Journal of Multidisciplinary Dental Research

REVIEW ARTICLE

Medical Emergencies in a Dental Setting: When Not To Panic!!!

Shivaprasad [1,*], Praneetha Rani[2], Mahima Mishra[3], Vaishnavi Pandey[3]

[1] *Senior Lecturer, Manipal College of Dental Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, India*
[2] *Senior Lecturer, NITTE (Deemed to be University), A B Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangalore, 575018, Karnataka, India*
[3] *Postgraduate, Manipal College of Dental Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, India*

ARTICLE INFO

Article history:
Received 04.01.2025
Accepted 13.02.2025
Published 04.12.2025

* *Corresponding author.*
Shivaprasad
drshivaprasadnk@gmail.com

https://doi.org/10.38138/JMDR/v11i2.25.1

ABSTRACT

Medical emergencies in dental practice are rare but can occur unexpectedly. It is crucial for dental practitioners to recognize and manage such emergencies effectively to minimize morbidity and mortality. Factors contributing to emergencies include an aging population seeking dental care, advances in medical therapies, longer dental appointments, and increased drug use in dentistry. A thorough medical history can help anticipate potential emergencies. In hospital settings, emergency events occur more frequently but mirror those in private practice. Accurate diagnosis and appropriate management are essential during emergencies. Dental practitioners and staff must possess the necessary skills, training, and equipment to address life-threatening situations. Continuous professional development (CPD) ensures dental care professionals maintain their competence in managing medical emergencies, reinforcing patient safety and care quality.

Keywords: Medical emergencies; Emergency drugs; Emergency equipment

1 INTRODUCTION

A medical condition demanding immediate treatment is an emergency and it requires immediate attention and successful management.[(1)] These are the life-threatening situations of which every practitioner must be aware of so that needless morbidity can be avoided.[(1)] Medical emergencies at dental office are a rare situation,[(2)] but they do occur and need to be taken care of. And in a periodontal surgical setup the chances of medical emergencies arise because of the longer duration of the treatment and also the invasive nature of the surgeries. Medical emergencies are rare but not unexpected. Consider for an example, newspaper articles describing the sudden and unexpected deaths of young, well-conditioned athletes.[(3,4)] In a survey of medical emergencies occurring in dental offices in Scotland, four deaths were reported in persons sustaining cardiac arrest who were listed as bystanders that is, persons not established for dental treatment in the dental office which they died.[(5)] Medical emergencies were most likely to occur during and after local anesthesia, primarily during tooth extraction and endodontics. Over 60% of the emergencies were syncope, with hyperventilation the next most frequent at 7%.[(6)]

Medical emergencies can occur in a dental setting so it is better to be well prepared to handle such situations and if possible, prevent them from occurring. In this review we discuss the different medical emergencies that can arise in a dental setup and how these can be prevented at the same time.

2 INCIDENCE OF MEDICAL EMERGENCIES

Fortunately, the incidence of emergency events seen in the general practice setting is rare but when an emergency does occur it can be life threatening. Medical emergencies in the dental practice that have been reported include vasovagal syncope (63%), angina (12%), hypoglycaemia (10%), epileptic seizures (10%), choking (5%), asthma (5%) and anaphylaxis.[(7)] Excluding syncope, adverse medical events have been reported to occur at a rate of 0.7 cases per dentist per year[(8)] or on average an event once every three to

four years.[9]

3 PREVENTION OF MEDICAL EMERGENCIES

McCarthy has stated that use of a complete system of physical evaluation for all prospective dental patients would be capable of preventing approximately 90% of life threatening situations.[10] The remaining 10% will occur in spite of all preventive efforts. Goldberger[11] wrote, "When you prepare for an emergency, the emergency ceases to exist". This is accurate to the extent that adequate preparation for an emergency diminishes the danger of possibility of its resulting in significant morbidity or death. Prior to the knowledge of a patients physical condition enables the doctor to incorporate modifications into the dental treatment plan. In other words, "to be forewarned is to be forearmed".[10]

The incidence of medical emergencies is higher in patients receiving ambulatory oral surgery compared with those receiving nonsurgical care because of the following three factors[12]

1. Surgery is more stress provoking.
2. A greater number of medications are typically administered to preoperative patients.
3. Longer appointments are often necessary when performing surgery.

These factors are known to increase the likelihood of medical emergencies. More gratifying than treating emergencies, however, is preventing them. Three-quarters of all of the medical emergencies reported in survey potentially developed as sequelae of pain (for example, inadequate local anesthesia), the dentist's failure to recognize and treat a patient's fear of dental care, or both. Preventing medical emergencies permits the dentist to carry out the planned dental treatment in an optimal environment. Therefore, dentists must obtain as much information as possible about their patients' medical status before starting any dental treatment.[13]

4 MEDICAL HISTORY

Most dental practitioners find health history forms to be an efficient means of initially collecting the medical history, whether obtained in writing or in an electronic format. When a credible patient completes a health history form the dentist can use pertinent answers to direct the interview. Properly trained dental assistants can "red flag "important patient responses on the form to bring positive answers to dentist attention.[12]

4.1 Visual inspection

Visual observation of the patient can provide the doctor with additional information about the patient's physical status and degree of anxiety. Observation of a person's posture, body movements, speech, and skin may help the doctor detect disorders that may previously have gone unnoticed.[13] Persons with chronic pulmonary disorders often must sit more upright in the dental chair than other patients because of severe orthopnea. Arthritic patients with a rigid neck need to rotate their entire trunk when turning toward the doctor or when viewing an object from the side. In addition, involuntary body movements occurring in conscious patients may indicate significant disorders. Tremors may be noted in disorders such as fatigue, multiple sclerosis, parkinsonism, and hyperthyroidism, as well as hysteria and nervous tension.

4.2 Dialogue history

The dentist reviews the completed form with the patient and asks additional questions about any medical problems that the patient has reported. Through this dialogue, the dentist seeks to determine the significance of any reported medical disorder to the proposed dental treatment plan.[13]

4.3 Medical risk assessment

The recognition of 'at-risk' patients and subsequent appropriate management is paramount in reducing the probability of an adverse event. Acknowledgement that any dental patient may have a medical emergency during dental treatment is a key start point. A thorough medical and drug history is mandatory and should be undertaken by the dentist in person. Patient-completed health questionnaires should be confirmed by a verbal history. Identification of at-risk patients will allow modifications to be made to treatment planning and may highlight those patients whose treatment may be more appropriately conducted at specific times or in specialist centres. Medical and drug records should be updated annually, and any changes highlighted during ongoing treatment plans should be re-assessed and recorded at every visit. This is more important now than ever as we are treating an ageing population who may have substantial co-morbidities and who are undergoing complex and frequently changing medical therapies.[14]

5 SOME STEPS TO PREVENT MEDICAL EMERGENCIES

5.1 Premedication[13]

Many apprehensive patients report that their fear of dentistry or surgery is so great that they are unable to sleep well the night before their appointment. Fatigued the next day, they are less able to tolerate any stress placed on them during treatment. The dentist may prescribe a sedative-hypnotic drug, such as diazepam, triazolam, flurazepam, zaleplon or zolpidem, for administration one hour before the patient goes to bed.

5.2 *Appointment scheduling*[13]

Apprehensive or medically compromised patients are better able to tolerate stress when rested. Consequently, for most of these patients, including children, the ideal time to schedule dental treatment is early in the day.

5.3 *Minimize waiting time*[13]

Once in the dental office, an apprehensive patient should not have to wait in the reception area or dental chair for extended periods before treatment begins. Anticipation of a procedure can induce more fear than the actual procedure.

5.4 *Sedation during treatment*

Should additionally stress reduction procedures be required, the dentist may consider using any available sedation technique or general anesthesia. Nondrug techniques include iatrosedation (including music and video) and hypnosis; the more commonly used pharmacosedative procedures include oral, inhalational, intramuscular, intranasal and intravenous (minimum or moderate) sedation.[15,16]

5.5 *Pain control*[13]

For stress reduction to be successful, the patient's pain must be controlled. Successful pain management is of greater importance in medically compromised patients.

5.6 *Treatment duration*[13]

In many instances, a healthy but fearful patient may wish to have as few dental appointments as possible, regardless of their length. However, satisfying a patient's (or parents' or guardians') desire for longer appointments is inadvisable if the dentist believes there are appropriate reasons for shorter appointments.

6 PREPARATION FOR A MEDICAL EMERGENCY

Medical emergencies that arise in the office are a great source of concern for practitioners and office staff. Proper planning for the unexpected can help alleviate some of this anxiety and improve patient safety within the office.[12] The recommendations throughout this book are based on the opinions of several experts; good evidence on the topic of emergency preparedness is lacking. Preparedness is the second most important factor in the management of medical emergencies. Preparation to handle the emergencies includes the four specific actions.[12]

1. Ensuring that the dentist owns education about emergency management is adequate and up to date.
2. Having the office staff trained to assist in medical emergencies.
3. Establishing a system to gain ready access to other health care providers able to assist during emergencies.
4. Equipping the office with equipment and supplies necessary to care initially for patients having serious problems.

6.1 *Emergency drugs*

The emergency drugs are of two categories[17]:

Essential emergency drugs and Additional emergency drugs (Figure 1).

Drug	*Indication*	*Initial Adult Dose*
1. Oxygen	almost any medical emergency	100%: inhalation
2. Epinephrine	anaphylaxis	0.1 mg i.v., or 0.3–0.5 mg i.m.
	asthma unresponsive to albuterol/salbutamol	0.1 mg i.v., or 0.3–0.5 mg i.m.
	cardiac arrest	1 mg i.v.
3. Nitroglycerin	pain of angina	0.3–0.4 mg sublingual
4. Antihistamine	allergic reactions	
(diphenhydramine or		25–50 mg i.v., i.m.
chlorpheniramine)		10–20 mg i.v., i.m.
5. Albuterol/salbutamol	asthmatic bronchospasm	2 sprays: inhalation
6. Aspirin	myocardial infarction	160–325 mg

Fig. 1: Essential Drugs

6.2 *Routes of Drug administration (Figure 2)*

Drug	Route of Administration
Oxygen	Inhalation
Glyceryl trinitrate (GTN) spray (400 micrograms per actuation)	Sublingual
Dispersible aspirin (300 mg)	Oral (chewed)
Salbutamol aerosol inhaler (100 micrograms per actuation)	Inhalation
Adrenaline injection (1:1000, 1 mg/ml)	Intramuscular
Glucagon injection (1 mg)	Intramuscular/subcutaneous
Oral glucose solution/gel (GlucoGel®)*	Oral
Midazolam 10 mg or 5 mg/ml (buccal or intranasal)	Infiltration/inhalation
*Alternatives: 2 teaspoons of sugar/3 sugar lumps 200 ml milk Non-diet Lucozade® 50 ml Coca-cola® non-diet 90 ml If necessary this can be repeated at 10-15 minute intervals.	

Fig. 2: Routes of Drug administration

6.3 *Basic Emergency Drugs for the dental office (Figure 3)*

Suggested basic emergency drugs for the general dental office.

INDICATION	DRUG	ACTION	ADMINISTRATION
Bronchospasm (Severe Allergic Reaction)	Epinephrine	α- and β-adrenergic receptor agonist	Autoinjectors or preloaded syringes, ampules; 1:1,000 solution subcutaneously, intramuscularly or sublingually; adults, 0.3 milligram; children, 0.15 mg
Mild Allergic Reaction	Diphenhydramine	Histamine blocker	50 mg intramuscularly; 25 to 50 mg orally every three to four hours
Angina	Nitroglycerin	Vasodilator	Sublingual tablet: one every five minutes up to three doses; translingual spray: one spray every five minutes up to three times
Bronchospasm (Mild Asthma)	Bronchodilator such as albuterol	Selective β_2- adrenergic receptor agonist	Two or three inhalations every one to two minutes, up to three times if needed
Bronchospasm (Severe Asthma)	Epinephrine	α- and β-adrenergic receptor agonist (bronchodilator)	Autoinjectors or preloaded syringes, ampules; 1:1,000 solution subcutaneously, intramuscularly or sublingually; adults, 0.3 mg; children, 0.15 mg
Hypoglycemia	Glucose, as in orange juice	Antihypoglycemic	If the patient is conscious, ingest
Myocardial Infarction	Aspirin	Antiplatelet	One full-strength tablet (165-325 mg) chewed and swallowed
Syncope	Aromatic ammonia	Respiratory stimulant	Inhalant crushed and held four to six inches under nose

Fig. 3: Equipment for general dental office

6.4 *Resuscitation Equipment (Figure 4)*

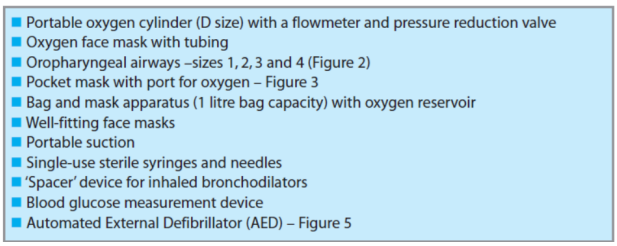

Fig. 4: Basic minimum equipment requirements

6.5 *The ABCDE approach (Figure 5)*

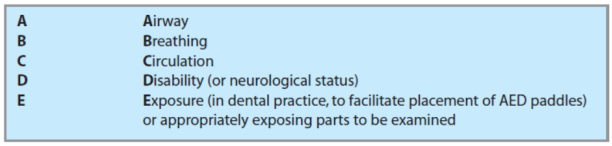

Fig. 5: ABCDE approach

If conscious, the patient should sit in any position that is comfortable. If unconscious, the patient should be supine with the legs elevated slightly to about 10° to 15°. This position facilitates blood flow to the brain, thus helping to correct any deficient oxygen delivery. Medical emergencies can often be prevented by early recognition.[18] An abnormal patient color, pulse rate or breathing can signal some impending emergencies. It is important to have a systematic approach to an acutely ill patient and to remain calm. The principles are summarized in the 'ABCDE' approach.[19]

Airway obstruction is a medical emergency and must be managed quickly and effectively. Usually, a simple method of clearing the airway is all that is needed. A head tilt, chin lift or jaw thrust will open the airway.[19] Patients who are unable to speak are to be feared and establishing a patent airway is vital.[19] It is important to remove any visible foreign bodies, blood or debris and the use of suction may be beneficial.

Opening Airway Technique[19]: The rescuer must stand behind the victim's head to perform this procedure.

Head tilt[19]: Place one hand on patient's forehead and apply backward pressure with the palm to rotate the head upward and backward.

Chin lift[19]: Place the tips of middle and index fingers on the symphysis of the mandible to lift the mandible.

Jaw thrust technique[19]: Place the fingers on the angle of the mandible and displace the mandible forward.

6.6 *Breathing*

The dentist and staff members should consider the second step—breathing— immediately after taking care of the patient's airway. If he or she is conscious, this usually is not a problem, and the team can move on quickly to circulation. If the patient is talking, then he or she is breathing, but in cases of asthma or allergy, the dentist must rule out wheezing (bronchospasm). He or she also needs to consider whether the patient is breathing too slowly or rapidly. Any team member can monitor the respiratory rate and adequacy of respiration. In adults, the normal respiratory rate is 12 to 15 breaths per minute. In children, the rate is higher, with an 8-year-old averaging 18 breaths per minute and a 3-year-old averaging 22 breaths per minute.9 Bradypnea is any respiratory rate significantly below the normal rate; it may result in hypoventilation and inadequate oxygenation. Tachypnea, often a sign of anxiety, is any respiratory rate significantly above the normal rate; it may lead to hyperventilation syndrome. For offices in which the clinician induces moderate or deep sedation or administers a general anesthetic, a pulse oximeter should be available and can be used to assess the adequacy of oxyhemoglobin saturation.

6.7 *Circulation*

Circulatory assessment should never delay the start of CPR. By far the most common cause of a collapse that is essentially circulatory in origin is the simple faint (vaso-vagal syncope). A rapid recovery can be expected in these cases if the patient is laid flat and the legs rose. Prompt management is required as cerebral hypoxia has devastating consequences if prolonged. Causes other than a faint must be considered if recovery does not happen quickly. Checking the carotid pulse to diagnose cardiac arrest can be unreliable, even when attempted by some health care professionals. Checking the carotid pulse should only be carried out by those proficient in doing this. The latest guidelines highlight the need to identify agonal gasps (as well as the absence of breathing) as a sign to commence CPR and lay no particular emphasis on checking the carotid pulse.[1]

6.8 *Disability*

Disability is the term which refers to an assessment of the neurological status of the patient. In this context, primarily, it refers to the level of consciousness (in trauma patients a more widespread neurological examination is required). Hypoxia or hypercapnia (increased blood levels of carbon dioxide) is possible causes, together with certain sedative or analgesic drugs. It is important to exclude hypoxia or hypotension and attention to the airway, giving supplemental oxygen and supporting the patient's circulation (by lying them supine and raising their legs) will in many cases solve the problem. All unconscious patients who are breathing and have a pulse should be placed in the recovery position if they are unable to maintain their own airway.[20]

A rapid gross assessment can be made of a patient's level of consciousness using the AVPU method [20]:

Are they Alert?

Do they respond to Vocal stimuli?

Do they respond to Painful stimuli? or

Are they Unresponsive?

A lapse into unconsciousness may be due to hypoglycaemia – if the blood glucose level is less than 3mmol/litre as checked by a glucose measuring device.

6.9 Exposure (E)

Exposure refers to loosening or removal of some of the patient's clothes. For example, for the application of defibrillator paddles (in dental practice), or if the patient has been involved in a traumatic incident (usually in hospital), for examination purposes. It is important to bear in mind the patient's dignity as well as the potential for clinically significant heat loss. [20]

7 CONCLUSION

Medical emergencies can arise at any state or situation so a dental practitioner should be well equipped to deal with such situations. The availability of the right equipment and the use of appropriate medication can prevent these emergencies. The proper knowledge and awareness of the practitioner will help and guide in preventing these emergencies.

8 DISCLOSURE

Funding: None

Conflict of Interest: Nil

REFERENCES

1) Ramanayake RPJC, Ranasingha S, Lakmini S. Management of emergencies in general practice: Role of general practitioners. *Journal of Family Medicine and Primary Care*. 2014;3(4):305–308. Available from: https://dx.doi.org/10.4103/2249-4863.148089.
2) Mohideen K, Thayumanavan B, Balasubramaniam AM, Vidya KM, Rajkumari S, Bharkavi SI. Basics of Management of Medical Emergencies in Dental Offi ce and Emergency Drug Kit. *International Journal of Scientifi c Study* . 2017;5(4):273–279. Available from: https://www.ijss-sn.com/uploads/2/0/1/5/20153321/ijss_july_ra03_-_2017.pdf.
3) Drooz A. Gathers Collapses, Then Dies : Loyola Star, 23, Is Taken Off Court During a Game. Los Angeles Times. March 5, 1990. Available from: https://www.latimes.com/archives/la-xpm-1990-03-05-sp-1491-story.html.
4) School girl dies during basketball drill. New York Times. November, 1988.
5) Wieling W, Ganzeboom KS, Saul JP. Reflex syncope in children and adolescents. *Heart*. 2004;90(9):1094–1100. Available from: https://dx.doi.org/10.1136/hrt.2003.022996.
6) Haas DA. Management of Medical Emergencies in the Dental Office: Conditions in Each Country, the Extent of Treatment by the Dentist. *Anesthesia Progress*. 2006;53(1):20–24. Available from: https://doi.org/10.2344/0003-3006(2006)53[20:momeit]2.0.co;2.
7) Müller M, Hänsel M, Stehr S. A state-wide survey of medical emergency management in dental practices: incidence of emergencies and training experience. *Emergency Medicine Journal*. 2008;25(5):296–300. Available from: https://doi.org/10.1136/emj.2007.052936.
8) Girdler NM, Smith DG. Prevalence of emergency events in British dental practice and emergency management skills of British dentists. *Resuscitation*. 1999;41(2):159–167. Available from: https://dx.doi.org/10.1016/s0300-9572(99)00054-4.
9) Atherton GJ, Mccaul JA, Williams SA. Medical emergencies in general dental practice in Great Britain Part 1: their prevalence over a 10-year period. *British Dental Journal*. 1999;186(2):72–79. Available from: https://doi.org/10.1038/sj.bdj.4800023.
10) Malamed SF. Medical Emergency in the Dental Office. 6th ed. Mosby. 1997. Available from: https://www.asia.elsevierhealth.com/medical-emergencies-in-the-dental-office-elsevier-ebook-on-vitalsource-9780323167925.html.
11) Goldberger E. Treatment of cardiac emergencies. 5th ed. St Louis, Mosby. 1990. Available from: https://cdn.mdedge.com/files/s3fs-public/issues/articles/media_95626be_ccjm59_5-0553.pdf.
12) Hupp JR, Tucker MR, Ellis E. Contemporary Oral and Maxillofacial Surgery. 6th ed. Elsevier Health Sciences. 2013. Available from: https://shop.elsevier.com/books/contemporary-oral-and-maxillofacial-surgery/hupp/978-0-323-09177-0.
13) Malamed SF. Knowing Your Patients. *The Journal of the American Dental Association*. 2010;141:S3–S7. Available from: https://dx.doi.org/10.14219/jada.archive.2010.0350.
14) Wilson MH, McArdle NS, Fitzpatrick JJ, Stassen LFA. Medical emergencies in dental practice. *Medical emergencies in dental practice*. 2009;55(3):134–143. Available from: https://pubmed.ncbi.nlm.nih.gov/19591313/.
15) American Dental Association. Guidelines for the use of sedation and general anesthesia by dentists, as adopted by the October 2007 ADA House of Delegates. Chicago: American Dental Association. 2007. Available from: https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/ada_sedation_use_guidelines.pdf?rev=313932b4f5eb49e491926d4feac00a14&hash=C7C55D7182C639197569D4ED8EDCDDF6.
16) American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. Practice guidelines for sedation and analgesia by non-anesthesiologists. *Anesthesiology*. 2002;96(4):1004–1017. Available from: https://doi.org/10.1097/00000542-200204000-00031.
17) Haas DA. Emergency drugs. *Dental Clinics of North America* . 2002;46(4):815–830. Available from: https://doi.org/10.1016/s0011-8532(02)00027-7.
18) Haas DA. Preparing dental office staff members for emergencies: developing a basic action plan. *Journal of the American Dental Association*. 2010;141(Suppl 1):8S–13S. Available from: https://doi.org/10.14219/jada.archive.2010.0352.
19) Greenwood M, Corbett I. Dental emergencies. John Wiley & Sons. 2012. Available from: https://books.google.co.in/books/about/Dental_Emergencies.html?id=J3c74nHD8qwC&redir_esc=y.
20) Greenwood M, Meechan JG. Medical emergencies: the drug box, equipment and basic principles. *BDJ Team*. 2014;1(1):14088. Available from: https://dx.doi.org/10.1038/bdjteam.2014.88.