

Medical Emergencies in the Dental Office

Continuing Dental Education
The University of Iowa College of Dentistry

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Disclosure Statement

- I have no relevant financial or product disclosures to report.

Course Objectives

- Understand the relationship of a thorough history and physical evaluation to patient risk in the dental office
- Identify the emergency drugs and equipment necessary as part of the office emergency kit
- Establish an office emergency plan for the dental office
- Identify and manage the most common medical emergencies encountered in the dental office

Medical Emergencies in the Dental Office

- Many emergencies in dental practice are potentially life-threatening
- Many emergencies in dental practice are preventable
- You will likely be a first responder to an emergency

History and Physical Evaluation

- Goals of a history and physical evaluation are to determine the patient's:
 - Overall health and medication use
 - Physical ability to tolerate the proposed procedure
 - Psychological ability to tolerate the proposed procedure
 - Need for treatment modifications to reduce stress
 - Contraindications or possible pharmacologic interactions
 - Which type of sedation is most appropriate (if applicable)

History and Physical Evaluation

- Vital signs
 - Should be obtained at every visit and recorded appropriately
 - Tailored to fit the needs of the proposed procedure/sedation
 - Absolute numbers are generally not as important as changes
 - Vary significantly among patients depending on various factors (age, weight, medical history, medications, presence of pain, etc.)
 - Good screening tool
 - Basic signs include:
 - Blood pressure
 - Pulse
 - Respiration rate
 - Temperature
 - Additional signs include:
 - Pulse oximetry – SpO₂
 - Capnography – EtCO₂
 - Electrocardiography – EKG/ECG

History and Physical Evaluation

- Categories to include in your assessment
 - Identification (ID)
 - Chief complaint (CC)
 - History of present illness (HPI)
 - Past medical history (PMH)
 - Past surgical history (PSH)
 - Allergies (ALL)
 - Medications (MEDS)

History and Physical Evaluation

- Categories to include in your assessment
 - Review of systems (ROS)
 - Family history (FH)
 - Social history (SH)
 - Clinical exam (CE)
 - Radiographic exam (RE)
 - Assessment
 - Plan

History and Physical Evaluation

- Identification (ID)
 - Patient's age, sex, referral source, and reason for referral
 - ex. 34 y/o female referred by Dr. Jones for evaluation of lower lip lesion.
- Chief complaint (CC)
 - Patient's reason for seeking help, in their OWN WORDS. Listen to the chief complaint.
 - ex. "I want to get an implant to replace my missing front tooth"

History and Physical Evaluation

- History of present illness (HPI)
 - A complete history of the patient's condition
 - Should include onset, duration, symptoms, location, radiation, success or failure of past treatments, eliciting factors, and degree this condition affects the patient's lifestyle
 - Secondary factors can be included: stress, psychological factors, and unreasonable goals

History and Physical Evaluation

- Past medical history (PMH)
 - What systemic diseases does the patient have?
 - Some things to specifically ask about include:
 - Heart murmurs, arrhythmias, pacemakers/defibrillators, angina, myocardial infarction (MI), bleeding disorders, anticoagulant use, asthma, obstructive sleep apnea (OSA), tuberculosis (TB), other respiratory problems (COPD/emphysema), cancer (tumor location/airway), tracheostomies, hepatitis, HIV/AIDS, immunosuppression, diabetes, renal disease, liver disease, chronic steroid use, seizures, stroke/TIA, pregnancy, sickle cell anemia, radiation treatment, positioning issues, difficult IV access/ports, need for antibiotic prophylaxis (orthopedic implants/cardiac valve replacements), use of IV/PO bisphosphonates, anesthetic complications (prolonged emergence, malignant hyperthermia, etc.)

History and Physical Evaluation

- Past surgical history (PSH)
 - Procedures, dates, and anesthetic complications
 - Important – often stimulates memory
- Allergies (ALL)
 - Allergic agent and the reaction to it
 - NKDA - no known drug allergies
- Medications (MEDS)
 - All medications, frequencies, and dosages
 - Important – often stimulates memory or leads you to conditions the patient has but does not report

History and Physical Evaluation

- Review of systems (ROS)
 - A sequential, comprehensive organ system review to elicit symptoms or disease. The cardiovascular and respiratory systems deserve special attention
 - General (Gen) - weight change, fever, chills, fatigue, weakness
 - Head, Ears, Eyes, Nose, and Throat (HEENT) - vision, hearing, vertigo (dizziness), airway, nosebleeds, sinusitis, hoarseness, dysphagia
 - Cardiovascular (CV) - palpitations, orthopnea, dyspnea, paroxysmal nocturnal dyspnea, hypertension, edema, claudication, chest pain

History and Physical Evaluation

- Review of systems (ROS)
 - Respiratory (Resp) - dyspnea (SOB), wheezing, cough, sputum, hemoptysis, chest pain, asthma ?'s (ER visits, what brings on attacks, etc.) Do you snore, sleep on pillows, wake up short of breath or gasping for air? Use a CPAP machine?
 - Gastrointestinal (GI) - appetite change, abdominal pain, dysphagia, jaundice
 - Genitourinary (GU) - change in bowel habits, bloody stools, nausea/vomiting, dysuria, hematuria, polyuria, incontinence
 - Neurological (Neuro) - syncope, seizures, changes in sensation, speech, paralysis or weakness

History and Physical Evaluation

- Review of systems (ROS)
 - Be thorough, especially with regards to cardiopulmonary function
 - Evaluate their functional capacity
 - Can they go up stairs, exercise, are they on oxygen, etc.?
 - Functional Capacity- METS (Metabolic Equivalents) classification
 - Poor: < 4 METS: Vacuuming, activities of daily living, walking 2 mph, writing
 - Moderate: 4-7 METS: Cycling, flight of stairs, golf, walking 4 mph, yard work
 - Excellent: >7 METS: Squash, jogging (10 minute mile), scrubbing floors, tennis

History and Physical Evaluation

- Review of systems (ROS)
 - Are the patient's medical conditions treated and (ideally) optimized?
 - This review will often tell you more than the exam.

History and Physical Evaluation

- Family history (FH)
 - Is there a family history of heart disease, diabetes, cancer, malignant hyperthermia...
- Social history (SH)
 - Tobacco, alcohol, drug use
- Clinical exam (CE)
 - Vital signs first
 - Focus on a complete head and neck exam, including the oral cavity and dental exam (cancer screening as applicable)

History and Physical Evaluation

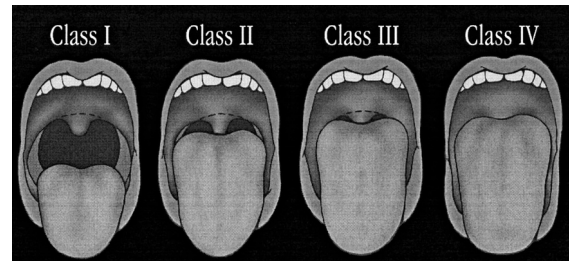
- Clinical exam (CE)
 - Describe, but do not diagnose
 - Four primary means of physical examination are:
 - Inspection
 - Palpation
 - Percussion
 - Auscultation
 - Look beyond the obvious and have a high level of suspicion

History and Physical Evaluation

- Airway evaluation
 - Mallampati score
 - Thyromental distance/retrognathia
 - BMI/body habitus – evaluate body weight and its distribution.
 - Airway obstructions, limited opening, etc.
 - Always think – what if something went wrong?

History and Physical Evaluation

- Airway evaluation – Mallampati



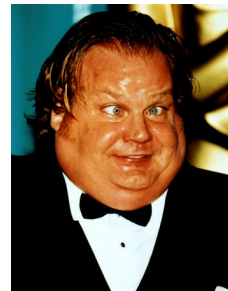
History and Physical Evaluation

- Airway evaluation – thyromental distance



History and Physical Evaluation

- Airway evaluation – body habitus/distribution



History and Physical Evaluation

- Airway evaluation – obstructive sleep apnea



History and Physical Evaluation

- Heart and lung exam prior to surgery using sedation
 - Breath sounds, irregular heart beats, etc.



History and Physical Evaluation

- Radiographic exam (RE)
 - Tailored to the specific patient and issue(s)
 - High quality radiographs are essential to proper evaluation
 - Remember the ALARA principle regarding radiation dosing – As Low As Reasonably Achievable
 - Describe, but do not diagnose
 - Look beyond the obvious and have a high level of suspicion
- Assessment
 - Summary of the above information and appropriate diagnosis

History and Physical Evaluation

- American Society of Anesthesiologists (ASA)
Physical Status Classification System
 - ASA 1 – a normal healthy patient
 - ASA 2 – a patient with mild systemic disease
 - ASA 3 – a patient with severe systemic disease

History and Physical Evaluation

- ASA 4 – a patient with severe systemic disease that is a constant threat to life
- ASA 5 – a moribund patient who is not expected to survive without the operation
- ASA 6 – a declared brain-dead patient whose organs are being removed for donor purposes
- ASA E – emergency surgery (ASA 2E)

History and Physical Evaluation

- Plan
 - Plan to address the diagnosis including sedation plan if applicable
 - Remember to thoroughly address risks of the procedure, as well as NPO/escort policies if applicable
- A detailed, standardized history form provided to the patient before the appointment is useful to obtain much of the information needed and also helps to stimulate recall of issues that may have been forgotten

History and Physical Evaluation

- Stress reduction protocol
 - Recognition
 - Medical consultation/optimization (if needed)
 - Possible premedication the night before or preoperatively (remember consent/travel aspects of treatment)
 - Morning appointments
 - Shorter appointments
 - Minimize waiting time
 - Adequate pain control
 - Postoperative pain/anxiety control

History and Physical Evaluation

- Remember:
 - The medical history and physical evaluation should correspond to the proposed procedure
 - The higher the risks, the more detailed the exam should be
 - Use of sedation necessitates a very detailed history and physical evaluation
 - All patients should have a history taken at their initial visit and updated appropriately on return appointments

26 Year Old Female – Cemento-Ossifying Fibroma



9/29/2015 7:54:36 AM, 145176

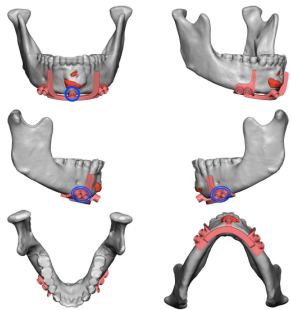
SLM Plate Details



SLM Plate – 2.0mm Thick
SLM Crib Mesh – 0.6mm Thick
2.0/2.3 mm Screws

VSP Marking Guide

Mandible Marking Guide

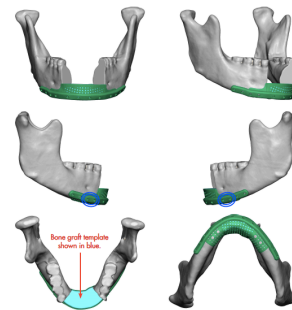


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Predictive Holes
Guide Fixation Holes

VSP SLM Plate Details

KLS Custom Plate with Mesh



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Predictive Holes

Screw Diagram

KLSmartin GROUP

SCREW LENGTHS

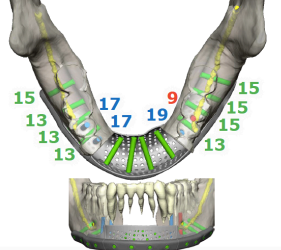
Dr. Stein

Pl. E.A. #7900

Nome, A.S., 29.06.2016; Vers. 1.03

2.0 / 2.3 mm Screws

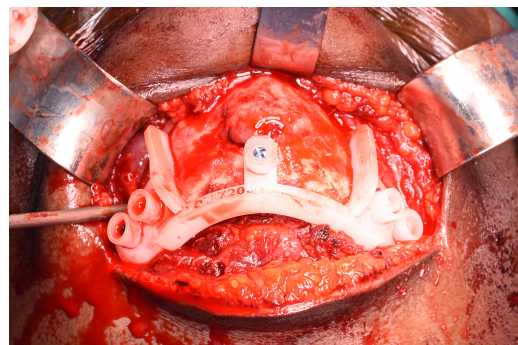
(for extracortical fixation, take next screw length up)



- Bicortical Screws (no interference)
- Monocortical Screws (to avoid nerves)
- Monocortical Screws (to avoid teeth)
- XX Bicortical Lengths (ideal angulation)

Screw lengths are based on pre-op CT scans and should be used as a reference only

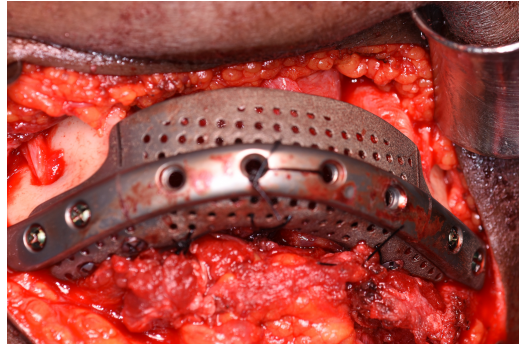
Marking Guide



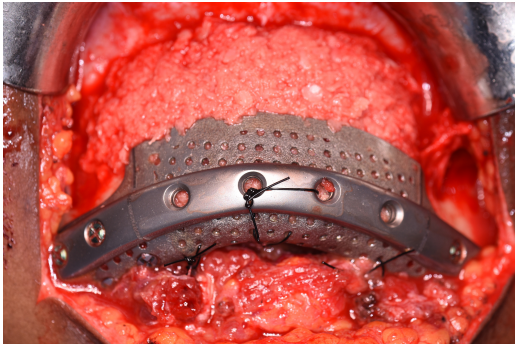
Specimen



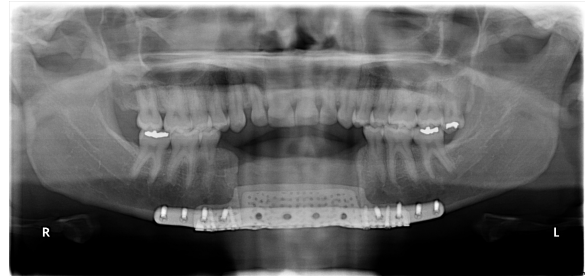
SLM Crib and Plate



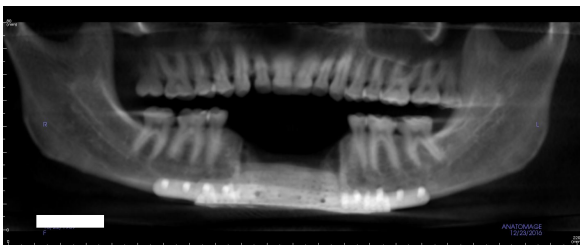
AICBG – Particulated w/ PRP



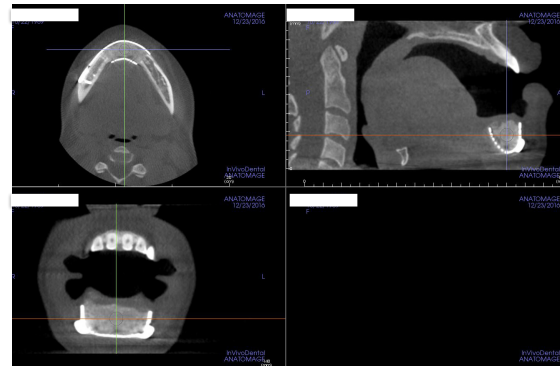
1 Month Post-Op Panorex



4 Month Post-Op Panorex



4 Month Post-Op CBCT



Emergency Preparation

- How can you be prepared for emergencies?
 - Be certified in basic life support (BLS)
 - Be certified in advanced cardiac life support (ACLS – if possible or required)
 - Know the location and proper use of emergency equipment
 - Know your patient
 - Use good patient management techniques
 - React to possible emergencies promptly

Emergency Preparation

- Team approach and training is vital
 - All staff members should be BLS trained
 - Preference to have as many staff members as possible trained in ACLS and/or PALS (Pediatric Advanced Life Support)
 - Documented office emergency plan
 - Specific roles for each member corresponding to their expertise and within their comfort level
 - Emergency call list
 - Regular training exercises and continuing education

Emergency Preparation

- Office Emergency Plan
 - Assigned duties for each team member
 - Doctor (team leader) – monitors the situation and determines treatment
 - Nurses/assistants – gets emergency equipment, obtains vitals, obtains IV access, prepares drugs, documents events/timeline, etc.
 - Office staff – calls and directs emergency medical services

Emergency Preparation

- Office Emergency Plan
 - Codes to alert other team members of an emergency without unnecessarily alarming other patients
 - Physical requirements to some duties (heavy lifting for transport, etc.)
 - Know other team member's duties and be able to cross cover if a team member is absent, etc.

Emergency Preparation

- Emergency Call List:
 - 911
 - Direct lines to local police, fire department, and emergency medical services
 - Local emergency room
 - Poison Control hotline
 - Drug Information hotline
 - Other local medical providers as appropriate
 - Public health facility (occupational exposures)
- Have at each phone in the office

Emergency Preparation

- What should be in the office?
 - Most states have specific requirements for what should be available based on your type of practice/permit
 - Deep sedation/general anesthesia requires the most comprehensive needs
 - Full “crash carts” or smaller emergency drug kits are commercially available depending on your needs
 - Some offer automatic reminders or refills on expiring drugs



Emergency Preparation

- Minimum equipment for deep sedation/general anesthesia (Iowa):
 - Monitors
 - Blood pressure
 - EKG
 - Pulse oximetry
 - Capnography
 - Suction equipment (and backup system)
 - Airway equipment
 - Positive pressure oxygen delivery system (and backup system)
 - Laryngoscope and blades
 - Endotracheal (ET) tubes
 - Magill forceps
 - Oral airways
 - Stethoscope
 - Emergency drugs (not expired)
 - Defibrillator (an AED is recommended)

Emergency Preparation

- Other recommended equipment for deep sedation/general anesthesia:
 - Airway
 - Nasal cannulas
 - Oxygen face masks
 - Oxygen tubing and connectors
 - Lubricating jelly (water soluble)
 - Nasal airways
 - Stylets for endotracheal tubes
 - Laryngeal mask airways (LMAs)
 - 10 cc and 30 cc syringes for cuff inflation
 - CO₂ detector
 - Cricothyrotomy kit
 - Suction
 - Yankauer suction
 - Flexible suction catheters (8-18 Fr)
 - Nasogastric suction tubing
 - Bulb suction

Emergency Preparation

- Other recommended equipment for deep sedation/general anesthesia:
 - IV access and infusion
 - Angiocatheters (14-24 gauge)
 - Butterfly needles
 - Assorted syringes and needles
 - IV tubing and stopcocks
 - Saline flushes
 - IV fluids
 - 500 and 1000 mL bags of LR or NS
 - 250 and 500 mL bags of D5W
 - Alcohol/chlorhexidine swabs
 - Tourniquets
 - Tape
 - Central line kit
 - Intraosseous access equipment
 - Drill
 - Needles
 - Connectors

Emergency Preparation

- Other recommended equipment for deep sedation/general anesthesia:
 - Scalpel handle and blades
 - Hemostats
 - Scissors
 - Needle holders
 - Suture
 - Benzoin/adhesive
 - Gloves
 - Sharps container
 - Extra batteries for equipment
 - Back board for CPR in the dental chair

Emergency Preparation

- Emergency drugs
 - O₂
 - Vasopressors – phenylephrine, ephedrine
 - Corticosteroids – hydrocortisone, dexamethasone
 - Bronchodilators – albuterol
 - Sedation reversal drugs – flumazenil, naloxone
 - Antihistamines – diphenhydramine
 - Coronary artery vasodilators – nitroglycerin
 - Antihypertensives – labetalol, metoprolol
 - Anticholinergics – ipratropium, atropine

Emergency Preparation

- Emergency drugs
 - Anticholinergics – ipratropium, atropine
 - Anticonvulsants – diazepam, midazolam
 - 50% dextrose – PO gel, injection
 - Glucagon
 - Epinephrine – IV and IM doses (Epi-pen)
 - Nitroglycerin
 - Aspirin
 - Morphine
 - Aromatic ammonia inhalants
 - Hemostatic agents – Avitene, Surgicel, Thrombin
 - Anti-emetics – Phenergan, ondansetron

Emergency Preparation

- Emergency drugs
 - ACLS/advanced drugs
 - Lidocaine
 - Vasopressin
 - Adenosine
 - Amiodarone
 - Norepinephrine
 - Dopamine
 - Calcium chloride
 - Furosemide
 - Magnesium sulfate
 - Phenytoin
 - Sodium bicarbonate
 - Etc.

Emergency Preparation



Emergency Preparation

- Tailor the emergency equipment, supplies, and drugs to meet your needs
- Remember pediatric sizes
- Ensure all emergency equipment is portable and electrical devices are properly charged
- Be familiar with the equipment and drugs available and be trained in their use
- Just because it is in the cart, does NOT necessarily make you prepared!
- All equipment and drugs should be evaluated on a regular basis to ensure proper functioning and that they are not expired

Emergency Management

- Initial Stabilization
- Respiratory Emergencies
- Cardiovascular Emergencies
- Neurological Emergencies
- Drug Related Emergencies
- Endocrine Emergencies
- Management of Acute Bleeding

Emergency Management

- Initial stabilization - what do you do in the case of a suspected emergency?
 - Stop treatment
 - Position the patient
 - Supine
 - Trendelenburg position (feet up, head down) – syncope
 - Reclined/semi upright – respiratory problems
 - Patient comfort vs. need for treatment/access
 - Administer O₂
 - Get vital signs
 - Blood pressure, pulse, respiratory rate, pulse oximetry, capnography, temperature
 - Summon assistance as necessary

Emergency Management

- Initial stabilization - adult BLS algorithm
 - Check Responsiveness
 - Call 911
 - Call for AED
 - Open airway
 - Check breathing
 - Check circulation
 - CPR/AED
 - Continue until emergency medical services take over or patient responds to care

*Remember ABC vs. CAB as appropriate

Emergency Management

- Respiratory Emergencies
 - Hyperventilation
 - Asthma
 - Airway Obstruction
 - Laryngospasm
 - Bronchospasm
 - Emesis/Aspiration
 - Swallowing/Aspiration of Foreign Body

Emergency Management

- Hyperventilation
 - Pathophysiology
 - Increased RR leads to decreased CO₂ which leads to increased pH
 - Increased pH leads to decreased Ca²⁺ ions resulting in neuromuscular irritation
 - Increased catecholamines leads to palpitation, sweating, chest pain

Emergency Management

- Hyperventilation
 - Predisposing factors
 - Predominantly young women
 - Anxiety
 - Prevention
 - Education
 - Control of anxiety

Emergency Management

- Hyperventilation
 - Manifestations
 - Complaints of chest tightness
 - Obvious overbreathing
 - Dizziness
 - Paresthesias
 - Muscle tetany
 - Loss of consciousness

Emergency Management

- Hyperventilation
 - Management
 - Reduce anxiety
 - Terminate the procedure
 - Position the patient upright
 - Rebreathe the exhaled air (cupped hands, paper bag, face mask without supplemental O₂)
 - Education

Emergency Management

- Asthma
 - Extrinsic asthma
 - Exposure to allergens
 - Decreases with age (tends to become mild, disappears in adulthood)
 - Intrinsic asthma
 - More common after age 35
 - Precipitated by upper respiratory infection, irritating inhalants, cigarette smoke, cold air, exercise, emotional upset
 - Status asthmaticus
 - True medical emergency
 - Does not respond to usual therapy

Emergency Management

- Asthma
 - Pathophysiology
 - Bronchial hyperactivity leads to bronchospasm
 - Bronchial edema and hypersecretion
 - Increased airway resistance leads to hyperinflation
 - Tachypnea results in fatigue, hypercarbia, hypoxia

Emergency Management

- Asthma
 - Prevention of attacks
 - Assure adequate medical management
 - Reduce anxiety
 - Avoid allergens
 - Use short acting inhaler (albuterol) prior to appointment
 - Manifestations
 - Shortness of breath (SOB), wheezing, cough, chest tightness, anxiety, orthopnea, cyanosis

Emergency Management

- Asthma
 - Management of asthma attack
 - Terminate the procedure
 - Position the patient upright
 - Use a bronchodilator inhalant
 - Administer O₂
 - Epinephrine 0.3-0.5 mg IV/IM if needed
 - Administer steroids as appropriate
 - Summon assistance

Emergency Management

- Airway Obstruction
 - Predisposing factors
 - Obesity
 - OSA
 - Edema
 - Pathology
 - Retrognathia
 - Prevention
 - Thorough patient evaluation
 - Careful titration of sedation

Emergency Management

- Airway Obstruction
 - Manifestations
 - Snoring
 - Wheezing
 - Stridor
 - Gurgling
 - Exaggerated breathing efforts
 - Absence of breath sounds

Emergency Management

- Airway Obstruction
 - Management
 - Head tilt, chin lift, jaw thrust
 - Pull tongue outward (manual/instrument/suture)
 - Suction
 - Abdominal thrusts/Heimlich maneuver
 - Administer O₂
 - Bronchodilator
 - Summon assistance
 - Intubation
 - Cricothyrotomy

Emergency Management

- Airway Obstruction
 - Laryngospasm
 - Protective reflex to prevent foreign material from entering trachea
 - Often caused by secretions, blood, vomitus, or mechanical irritation of the airway
 - Can be partial or complete
 - Highest risk is in stage II of anesthesia (deep sedation/ultralight general anesthesia – hyperactive reflexes present)
 - Characteristic stridor when patient attempts to breathe
 - May have no breath sounds

Emergency Management

- Airway Obstruction
 - Laryngospasm
 - Management
 - Stop procedure
 - Monitor vital signs
 - Deepen anesthetic plane?
 - Suction
 - Positive pressure O₂
 - If no improvement, administer muscle relaxant
 - Succinylcholine 10-20 mg IV or 40-50 mg IM for adults, 0.1-0.2 mg/kg IV or 4-5 mg/kg for children
 - Must assist breathing until paralytic effects wear off
 - Summon assistance

Emergency Management

- Airway Obstruction
 - Bronchospasm
 - Reflex bronchiolar constriction
 - Inflammatory thickening of mucosa
 - Production of thick mucous
 - Common in smokers, patients with chronic or recent acute bronchitis, asthmatics
 - Histamine releasing drugs may increase risk (morphine, etc.)
 - Characteristic wheezing which is more pronounced on expiration
 - Tachypnea, dyspnea

Emergency Management

- Airway Obstruction
 - Bronchospasm
 - Management
 - Stop treatment
 - Deepen anesthetic plane?
 - Suction
 - Administer O₂
 - Bronchodilator 10-20 puffs if needed
 - Anticholinergics (Ipratropium)
 - Epinephrine 0.3-0.5 mg IV/IM
 - Summon assistance
 - Intubation if not responsive

Emergency Management

- Emesis/Aspiration
 - Pathophysiology
 - Airway reflexes remain intact in conscious sedation and aspiration is rare
 - Vomiting is rare with general anesthesia, but aspiration risk is high
 - Stomach contents have very low pH and may have solid material
 - pH of the aspirate is more significant than the volume
 - Large particulate aspiration and low pH = poor prognosis
 - Aspiration causes rapid and robust airway inflammation and edema
 - Mortality 5-12.5%
 - If asymptomatic >2 hours, no respiratory sequelae are likely
 - Due to the wider and more vertical right main bronchus, aspirate is more likely to enter the right lung

Emergency Management

- Emesis/Aspiration
 - Predisposing factors
 - Not NPO for sedation procedures (remember ASA NPO guidelines)
 - Obesity
 - Diabetes
 - Pregnancy
 - Geriatric
 - GERD
 - Symptomatic hiatal hernia
 - High anxiety

Emergency Management

- Emesis/Aspiration
 - Manifestations
 - Vomitus visualized
 - Gurgling
 - Airway obstruction
 - Bronchospasm
 - Dyspnea
 - Tachycardia
 - Cyanosis
 - Hypotension
 - Pulse oximeter <90% despite efforts to increase

Emergency Management

- Emesis/Aspiration
 - Management
 - Trendelenburg
 - Turn patient onto their right side
 - Suction
 - Encourage the patient to "cough it up"
 - Administer O₂
 - Bronchodilator
 - Observe 2 hours
 - Discharge if SpO₂ is acceptable on room air and no wheezing or SOB
 - Summon assistance
 - Intubation
 - Voluminous or particulate aspiration
 - Unable to mask ventilate
 - Hospitalization

Emergency Management

- Swallowing/Aspiration of Foreign Body
 - Pathophysiology
 - Due to the wider and more vertical right main bronchus, a foreign body is more likely to enter the right bronchial tree/lung
 - Predisposing factors
 - Lack or improper positioning of a throat screen or rubber dam when handling small instruments or objects within the mouth
 - Prevention
 - Proper use of throat screen or rubber dam
 - Consider use of dental floss passed through instruments as tails

Emergency Management

- Swallowing/Aspiration of Foreign Body
 - Management
 - If visible, attempt to remove the foreign body with hemostats
 - If not visible, encourage the patient to "cough it up"
 - If choking occurs, use abdominal thrusts or the Heimlich maneuver
 - Monitor for signs of airway obstruction and treat appropriately
 - If not removed, referral for evaluation with chest/abdominal films and GI/thoracic surgery consult is required
 - Depending on the circumstances (object, symptoms, etc.) this may be emergent
 - Administer O₂ as needed
 - If located in the gastrointestinal system, the object may be allowed to pass or may be retrieved via endoscopy or a surgical procedure
 - If located in the respiratory system, the object will be retrieved via a bronchoscopy or thoracotomy

Emergency Management

- Cardiovascular Emergencies
 - Hypertension
 - Hypertensive Crisis
 - Hypotension
 - Angina
 - Acute Myocardial Infarction (MI)
 - Dysrhythmias

Emergency Management

- Hypertension
 - Typically defined as resting BP of >140/90
 - Most patients have a transient elevation of BP peri-operatively due to many factors:
 - Pain, anxiety, inadequate local anesthesia, light sedation, hypercarbia, hypoxia, emergence delirium
 - Pre-operative BP should be taken on all patients (as well as post-operative BP)
 - Generally, no elective treatment above 160/100, no emergency treatment over 180/110.
 - Varies based on patient condition and the situation (infection, pain, etc.)

Emergency Management

- Hypertension
 - Predisposing factors
 - Coronary artery disease (CAD)
 - Tobacco use
 - Drug use (cocaine)
 - Hypertension (HTN)
 - Hypercholesterolemia/hyperlipidemia (HLD)
 - Diabetes mellitus (DM)
 - Obesity
 - Increased age
 - Prevention
 - Good patient management
 - Anxiety reduction
 - Adequate anesthesia
 - Adequate pre-operative medical management

Emergency Management

- Hypertensive Crisis
 - Hypertensive urgency (SBP > 180 or DBP > 120 vs 110)
 - Usually asymptomatic
 - End-organ damage is possible
 - Hypertensive emergency (SBP > 180 or DBP > 120 vs 110)
 - Symptomatic
 - May experience severe headache, loss of consciousness, memory loss, shortness of breath, numbness/weakness, difficulty speaking, or changes in vision
 - End-organ damage is occurring or imminent

Emergency Management

- Hypertensive Crisis
 - Management
 - Stop treatment
 - Deepen anesthetic plane?
 - Administer O₂
 - Depending on the circumstances, consider obtaining a new measurement
 - Urgency requires immediate attention
 - Emergency requires emergent attention
 - If BP is non-responsive or patient is symptomatic, summon assistance
 - Consider antihypertensives (metoprolol, labetalol, etc.)
 - Titrate slowly to avoid sudden drops in pressure to maintain cerebral perfusion
 - Often requires a period of inpatient blood pressure management to ensure a stable BP
 - MI and stroke need to be ruled out

Emergency Management

- Hypotension
 - Typically defined as SBP < 90 mm Hg
 - Severity relative to patient's medical condition
 - Must maintain end-organ perfusion
 - Nearly all patients experience some drop in BP when sedated

Emergency Management

- Hypotension
 - Prevention
 - Titrate sedation slowly
 - Pre-operative BP
 - Proper fluid management
 - Possible causes
 - Excessive pre-medication
 - Prescribed medications (diuretics, antihypertensives, etc.)
 - Overdose
 - Reflex hypotension
 - Hypoxia/hypercarbia
 - Adrenocortical insufficiency
 - Metabolic imbalances (hypoglycemia, hyperglycemia)
 - Positional changes
 - MI
 - Dehydration/blood loss

Emergency Management

- Hypotension
 - Management
 - Stop treatment
 - Trendelenburg position
 - Administer O₂
 - Lighten anesthetic plane/administer reversal agents
 - IV fluids
 - Treat underlying cause
 - Rule out MI
 - Vasopressors if needed
 - Phenylephrine, ephedrine, epinephrine
 - Summon assistance

Emergency Management

- Angina
 - Pathophysiology
 - Insufficient blood flow (ischemia) to heart muscle - reversible
 - Predisposing factors
 - Coronary artery disease (CAD)
 - Tobacco use
 - Hypertension (HTN)
 - Hypercholesterolemia/hyperlipidemia (HLD)
 - Diabetes mellitus (DM)
 - Obesity
 - Dysrhythmias
 - Increased age
 - Male

Emergency Management

- Angina
 - Prevention
 - Control risk factors
 - Stress reduction
 - Medical management
 - O₂
 - Anti-platelet therapy (aspirin, clopidogrel)
 - Nitroglycerin?

Emergency Management

- Angina
 - Manifestations
 - Stable angina
 - Substernal chest pain or dull aching discomfort
 - Exercise or stress induced (identifiable cause)
 - Relieved by rest or nitroglycerin
 - Consistent with prior chest pain over last 2 months
 - Unstable (transitional) angina
 - May occur at rest
 - No identifiable cause
 - Not relieved by rest or nitroglycerin
 - Variable in presentation

Emergency Management

- Angina
 - Management
 - Terminate treatment
 - Position upright
 - Sublingual nitroglycerin (may repeat every 5 minutes up to 3 total doses)
 - Monitor vitals
 - Administer O₂
 - If not improved, summon assistance

Emergency Management

- Acute Myocardial Infarction (MI)
 - Pathophysiology
 - Occlusion of a coronary artery causing cessation of blood flow and death (necrosis) of heart muscle – irreversible
 - Predisposing factors
 - Same as angina
 - Prevention
 - Same as angina
 - Post MI – avoid elective care for 3-6 months depending on circumstances
 - Stress reduction
 - Administer O₂

Emergency Management

- Acute Myocardial Infarction (MI)
 - Manifestations
 - Sudden onset of severe pain
 - Crushing chest pain, may radiate to the jaw and/or left arm
 - Not relieved by rest or nitroglycerin
 - Sweating, weakness, restlessness
 - Sense/look of impending doom
 - Dyspnea
 - Abdominal bloating
 - Some classic signs are not observed, particularly in women/diabetics – “silent MI”

Emergency Management

- Acute Myocardial Infarction (MI)
 - Management
 - Begin as for angina
 - BLS
 - Summon assistance
 - Chew 1 regular aspirin (325 mg) or 4 baby aspirin (4 x 81 mg)
 - Monitor vitals
 - Relieve pain (morphine, nitrous oxide)
 - Manage complications (arrhythmias, heart failure)
 - Transport

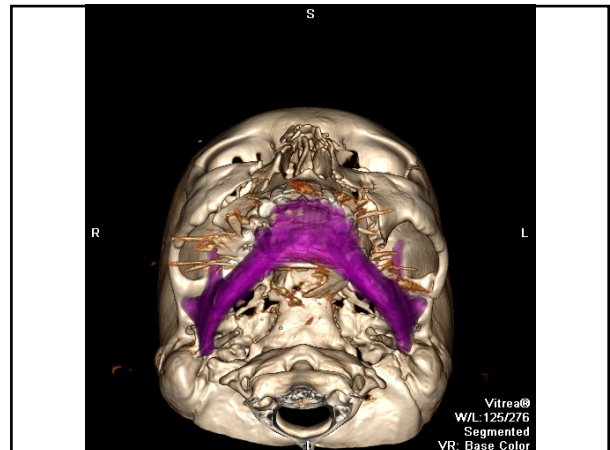
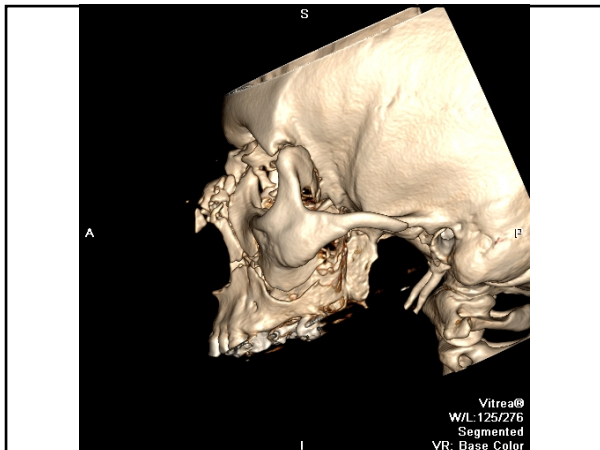
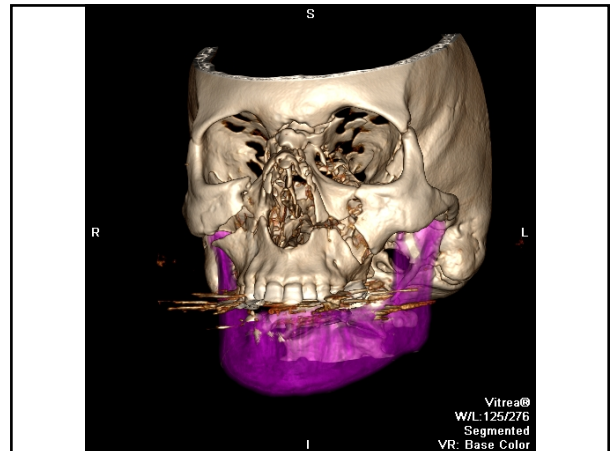
***MONA – Morphine, Oxygen, Nitroglycerin, Aspirin

Emergency Management

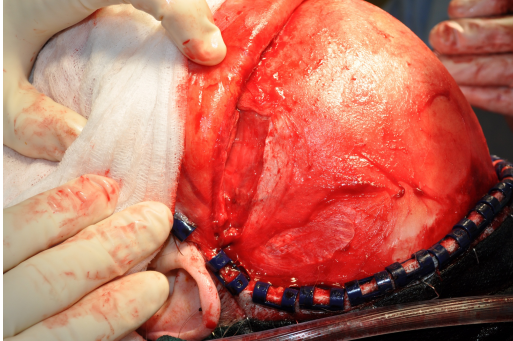
- Dysrhythmias
 - Many different types and degrees of severity
 - ACLS will cover
 - Be certified and up to date
 - Have ACLS medications available

Panfacial Trauma

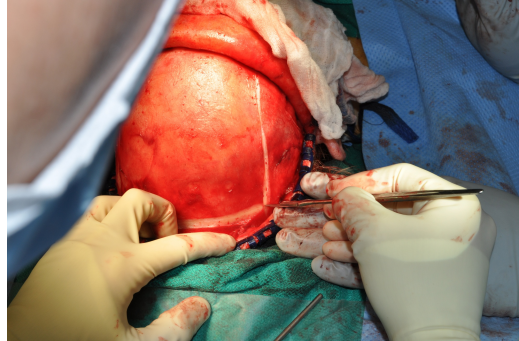
61 year old female s/p cattle gate to face



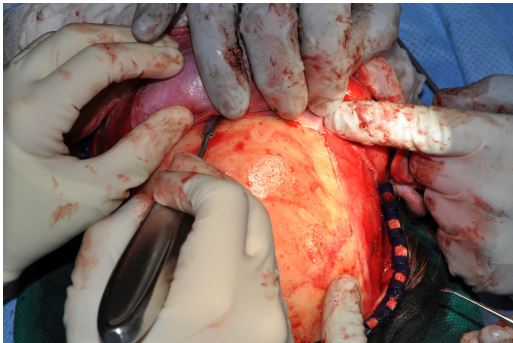
Coronal Approach



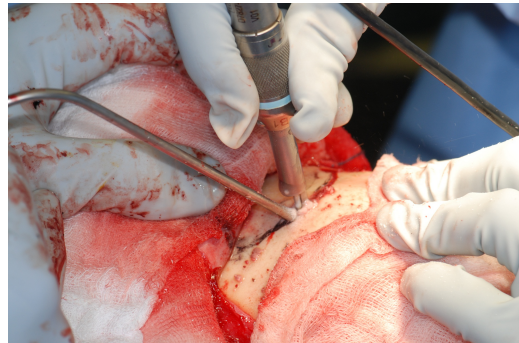
Coronal Approach



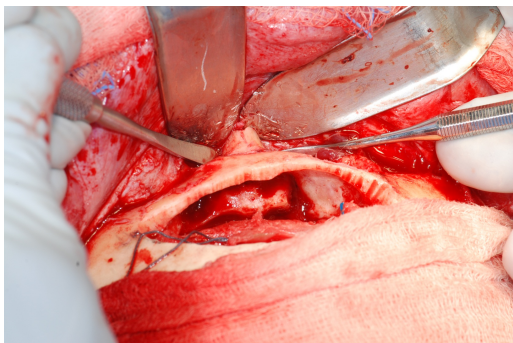
Coronal Approach



Craniotomy – Frontal Sinus



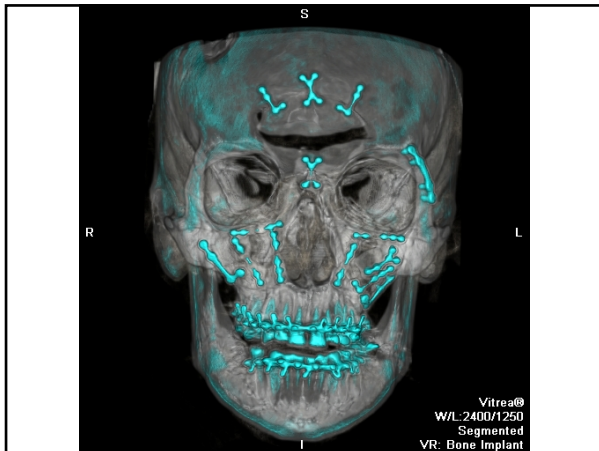
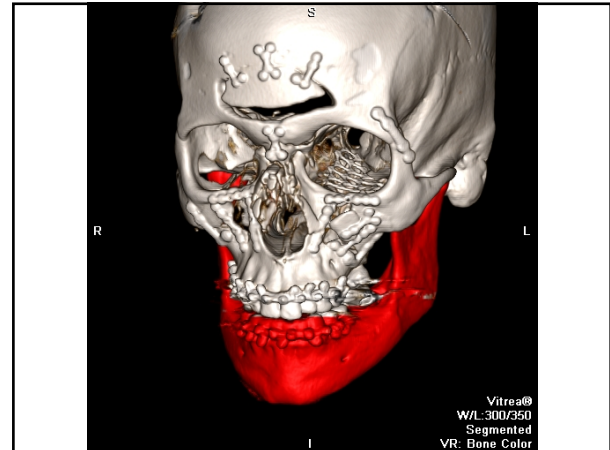
Nose and Frontal Sinus



Cranial Bone Harvest and Frontal Sinus
Cranialization



Closure



Emergency Management

- Neurological Emergencies
 - Panic Attack
 - Syncope
 - Seizures
 - Cerebrovascular Accident (CVA)/Stroke

Emergency Management

- Panic Attack
 - Predisposing factors
 - History of anxiety
 - Excessive fear of dental treatment
 - Manifestations
 - Acute and severe anxiety
 - Hyperventilation
 - Restlessness
 - Nausea
 - Diaphoresis

Emergency Management

- Panic Attack
 - Management
 - Position the patient for comfort
 - Calmly reassure the patient
 - Eliminate surrounding stimuli as possible (dim lights, quiet the room, etc.)
 - Monitor vital signs as necessary without further alarming the patient
 - Treat accompanying manifestations (hyperventilation)
 - Administer O₂
 - Consider anxiolytic medications (benzodiazepines)
 - Summon assistance if necessary

Emergency Management

- Syncope
 - Pathophysiology
 - Vasovagal response leads to a decrease in heart rate (negative chronotropic effect) and contractility (negative inotropic effect)
 - Loss of sympathetic tone to the vasculature leads to vasodilation, hypotension, and pooling of blood inferiorly
 - This leads to cerebral ischemia and loss of consciousness
 - Predisposing factors
 - Young adult males
 - Psychogenic factors
 - Anxiety
 - Emotional stress
 - Unwelcome news
 - Pain
 - Sight of blood

Emergency Management

- Syncope
 - Predisposing factors
 - Non-psychogenic factors
 - Sitting upright or standing
 - Hunger
 - Dehydration
 - Exhaustion
 - Poor physical condition
 - Heat and humidity
 - Prevention
 - Eliminate non-psychogenic factors
 - Reduce anxiety

Emergency Management

- Syncope
 - Manifestations
 - Pre-syncope
 - Initial: Warmth, pallor, sweating, nausea
 - Later: deep breathing, hypotension, bradycardia, pupillary dilation
 - Syncope
 - Loss of consciousness
 - Irregular, shallow, or absent breathing
 - Convulsive movements or twitching
 - Extreme hypotension and bradycardia
 - Weak, thready pulse
 - Post-syncope
 - Pallor, nausea, weakness, sweating
 - Return of vital signs toward normal
 - Tendency to faint may persist for several hours

Emergency Management

- Syncope
 - Management
 - Stop the procedure
 - Place in Trendelenburg position
 - Administer O₂ – establish airway if necessary
 - Cold washcloth on forehead for comfort
 - Ammonia ampule for complete loss of consciousness
 - Muscle movement (move legs)
 - Check vital signs

Emergency Management

- Seizures
 - Pathophysiology
 - Paroxysmal, abnormal excitatory neuronal activity in the brain
 - Predisposing factors (triggers/aura)
 - Hypoxia
 - Hypoglycemia
 - Hypocalcemia
 - Flickering lights
 - Fatigue
 - Poor health
 - Physical or emotional stress

Emergency Management

- Seizures
 - Prevention
 - Avoid intravenous local anesthetic injection
 - Avoid triggers if known
 - Manage hypoglycemia
 - Reduce anxiety
 - Adequate pre-operative medical management

Emergency Management

- Seizures
 - Prodromal stage
 - Subtle changes in emotional reactivity
 - Convulsive stage
 - LOC, tonic contraction, clonic movement may last 2-5 minutes
 - Postictal stage
 - Gradual return of consciousness, disorientation

Emergency Management

- Seizures
 - Status epilepticus
 - Continuation of tonic-clonic seizures
 - Hyperthermia
 - Hypertension
 - Hypoventilation

Emergency Management

- Seizures
 - Management
 - Position supine
 - Prevent injury (restrain without force)
 - Open airway and suction (vestibule)
 - Administer O₂
 - Monitor vital signs
 - If continuous – valium 2 mg/minute up to 10 mg
 - Summon assistance

Emergency Management

- Cerebrovascular Accident (CVA)/Stroke
 - Pathophysiology
 - Insufficient blood flow to brain tissue resulting in loss of function
 - Often due to occlusion of a cerebral blood vessel causing ischemia death (necrosis) of brain tissue – irreversible
 - May be less than 24 hours in duration and reversible – transient ischemic attack (TIA)
 - May also be due to bleeding – hemorrhagic stroke

Emergency Management

- Cerebrovascular Accident (CVA)/Stroke
 - Predisposing factors
 - Hypertension (HTN)
 - Hypercholesterolemia/hyperlipidemia (HLD)
 - Dysrhythmias
 - Coronary artery disease (CAD)
 - Tobacco use
 - Diabetes mellitus (DM)
 - Obesity
 - Increased age

Emergency Management

- Cerebrovascular Accident (CVA)/Stroke
 - Prevention
 - Control risk factors
 - Stress reduction
 - Medical management
 - O₂
 - Anti-platelet therapy (aspirin, clopidogrel)

Emergency Management

- Cerebrovascular Accident (CVA)/Stroke
 - Manifestations
 - Muscle weakness/paralysis
 - Speech/vision problems
 - Confusion
 - Headache
 - Loss of consciousness
 - Often unilateral in presentation

Emergency Management

- Cerebrovascular Accident (CVA)/Stroke
 - Management
 - Summon assistance
 - Support airway
 - Administer O₂
 - BLS
 - Monitor vitals
 - Reassure patient
 - Manage complications (arrhythmias, heart failure)
 - Transport

Emergency Management

- Drug Related Emergencies
 - Allergy
 - Delayed Skin Reaction
 - Immediate Skin Reaction
 - Respiratory Reaction
 - Laryngeal Edema or Anaphylaxis
 - Epinephrine Reaction
 - Local Anesthetic Overdose
 - Broken Dental Needles
 - Sedation Overdose
 - Malignant Hyperthermia

Emergency Management

- Allergy
 - Potential allergens
 - Penicillin – incidence of 5-10%, ranging from rash to anaphylaxis, 0.004 to 0.04% develop anaphylaxis and 10% die (100 to 300 deaths/year)
 - ASA – incidence 0.2 – 0.9%, ranging from rash to anaphylaxis
 - Latex
 - Local anesthetics – ranging from dermatitis to anaphylaxis, can also include topical anesthetic – amide local anesthetic allergies are quite rare and are generally due to allergies with preservatives including PABA, methylparaben, or bisulfites
 - Epinephrine – incompatible with life (endogenous)

Emergency Management

- Allergy
 - Predisposing factors
 - History of allergies – differentiate from side effects such as nausea, vomiting, stress induced reactions, etc.
 - Potential allergies to related drugs – penicillins and cephalosporins, narcotic classes, etc.
 - Prevention
 - Obtain an accurate health history, including allergy testing if necessary (especially for reported local anesthetic allergies)
 - Avoid allergens and allergy prone meds
 - Manifestations
 - Immediate vs. delayed reactions occur
 - Range from mild skin reaction to severe urticaria
 - Asthma
 - Angioedema
 - Anaphylaxis (urticaria, angioedema, cardiovascular collapse)

Emergency Management

- Allergy
 - Management
 - Delayed skin reaction
 - Antihistamine – diphenhydramine 50 mg Q 6h PO
 - Immediate skin reaction
 - Epinephrine 0.3 – 0.5 mg IV/IM
 - Antihistamine – diphenhydramine 50 mg Q 6h PO or 25 mg IV/IM
 - Observe ≥ 1 hour
 - Summon assistance if necessary
 - Medical consultation/evaluation depending on history and severity

Emergency Management

- Allergy
 - Management
 - Respiratory reaction
 - Position semi upright
 - Support airway
 - Administer O₂
 - BLS
 - Monitor vitals
 - Bronchodilator
 - Summon assistance
 - Epinephrine 0.3 – 0.5 mg IV/IM
 - Antihistamine – diphenhydramine 25-50 mg IV/IM
 - Observe
 - Medical consultation/evaluation depending on history and severity

Emergency Management

- Allergy
 - Management
 - Laryngeal edema or anaphylaxis
 - Summon assistance
 - Position patient semi upright
 - Support airway
 - Administer O₂
 - BLS
 - Epinephrine 0.5 mg IV/IM
 - Bronchodilator
 - Antihistamine
 - Intubation
 - Cricothyrotomy
 - Transport
- ***Secure the airway early!!!



Emergency Management

- Epinephrine Reaction
 - May occur due to intravascular injection or due to patient response to anxiety/stress that accompanies local anesthetic administration
 - Allergy is incompatible with life (endogenous)
 - Management
 - Stop treatment
 - Reassure the patient
 - Position the patient
 - Monitor vitals – should normalize in 10-30 minutes
 - Administer O₂ if necessary
 - Summon assistance if necessary
 - Manage complications (hyperventilation, panic attack, etc.)

Emergency Management

- Local Anesthetic Overdose
 - Pathophysiology
 - High concentrations of local anesthetics can cross the blood-brain barrier and exert their depressant effects on the central nervous system
 - Other organ systems, such as the cardiovascular system are also affected, but more slowly and generally to a lesser degree than the CNS
 - Predisposing factors
 - Patient age and weight
 - Hepatic and renal disease
 - Genetics
 - Drug concentration
 - Rate and route of injection
 - Presence of a vasoconstrictor

Emergency Management

- Local Anesthetic Overdose
 - Prevention
 - Use a local anesthetic with a vasoconstrictor
 - Avoid highly concentrated local anesthetics when possible
 - Careful administration technique (aspiration)
 - Appropriate dosing technique (know the maximum dose and running total of ALL agents)
 - For example, 2% lidocaine with 1:100,000 epinephrine has a maximum recommended dose of 7.0 mg/kg (3.2 mg/lb) with an absolute maximum of 500 mg
 - This equates to approximately 14 carpules of local anesthetic at the absolute maximum dose (which corresponds to a 70 kg adult)
 - A good, safe rule for a regular sized adult is 10 carpules of 2% lidocaine with 1:100,000 epinephrine
 - A good, safe rule for pediatric patients is ONE carpule of 2% lidocaine with 1:100,000 epinephrine per 10 kg (20 lbs)
 - Local anesthetic maximum doses are additive but to what degree is somewhat unclear, so being conservative with combinations of agents is advised

Emergency Management

- Local Anesthetic Overdose
 - Manifestations
 - Talkativeness/excitability
 - Lightheadedness/confusion
 - Perioral numbness/metallic taste
 - Hypertension/tachycardia
 - Muscle twitching
 - Hallucinations
 - Loss of consciousness
 - Decreased cardiac contractility and output
 - Hypotension
 - Seizures
 - Sinus bradycardia
 - Dysrhythmias
 - Respiratory and circulatory arrest

Emergency Management

- Local Anesthetic Overdose
 - Management
 - Stop treatment
 - Position the patient
 - Reassure the patient
 - Support airway
 - Administer O₂
 - BLS
 - Monitor vitals
 - Summon assistance if necessary
 - Manage complications (seizures, respiratory, cardiovascular, etc.)
 - Transport
 - Intravenous lipid emulsion
- *Varies based on severity and symptoms

Emergency Management

- Broken dental needles
 - Exceptionally rare but avoidable!
 - Almost every documented instance of a broken dental needle involved use of a 30 gauge short needle for an inferior alveolar nerve block
 - Studies have shown that patients cannot differentiate between injections performed with 25, 27, and 30 gauge needles
 - Average length for administration of a standard inferior alveolar nerve injection on an adult is 20-25 mm
 - The average length of a 30 gauge short needle is 20 mm while a 27 gauge long needle is 32 mm
 - The needle always breaks at the hub

Emergency Management

- Broken dental needles
 - Keys to prevention
 - Use the proper needle gauge and length for the proposed injection
 - Avoid inserting the needle its entire length into the soft tissues (i.e. to the hub) unless it is essential for the injection
 - Avoid bending the needle unless it is essential for the injection
 - Prevent sudden patient movements as much as possible (consider sedation if needed)

Emergency Management

- Broken dental needles
 - What if this happens?
 - Remain calm and instruct the patient not to move
 - Do not allow the mouth to close - insert a bite block if possible
 - If a portion of the needle is visible protruding out of the tissue, remove it with a hemostat
 - If the needle is not visible, do NOT attempt removal as this could cause further displacement of the needle fragment and complicates surgical removal
 - Verify removal/retention with a radiograph
 - Calmly inform the patient of the incident and thoroughly document the incident in the record
 - If retained, refer the patient to an Oral and Maxillofacial Surgeon and inform your malpractice insurance carrier of the incident immediately (keep the remaining needle)

Retained Dental Needle

- Clinical Case
 - 13 year old female undergoing a restorative procedure
 - During a right inferior alveolar nerve injection with a 30 gauge short needle, the needle broke at the hub
 - The dentist attempted surgical removal of the needle fragment as well as use of a magnet to draw it out
 - These attempts were unsuccessful and the patient was referred to a local oral surgeon and then to UIHC Oral and Maxillofacial Surgery for further evaluation and treatment
 - On presentation approximately 24 hours after the incident, the patient was in mild pain with a maximal incisal opening of 20 mm, though wider opening elicited significantly increased pain
 - No lingual or inferior alveolar nerve paresthesia was noted

Retained Dental Needle



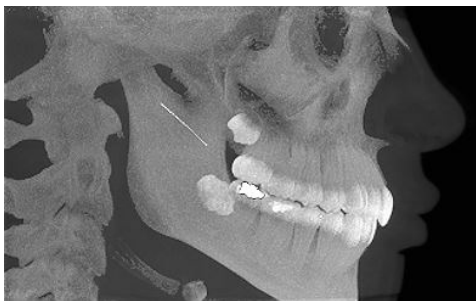
Initial Panorex



CBCT – Reformatted Axial View



CBCT – Reformatted Sagittal View



CBCT – Reformatted Coronal View



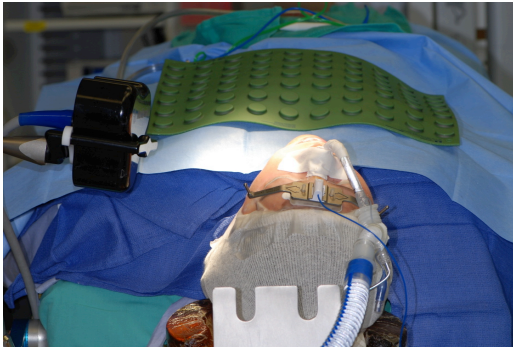
Retained Dental Needle

- Clinical Case
 - The patient was evaluated and planned for removal of the fragment in the operating room using real time CT image guidance (stealth)
 - She was instructed on range of motion exercises to maintain her MIO and provided an antibiotic, chlorhexidine, and analgesics
 - The patient began to experience increased pain and her MIO began to decrease further
 - A custom bite block was fabricated to allow for repeatable mandibular positioning for the pre-op stealth CT acquisition and intra-op removal of the needle fragment
 - The patient was taken to the OR two weeks after the initial incident

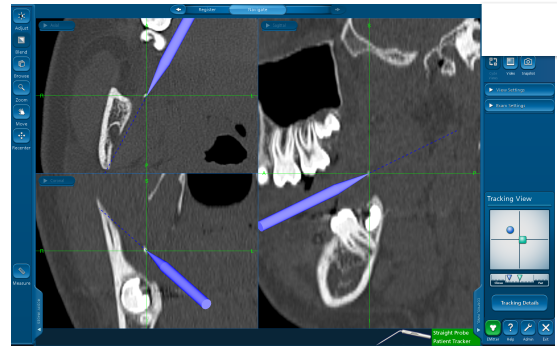
Bite Block Intra-op



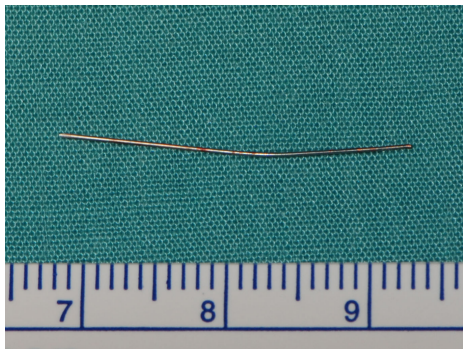
CT Guided Surgery Set-up



Intra-op CT Navigation



Retrieved Needle Fragment



Wound Closure



Final Panorax



Retained Dental Needle

- Clinical Case
 - The needle was retrieved intact with minimal tissue manipulation/dissection
 - Total operative time was approximately 15 minutes
 - The patient had no lingual or inferior alveolar nerve paresthesia
 - Her range of motion returned to normal within a few weeks
 - Consideration of leaving the fragment with long term monitoring may be considered
 - However, removal is preferred keeping in mind the risk of damage to adjacent structures
 - With current technology available, removal can be completed quickly and with minimal trauma

Emergency Management

- Sedation Overdose
 - Predisposing factors
 - IM or PO sedation (IV or inhalation routes are also possible)
 - Previous hypereaction to anesthetic
 - 15% of population over-responds to anesthetic
 - No reliable predicting factors other than history
 - Prevention
 - Careful titration
 - Accurate history

Emergency Management

- Sedation Overdose
 - Manifestations
 - Hyper-reactivity to stimuli
 - Respiratory depression
 - Pallor, “shock-like” appearance
 - Cardiovascular depression
 - Hypotension
 - Bradycardia/tachycardia
 - Respiratory arrest and cardiovascular collapse

Emergency Management

- Sedation Overdose
 - Management
 - Stop treatment
 - Position the patient
 - Support airway
 - Administer O₂
 - BLS
 - Monitor vitals
 - Administer reversal agents as necessary
 - Benzodiazepines – Flumazenil 0.2 mg q minute x 5 minutes
 - Opioids – Naloxone 0.1-0.4 mg q 3 minutes to desired effect
 - Reversal agents are competitive inhibitors and (generally) have a shorter half life than the drug they are reversing so the patient must be monitored appropriately for re-sedation
 - Summon assistance
 - Manage complications (respiratory, cardiovascular, etc.)

Emergency Management

- Malignant Hyperthermia
 - Pathophysiology
 - A hypermetabolic syndrome occurring in genetically susceptible individuals after exposure to specific triggering agents
 - Autosomal dominant disease
 - Reduction in the reuptake of Ca²⁺ by the sarcoplasmic reticulum required for termination of contraction
 - Sustained muscle contraction ensues with resultant hypermetabolism
 - Predisposing factors
 - Triggering agents
 - All volatile inhalational agents (isoflurane, sevoflurane, etc.)
 - Succinylcholine

Emergency Management

- Malignant Hyperthermia
 - Prevention
 - Avoid triggering agents
 - Manifestations
 - Unexplained tachycardia
 - Hypercarbia or tachypnea
 - Metabolic acidosis
 - Muscle rigidity despite neuromuscular blockade
 - Hypoxemia
 - Ventricular dysrhythmias
 - Hyperkalemia
 - Fever is a late sign
 - Myoglobinuria

Emergency Management

- Malignant Hyperthermia
 - Treatment
 - Summon assistance!!!
 - Discontinue the triggering agent
 - Hyperventilate with 100% O₂
 - Dantrolene sodium administration – 2-3 mg/kg every 5 minutes up to 10 mg/kg
 - Inhibits Ca²⁺ release from the sarcoplasmic reticulum
 - Begin iced IV fluid administration
 - Cool the patient (blankets, ice packs, etc)
 - Transport to a hospital/intensive care setting

Emergency Management

- Endocrine Emergencies
 - Hypoglycemia
 - Hyperglycemia (Diabetic Ketoacidosis – DKA)

Emergency Management

- Hypoglycemia
 - Precipitating factors
 - Weight loss
 - Increased exercise
 - Recovery from infection and fever
 - Omission or delay in meals
 - Diabetes mellitus (DM)
 - Insulin overdose
 - Prevention
 - Adequate pre-operative medical management
 - Proper nutrition

Emergency Management

- Hypoglycemia
 - Manifestations
 - May have rapid onset
 - Hunger
 - Nausea
 - Sweating
 - Tachycardia
 - Anxiety
 - Diaphoresis
 - Decreased ventilation
 - May progress to rapid LOC, seizures, and/or coma

Emergency Management

- Hypoglycemia
 - Treatment
 - Conscious patient
 - Assess vitals and blood glucose
 - Give oral carbohydrates (orange juice, candy, dextrose gel)
 - Assure recovery
 - Unresponsive/unconscious patient
 - Assess vitals and blood glucose
 - BLS as necessary including administration of O₂
 - If IV access, administer 25-50 mL of 50% dextrose
 - If no IV access, administer 1 mg of glucagon IM
 - Summon assistance if necessary
 - Assure recovery

***Administering oral medications to a non-responsive patient, particularly in large volumes, is not advised!!!

Emergency Management

- Hyperglycemia (Diabetic Ketoacidosis – DKA)
 - Precipitating factors
 - Diabetes mellitus (DM)
 - Infection and fever
 - Lack of insulin administration
 - Prevention
 - Adequate pre-operative medical management
 - Proper nutrition

Emergency Management

- Hyperglycemia (Diabetic Ketoacidosis – DKA)
 - Manifestations
 - Nausea and vomiting
 - Pronounced thirst
 - Excessive urine production
 - Dehydration
 - Fruity breath
 - Electrolyte imbalances and acidosis
 - Abdominal pain
 - Labored, deep gasping breathing (Kussmaul breathing)
 - Confusion
 - May progress to rapid LOC and coma

Emergency Management

- Hyperglycemia (Diabetic Ketoacidosis – DKA)
 - Treatment
 - Summon assistance
 - BLS as necessary including administration of O₂
 - Assess vitals and blood glucose
 - Administer IV fluids (normal saline)
 - Administer insulin
 - Electrolyte replacement
 - Transport

Emergency Management

- Management of Acute Bleeding
 - May occur as the result of a procedure or accident in or near the office
 - Evaluate the medical history for bleeding problems
 - Evaluate the medication list for anti-platelet or anticoagulation drugs
 - Consider possible drug interactions
 - Monitor vitals
 - Summon assistance as necessary
 - Obtain labs (including INR, PTT, platelets, etc.) as necessary
 - Manage complications (hypotension, respiratory, etc.)
 - Do not release patient until comfortable with control
 - Transport as necessary

Emergency Management

- Management of Acute Bleeding
 - Intraoral
 - Adequate lighting and suction to visualize and assess the area – may require additional light source(s) and suction(s)
 - Direct gauze pressure for 5-10 minutes is usually sufficient
 - Inject local anesthesia with epinephrine
 - Suture the area
 - Obtain primary closure if possible

Emergency Management

- Management of Acute Bleeding
 - Intraoral
 - Consider adjunctive treatments
 - Electrocautery
 - Thermocautery
 - Tie-off/clip vessels
 - Collagen (Gelfoam/Collaplug)
 - Microfibrillar collagen (Avitene)
 - Oxidized regenerated cellulose (Surgicel)
 - Bone wax
 - Topical thrombin
 - Thrombin and bovine gelatin (FloSeal)

Emergency Management

- Management of Acute Bleeding
 - Intraoral
 - Fluid/blood product infusions
 - Fluid resuscitation
 - Crystalloid vs. colloid
 - Fresh frozen plasma
 - Platelets
 - Cryoprecipitate
 - Specific clotting factors
 - Red blood cells

Emergency Management

- Management of Acute Bleeding
 - Extraoral
 - Same as for intraoral bleeding
 - Also consider:
 - Elevating the area if possible
 - Temporary (or definitive) suturing in office?
 - Tourniquet as an absolute last resort

Medical Emergencies in the Dental Office

- Summary:
 - Have emergency equipment readily available
 - All office personnel should know where emergency equipment is located and how to use it
 - Consider practice scenarios for emergency situations to help you and your office staff be prepared
 - BLS protocol – ABC vs. CAB as appropriate

Medical Emergencies in the Dental Office

- Summary:
 - When in doubt, administer O₂
 - When in doubt, summon assistance (EMS/Rapid Response/Code Blue) – do not wait too long!!!
 - When in doubt get an appropriate medical consult after the initial evaluation to aid in prevention
 - It is a good idea to recommend medical follow-up (immediate or delayed as appropriate) after an emergency occurs and document this recommendation

Medical Emergencies in the Dental Office

- Standard of Care:
 - What would the prudent doctor (provider) do or not do in this situation?

Medical Emergencies in the Dental Office

- Things to keep in mind:
 - Common things occur commonly while uncommon things occur uncommonly
 - Ockham's Razor (paraphrased)
 - “The simplest explanation is usually the correct one”

Medical Emergencies in the Dental Office

- Remember:
 - Just because you can doesn't mean you should
 - If you're not comfortable doing it, don't
 - Always think about what you would do in an emergency... (can I intubate the patient? etc.)

Medical Emergencies in the Dental Office

Continuing Dental Education
The University of Iowa College of Dentistry

Kyle M Stein, DDS, FACS
Oral and Maxillofacial Surgery
The University of Iowa