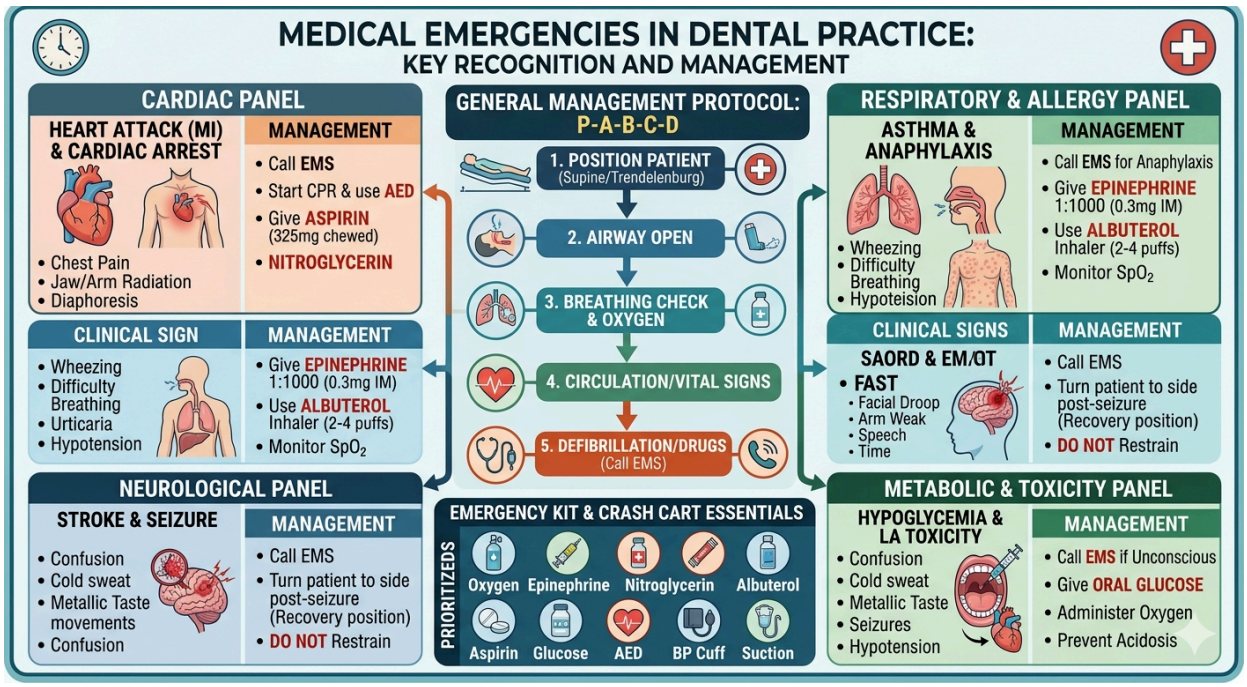

Medical Emergencies in Dental Practice

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This comprehensive guide outlines the recognition and management of critical events in the dental setting. The goal is to stabilize the patient until emergency medical services (EMS) arrive.

1. Cardiac Arrest (The Ultimate Emergency)

• Recognition: Sudden loss of consciousness, absence of normal breathing, and no palpable pulse.

• Management:

1.Call EMS: Activate the office emergency protocol immediately.

2.CPR: Start high-quality chest compressions (30:2 ratio).

3.AED: Attach the Automated External Defibrillator as soon as it arrives. Follow voice prompts.

4.Oxygen: High-flow oxygen via bag-valve-mask.

2. Heart Attack (Myocardial • Recognition: "Crushing" chest pain, radiation to the left arm/jaw, shortness of breath, and diaphoresis (sweating). Unlike angina, it does not resolve with Nitroglycerin.

• Management:

1.Position: Comfortable (usually upright to assist breathing).

2.MONA (modified for dental):

• Morphine (if available/licensed) or calm the patient.

• Oxygen.

• Nitroglycerin (0.4mg sublingual, up to 3 doses). May be dangerous inferior wall MI

• Aspirin (325mg chewed and swallowed).

3.Call EMS.

3. Stroke (Cerebrovascular Accident)

• Recognition (FAST):

• Facial drooping.

• Arm weakness.

• Speech difficulty (slurring).

• Time to call EMS.

• Management:

1.Keep patient calm; monitor vitals.

2.Position: Slightly elevated head.

3.Do not give Aspirin (it could be a hemorrhagic stroke).

BEFAST- Balance , E - Eye to rule out or rule in Posterior circulation stroke

4. Seizure

• Recognition: Sudden loss of consciousness, tonic-clonic muscle movements, possible incontinence.

• Management:

1.Protect: Move equipment away; do not restrain or place anything in the mouth.

2.Post-ictal care: Once movements stop, place in the recovery position and suction the airway if needed.

3.Medication: If seizure lasts >5 mins (Status Epilepticus), Midazolam (5-10mg IM/buccal) may be indicated.

5. Local Anesthetic Systemic Toxicity (LAST)

• Recognition: Metallic taste, perioral numbness, tinnitus, followed by tremors, seizures, and eventual cardiac collapse.

• Management:

1.Stop Injection.

2.Oxygen: Prevent hypoxia/acidosis which worsens toxicity.

3.Seizure control: Benzodiazepines.

4.Lipid Rescue Therapy: (Hospital setting) Intravenous lipid emulsion.

6. Allergy and Anaphylaxis

• Recognition: Mild (rash, itching) vs. Severe (stridor, wheezing, hypotension, swelling of the airway).

• Management:

1.Mild: Antihistamine (Diphenhydramine 50mg).

2.Severe (Anaphylaxis): Epinephrine 1:1000 (0.5mg IM) in the outer thigh. Repeat every 5–15 mins if no improvement. Call EMS.

7. Respiratory: Asthma & COPD Exacerbation

• Recognition: Wheezing, use of accessory muscles to breathe, cyanosis.

• Management:

1.Asthma: 2–4 puffs of Albuterol (Salbutamol) inhaler. Repeat as needed.

2.COPD: Sit the patient upright. Administer oxygen with caution (low flow if chronic, but high flow if the patient is crashing).

8. Syncope (Fainting)

• Recognition: Pale skin, cold sweat, slow pulse followed by brief loss of consciousness.

• Management:

1.Trendelenburg Position: Feet higher than head.

2.Aromatic Ammonia: Crushed under the nose (stimulates breathing).

3.Cooling: Cold compress on forehead.

9. Hypoglycemia (Low Blood Sugar)

• Recognition: Confusion, "cold and clammy" skin, tremors.

• Management:

1.Conscious: Oral glucose (juice, cake frosting, glucose tabs).

2.Unconscious: Glucagon (1mg IM) or IV Dextrose. Call EMS.

10. Uncontrolled Bleeding

• Recognition: Persistent oozing or "pumping" blood post-extraction.

• Management:

1.Direct Pressure: Bite on gauze for 20 mins.

2.Local Agents: Gelfoam, Surgicel, or Collagen plugs in the socket.

3.Suturing: Primary closure of the site.

4.Tranexamic Acid: Use as a soak or mouthwash.

11. Patients on Anticoagulants

• **Protocol**:

• INR: For Warfarin, ensure INR is <3.5–4.0 before surgery.

• DOACs: Do not stop medication; use local hemostatic measures.

• Education: Avoid NSAIDs (use Acetaminophen for pain).

12. The Dental Crash Cart (Emergency Kit)

A well-organized kit is organized by "module" rather than a jumble of drugs.

Category	Items
Critical Drugs	Epinephrine, Nitroglycerin, Albuterol, Aspirin, Glucose, Diphenhydramine.
Airway	Portable Oxygen (E-cylinder), Bag-Valve-Mask (Ambu-bag), Oropharyngeal airways, Suction tips.

Circulation	AED, Sphygmomanometer (BP cuff), Stethoscope.
Delivery	Syringes, needles, alcohol swabs, tourniquet.
Documentation	Medical emergency log sheets to record times and dosages given.

Summary Rule: P-A-B-C (Position, Airway, Breathing, Circulation). If you don't know what it is, but they look bad, call EMS and give Oxygen.

Management of Patients on Anticoagulants (Blood Thinners)

The modern consensus is that thrombotic risk (clot/stroke) from stopping medication is generally more dangerous than the bleeding risk from a dental procedure.

Warfarin (Vitamin K Antagonists)

• The 48-Hour Rule: Check the patient's INR within 24–72 hours of the procedure.

• The Safe Zone: If the INR is \leq 4.0, you can proceed with minor oral surgery (1–3 extractions, periodontal surgery) without stopping the medication.

• If INR > 4.0: Defer elective treatment and refer the patient to their physician to adjust the dosage.

DOACs (Direct Oral Anticoagulants - e.g., Apixaban, Rivaroxaban)

• No Interruption: For most minor procedures, do not stop the DOAC.

• Timing: Schedule the procedure for the "trough" level—usually just before their next scheduled dose.

• Renal Factor: Use extra caution if the patient has known kidney disease, as DOACs are cleared renally and may linger longer in the system.

Local Hemostatic Measures (The "Safety Net")

When treating these patients, always use "triple-local" hemostasis:

1.Suture: Use resorbable sutures to close the site.

2.Pack: Place a hemostatic agent (e.g., Surgicel, Gelfoam) in the socket.

3.Pressure: Have the patient bite on gauze for a full 30 minutes post-op.

4.Rinse: Consider 4.8% Tranexamic Acid mouthwash (if available) for 2 days post-op.

2. Cardiac Conditions & Antibiotic Prophylaxis (AP)

Current guidelines have significantly narrowed who receives antibiotics. We no longer pre-medicate for most heart murmurs or joint replacements.

Who REQUIRES Prophylaxis? (High-Risk Only)

• Prosthetic Heart Valves: Mechanical or biological (including TAVI/TAVR).

• History of Infective Endocarditis (IE): Previous infection of the heart lining.

• Unrepaired Cyanotic Congenital Heart Disease: Or repaired with prosthetic material for the first 6 months post-op.

• Cardiac Transplant Recipients: Only if they have developed valvulopathy.

The Regimen (30–60 Minutes Pre-Op)

• Standard: Amoxicillin 2g orally (Adults) or 50mg/kg (Pediatrics).

• Penicillin Allergy:

• Azithromycin/Clarithromycin: 500mg.

• Cephalexin: 2g (Avoid if the allergy was anaphylactic).

• Note: Clindamycin is no longer recommended by the AHA for prophylaxis due to the risk of C. difficile and higher adverse reactions.

3. The "Heart Murmur" Distinction

• Innocent/Functional Murmurs: No antibiotic prophylaxis needed.

• Mitral Valve Prolapse (MVP): No antibiotic prophylaxis needed (even with regurgitation).

• Bicuspid Aortic Valve: No antibiotic prophylaxis needed under current guidelines (unless associated with other high-risk criteria).

Clinical Summary Table

Patient Condition	Action Required
Warfarin (INR 3.2)	Proceed with local hemostatic measure not stop drug.
Prosthetic Valve	Must give Antibiotic Prophylaxis (2g Amoxicillin).
Old Heart Murmur	Consult history; usu No prophylaxis unle a high-risk valve.
Aspirin (Daily)	Proceed normally; e slightly prolonged bleeding.

Old Heart Murmur	Consult history; usu No prophylaxis unle a high-risk valve.
Aspirin (Daily)	Proceed normally; e slightly prolonged bleeding.
Stent (within 6mo)	Consult cardiologist usually dual-antiplat therapy (DAPT) rem active.

Pre-Dental Procedure Clinical Checklist

1. Patient Verification & Consent

• [ ] Identity Check: Confirm name and date of birth.

• [ ] Procedure Match: Verify the planned treatment matches the chart and the patient's expectation (e.g., "We are doing a filling on the upper right today, correct?").

• [ ] Informed Consent: Ensure the consent form is signed, dated, and the patient has had an opportunity to ask questions.

2. Medical History Review (The "Big Five")

• [ ] Allergies: Specifically check for Latex, Local Anesthetics, Antibiotics (Penicillin), and NSAIDs.

• [ ] Medications:

• Are they on Anticoagulants (Blood thinners)? Check INR if applicable.

• Are they on Bisphosphonates? (Risk of Osteonecrosis).

• [ ] Cardiovascular Status: History of MI, stroke, or valve replacement? Do they require Antibiotic Prophylaxis?

• [ ] Endocrine Status: For Diabetics, did they eat today? When was their last glucose check?

• [ ] Respiratory Status: History of Asthma? Is their rescue inhaler on the bracket table?

3. Vital Signs Baseline

• [ ] Blood Pressure: Within acceptable limits for the procedure (typically < 160/100 for elective care).

• [ ] Pulse: Rate and rhythm (assess for tachycardia or arrhythmias).

• [ ] Oxygen Saturation (SpO_2): Especially critical if performing any level of sedation.

4. Local Anesthesia Safety

• [ ] Weight Check: Essential for pediatric or geriatric patients to calculate Maximum Recommended Dose (MRD).

• [ ] Anesthetic Selection: Choice of agent (e.g., avoiding Epinephrine in severe cardiac patients if necessary).

• [ ] Aspiration Check: Ensure the syringe/cartridge is functioning and the needle is the correct gauge for the site.

5. Operatory & Emergency Readiness

• [ ] PPE: Clinician and assistant have appropriate barriers (gloves, masks, eyewear).

• [ ] Emergency Kit: Located and accessible.

• [ ] Oxygen Tank: Turned on and pressure checked.

• [ ] High-Volume Suction: Tested and working (vital for airway management).

• [ ] Radiographs: Correct and current X-rays are displayed on the monitor.

Pro-Tip: The "Time Out"

Just before the needle touches the tissue, many high-safety clinics perform a 30-second "Time Out."

The "Time Out" Verbal Script:

"We are treating [Patient Name] for a [Procedure] on tooth #[Number]. Patient has no known allergies/medications that contraindicate this. Vital signs are stable. Does everyone agree?"

Local Anesthetic (LA) Toxicity in Dental Practice

Local Anesthetic Systemic Toxicity (LAST) is a rare but potentially fatal complication. It occurs when the concentration of local anesthetic in the bloodstream reaches a toxic level, usually due to inadvertent intravascular injection or excessive dosage.

1. Mechanisms of Toxicity

LA agents work by blocking sodium channels to prevent nerve conduction. When systemic levels become too high, they begin blocking sodium channels in other excitable tissues—specifically the Central Nervous System (CNS) and the Cardiovascular System (CVS).

• CNS Toxicity: Typically appears first.

• CVS Toxicity: Requires higher doses but is more difficult to manage (especially with Bupivacaine).

2. Clinical Presentation: Recognition

Symptoms usually follow a progression from "excitation" to "depression."

Phase I: CNS Excitation (Early)

• Numbness of the tongue or perioral region (metallic taste).

• Lightheadedness or dizziness.

• Visual and auditory disturbances (tinnitus/ringing in ears).

• Disorientation or talkativeness.

• Muscle twitching or tremors.

Phase II: CNS Depression (Intermediate)

• Generalized tonic-clonic seizures.

• Loss of consciousness.

• Respiratory depression or arrest.

Phase III: CVS Toxicity (Late/Severe)

• Hypotension (low blood pressure).

• Bradycardia (slow heart rate) or arrhythmias.

• Cardiac Arrest.

3. Prevention:

The Dentist's Role

The Golden Rule: Always aspirate before injecting and inject slowly.

Aspiration: Perform in at least two planes to ensure the needle is not inside a blood vessel.

• Slow Injection: A standard 1.8 ml cartridge should be injected over roughly 60 seconds.

• Calculate Maximum Recommended Dose (MRD): Always calculate based on the patient's weight, especially in children and the elderly.

• Acknowledge Comorbidities: Patients with liver or kidney dysfunction may have reduced ability to metabolize or excrete the anesthetic.

4. Immediate Management (P-A-B-C)

1. **P - Position: Terminate the procedure and place the patient in a supine position.**
2. **A - Airway: Maintain a patent airway.**
3. **B - Breathing: Administer 100% Oxygen. Hyperventilation is actually helpful here as it raises the seizure threshold by decreasing PCO_2 and increasing pH.**
4. **C - Circulation: Monitor vitals and start BLS/CPR if pulses are absent.**
5. **D - Definitive Care:**

• Call EMS: If symptoms progress beyond mild tremors.

• Anticonvulsants: If seizures occur, Midazolam (Benzodiazepine) is the drug of choice.

• Lipid Rescue Therapy: In severe hospital settings, 20% Lipid Emulsion is used to "soak up" the anesthetic from the blood (the "lipid sink" effect).

5. Common LA Maximum Dosages (Reference)

Anesthetic	Concentration
Lidocaine	2% with 1:100k Epi
Articaine	4% with 1:100k Epi
Mepivacaine	3% Plain
Bupivacaine	0.5% with 1:200k Epi

Summary Checklist

• Update weight for pediatric patients.

• Aspirate every time.

• Observe the patient for 5–10 minutes post-injection; toxicity can be delayed if absorption is slow.

Crash Cart for Dental Clinic

Dental Clinic Crash Cart Components

A well-organized crash cart is vital for managing medical emergencies in a dental setting. It should be mobile, easily accessible, and regularly audited.

1. Essential Emergency Drugs

- Oxygen: The most used 'drug.' Must be in an 'E' cylinder with a regulator and flowmeter.
- Epinephrine (1:1000): For anaphylaxis. Available in auto-injectors (EpiPen) or ampules.
- Nitroglycerin: (Spray or tablets) For acute angina.
- Albuterol/Salbutamol: Bronchodilator for asthma attacks.

- Aspirin (Non-enteric coated): For suspected myocardial infarction (chewed).
- Oral Glucose: (Gel or juice) For conscious hypoglycemic patients.
- Diphenhydramine: (Injectable or oral) For delayed allergic reactions.

2. Airway Management Equipment

- Positive pressure ventilation mask (Bag-Valve-Mask/Ambu bag).
- Oropharyngeal and nasopharyngeal airways (multiple sizes).
- Pocket masks with one-way valves.
- High-volume suction and portable suction tips.

3. Diagnostic and Monitoring Tools

- AED (Automated External Defibrillator): Critical for cardiac arrest.
- Sphygmomanometer (BP Cuff): Manual or digital (include child and adult sizes).
- Stethoscope.
- Pulse Oximeter: To monitor oxygen saturation and heart rate.
- Glucometer: For rapid blood sugar testing.

4. Injectable Supplies

- Syringes (1ml, 3ml, 5ml).
- Needles (various gauges).
- Alcohol swabs, tourniquets, and medical tape.

5. Maintenance Protocol

- Monthly Logs: Check expiration dates of drugs and battery status of the AED/ Glucometer.
- Accessibility: Ensure the cart is not locked or obstructed.
- Staff Familiarity: All team members should know the location and contents of the cart.