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MEDICAL EMERGENCIES AT THE DENTAL OFFICE

**Giovani E M¹., Bolorino E²., Ozi J³., Georgevich Neto R⁴., Andia Merlim⁵., Silva TW⁶.,
Marques F. CC⁷ and Santos C C⁸**

¹Master in Oral Pathology, Ph.D. in Integrated Clinic, Full Professor of Integrated Clinical Discipline and Patients with Special Needs, Professor of Master's and Ph.D. Program, Coordinator of CEAPE, Dentistry Course of the Faculty of Dentistry of Paulista University, FOUNIP, Sao Paulo, Brazil

^{2,3}DDS- UNIP, Sao Paulo, SP, Member of Center for Studies and Special Service for Patients, Brazil

^{4,6}MD Student UNIP, Sao Paulo, SP, Member of Center for Studies and Special Service for Patients, Brazil

^{5,7,8}DDS, Phd Student UNIP, Sao Paulo, SP, Member of Center for Studies and Special Service for Patients, Brazil

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ABSTRACT

The proposal of this article is to address the main medical emergencies in the dentist's routine and the treatment that these professionals must carry on. This article was based on revision of literature on the subject. The scientific literature shows that medical emergencies in dental offices are common, consequently, some of these emergencies cannot easily be reverted with the simple performance of a professional who is not trained for such situation. The surgeon dentist does not have to hesitate in calling 911, however, it is necessary that the dentist knows the basics of first aid procedures in order to keep the patient alive until emergency help arrives. The most important in the dentist's behavior is to prevent an emergency situation before it happens in the office, with a good anamnesis and a careful physical examination, followed by an evaluation of the signals and symptoms that the most common medical emergencies present.

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INTRODUCTION

The scientific literature shows that medical emergencies in dental offices are common and, consequently, some of these emergencies cannot be easily reversed with the simple performance of a professional who is not trained for such a situation. The Dental Surgeon should not hesitate to call for emergency care, however, first aid must be performed to ensure patient survival until specialist relief arrives. The most important in the conduct of the Dentist is to prevent emergency situations in the dental office by means of an anamnesis and careful physical examination, followed by the evaluation of the signs and symptoms that the main medical emergencies present. The Dentist, as a health professional, must be able to provide first aid in an emergency that may occur in the workplace. The present work aims at a clinical approach for the Dentist to raise the attention to the subject and to conscientize

on the severity of the emergencies as hypertension, hypoglycemia, asthma crisis, convulsive crisis, lipothymia, Steven Johnson's Syndrome, and others, and can occur at any time in your service routine. For this, the professional must be prepared to diagnose and intervene adequately in these interferences.

Main Medical Emergencies in the Dental Office:

Aspiration of Strange Bodies

According to [Bittencourt and Camargos \(2002\)](#), depending on the age of the patient, the type of foreign body aspirated and its location in the airways, there may be partial or total obstruction to the passage of air. A foreign body lodged in the larynx can cause complete obstruction of the respiratory tract and, consequently, death in 45% of the cases. If the obstruction is partial, it may cause snoring, hoarseness, aphonia,

*Corresponding author: **Giovani E M**

Master in Oral Pathology, Ph.D. in Integrated Clinic, Full Professor of Integrated Clinical Discipline and Patients with Special Needs, Professor of Master's and Ph.D. Program, Coordinator of CEAPE, Dentistry Course of the Faculty of Dentistry of Paulista University, FOUNIP, Sao Paulo, Brazil

odynophagia, hemoptysis and dyspnea of variable intensity, and these objects may remain impacted for prolonged periods.

Monnazzi *et al.* (2001) cite that the patient cannot speak, is anxious, loss of consciousness, cough, feeling of suffocation, noisy breathing and dyspnea. The authors further state that immediate treatment should have the following procedures: discontinue dental treatment; If the patient coughs, he must make his own attempts; Do abdomen compression and / or Heimlich maneuver; Oxygenate the patient; Remove the foreign body with your fingers or tweezers, and tongue retractors or even wooden spatulas can be used to visualize the hypopharynx and larynx.

The Heimlich maneuver consists, according to Socesp (2001), in positioning behind the victim, closing the fist and positioning it with the thumb in between the navel and the sternum bone. With your other hand, grasp the handle and pull both hands toward you, with a quick push up and in from the elbows. The upper abdomen should be compressed against the base of the lungs to expel the remaining air and force the elimination of the blockage. Repeat five times. Each push should be vigorous enough to dislocate the blockage of the airways

Asthma Crisis

Piovesan *et al.* (2006) argue that acute asthma is a very common medical emergency. It has been shown that the severity of the asthma attack is defined more by the outcome than by the initial clinical presentation. Thus, the immediate functional response to inhaled bronchodilators is a prognostic parameter.

Asthma is a chronic inflammatory disorder of the airways that causes recurrent episodes of wheezing, shortness of breath, chest stiffness and coughing, particularly at night and / or early in the morning. These symptoms are usually associated with disseminated but variable bronchoconstriction and airflow limitation, which is at least partially reversible, either spontaneously or with treatment (Hussein and Kumar 2005). However, Dalcin *et al.* (2000), Oliveira *et al.* (2003) and Figueiredo *et al.* (2006) report that asthma is characterized by a variable, recurrent, reversible respiratory obstruction that manifests clinically through intermittent episodes of wheezing and dyspnea. Bronchial hyperresponsiveness is associated with various stimulus that may be mediated by allergic antigens in asthma.

Fritscher (2001) and Oliveira *et al.* (2003) state that treatment should follow the procedures: discontinue dental treatment; Keep the patient calm; Monitoring airways; Gauging pulse and pressure; Administer Bronchodilators and Rocha *et al.* (2004) also report that the therapeutic resources recommended for the management of acute asthma in emergencies include oxygen therapy, the use of short-acting β_2 -adrenergic bronchodilators, inhalation ipratropium bromide, and systemic corticosteroids.

Convulsive Crisis

Figueiredo *et al.* (2006) report that, in addition to fever, the most common causes of convulsive crisis in children are infections, trauma and omission of doses of anticonvulsants and motor activities, causing disordered stimulus of brain

neurons. In dentistry can occur by stimulating the local anesthetic.

The epileptic crisis may also appear as a nonspecific form of reaction to any organic brain involvement (hypertensive encephalopathy, trauma, embolism, tumors, infections, hemorrhages, congenital anomalies, neurocutaneous disorders, arteritis by collagenosis, neurocysticercosis, etc.) (Resende 2009)

The Dentist may also deliver some medications to make the convulsive crisis, which are usually short, stop faster. The drugs can be: Diazepam 5 to 10 mg per route (I.M.) (adults); 200 to 400 mg intravenously (adults) Phenobarbital. (Monnazzi *et al.* 2001, Resende *et al.*, 2009)

Syncope

The syncope is caused by transient cerebral hypoxia. The causes are variable, yet they are always tied to emotional factors, fatigue, hunger and tension. It is characterized by any type of short-term loss of consciousness, presenting complete absence of responses and sensory and emotional stimuli. It is a temporary process without severity. The signs and symptoms are paleness, hypotension, tachycardia, darkening of vision, tinnitus, drowsiness, and gastric emptying sensation. (Andrade and Ranali 2011; Figueiredo *et al.* 2006; Fernandes 2004; Braunwald 2003).

Treatment should follow the following procedures: discontinue dental treatment; Lying the patient in Trendelenburg position to facilitate cerebral circulation; To loosen the garments; Administer oxygen; Check blood pressure and pulse; Extend the head to keep the upper airways clear. If the patient does not recover consciousness within 15 seconds, contact the emergency department. (SÁ Del Fiol and Fernandes 2004, Andrade & Ranali 2011)

Hypoglycemia

Hypoglycemia means low blood glucose. When glycemia is below 60 mg%, symptoms of a hypoglycemic reaction may occur: acute hunger, difficulty thinking, feeling weak with too much fatigue, excessive sweating, thin or coarse tremors of the extremities, yawning, drowsiness, Double vision, confusion that can lead to total loss of consciousness and coma. Hypoglycemia can occur in several situations and with several types of patients, mainly insulin-dependent diabetics (Resende *et al.*, 2009, LIMA *et al.*, 2004).

RESENDE *et al.*, 2009; Souza *et al.* (2003), Hernandez *et al.* (2003) state that treatment should follow the procedures: discontinue dental treatment; If the patient is conscious, one should drink one glass of water and two tablespoons of sugar; If the patient is unable to swallow, 25 g of glucose should be administered intravenously, 50 ml of the 50% solution being made drop-wise intravenously in about 20 minutes and observing the patient's reactions. They report that treatment for the awake, conscious and swallowing patient should follow the following procedure: offer a food as soon as you suspect it is hypoglycemic (preferably confirmed by the measurement of glycemia at the tip of the finger). 15 g of carbohydrates should be eaten, such as: one tablespoon of sugar with water, 150 ml of regular (non-diet) soda, 150 ml of orange juice and 3 pieces of caramel. Wait 15 minutes and check the blood glucose

again. If it remains below 79 mg / dl, repeat the schedule. When the patient is semi-conscious or unconscious: administer an IV glucagon injection.

Arterial Hypertension

Hypertension is the elevation of blood pressure to numbers above the values considered normal (140/90 mmHg). This abnormal elevation can cause injury to different organs of the human body, such as brain, heart, kidneys and eyes. Arterial hypertension is a very prevalent pathology that evolves in a non-symptomatic or asymptomatic way most of the time (MARQUES, 1999; SONIS *et al.*, 1996).

In hypertensive patients, anesthesia based on 3% mepivacaine without vasoconstrictor should be used, which provide anesthesia of up to 20 minutes in infiltrative injections and up to 30 to 40 minutes in regional blocks (OLIVEIRA *et al.*, 2003).

If the patient is already taking antihypertensive medication, it should be taken at each visit. If there is a crisis, the drug should be administered and the patient should remain lying flat. Check blood pressure in time spaces. Usually this therapy is enough to reverse the case. In dental clinics the great concern is the occurrence of hypertensive crises due to clinical and surgical interventions, triggered by drugs and associated with the emotional factor (Resende 2009)

Orthostatic Hypotension

Fall in blood pressure when the patient moves from the lying down position to the sitting or standing abruptly (CALKINS and ZIPES 2003). Signs and symptoms such as vision dimming, paleness, weakness, palpitations (MONNAZZI *et al.*, 2001).

Salt may be used to raise blood pressure in patients with normal renal function (CALKINS and ZIPES 2003).

The best way to prevent this disease is to slowly sit the patient after the treatment is finished and ask the patient to wait a few minutes to stand up (Souza *et al.*, 2003).

Anaphylaxis

According to Abbas (2005) and Kaufman (2002) and anaphylaxis is characterized by vascular shock, disseminated edema and respiratory distress. The reaction is immune in nature and depends on the formation of IgE antibodies, the immunoglobulin responsible for typical allergic reactions. The initial sensitization step induces the formation of specifically directed IgE against the triggering substance. IgE-mediated reactions can cause signs and symptoms that affect the cutaneous, respiratory, cardiovascular and hematological systems. In anaphylaxis the reaction occurs rapidly after the administration of minimal concentrations of the aggressor material and can be potentially fatal. They can be:

1. Height (itching, sweat) - No treatment or administration required. Diphenhydramine hydrochloride (Benadryl®) 50 mg oral.
2. Moderate (respiratory distress, bronchospasm, glottis edema and angioedema) - Epinephrine, 1: 1000, 0.2-0.3 ml subcutaneous or intramuscular (IM). Administer 100% oxygen and diphenhydramine hydrochloride (Benadryl®) 50mg oral.

3. Severe (pallor, circulatory and respiratory collapse, skin reaction, seizures) - Epinephrine, 1: 1000 0.5ml subcutaneous, IM or sublingual. Cardiopulmonary resuscitation. Give 100% oxygen. Cortisone 100mg intravenous (EV), diphenhydramine hydrochloride (Benadryl®) 50mg IV.

Toxic Reactions to Local Anesthetics

Serious toxic effects are for the most part caused by excessive blood concentrations caused by inadvertent intravascular injection or administration of large quantities of the drug. In general, these reactions can be avoided by observing three precautions: administer the lowest dose that produces effective anesthesia; Employ appropriate injection techniques, including aspiration; And use a solution containing vasoconstrictor, when not contraindicated by patient history or surgical necessity. If an adverse reaction occurs, immediate treatment should be given.

The patient should be placed in the supine position and oxygen should be given, which is often sufficient for mild toxic reactions, responses to epinephrine or syncope attacks. (Kopp *et al* 2009, Berd *et al* 2010)

The treatment consists of dealing correctly with the emergency generated by the anesthetic, anaphylaxis, myocardial infarction). Evaluate vital signs, if there is stimulation of the Central Nervous System-Administer; Diazepam 5-10mg EV. If CNS depression occurs, the patient should be placed in Trendelenburg position, administer 100% oxygen, and monitor vital signs. (NEIDLE, 2000; Barbosa 2010)

Steven Johnson's Syndrome

Steven Johnson's Syndrome is the most abrupt form of erythema multiforme, it is used to designate a symptom complex that forms a group of mucocutaneous syndromes. Erythema multiforme is an acute inflammatory disease characterized by the appearance of red macules (erythema) that develop into self-limited vesicles, blisters and ulcers (multiforme). Most often, the lesions distribute themselves symmetrically, especially in the hands, arms, legs, feet, face and neck, having variable size and aspect of concentric rings. Such changes may occur in any region of the skin, buccal mucosa, conjunctiva and genital mucosa. This disease usually presents with systemic symptoms. Erythema multiforme can reach individuals of any age, but it is more common in young males, with no racial predisposition. Such a condition occurs rarely in people aged less than three years or greater than 50. The incidence of erythema multiforme is unknown, however, the occurrence of this pathological condition is around 0.8 to 6 cases per million inhabitants. The authors report that there are several theories described to explain the etiopathogenesis of erythema multiforme or polymorph, including infectious, toxic and immunological causes. However, in more than 50% of cases, its etiology is still unknown. It is known, however, that erythema multiforme is considered a hypersensitivity reaction to a very varied number of agents (GOMES *et al.*, 2003; KUMAR 2005).

According to Gomes *et al.* (2003) and Lingen and Kumar (2005) and Neville (2004), the use of corticosteroids is indicated by topical or oral route. Antibiotics associated with corticosteroids are usually the drugs of choice. In very

extensive lesions, topical antiseptic treatment is used. In most cases of erythema multiforme, they resolve completely with time. In the region of the buccal mucosa, where the lesions are very painful, the use of weak solutions of hydrogen peroxide, oral antiseptics and the like is indicated in order to diminish the local discomfort and to aid the cicatrization. Allergic erythema multiforme frequently responds to locally applied antihistamines in the form of mouthwashes or suspensions, as well as administered orally. In the most abrupt form it is the responsibility of the Dentist to eliminate the causes, discontinue any procedure and administer antihistamine and systemic corticosteroid triggering medical relief immediately.

Angina Pectoris

Some patients complain of localized discomfort only to the left or rarely to the right of the thoracic midline. Commonly mandibular pain radiated to the neck and throat. Pain duration is important to determine its etiology. Angina is relatively brief in duration, usually 4 to 10 minutes. However, if the pain is very brief momentary, sharp and acute, lasting less than 15 seconds, the diagnosis of angina can be ruled out. (Cannon and Braunwald 2003, Garfunkel et al., 2002 and Schoen 2005)

Rest and Sublingual isosorbide dinitrate decrease the discomfort of angina in about 1 to 5 minutes. After more than 10 minutes without improvement, the diagnosis of stable chronic angina becomes questionable. For angina patients administer prophylactic dose of Isosorbide Dinitrate a few minutes before the consultation. (Chapman 2002; Neto 2016)

Acute Myocardial Infarction

Myocardial infarction consists of the death of the cardiac muscle resulting from ischemia, with atherosclerosis being the main underlying cause. According to Antman and Braunwald (2003), myocardial necrosis, once established, causes permanent abnormality of parietal motility, where the myocardium has its capacity to function functionally abnormal. (Schoen 2005 and Garfunkel et al., 2002).

The signs and symptoms are pain in the shoulder, arm, neck, jaw or back. Generally the pain is spontaneous and may be associated with a change of position, physical exertion, emotional stress and respiratory function. Symptoms associated with nausea, vomiting, sweating, cold hands and feet, abdominal pain, anxiety and panic may also be present or may be associated with shortness of breath, palpitations, nausea, vomiting, and intense sweating. Frequently, pain is described as Similar to angina pectoris, but more intense and delayed. Although the differential diagnosis is defined by the electrocardiogram, the signs and symptoms mentioned above authorize emergency therapeutic measures in order to avoid the extension of ischemia. Early treatment aims at decreasing the myocardial oxygen demand, without compromising vital organs. Therefore Isosorbide Dinitrate (Isordil) and 100% oxygen should be used. The patient should be positioned with the lower limbs elevated in order to decrease the hypotensive action of the drug. (Neto 2016)

Cardio-Respiratory Stop (PCR)

According to Myerburg and Castellanos (2003), cardiac arrest itself is characterized by the abrupt loss of consciousness resulting from a lack of adequate cerebral blood flow. It is an

event that leads to death in the absence of an effective intervention and spontaneous reversals rarely occur.

According to Barbosa and Padua (2005), the clinical diagnosis is due to the finding of unconsciousness, apnea or sketch of breathing and absence of pulse in the great arteries, and cardiopulmonary resuscitation is fundamental for the success of resuscitation maneuvers in the treatment of CRP. Early diagnosis of the condition of the cardiorespiratory arrest, prompt and rapid institution of basic life support, defibrillation as fast as possible. This is determinant for the patient to have a chance of over life. Marques (1999) describes that the pupils begin to dilate about 45 seconds after the interruption of circulation.

The Dentist should release the airways, administer 100% oxygen, initiate cardiopulmonary resuscitation (CPR). Administer epinephrine 1: 1000 5.0 mg intravenously (EV) and trigger relief.

Emergency Operations

The emergency management in the dental office by the Dentist should be based on the Basic Life Support.

Guimarães et al. (2005) affirm that the ABC of life orders care in all emergencies and urgencies, such as dental offices, at home or accidents on public roads: A - Airway (opening of the airways); B - Breating (artificial respiration); C - Circulation (heart massage).

- A - Airway** (airway opening): Remove any object that may be obstructing or obstructing the passage of air. Secretions, such as blood and saliva, should also be aspirated. Hyperextension of the head, to avoid the fall of the tongue.
- B - Breating** (artificial respiration): check if the patient breathes well. If the patient is not breathing, two artificial ventilation should be performed.
- C - Circulation** (heart massage): check the carotid pulse, the absence means cardiac arrest. Therefore, place the patient on a rigid surface and initiate cardiopulmonary resuscitation maneuvers.

In the dental office, according to Guimarães et al. (2005) and Timerman et al. (2006), the most important determinant of survival in medical emergencies is the presence of a trained Dental Surgeon who is ready, willing, capable and equipped to intervene. In addition to training and training, it is imperative to use an emergency kit that should contain at least:

Glycosimeter
Sphygmomanometer and Stethoscope
Oxygen mask
Oxygen Cylinder & Accessories
Ambu

Medication: Salbutamol Sulfate, Promethazine Hydrochloride, Valium, Fenoterol Hydrobromide, Isordil, Diphenhydramine Hydrochloride, Valproic Acid, Captropil, Adrenaline, Glucose, Insulin, Aminophylline. Capoten 50mg; Adrenaline 1/1000; Distilled water for injection; Hypertonic glucose 25%; Valium 10mg (Diazepam); Fernegan (Promethazine); Isordil 5mg sublingual; Aspirin 100mg; Solucortef; Solucortef 500mg (Hydrocortisone); 5% glycoside serum; Lactated Ringer's solution.

CONCLUSION

This article aims to provide theoretical support and technical skills for the Dentist to act in the face of emergency situations, alerting the importance of obtaining knowledge and training in the subject, since the studies show that the medical emergencies in dental offices are not rare. In addition, it is evident the need to have in the office a first aid kit with all the medicines and equipment for the procedures described here. And through a detailed history, the dentist can avoid a number of undesirable events during treatment. There is no doubt that it is better to prevent emergency situations than to treat them, but if any of them occur we must be prepared to intervene and offer basic life support to these patients.

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