualification, in addition to their basic paramedical qualification. The basic ambulance assistants had an average of 9.5 years of operational experience, in contrast to the higher qualified Critical Care Assistant who had, on average, 20 years of experience. Those ECPs with a basic rescue qualification had that qualification for over 21 years, whilst 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 ( $p = 0.233$ ), but significantly more respondents ( $p < 0.001$ ) indicated that they did not receive any further training post-qualification, as indicated in Figure 2.

**Figure 2:** ECPs training in dealing with orofacial medical emergencies



A significant difference existed in the ECPs ability to identify teeth in the mouth ( $p < 0.001$ ) with 53% being unable to do so. A large number of ECPs reported dealing with patients who presented with some type of dental injury (soft-tissue lacerations -63.8%, Mandible fractures (50%). However, a significant 64% ( $p < 0.001$ ) 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.

When asked about the management of the potentially life-threatening orofacial condition of Ludwig’s Angina a statistically significant 55.5% ( $p < 0.001$ ) of the ECPs were unaware of this condition. Airway obstruction was recognized by more than 14% of the participants as being one of the sequel of Ludwig’s angina, and only 8% recognized the Ludwig’s angina is a bilateral swelling of submandibular, sublingual and submental spaces.

Participants were asked a series of questions related to their knowledge, attitudes and confidence to deal with orofacial emergencies, and the results are displayed in the Table below. A training officer at the provincial Emergency Medical Service Training College stated during an interview that “Whilst there is a need for further training in the emergency management of orofacial injuries there is very little curriculum content.” When asked about their need for further training, a significant two-thirds (74%,  $p < 0.001$ ) of the respondents agreed with the need for further training. Another training officer reiterated the need for

training, but expressed the need for dental professionals to deliver such 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 either a formal lecture or workshop, rather than online. Most (69%) of the ECPs wanted this training on a regular basis (between 6 months to annually), and a significant number (66%,  $p = 0$ ) wanted this training to be of between half to a day in duration.

Table 1: ECPs knowledge, attitudes and confidence to deal with medical emergencies.

Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Chi Square
	Row N %	Row N %	Row N %	Row N %	Row N %	p-value
I am confident and comfortable treating common traumatic orofacial injuries and medical emergencies	8.7%	5.8%	31.9%	44.2%	9.4%	< 0.001
I have adequate knowledge on how to manage common traumatic orofacial injuries and medical emergencies.	10.1%	13.8%	28.3%	41.3%	6.5%	< 0.001
I feel that I do require further training in the management of common traumatic orofacial injuries and medical emergencies.	10.1%	2.9%	13.0%	57.2%	16.7%	< 0.001
I am confident in identifying a significant complication of a dental abscess such as Ludwig's Angina	15.2%	17.4%	37.7%	21.0%	8.7%	< 0.001
I am confident in the management of post-extraction bleeding.	13.8%	10.9%	21.7%	47.1%	6.5%	< 0.001
I am confident in the assessment of dental trauma.	10.1%	11.6%	29.7%	44.2%	4.3%	< 0.001
I am confident in the initial management of dental fractures.	13.0%	10.1%	29.7%	42.0%	5.1%	< 0.001
I am confident in the initial management of a partially dislodged tooth.	12.3%	18.1%	26.8%	35.5%	7.2%	< 0.001
I am not confident in the initial management of a completely dislodged (avulsed) tooth.	10.9%	24.6%	27.5%	29.7%	7.2 %	< 0.001

## Discussion

In a country like South Africa that is plagued with high levels of criminal and interpersonal violence, and a high rate of motor vehicle and pedestrian accidents there is a good chance that most ECPs will respond to numerous incidents wherein there are casualties presenting with orofacial traumas and injuries (RMTC, 2016). With a warm climate, many South Africans are active sports participants, and this presents an additional risk to participants who could sustain orofacial traumas, especially in aggressive contact sports such as rugby, boxing and martial arts (Laloo, 2003). An adequate understanding and knowledge of how to deal with these type of injuries is important for ECPs and first responders (MacFarlane, van Loggerenberg and Kloeck; 2005). Poor 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, and highlighted the lack of training in dealing with orofacial trauma at even basic levels of undergraduate training. This is similar to studies conducted in numerous countries, such as Hong Kong (Chan, Wong and Cheung, 2001), Brazil (Panzarini et al., 2005), Israel (Holan and Shmueli, 2003). During an interview an EMS base manager made the following comment:

*“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]

Whilst noting the effect of seniority, both in terms of qualification and experience, it is of concern that the younger, and often lower-qualified ECP, has minimal confidence in the management of such injuries, yet is most likely to respond to a larger number of incidents involving casualties with orofacial trauma, as these younger ECPs often work longer hours and have many years left in their careers. ECPs who indicated that they had higher-levels of knowledge were more confident in treating orofacial trauma, and this emphasizes the need for improved training. EMS base manager “R” concurred with this result, and stated that he

*“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].

During the interviews with the ECPs one of the EMS base supervisors commented that whilst understanding the need for ECPs to be trained in the emergency medical care of patients presenting with orofacial traumas

there was no emphasis on the prevention of such injuries. He commented on how the EMS was a reactive service, and did not pay any attention to the prevention of such emergencies. It is evident that there is a need, and a demand, for both basic and advanced training in the management of medical emergencies related to common orofacial traumas. This was evident as most of the participants expressed the need and desire for more education, and expressed a willingness to receive such education. Of concern is the particularly high number of ECPs (55.5%) who did not know of the potentially life-threatening orofacial condition of Ludwig's Angina. With this condition there is an increased possibility of airway obstruction, and as emergency first responders this should be of concern to them.

The lack of curriculum content related to the emergency medical management of orofacial traumas and emergencies was evident, and even the ECPs recognised this gap. The need for further training was also expressed by the ECPs. The findings of this study suggest that specific, targeted education and training in the prevention and emergency management of orofacial conditions will be beneficial to ECPs and to their patients.

### **Limitations of the study**

In a study of this nature there are bound to be both obvious and hidden factors that could affect the study. Some of the limitations included time constraints, especially with ECPs working shifts; delays in obtaining approval from gatekeeper; and inadequate study participants. Another limitation is that only ECPs employed by the public sector are being considered as research participants. Careful thought has gone into this, and the researcher has consulted with experienced ECPs for advice. There is general consensus that the private sector EMS arena has numerous small EMC service providers, and often they have a high staff turnover. In addition it was argued that many of the private EMS has a comparatively small work case load when compared to the public sector EMS. Additionally the training received by these ECP is often not uniform, and may have occurred at a plethora of formerly – accredited but now defunct EMC institutions. Another limitation is that the study is only being conducted in the eThekweni district, however this is the largest districts and the results could be generalised and extrapolated provincially and nationally.

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**Conflict of Interest:** None declared

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## CHAPTER 5

### 5.1. Introduction

This chapter presents an analysis of how the four objectives of the study were addressed. An outline of the study limitations is presented. This is followed by a statement related to the significance of the study.

The results of Objective 1, which was to determine the knowledge of emergency care practitioners in managing casualties presenting with common orofacial trauma and medical emergencies, indicate that there are deficiencies in the education, training, and curriculum with respect to the management of common orofacial traumas.

Regarding Objective 2, which was to determine the attitudes of emergency care practitioners in managing casualties presenting with common orofacial trauma and medical emergencies, the results indicate that ECPs have self-reflected on their knowledge levels, and the majority of the respondents recognise that there were gaps in their knowledge, and would prefer to receive training in this arena.

The results from Objective 3, which was to understand the management practices of ECPs in managing casualties presenting with common orofacial trauma and medical emergencies, suggested that there was a lack of confidence and knowledge in the management of orofacial traumas and injuries.

Objective 4 looked at investigating the need for further training, policy reform, and curriculum reform, and at enhancing the training of ECPs with regard to the management of common orofacial trauma and medical emergencies. The findings revealed a dire need for such training.

Therefore, it can be concluded that ECPs do not have sufficient knowledge, education and training to appropriately manage with the medical management of common orofacial trauma. They do require further or continuous professional development education and/or training in the management of common orofacial traumas. The curriculum of the various cadres of ECPs training programme(s) does not have sufficient and adequate training in the emergency medical management of common orofacial traumas

### 5.2. Study Strengths and Limitations

The study had a number of limitations, including that the focus was exclusively on ECPs, and other first responders such as first-aiders attached to organisations. Some of the limitations that the researcher has observed include: a lack of funding; time constraints, especially with ECPs working shifts; delays in obtaining approval from gatekeeper; and inadequate samples.



Another possible limitation is that only ECPs employed by the public sector are being considered as research participants. Careful thought has gone into this, and the researcher has consulted with experienced ECPs for advice. There is general consensus that the private sector EMS arena has numerous small EMS service providers, and often they have a high staff turnover. In addition it was argued that many of the private EMS has a comparatively small work case load when compared to the public sector EMS. Additionally, the training received by these ECPs is often not uniform, and may have occurred at a plethora of formerly – accredited but now defunct EMS institutions. Another limitation is that the study is only being conducted in the eThekweni district, however this is the largest districts and the results could be generalised provincially and nationally.

Despite these limitations, the study does provide valuable insight into the levels of knowledge, education and training. The study suggests that there is an association between qualification and experience, with the higher qualified and more experienced ECPs displaying greater knowledge and confidence in their ability to manage common orofacial trauma emergencies. The study findings also indicate a need for ECP curriculum review, and that ECPs could benefit from annual or bi-annual continuous professional development training, and refresher courses, in the management of common orofacial traumas and emergencies. This need is reinforced by the understanding that these traumas occur in an area of the human body that acts as the conduit to the airway.

### **5.3. Significance of the Study**

This study contributed to the literature regarding the knowledge, and attitudes of emergency care practitioners in the management of common traumatic orofacial injuries and medical emergencies in SA. Trauma related to the orofacial region mandates special attention. It is important to understand the uniqueness of the orofacial region, both in terms of anatomy and the neighbouring structures. In emergency medicine, orofacial injuries are commonly encountered. Most patients with orofacial injuries suffer poly-trauma that requires coordinated management between ECPs, specialists in orofacial surgery, ophthalmology, trauma surgery and other healthcare practitioners. Early intervention is always needed to improve the prognosis. Early diagnosis and treatment of life-threatening orofacial injuries and compromised vital structures will improve the prognosis, rehabilitation and eventual outcome of the injury.

Thus, by investigating the knowledge of ECPs and their ability to render appropriate management of common orofacial trauma and medical emergencies, gaps were identified and the following recommendations were made towards improving education and training of ECPs.

#### **5.4. Recommendations**

The following recommendations are made:

- There is need for a curriculum review in terms of educational instruction and training of ECPs at all levels of education, and across all qualification levels to improve in the management of common traumatic orofacial injuries.
- There is also a need for regular continuous professional education, via various fora and learning platforms, to update and enhance the knowledge and skills of ECPs with regards to the management of orofacial traumas.
- Policymakers and other stakeholders recognize the deficiency that exists in terms of the emergency medical management of common orofacial injuries and institute policy, training and other interventions to address this deficit.
- More research is required to determine the knowledge, skills and attitudes of ECPs, and other first responders, towards the emergency medical management of common orofacial injuries and traumas.

#### **5.5. Conclusion**

This study established that there is inadequate knowledge, education and training amongst most ECPs, regardless of qualification, experience or age regarding management of common traumatic orofacial injuries. This has potentially serious and costly effects. The findings suggest that with adequate education and training the emergency medical management of common orofacial traumas can be improved, leading to improved patient outcomes.

## **CHAPTER 5**

## CHAPTER 6

### 6. References

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## CHAPTER 7

### 7. APPENDICES

#### Appendix 7.1

**Table 7.1:** The Scope of Practice of Emergency care practitioners

CAPABILITY	BAA	ILS	CCA	ECT	ECP
<b>Airway Management</b>					
Finger sweep; Head -tilt-chin lift; Jaw thrust	√	√	√	√	√
Suctioning of the airway; Airway obstruction removal techniques	√	√	√	√	√
Use of Magill's forceps		√	√	√	√
Oropharyngeal airway insertion	√	√	√	√	√
Nasopharyngeal tube airway insertion		√	√	√	√
Cricoid pressure		√	√	√	√
Orotracheal intubation			√		√
Nasotracheal intubation			√		√
Blind Nasotracheal intubation			√		√
Digital endotracheal intubation			√		√
Retrograde intubation			√		√
Supraglottic extraglottic airway devices insertion			√	√	√
Orogastric tube insertion			√	√	√
Nasogastric tube insertion			√	√	√
Needle cricothyroidotomy		√	√	√	√
Surgical cricothyroidotomy			√		√
Rapid sequence intubation, only with capnography and ventilator					√
<b>Oxygenation and Ventilation</b>					
Oxygen therapy	√	√	√	√	√
Nebulisation (medicated)		√	√	√	√
Use of pulse oximetry		√	√	√	√
Needle thoracentesis		√	√	√	√
Bag valve mask ventilation, Bag mask tube ventilation	√	√	√	√	√
Mechanical ventilation, Use of PEEP			√		√
Use of capnography			√	√	√

<b>Circulatory Management</b>					
Blood pressure measurement	√	√	√	√	√
Peripheral intravenous cannulation - > 8 year old patients		√	√	√	√
Peripheral intravenous cannulation - all age categories			√	√	√
External jugular vein cannulation			√	√	√
Femoral vein cannulation			√		√
Intra - osseous insertion			√	√	√
Umbilical vein cannulation			√	√	√
Fluid administration		√	√	√	√
Intravenous drug administration			√	√	√
Intraosseous drug administration			√	√	√
Subcutaneous drug administration		√	√	√	√
Intramuscular drug administration			√	√	√
Endotracheal tube drug administration			√		√
Drug infusions and use of infusion devices			√		√
Use of syringe drivers			√		√
Use of non - invasive blood pressure monitors	√	√	√	√	√
External haemorrhage control including use of tourniquet	√	√	√	√	√
Use of pneumatic anti - shock garmet - legs only		√	√	√	√
Use of pneumatic anti - shock garmet - entire			√		√
Automated external defibrillation	√	√	√	√	√
Manual defibrillation (asynchronous)		√	√	√	√
Synchronised cardioversion			√		√
Vagal manoeuvres			√		√
Central line management			√		√
Transcutaneous cardiac pacing			√		√
3 Lead ECG monitoring		√	√	√	√
12 Lead ECG monitoring			√		√
Fibrinolysis					√
<b>ECG Rhythm Analysis</b>		√	√	√	√
Normal sinus rhythm		√	√	√	√
Sinus bradycardia		√	√	√	√
Sinus tachycardia		√	√	√	√
Ventricular fibrillation		√	√	√	√



Asystole/PEA		√	√	√	√
All other emergency cardiac dysrhythmias			√		√
<b>Obstetric Management</b>					
Normal vaginal delivery	√	√	√	√	√
Prolapsed cord management	√	√	√	√	√
Breech delivery management (scope specific)	√	√	√	√	√
Mal presentations management (scope specific)	√	√	√	√	√
Preterm labour management (scope specific)	√	√	√	√	√
Obstructed labour management (scope specific)	√	√	√	√	√
Fundal massage	√	√	√	√	√
Bimanual compression			√		√
Tocolysis			√		√
<b>General</b>					
CPR (adult, child, infant, neonate)	√	√	√	√	√
Patient clinical assessment	√	√	√	√	√
Vital sign assessment	√	√	√	√	√
Finger prick and blood glucose measurement	√	√	√	√	√
Cervical spinal clearance			√	√	√
Application of cervical collar	√	√	√	√	√
Application of head blocks	√	√	√	√	√
Application of spider harness	√	√	√	√	√
Spinal immobilization using scoop stretcher and long spinal board	√	√	√	√	√
Spinal immobilization using an extrication device	√	√	√	√	√
Application of splints including the traction splint	√	√	√	√	√
Application of vacuum mattress	√	√	√	√	√
Use of stretchers	√	√	√	√	√
Urinary catheterization			√	√	√
Basic wound care and application of dressing	√	√	√	√	√
Suturing		√	√		√
Declaration of death: withdrawal of resuscitation efforts		√	√	√	√
Declaration of death: withholding resuscitation	√	√	√	√	√
Administration of medication as per current HPCSA protocol	√	√	√	√	√
General patient inter - facility transfer	√	√	√	√	√
Neonatal intensive care transfer			√		√

## Appendix 7.2 – Ethics Approval



02 June 2017

Ms Lucy Reddy (9900633)  
School of Health Sciences – Dentistry  
Westville Campus

Dear Ms Reddy,

**Protocol reference number: HSS/0407/017M**

**Project title: A knowledge, Attitudes and Practices (KAP's) study into Emergency Care Provider's Management of Common Traumatic Oro-facial Injuries and Emergencies in the eThekweni Health District, KwaZulu-Natal, South Africa**

### **Approval Notification – Expedited Application**

With regards to your response received on 01 June 2017 to our letter of 16 May 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

**PLEASE NOTE:** Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenuka Singh (Chair)

fms

cc Supervisor: Mrs Ilana Moodley  
cc Academic Leader Research: Professor J van Heerden  
cc School Administrator: Ms Phindile Nene

Humanities & Social Sciences Research Ethics Committee

Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X04001, Durban 4001

Telephone: +27 (0) 31 260 358 / 031 260 4007 Facsimile: +27 (0) 31 260 4300 Email: [ethics@ukn.ac.za](mailto:ethics@ukn.ac.za) / [ethics@hss.ukn.ac.za](mailto:ethics@hss.ukn.ac.za) / [ethics@ukn.ac.za](mailto:ethics@ukn.ac.za)

Website: [www.ukn.ac.za](http://www.ukn.ac.za)



Hosting Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

## Appendix 7.3 - DOH District Approval



**health**  
Department:  
Health  
PROVINCE OF KWAZULU-NATAL

DIRECTORATE:

Physical Address  
Postal Address  
Tel: 031-4803650 Fax: 031-4603628 Email: linda.reddy@kznhealth.gov.za  
www.kznhealth.gov.za

EMERGENCY MEDICAL  
SERVICES – eTHEKWINI

Reference: EMS 3/3/R

Date: 08 May 2017

Ms. Lucy Reddy

### APPROVAL TO CONDUCT MASTERS RESEARCH

- Reference is made to your e-mail dated 08 May 2017, requesting permission to conduct research in EMRS eThekwin.
- Approval is granted.

Kind Regards

.....  
**Mr. R. Naidoo**  
District Manager  
Emergency Medical Services  
eThekwin District

## Appendix 7.4 – DOH Provincial Approval



**health**

Department:  
Health  
PROVINCE OF KWAZULU-NATAL

DIRECTORATE: CORPORATE SERVICES

ETHEKWINI HEALTH DISTRICT OFFICE

53 King Cetshwayo Highway  
Mayville, Durban, 4001  
Tel: 031 240 5455 Email: [ava@dr.harrichandparsad@kznhealth.gov.za](mailto:ava@dr.harrichandparsad@kznhealth.gov.za)  
[www.kznhealth.gov.za](http://www.kznhealth.gov.za)

24 May 2017

Dear Miss Lucy Reddy

**Re: Permission To Conduct Research at eThekweni District Emergency Medical Service Bases.**

This letter serves to confirm that your application to conduct the research study titled, "A Knowledge, Attitudes and Practices (KAP's) Study into Emergency Care Provider's Management of Common Traumatic Crani-Facial Injuries and Emergencies in the eThekweni Health District, KwaZulu-Natal, South Africa", in the following Emergency Medical Services bases in the eThekweni District has been recommended:

1. Meris Hill
2. Wentworth
3. R.K. Khan
4. Phoenix
5. Tongaat
6. Kwa Mashu
7. Umhlati

Kindly upload this letter together with your application as required to the Health Research and Knowledge Unit for the KZN Department of Health for approval.

Please also note the following:

1. This research project should only commence after final approval by the KwaZulu-Natal Health Research and Knowledge Unit, and full ethical approval, has been granted.
2. That you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
3. All research activities must be conducted in a manner that does not interrupt clinical care at the health care facility.
4. Ensure that this office is informed before you commence your research.
5. The District Office/Facility will not provide any resources for this research.
6. All logistical details must be arranged with the CEO/medical manager /operational manager of the facility.
7. You will be expected to provide feedback on your findings to the District Office/Facility.

Yours sincerely

**Dr. A. Harrichandparsad**

PP: Ms. T. P. Msimango  
Chief Director (Acting)  
eThekweni Health District

Fighting Disease. Fighting Poverty. Giving Hope.

## Appendix 7.5 - KZN-DOH Ethics Committee Approval



**health**  
Department:  
Health  
PROVINCE OF KWAZULU-NATAL

Physical Address: 330 Langelabalele Street, Pietermaritzburg  
Postal Address: Private Bag X9051  
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3762  
Email: [hrkm@kznhealth.gov.za](mailto:hrkm@kznhealth.gov.za)  
[www.kznhealth.gov.za](http://www.kznhealth.gov.za)

DIRECTORATE:

Health Research & Knowledge  
Management

HRKM Ref: 187/17  
NHRD Ref: KZ\_2016RP24\_504

Date: 26 May 2017  
Dear Ms L. Reddy  
UKZN

### Approval of research

1. The research proposal titled 'A Knowledge, Attitudes and Practices (KAP's) Study into Emergency Care Provider's Management of Common Traumatic Oro-Facial Injuries and Emergencies in the eThekweni Health District, KwaZulu-Natal, South Africa' was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby **approved** for research to be undertaken at Tongaat, Phoenix, KwaMashu, Marianhil, RK Khan, Wentworth and Umlazi EMRS bases.

2. You are requested to take note of the following.
  - a. Make the necessary arrangement with the identified facility before commencing with your research project.
  - b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.
3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to [hrkm@kznhealth.gov.za](mailto:hrkm@kznhealth.gov.za)

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

**Dr E Lutge**

Chairperson, Health Research Committee

Date: 31/07/17

Fighting Disease. Fighting Poverty. Giving Hope

## Appendix 7.6 - Participant Information Sheet



Date:

Greetings

I am a Masters student from the University of KwaZulu-Natal. We are required to do a research study as part of our training. Our research is on an investigation of the knowledge and attitudes of ECPs in the management of orofacial trauma. Research is just the process to learn the answer to our question.

You are being invited to consider participating in a study that involves research on an investigation of the knowledge and attitudes of ECPs in the management of orofacial trauma.

The study is expected to recruit people. It will involve answering questions about management of orofacial trauma, by means of a questionnaire. It should take about 10 minutes for you to answer these questions. We are not being paid to do this study; it is a requirement as part of our postgraduate Masters in Medical Sciences at the University of KwaZulu-Natal.

The study only involves us asking you questions, with your answers being recorded on the prepared questionnaire. The study will not provide any direct benefits to you, the participant, but it will help us gain more knowledge with regards to the topic. There are no risks involved in participation in this study.

Participation in this research is voluntary and you may withdraw participation at any point of the study. In the event of refusal/withdrawal of participation you will not incur penalty or loss of treatment or other benefits to which you are normally entitled.

You will not be paid or given anything by the researchers if you participate.

These questionnaires do not record your name or address – just a study number. We will protect confidentiality of personal/clinical information at all times.

This study has been ethically reviewed and approved by the University of KwaZulu-Natal, Social Sciences and Humanities Research Ethics Committee (approval number\_\_\_\_\_).

In the event of any problems or concerns/questions you may contact the researcher at 084 441 4546 or (031) 405 1918, or the UKZN Biomedical Social Sciences and Humanities Research Ethics Committee. The contact details as follows:

SOCIAL SCIENCES AND HUMANITIES RESEARCH ETHICS COMMITTEE  
ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

Thanking You Sincerely

Ms L Reddy

**Appendix 7.7 - Patient Consent Form**



I, \_\_\_\_\_ have been informed about the study: “An Investigation of the Knowledge and Attitudes of ECPs in the Management of Oro – facial Trauma”. I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction. I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any treatment or care that I would usually be entitled to.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at 084 441 4546 or (031) 4051 918. If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION  
Research Office, Westville Campus  
Govan Mbeki Building  
Private Bag X 54001, Durban, 4000  
Tel: 27 31 2604769 - Fax: 27 31 2604609  
Email: BREC@ukzn.ac.za

-----

Signature of participant

-----

Signature of witness

-----

Date

-----

Date



## Appendix 7.8 - Participant Questionnaire



### Section A - Demographics

Please tick answers applicable to you

1. AGE

- 20 – 30 years
- 30 – 40 years
- 40 – 50 years
- 50 +

2. GENDER

- Male
- Female

3. What is your current level of qualification?

- |                              | Date obtained | Institution |
|------------------------------|---------------|-------------|
| <input type="checkbox"/> BAA | _____         | _____       |
| <input type="checkbox"/> AEA | _____         | _____       |
| <input type="checkbox"/> CCA | _____         | _____       |
| <input type="checkbox"/> ECT | _____         | _____       |
| <input type="checkbox"/> ECP | _____         | _____       |

4. Do you have any other medical or rescue qualifications?

- No
- Yes

If yes please list and include date and institutions where obtained.

Qualification	Date obtained	Institution
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. How many years of operational experience do you have in the following levels of your profession?

BAA - \_\_\_\_\_

AEA - \_\_\_\_\_

CCA - \_\_\_\_\_

ECT - \_\_\_\_\_

ECP - \_\_\_\_\_

IMR - \_\_\_\_\_

BMR - \_\_\_\_\_

AMR - \_\_\_\_\_

Other - \_\_\_\_\_

Total - \_\_\_\_\_

6. Did you receive training in the management of orofacial injuries and medical emergencies during your emergency training?

- Yes
- No

7. Have you received any further education/ updated training in the management of common orofacial traumatic injuries or oro –facial medical emergencies since your basic training?

- Yes
- No

If yes, please describe the type and duration of such training.

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**Section B – Knowledge**

1. Full dentition in an adult and in a child consists of:

- 32 permanent teeth, 16 deciduous teeth
- 32 permanent teeth, 20 deciduous teeth
- 28 permanent teeth, 16 deciduous teeth
- 28 permanent teeth, 20 deciduous teeth
- I am unsure

2. What is the name of the right lower sixth tooth from the midline in adult dentition?

- Incisor
- Canine
- Premolar
- Molar
- I am not sure

3. Which of the following common traumatic orofacial injuries have you experienced in practicing emergency care?

- Tooth avulsion
- Dislocation of the mandible
- Laceration of soft tissue eg. Tongue, cheek, lip
- Fractures of the maxillae
- Fractures of the mandible
- Tongue biting
- Other
- None

4. When would you consider re-implantation of a primary (deciduous) avulsed tooth?

- Always
- Never
- Depends on the age of the child
- Depends on the child's cooperation
- I am not sure

5. Which of the following statement is incorrect regarding tooth avulsion?

- Foreign bodies on the root may be gently removed with forceps
- Remove any blood from the tooth with alcohols/anti-septic irrigation
- The tooth must not be allowed to dry out, it may be stored in milk for a short period
- A permanent tooth should be replaced into its socket as soon as possible, ideally within 2 hours
- I am not sure

6. Which of the following statement is incorrect regarding Ludwig's angina?

- The most serious immediate sequel is airway obstruction
- Haemolytic streptococcus is most commonly responsible for the infection
- A site of discrete fluctuance can often be found

- It is bilateral swelling of the submandibular, sublingual and submental spaces
- I am not sure

**Section C – Attitudes and Management Practices (Please rate your agreement)**

1. I am confident and comfortable treating common traumatic orofacial injuries and oro – facial medical emergencies?
  - Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly agree
  
2. I have adequate knowledge on how to manage common traumatic orofacial injuries and medical emergencies?
  - Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly agree
  
3. I feel that I do require further training in the management of common traumatic oro - facial injuries and medical emergencies.
  - Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly agree

4. I am confident in identifying a significant complication of a dental abscess such as Ludwig's angina.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

5. I am confident in the management of post-extraction bleeding.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

6. I am confident in the assessment of dental trauma.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

7. I am confident in the initial management of dental fractures.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

8. I am confident in the initial management of a partially dislodged tooth..

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

9. I am not confident in the initial management of a completely dislodged (avulsed) tooth.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

**Section D – (Further training-Please rate your agreement where necessary)**

1. Identify areas of further training regarding orofacial trauma that you feel you may require.

- Tooth avulsion
- Dislocation of the mandible
- Laceration of soft tissues eg. Lip, tongue, cheek
- Fracture of the mandible
- Fracture of the maxillae
- Other (Please list)

\_\_\_\_\_

2. Institutions should offer further/advanced training in the management of common traumatic orofacial injuries and orofacial medical emergencies?

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

3. Who do you think should offer such training?

- Dental professionals
- Medical doctors
- Sports medicine
- Bio kinetics
- Other (Specify) \_\_\_\_\_

4. Which of the following types of education about dental emergencies would you be willing to undertake?

- Lectures
  - workshops
  - Conferences
  - Textbook
  - Internet
  - Audio presentations
  - Visual presentations
  - Other (Please list)
-



5. How frequently should there be educational programs to update your knowledge on dental emergencies?

- Never
- Every 6 months
- Every year
- Every 18 months
- Every 2 years
- Every 3 years

6. What is the optimal duration for an educational program on dental emergencies?

- 1 hour
- 2 hours
- Half a day
- Full day
- Many days

The end

Thank you

## Appendix 7.9 - Focus Group interview



1. In terms of current qualifications, do you think there is adequate education and training offered to students to manage common orofacial traumatic injuries and medical emergencies?
2. In terms of the revised qualifications (ECT-Mid-level workers) and longer training (4 year degree), do you think there is adequate education and training offered to students to manage common orofacial trauma and medical emergencies?
3. In your opinion, is further training required for ECPs in training to efficiently manage common orofacial trauma and medical emergencies?
4. Who do you think should offer such training?
5. Are you aware of any CPD activities that have focused on the management of common traumatic orofacial injuries and medical emergencies? If not do you think there should be such CPD activities?
6. Do you have any other comments or suggestions that you would like to add regarding the research?

**Appendix 7.10 – Research Ethics Certificate**



**FHI 360**

certifies that

*Lucy Reddy*

has completed the

**RESEARCH ETHICS TRAINING CURRICULUM**

November 13, 2017