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# DENTAL RESTORATION

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| **Surgical Specialty:** | Dentistry |
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## Background:

- General Considerations
  - Most children are able to have their dental care performed in a dental clinic without sedatives.
  - Children with poor dental hygiene will often have such extensive damage to their teeth that they require a large number of crowns or tooth extractions.
  - With such extensive tooth decay, these patients require general anesthesia to be able to tolerate the lengthy dental work.
- Patient Considerations
  - Disease Specific Considerations
    - Pre-existing poor dentition increases the risk of dental trauma with intubation.[1]
    - Having already failed to have dental work performed in the clinic, these patients have a high incidence of pre-operative anxiety or behavioral issues.[2]
  - Associated Comorbidities/Syndromes
    - Severe anxiety
    - Developmental delay
    - Autism spectrum disorder
    - Cerebral palsy
    - Cleft palate
    - Sensory processing disorders

## Anesthetic Planning:

- Pre-Anesthetic Evaluation
  - Standard pre-anesthetic evaluation including past/family anesthetic history and recent illnesses.
  - Rule out epistaxis or bleeding disorders in the patient or patient's family.
  - Additional labs or tests are dictated by the patient's specific comorbidities.
  - Discussions to have with surgeon/family
    - Possibility for further dental damage during intubation and the airway risk this poses.
    - Possibility for nasal bleeding and/or trauma with nasal intubation.
    - As patients are at higher risk for pre-operative anxiety, consider discussing pre-operative anxiolytics[3] and/or parental presence during induction.

        - Oral midazolam (0.5mg/kg, max 20mg) is commonly given, but allow at least 30 minutes after administration for effect.
            - Institutional maximum doses vary with some centers limiting Midazolam doses to 10-15mg
        - If the patient is unable or uncooperative with oral medications, intranasal dexmedetomidine (1-2mcg/kg) can be given but allow at least 30 minutes after administration for effect.
        - If the patient is uncooperative with other pre-operative anxiolytics, intramuscular ketamine (3-5mg/kg) can be administered.
- Specific or Unique Room Set-Up Requirements
    - Airway
        - Setup for nasal intubation, including:
            - Nasal RAE endotracheal tube (ETT).
            - McGill forceps.
            - ETT soaking in a bottle of warm fluid or a lubed red rubber catheter, to minimize damage to the nasal passage as well as bleeding.
                - Placing the sealed ETT in a blanket warmer or next to a desflurane vaporizer may also achieve this effect.
            - Lubed nasal airway to check for nostril patency before intubation.
    - Drugs/Infusions
        - For induction and maintenance:
            - Sevoflurane
        - For intubation:
            - Fentanyl (1 mcg/kg)
            - Propofol (2-4 mg/kg)
            - Nasal oxymetazoline (0.05%) or phenylephrine (0.125% or 0.25%) to minimize nasal bleeding with intubation.
                - Oxymetazoline is considered safer; however, both medications should be used with caution, as they can be absorbed systemically and cause hypertension and bradycardia[4].
                - Beta blockade should not be used to treat hypertension resulting from oxymetazoline or phenylephrine administration.
        - PONV prophylaxis
            - Ondansetron (0.1-0.15 mg/kg), max 4mg
            - Dexamethasone (0.1 mg/kg)
        - Emergence delirium prophylaxis
            - Dexmedetomidine (0.5 mcg/kg)
        - Postoperative pain control
            - Ketorolac (0.5 mg/kg)
            - Consider long-acting opioids (morphine or hydromorphone)- (particularly if multiple extractions were performed)
    - Monitors
        - Standard American Society of Anesthesiologists monitors
    - Blood Availability (if indicated)
        - Not indicated
    - PICU Bed Availability (if indicated)
        - Usually an outpatient procedure.
    - Other Indicated Resources
        - None

## Intraoperative Considerations:

- General
    - Limited access to the airway during the procedure.
- Induction
    - Inhalational induction: begin with nitrous oxide if the patient is cooperative, and then slowly add sevoflurane.
    - Once an IV has been placed, give fentanyl and propofol to blunt the physiologic response to intubation.
    - Spray oxymetazoline or phenylephrine into each nare before attempted intubation to vasoconstrict nasal blood vessels and minimize bleeding during ETT placement.
        - Try to minimize the dose, which can be difficult to determine if using spray bottles. When the spray bottle is held upside down and sprayed (for example, when the patient is supine) the dose administered is dramatically increased compared to using the spray bottle held upright[4].
        - Suction any excess medication out of the pharynx to minimize the dose the patient absorbs systemically[4].
    - Optionally, examine for nostril patency with a nasal airway.
- Positioning
    - Supine with the operating table turned 90 degrees.
    - Ensure arms, legs, and occiput are well padded and that no monitors or lines are pressing into the patient's skin.
    - Use extra padding and a head wrap to secure the ETT. Ensure that there is no pressure on the eyes and that the ETT is not compressing the ala of the nose.
- Maintenance
    - Volatile anesthetic.
    - Drugs as mentioned earlier.
- Hemodynamic/Physiologic goals
    - Maintain normal vitals as appropriate for age.
- Surgical Considerations (such as neuromonitoring, muscle relaxation, anticipated blood loss)
    - No muscle relaxation is necessary.
    - Blood loss is minimal.
    - Oral x-rays are often taken at the start of the case. Ensure that the patient and providers have adequate radiation protection.
    - A throat pack will typically be placed by the dentist before starting the dental work.
    - Surgeons will often use lidocaine with epinephrine if they are performing tooth extractions.
- Emergence/Disposition
    - As long as there are no patient-specific risk factors, deep extubation is safe for these patients.
    - Consider awake extubation in children with evidence of ongoing nasal bleeding.
    - Patients will generally recover in the PACU and then be discharged home.
- Post-op Care
    - The most common postoperative complaints are dental pain, sleepiness, nasal bleeding, and poor appetite[5].
    - Pain control with acetaminophen (10-15mg/kg) and ibuprofen (10mg/kg).

## Case-Specific Complications/Pitfalls

- If the dentist does not use a throat pack, suction the stomach before extubation to remove any blood that may have accumulated from the procedure.

- Emergence delirium is a common complication because of the high level of pre-operative anxiety and the group of children who require dental work under general anesthesia.

## References


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