Basic Considerations Of Sedating Children In The Dental Setting

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Patient Assessment
Psychological, emotional, temperament
Physical assessment

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<th>Murphy et al 1 1984</th>
<th>Lawrence et al 3 1991</th>
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<td>Positive reinforcement</td>
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<td>Active restraint</td>
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<td>Mouth prop</td>
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<td>Sedation</td>
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*Vertical lines (I) indicate mean values that were not significantly different between techniques (ANOVA and Tukey test).*

Why Do We Sedate Children?

• Patient, regardless of age or mental status, cannot cooperate in delivery of quality care without sedation (thus preventing potential harm)

• Extent of caries is significant requiring multiple visits wherein patient behavior may deteriorate to point that sedation is needed

• Parental request that is based on anticipated child anxiety or disruptive behaviors

• Dentist’s opinion, based on experience and training, that sedation will be beneficial to patient, family, and dental team
Component Drivers of Behavior in Threatening Situations

• Genetics
  – Thousands of years in the making
    • Phylogeny of the brain–
      – Flight:fight response pattern
      – Physiological preparation supporting extreme action;
      – Emotional dominance of mind state
    • Cerebral cortex
      – Last to develop
      – Generally inhibitory of lower parts of CNS
      – Specializing in integratory associations

• Environmental implications
  – Settings triggering less controlled patterns of behavior
Key Characteristics of Children Affecting Decisions Related to Pharmacological Management

- Age and cognition
- Temperament & attachment
- Emotional management of fear & anxiety

- What we “see”
  - Quiet or minimal protesting
  - Intense crying & screaming
    - Controlled
    - Uncontrolled
  - Tears or no tears
    - Fear
    - Pain
  - Seeking parent’s attention/rescue
Psychosocial & Family Issues

• Higher rate of single parent families

• Differences in generations?
  – It’s for me, I don’t care about others, I want it now, and it feels good
  
  – I need to save, work is necessary to get what I want, my day will come if I work like hell till then.

• Increasing likelihoods of toxic stress and its outcomes
Factors Influencing Child Behavior During Sedation

Procedural factors

- Drug(s) used, routes of administration, and its/their dose
  - Issues affecting likelihood of loss of consciousness
- Painful stimuli - its duration, frequency, and even its cessation
  - Possibly involving one of most sensitive areas of the body
  - Exhaustion from anxiety, emotions, physical struggle
- Length of procedure
- Issues involving airway
  - Its protection & management
Medical, Dental, and Social History

• Medical history – an absolute must
  – Review of systems
  – Follow-up on anything “different”

• Dental history
  – Prior contact – how much, what was done

• Social history
  – Sibs
  – Interaction style
Anatomy, Physiology, & Assessment
Children We Sedate

• Children sedated for dentistry in an office should be:
  – Healthy (ASA I – some ASA II’s)
    • No history of pre-maturity or birth issues
  – Developmentally normal (physically)
    • Most systems fully developed by 20 months
    • 10 kgs or more of body weight
Main Physiological Systems of Interest During Sedation

• Respiratory
  – Most frequently involved system in initial aspects of adverse events involving sedation

• Cardiovascular (including fluids & electrolytes)

• CNS

• Renal & GI
Child Anatomy/Physiology in a Nutshell

- Respiratory system
  - Tiny turns & tubes
  - Lymphoid liability
  - Minimal muscle mechanics
  - Restricted reserve &
  - Sensitive sensors
  - Understanding and differentiating between
    - Ventilation
    - Oxygenation

The overwhelming majority of documented sedation adverse events initially involved the respiratory system.
Ventilation & Airway*

- Children breathe faster and have a smaller absolute tidal volume than adults.
- Anatomically, airway is different in children than adults:
  - increased airway resistance
  - glottis (cords) is more cephalad and anterior
  - smallest portion of upper airway is at level of cricoid cartilage (below the cords)
- Other anatomical challenges:
  - relatively larger tongue and epiglottis
  - significant lymphoid tissue is possible
  - larger head to body size ratio
  - shorter neck
  - mandible is less developed

Possibly, the smaller and younger the child, the greater the potential for management of airway issues.
Pulmonary Keys To Safety

• Keep the airway open & protected

• Always be cognizant of the absolute and trending situations of the child’s
  – airway patency,
  – ventilation, and
  – oxygenation

  in recognizing subtle, detrimental respiratory function

• Afford enough oxygen for the patient’s activity, situation, and demand

• Be ready to proficiently and effectively use a bag-valve mask in delivering positive pressure oxygen

  Those who use it everyday indicate practice in its use is an absolute necessity
Necessary Minimal Skills in Airway Management

• You must have competent skills in:

  – Head tilt

  – Jaw thrust

  – Use of ambu bag in delivering positive pressure oxygen
Choices in order of importance for airway management tools in the office

1. Ambu bag + O$_2$

2. Airways (oral and nasal)

3. Intermediate skill level – LMA

4. Gold standard - intubation
Chin Up, Shoulder Roll, and Rubber Dam!!!

Always tilt the chin towards the ceiling to open the airway

Shoulder roll
Cardiovascular – Bottom line

– Pediatric heart is rate-dependent pump
  • Slow rate of pumping (bradycardia) is potentially devastating if not corrected

HYPOXIA  ➔  BRADYCARDIA

CARDIAC OUTPUT = HR (major) X SV (minor)

HYPOTENSION:

Once bradycardia and hypotension are present, reversing the patient’s condition becomes extremely difficult.

– Volume in cardiovascular system of child can rapidly change (e.g., diarrhea)

– Unusual cardiac rhythms fairly rare, but must be greatly respected – consults!!!
Pre-Sedation Physical Assessment

• General assessment
  – Symmetry – body & face
  – Weight-height
  – Neck – thin, thick, short

• Airway
  – Mouth breather
  – Tonsil – airway ratio

• Chest (auscultation)
  – Airway sounds – location & sounds
  – Heart sounds – regular rate & rhythm
Other Common Concerns Impacting Normal Physiologic Function

• Sedative/anesthetic agents & their effects

• Other drugs that might be “on board”
  – OTC cold medications

• Head trauma

• Obstructive pulmonary disease
  – Asthma
  – Upper respiratory infection - URI (decrease in airway diameter)
    • 2 to 6 weeks to resolve; don’t sedate for a minimum of 2-3 weeks following URI

• Iatrogenic restrictive pulmonary disease
  – Restraints!!!!
**Major Categories Of Concern When Considering Sedation In The Office**

- Obesity
- ASA II’s and greater
  - Systems problems
    - Seizures
    - GERD
    - Asthma/allergies
  - Syndromes
    - Those with airway problems
    - Trisomy’s
- Mental/emotional (degree of)
  - Autism
  - ADHD
Take Home Message - I

• The pediatric respiratory system is unique and needs professional respect:
  – Anatomically challenging
  – High metabolic rate with relatively small pulmonary reserve
  – Deteriorates rapidly during obstruction or depression

• *Patent airway is essential*
  – Respiratory obstruction & depression will result in rapid oxygen desaturation and occurs faster when additional oxygen is not administered (use increased oxygen concentrations!)
  – Sedatives, especially opioids, may disrupt normal compensatory mechanisms of respiration
Take Home Message - II

- Monitor ventilation with a ventilation monitor *in a quiet, moderate to deeply sedated patient*:
  - Auscultation
  - Capnography

- Must keep heart rate elevated
  - Stimulate child as needed with trapezius pinch
    - *Bradycardia in children means hypoxemia onset and that signifies danger*

- URIs may require a delay of at least 2-3 weeks before sedation is safe
In Detailed Summary

Thank You!!!