Sedation In Paediatric Dentistry

Friday 2 November 2012
Swissotel Hotel
Sydney NSW
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The Paediatric Dental Patient

What makes treating them so difficult?

Treatment, Planning and Parental Concerns?
The Paediatric Dental Patient

1. What makes treating them so difficult?

2. Parental Concerns?
The Paediatric Dental Patient

1. What makes treating them so difficult?

A Clinician’s Perspective
The Paediatric Dental Patient

1. What makes treating them so difficult?

   a) Size
a) Size

- Somatic (body) size
- Size of teeth
- Size of supporting structures
- Size of oral cavity
The Paediatric Dental Patient

1. What makes treating them so difficult?
   a) Size
   b) Structure
The Paediatric Dental Patient

1. What makes treating them so difficult?
   a) Size
   b) Structure Primary teeth do not bond (Prismless Enamel)
      Primary teeth have larger pulps (Pulpal Exposures)
      Primary teeth wear more easily (Differential Wear)
The Paediatric Dental Patient

1. What makes treating them so difficult?
   a) Size
   b) Structure
   c) Development
Piaget's 4 Stages of Cognitive Development of Children

Sensory Motor Stage
(Birth - 2 years)

Pre-operational Stage
(2 years - 7 years)

Concrete Operational Stage
(7 years - 11 years)

Formal Operations
(11 years - 16 years)
The Paediatric Dental Patient

What makes treating them so difficult?

a) Size

b) Structure

c) Development

d) Ability to co-operate
Only well-behaved children are welcome.
Behaviour Management Techniques in Paediatric Dentistry*

1. Tell show do
2. Nonverbal communication
3. Voice control
4. Positive reinforcement
5. Distraction
6. Hand-over mouth exercise
7. Active immobilisation for non sedated child
8. Passive immobilisation for non sedated child
9. Active immobilisation for sedated child
10. Passive immobilisation for sedated child
11. Conscious sedation
12. Nitrous oxide/oxygen inhalation technique
13. General anaesthesia

* PEDIATRIC DENTISTRY Vol 26 No 2 March/April 2004
Behaviour Management Consensus Conference: Special Issue

1. Tell show do
2. Positive reinforcement
3. Voice control
4. Mouth prop
5. Physical Restraint (Assistant)
6. Physical restraint (Dentist)
7. Hand-over mouth exercise (Home)
8. Sedation
9. General Anaesthesia
10. Papoose Board Restraint
"For some kids a trip to the dentist can be a traumatic experience. But just imagine what it might be like strapped into a cocoon-like restraining device called a papoose board that is sometimes used to immobilize children at the dentist’s office."

"They’re smiling today, but eight children say they were strapped into a papoose board while visiting the same dentist for routine work."

"The papoose board is a controversial device. Some pediatric dentists use it, but others refuse to except in special circumstances."

"The American Academy of Pediatric Dentists approves the use of the papoose and other stabilization devices in certain situations to protect the patient and dentist, but cautions that it has "the potential to produce serious consequences, such as physical or psychological harm..."
In connection with our report, the American Academy of Pediatric Dentistry (AAPD) provided us with the following statement: 26/4/2012

The American Academy of Pediatric Dentistry (AAPD) recognizes that in providing oral health care for infants, children, adolescents and persons with special health care needs, a range of behavior guidance techniques may be used by dental health care providers. Behavior guidance is a continuum of interaction involving the dentist and dental team, the patient and the parent directed toward communication and education. Its goal is to ease fear and anxiety while promoting an understanding of the need for good oral health and the process by which that is achieved.

Protective stabilization is used when other behavior management techniques are ineffective, such as during emergencies, in the case of a child with special health care needs, or when a child cannot cooperate for treatment. Protective stabilization should only be used when absolutely necessary, in the shortest amount of time possible, to protect the child, the oral health professional and other dental office staff during oral health procedures, and should not cause physical injury or discomfort. The objectives of protective stabilization are to:

- Reduce or eliminate sudden, uncontrolled or aggressive movement of the child's head, jaw, body or appendages
- Provide stability for the child in the dental chair
- Protect the child and oral health staff from injury
- Facilitate delivery of quality oral health procedures

For more information, please access AAPD’s Guideline on Behavior Guidance for the Pediatric Dental Patient:

Behaviour Management

Tell-Show-Do

Modelling

Distraction (Externalisation/Internalisation)

Nitrous Oxide

General Anaesthesia

Rubber Dam
Behaviour Management

Time Out

Restraint - Dentist-Parent-Dental Assistant
  - Papoose Board / Pedi Wrap

Sedation - Oral-Rectal-Submucosal-Nasal-IM-IV

Hypnosis

Voice Control
Nitrous Oxide

Nitrous Oxide Analgesia

Nitrous Oxide Anaesthesia

Relative Anaesthesia/Analgesia

Inhalational Sedation

Anxiolysis
Conclusion: Wrap around Video Eyewear can be an effective approach to managing distress in children undergoing restorative dental treatment.
General Anaesthesia*

General Anaesthesia is an induced state of unconsciousness accompanied by partial or complete loss of protective reflexes, including the ability to independently maintain an airway and respond purposefully to physical stimulation or verbal command.

*American Academy of Paediatric Dentistry Definition

*Pediatric Dentistry Vol. 25 No 7 Reference Manuel page 76
American Society of Anaesthesiologists (ASA)

Class 1: No organic, physiological, biochemical or psychiatric disturbance.

Class 2: Mild to moderate systemic disturbance, e.g. mild diabetes, moderate anaemia, well-controlled asthma.

Class 3: Severe systemic disease, e.g. severe diabetes with vascular complications, severe pulmonary insufficiency.

Class 4: Severe systemic disorders that are already life-threatening, e.g. signs of cardiac insufficiency.

Class 5: The moribund patient who has little chance of survival without operative intervention.
Indications for GA*

1. Patients with certain physical, mental or medically compromising conditions.
2. Patients with dental restorative or surgical needs for whom local anaesthesia is ineffective.
3. Patients who have sustained extensive orofacial or dental trauma.
4. The extremely uncooperative, fearful, anxious, physically resistant child or adolescent with substantial dental needs and no expectation that the behavior will improve soon.
5. Patients with dental needs who otherwise would not receive comprehensive dental care.

Frequency of Anaesthesia
*The Frequency of and Indications for General Anaesthesia in Children in Western Australia 2002-2003 C.Sims, B.Stanley, E.Milne

Study Design 2002-2003 over a 12 month period

- A total of 28,522 general anaesthetics were administered in the 12 month study period. (2002-2003)
- This equated to 5.5% of the WA child population. (456,753 children)*

*Australian Bureau of Census and Statistics
Study 2002-2003

- 24,981 children*
- 28,522 operations
- 2,462 children had > 1 anaesthetic (9.9%)

* A child was defined as 16 years of age or less
Frequency

• 10% of all Australians undergo General Anaesthesia each year

• 5.5% of all children in Western Australia had a General Anaesthetic during the study period

• 5.4% of girls 4-14 years were anaesthetised in France in 1996 (Clergue et al 1996)
Types of Paediatric Surgery

The most common types of surgery were:

- Ear Nose and Throat (8087 cases) (28%)
- General Surgery (6022 cases) (21%)
- Dental /Oral (4756 cases) (17%)
- Orthopaedic (4240 cases) (15%)

*Above data is for patients 16 years or less.
Number of Anaesthetics given for procedures in the ten most common surgical specialities
Age Distribution

4756 Dental/Oral general anaesthetics in the study period as follows:

- < 1 year, 2 cases
- 1 - 4 years, 1425 cases
- 5 - 8 years, 1145 cases
- 9 - 12 years, 656 cases
- 13 - 16 years, 1528 cases
The Paediatric Dental Patient

Parental Concerns
The Paediatric Dental Patient

Parental Concerns

1. Death of the child
Death, Greed at the Dentist: American Children at Risk
July 12, 2012

Raven Blanco (far left) was eight years old when she died shortly after a trip to the dentist. A foundation set up by her parents, the Raven Maria Blanco Foundation, tracks other cases of children and young adults whose deaths were linked to the sedatives they received at the dentist.
American children are being put at risk by inadequately trained dentists who often seek to enhance profits by sedating their young patients for even routine tooth cleaning and cavity treatments, an ABC News investigation has found.

More than a dozen children have died after being sedated by dentists, according to the Raven Maria Blanco Foundation, which seeks to alert parents to the potential dangers of the increasingly widespread use of oral sedatives on patients as young as 18-months old.
Death, Greed at the Dentist: American Children at Risk
July 12, 2012

“There is no national registry of dental deaths, and some experts say many deaths go unreported or are never officially tied to dental sedation”.

“In the last five years, more than 18,000 dentists across the country have signed-up for weekend-long courses in oral sedation that are set up in local hotel ballrooms and promise to add tens of thousands of dollars to the bottom line”.
“Leading dental professionals say sedation for routine procedures can make it safer to work on young patients whose anxiety can make it difficult or dangerous to use high speed drills and other equipment.

But, they say, it takes extensive training to learn how to administer sedation safely and be prepared to deal with emergencies.”
Anaesthetic Mortality Rates in WA

- N.Gibbs, P.Rodoreda
Anaesthesia and Intensive Care, Volume 33, Number 5, October 2005. pp 616-22

*Report of the Western Australian Anaesthetic Mortality Committee
Anaesthesia-related mortality in Western Australia per 100,000 surgical procedures per annum.
Anaesthesia as the “Primary Cause” of death in Western Australia per 100,000 surgical procedures per annum.
Anaesthesia-related mortality in Western Australia per million population per annum.

Anaesthesia-related Mortality per 1,000,000 population pa

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Anaesthesia as the Primary Cause of Mortality per 100,000 Procedures

- 1980-1984  4.0 deaths/100,000 procedures
- 2000-2002  0.2 deaths/100,000 procedures

Author’s note*
*These rates are similar to those reported from other developed countries such as the UK, Canada, Finland and Japan.
Reasons for the Reduction

• Routine pulse oximetry
• End tidal CO₂ monitoring
• Improved post-operative care in recovery rooms, high dependency units and intensive care units
• Improved anaesthesia training
• Safer anaesthetic agents
• Improved equipment for Airway Management, particularly the laryngeal mask
Developing Countries

“It is noteworthy that in many developing countries, without the benefit of these advances, the anaesthetic mortality rate is up to 100 times that reported in developed countries.”
Australian and New Zealand College of Anaesthetists (ANZCA)

Safety of Anaesthesia
A review of anaesthesia-related mortality reporting in Australia and New Zealand 2006-2008

Neville Gibbs, MBBS, MD, FANZCA
Safety of Anaesthesia
A review of anaesthesia-related mortality reporting in Australia and New Zealand 2006-2008

Editor: Neville Gibbs, MBBS, MD, FANZCA
## DEATHS IN GENERAL ANAESTHESIA
### 2006-2008

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<tr>
<th></th>
<th>NSW</th>
<th>VIC</th>
<th>WA</th>
<th>TAS</th>
<th>TOTAL</th>
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<td>&lt;11 Years</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
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<tr>
<td>11-20 Years</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
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No anaesthesia-related deaths were recorded in children under one year of age (although NSW recorded two deaths in children under two). The majority of deaths occurred in patients over sixty years of age (79%). Over two thirds occurred in patients over 70 years of age, and over 40% in patients over 80 years of age.
UK Experience

- 1970-1990
- 35 children died
- 40% in hospital
- 1:215,000
- Mostly extraction cases
The Paediatric Dental Patient

Parental Concerns

1. Death of the child

2. Developmental Problems
Are Anaesthetic Drugs harmful for the Developing Brain?
Are Anaesthetic Drugs harmful for the Developing Brain?

“In 2011 half the Paediatric Papers in ANESTHESIOLOGY were related to neurotoxicity of General Anaesthetics to the developing brain.”

*Davidson AJ Editor Anesthesiology 2012; 116: 507-9

DiMaggio C, Sun LS. Early Childhood Exposure to Anesthesia and Risk of Developmental and Behavioural Disorders in a Sibling Birth Cohort. Anesth & Analg 2011;113:1143-51

Ing C, DiMaggio D, Whitehouse A, Hegarty M, et al. Long term Differences in Language and Cognitive Function after Childhood Exposure to Anaesthesia. Pediatrics 2012;130;e476; originally published online

Review article  89 references

“Anaesthesia kills neurons in the brain of infantile animals, including primates, and causes permanent and progressive neurocognitive decline. The anesthesia community and regulatory authorities alike are concerned that it is also true in humans”

“The risk of being subsequently diagnosed with developmental and behavioural disorders in children who were enrolled in a state Medicaid programme and who had surgery when they were younger than 3 years was 60% greater than that of a similar group of siblings who did not undergo surgery.”
Long-term Differences in Language and Cognitive Function after Childhood Exposure to Anaesthesia. Pediatrics 2012;130;e476; originally published online August 20 2012;

“Children in our cohort exposed to anesthesia before age 3 had a higher relative risk of language and abstract reasoning deficits at age 10 than unexposed children.”
The Paediatric Dental Patient

What makes treating them so difficult?

c) Involvement of parent(s)
The Paediatric Dental Patient

The Paediatric Dental Triangle

Parent → Child

Dentist
Paediatric Dentistry Vol 26 No 2 Mar/Apr 2004

"Behaviour Management Consensus Conference:
Special Issue"

“Behaviour of paediatric patients reflects fewer boundaries, less discipline and self control, and lowered behavioural expectations by parents”.
Paediatric Dentists are affected by changes in:

1. Parenting practices
2. Society
3. Marketing and Media
4. Communications and Technology

Survey mailed to 4180 AAPD members with a response of 2768 members:

7% General dentists
1% Specialists (Non Paediatric Dentists)
92% Paediatric Dentists
## Parental Presence in the Dental Surgery 2004

<table>
<thead>
<tr>
<th>Variable</th>
<th>% of respondents</th>
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<tr>
<td><strong>Parental presence in last 5 years</strong></td>
<td></td>
</tr>
<tr>
<td>Increased</td>
<td>38</td>
</tr>
<tr>
<td>Decreased</td>
<td>12</td>
</tr>
<tr>
<td>Stayed the same</td>
<td>50</td>
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<tr>
<td><strong>Reason for increase</strong></td>
<td></td>
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<tr>
<td>Parents prefer to be present</td>
<td>78</td>
</tr>
<tr>
<td>Parents insist on being present</td>
<td>53</td>
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<tr>
<td>Able to consult with parent while treating</td>
<td>51</td>
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<tr>
<td>Concern about legal action</td>
<td>35</td>
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<tr>
<td>More comfortable with parents present</td>
<td>31</td>
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<tr>
<td>Parents won’t consent to treatment unless present</td>
<td>21</td>
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<tr>
<td>Patients behave better with parent present</td>
<td>9</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
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Conclusions:
The younger the child, the older the parents and the fewer the previous appointments, the more the parents wanted to accompany the child.

Conclusions:

a) Parents were more satisfied with their child's dental appointment

b) Parents had a more positive attitude towards the dentist and the dental visit

c) Parents had a more positive perception of their child's response to the appointment