Dentistry through the ages:

From the young to the young at heart

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Learning objectives:

1. Review risk assessment strategies and how these assessments can be incorporated into your treatment plan.
2. Identify appropriate treatment strategies for patients in all stages of life.
3. Become familiar with rational treatment planning and understand when it is can be applied in your patients.
Disclosure

✓ We declare having NO conflicts of interest, financial or other competing interests
Definition: Young at heart

- Biological Age
  - Traditionally – 65 years
  - Retirement and Medicare eligible
  - Statistical Data available
Biological Aging

• Disease vs. Aging

• Functional Reserve
  • Great Reserve
    • Heart
    • Lungs
    • GI system
    • Muscles – get out of shape
      • Diaphragm
  • Changes
    • Kidneys
    • CNS

Table 2: Normal physiological changes in elderly patients.

<table>
<thead>
<tr>
<th>System</th>
<th>Change with age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central nervous system</td>
<td>neuronal density</td>
</tr>
<tr>
<td></td>
<td>reflexes</td>
</tr>
<tr>
<td></td>
<td>sympathetic response</td>
</tr>
<tr>
<td>Cardiovascular system</td>
<td>cardiac output</td>
</tr>
<tr>
<td></td>
<td>baroreceptor activity</td>
</tr>
<tr>
<td></td>
<td>total peripheral resistance</td>
</tr>
<tr>
<td>Gastrointestinal system</td>
<td>gastric emptying</td>
</tr>
<tr>
<td></td>
<td>gastrointestinal motility</td>
</tr>
<tr>
<td></td>
<td>gastric pH</td>
</tr>
<tr>
<td></td>
<td>intestinal blood flow</td>
</tr>
<tr>
<td>Respiratory system</td>
<td>tidal volume</td>
</tr>
<tr>
<td></td>
<td>vital capacity</td>
</tr>
<tr>
<td></td>
<td>residual volume</td>
</tr>
<tr>
<td></td>
<td>lung capacity</td>
</tr>
<tr>
<td>Renal system</td>
<td>renal blood flow</td>
</tr>
<tr>
<td></td>
<td>glomerular filtration</td>
</tr>
<tr>
<td></td>
<td>tubular secretion</td>
</tr>
<tr>
<td>Immune system</td>
<td>white blood cells</td>
</tr>
<tr>
<td></td>
<td>cell-mediated immunity</td>
</tr>
</tbody>
</table>
Kidneys

• Decreased kidney function with aging
• ↓ Functioning Glomeruli and ↑ sclerotic glomeruli
• Decreased blood flow

Reference Table for Population Mean eGFRs From NHANES III:

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Mean eGFR*</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>116 mL/min/1.73 m²</td>
</tr>
<tr>
<td>30-39</td>
<td>107 mL/min/1.73 m²</td>
</tr>
<tr>
<td>40-49</td>
<td>99 mL/min/1.73 m²</td>
</tr>
<tr>
<td>50-59</td>
<td>93 mL/min/1.73 m²</td>
</tr>
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<td>85 mL/min/1.73 m²</td>
</tr>
<tr>
<td>70+</td>
<td>75 mL/min/1.73 m²</td>
</tr>
</tbody>
</table>

*For diagnostic purposes the NKDEP recommends laboratories report eGFR values greater than or equal to 60 as "≥ 60 mL/min/1.73 m²," not as an exact number.
Kidneys

<table>
<thead>
<tr>
<th>Stage</th>
<th>GFR</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90+</td>
<td>Normal kidney function but urine findings or structural abnormalities or genetic trait point to kidney disease</td>
</tr>
<tr>
<td>2</td>
<td>60-89</td>
<td>Midly reduced kidney function, and other findings (as for stage 1) point to kidney disease</td>
</tr>
<tr>
<td>3A</td>
<td>45-59</td>
<td>Moderately reduced kidney function</td>
</tr>
<tr>
<td>3B</td>
<td>30-44</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>15-29</td>
<td>Severely reduced kidney function</td>
</tr>
<tr>
<td>5</td>
<td>&lt;15 or on dialysis</td>
<td>Very severe or endstage kidney failure (sometimes call established renal failure)</td>
</tr>
</tbody>
</table>

GFR: Glomerular Filtration Rate

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</tr>
</tbody>
</table>

*For diagnostic purposes the NKDEP recommends laboratories report eGFR values greater than or equal to 60 as “≥ 60 mL/min/1.73 m²,” not as an exact number.
Kidneys

- **Dental Considerations:**
  - Antibiotics
  - Antifungals
  - **Tylenol: drug of choice**
  - NSAIDS – use lower dose and expect longer duration of action
  - **Anxiolytics**
    - Lorazepam, Oxazepam, Triazolam.
      - Shorter Duration of action
      - No active metabolites
    - Diazepam – half life can be 100+ hours

<table>
<thead>
<tr>
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<th>GFR</th>
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</tr>
</thead>
<tbody>
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<td>1</td>
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</table>

GFR: Glomerular Filtration Rate

Matear & Clarke 1999
CNS Changes with Aging

- Coordination
- Reaction Time
- Muscle Mass/Strength

Dental Considerations:
- Take care prescribing CNS depressants -> Fall Risk
  - Opioids
  - Benzodiazepines
Sensory Changes with Age

• Eyes
  • Difficulty reading small print
  • Need more light to see sharply
  • Slow adaptation to quick changes in light
  • Decreased color perception
  • Peripheral vision declines

• Ears
  • Decreased perception of high pitched sounds
  • Difficulty discriminating speech from background noise

Farage et al 2012
Biologically Aging in Teeth

Fig. 2. Changes to dentin with aging. The secondary dentin grows inwardly into the pulp chamber, decreasing the chamber’s size. (Courtesy of Gregory An, DDS, MPH.)

Abrams, 2014
Examples

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Conditions</th>
<th>Activities and Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 yr old male</td>
<td>Diabetes Type II, Chronic Kidney Disease, Dialysis 3x/week</td>
<td>Walks with a cane, And gets tired easily</td>
<td></td>
</tr>
<tr>
<td>70 yr old male</td>
<td>Hypertension controlled with medication</td>
<td>Works at a local grocery store, Bikes to and from work</td>
<td></td>
</tr>
<tr>
<td>80 yr old female</td>
<td>Alzheimer’s Disease, Depression</td>
<td>Lives in a nursing home, uses a wheelchair for transportation and needs help standing and transferring</td>
<td></td>
</tr>
<tr>
<td>90 yr old female</td>
<td>History of Uterine cancer treated with surgery and radiation, Hypertension, Atherosclerosis w/ stent placement</td>
<td>Walks one mile every day</td>
<td></td>
</tr>
</tbody>
</table>
Definition: Older Adults

• Biological Age
  • Traditionally – 65 years
  • Retirement and Medicare eligible
  • Statistical Data available

• Functional Status
  • Functional health status – describes how a person functions in daily life
  • Physical functioning – self-reported ability to perform tasks including self-care activities.

Defining Functional Status for Dental Patients

• Independent Older Adult
  • Able to live independently. Can handle most/all Instrumental Activities of Daily Living (IADLs)
  • IADLs: Driving, Shopping, Finances, Telephone, Housework

• Frail Older Adult
  • Frail elders often have low physical activity, muscle weakness with impaired mobility, slowed performance of daily tasks, and fatigue easily.
  • May or may not need assistance with Activities of Daily Living (ADLs).
  • ADLs: personal hygiene, dressing, eating, toileting, and transferring in and out of a bed or chair

• Dependent Older Adult
  • Require the help of others for daily tasks (ADLs)

Ettinger and Beck 1984
Defining Functional Status for Dental Patients

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• Dependent Older Adult
  • Require the help of others for daily tasks (ADLs)

Ettinger and Beck 1984
Rational Treatment Planning

• Dental Care that is appropriate given **all modifying factors**
  • Stress involved to implement idealized treatment plan could pose health risks
  • Can limit the potential benefit from ideal treatment = inappropriate

• Modifying Factors
  • Health History and Medications
  • Dental Conditions
  • **Social Factors !!!!!**
    • Living situation
    • Social support – caregiver, spouse
    • Diet
    • Finances
    • Transportation to appointments

Ettinger 2006
Marchini et. al 2017
Clinical Examples
Rapid Oral Health Deterioration (ROHD)

• Avoid Tunnel Vision!!!
• View patient’s as a moving picture
• Stages:
  • 1. Patient is not at risk of ROHD
  • 2. Patient is at risk, but no disease
  • 3. Patient is experiencing ROHD and at risk of further oral health decline
  • 4. Patient has already experienced ROHD.

![Graph showing the stages of ROHD with a Disability Threshold and Older Age scales. The graph is adapted from Kalache and Kielbussch, 1997.](image)
Case #3 ROHD

• Stages:
  • 1. Patient is not at risk of ROHD
  • 2. Patient is at risk, but no disease
  • 3. Patient is experiencing ROHD and at risk of further oral health decline
  • 4. Patient has already experienced ROHD.
Case #3 ROHD

• Stages:
  • 1. Patient is not at risk of ROHD
  • 2. Patient is at risk, but no disease
  • 3. Patient is experiencing ROHD and at risk of further oral health decline
  • 4. Patient has already experienced ROHD.
Sources

Farage MA et. al. Design Principles to Accommodate Older Adults. Glob J Health Sci 4(2)2-25, 2012
A Historical Look at Behavioral Guidance

Table 8. TECHNIQUES RANKED BY PARENTAL ACCEPTANCE IN FOUR SIMILAR STUDIES

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Murphy et al. (1984)**</th>
<th>Lawrence et al.** (1991)*</th>
<th>Eaton et al. (2003)**</th>
<th>Present study†</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tell-show-do</td>
<td>Tell-show-do</td>
<td>Sedation</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Positive reinforcement</td>
<td>N₂O</td>
<td>N₂O</td>
<td>GA</td>
</tr>
<tr>
<td>3</td>
<td>Mouth prop</td>
<td>Voice control</td>
<td>GA</td>
<td>Active restraint</td>
</tr>
<tr>
<td>4</td>
<td>Voice control</td>
<td>Active restraint</td>
<td>Oral premedication</td>
<td>Passive restraint</td>
</tr>
<tr>
<td>5</td>
<td>Physical restraint, dentist</td>
<td>Hand-over-mouth</td>
<td>Voice control</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Physical restraint, assistant</td>
<td>Papoose Board</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Hand-over-mouth</td>
<td>Oral premedication</td>
<td>Passive restraint</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Sedation</td>
<td>GA</td>
<td>Hand-over-mouth</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>General anesthesia (GA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Papoose Board</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Vertical lines (†) indicate mean values that were not significantly different between techniques (analysis of variance and Tukey test).
† Vertical lines (†) indicate mean values that were not significantly different between techniques (Wilcoxon two-sample test).
What is Protective Stabilization

• Words we use
  • Burrito
  • Like swaddling a baby
  • Bracelets
Why Do We Use Protective Stabilization

- Emergency treatment
- Previously cooperative patient
- Sedation
- Children with SHCN
  - have uncontrolled movement
- Least restrictive method possible
- Safety
Documentation

• Indication for use
• Type of stabilization
• Informed consent
• Reason for parental exclusion
• Duration of use
• Behavior while in the papoose board
• Any untoward outcomes
Guideline for Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedures: Update 2016

Developed and Endorsed by
American Academy of Pediatric Dentistry and American Academy of Pediatrics

Abstract
The safe sedation of children for procedures requires a systematic approach that includes the following: no administration of sedating medication without the safety net of medico-legal supervision, careful preprocedure evaluation for underlying medical or surgical conditions that would place the child at increased risk from sedating medications, appropriate testing for elective procedures and a balance between the depth of sedation and risk for those who are unable to fast because of the urgent nature of the procedure, a focused history examination for key (baking) factors or anatomic or physiologic abnormalities that might increase the potential for airway obstruction, a clear understanding of the medico-legal pharmacokinetics and pharmacodynamic effects and drug interactions, appropriate training and AHA in airway management, close review of the patient, age-appropriate equipment for airway management and venous access, appropriate medications and reversal agents, sufficient numbers of staff to both carry out the procedure and monitor the patient, appropriate physiologic monitoring during and after the procedure, a properly equipped and staffed recovery area, recovery to the preprocedure level of consciousness before discharge from medical/clinical supervision, and appropriate discharge instructions. This report was developed through a collaborative effort of the American Academy of Pediatrics and the American Academy of Pediatric Dentistry to offer pediatricians updated information and guidance in delivering safe sedation to children.

Introduction
The number of diagnostic and minor surgical procedures performed on pediatric patients outside of the traditional operating room setting has increased in the past several decades. As a consequence of this change and the increased awareness of the importance of providing analgesia and anxiolysis, the need for sedation for procedures in physicians’ offices, dental offices, subspecialty procedure suites, imaging facilities, emergency departments, other inpatient hospital settings, and ambulatory surgery centers who has increased markedly. In recognition of the need for both effective and emergency use of sedation in nontraditional settings, the American Academy of Pediatrics (AAP) and the American Academy of Pediatric Dentistry (AAPD) have published a series of guidelines for the monitoring and management of pediatric patients during and after sedation for a procedure. The purpose of this updated report is to unify the guidelines for sedation used by medical and dental practitioners to add clarifications regarding monitoring modalities, particularly regarding continuous expired carbon dioxide measurements, to provide updated information from the medical and dental literature, and to suggest methods for further improvement in safety and outcomes. This document uses the same language to define sedation categories and expanded physiologic parameters as The Joint Commission, the American Society of Anesthesiologists (ASA), and the AAPD.

This revised statement reflects the current understanding of appropriate monitoring needs of pediatric patients both during and after sedation for a procedure. The monitoring and care outlined may be exceeded at any time on the basis of the judgment of the responsible practitioner. Although intended to encourage high-quality patient care, adherence to the recommendations in this document cannot guarantee a specific patient outcome. However, structured sedation protocols designed to incorporate these safety

ABBRIFARATIONS
AAP: American Academy of Pediatrics; AAPD: American Academy of Pediatric Dentistry; ASA: American Society of Anesthesiologists; BIS: Bispectral Index; CPP: Continuous positive airway pressure; EKG: Electrocardiography; GLU: Glucose; HEM: Hematocrit; HR: Heart Rate; ICP: Intracranial Pressure; INR: International Normalized Ratio; IV: Intravenous; NAM: N-acetylmethylamphetamine-photography; OR: Operating rooms; PACU: Post Anesthesia Care Unit; POCUS: Point of Care Ultrasound; PTP: Pulse Trace Pneumatic Tourniquet; PVO2: Partial Oxygen Pressure; R Wave: Right Wave of EKG; TEE: Transesophageal echocardiography; TV: Tracheal Ventilation; VAS: Visual Analog Scale; X-ray: X-ray
Sedation Guidelines

• Presedation evaluation
• Appropriate fasting for procedure
• Focused airway examination
• Understanding of the medications and drug interactions
• Training and skills for airway management
• Sufficient number of staff to carry out the procedure and monitor the patient
• Monitoring equipment
• Recovery and treatment area
What is Oral Conscious Sedation

• Definition of sedation
• Different regimens
  • dependent on patient age and procedure
• Must be a healthy child
  • ASA I and II
• Cannot have any underlying medical issues
Goals of Sedation

• Patient’s safety and welfare
• Minimize physical discomfort and pain
• Control anxiety
  • minimize psychological trauma
  • maximize potential amnesia
• Modify behavior for safe completion
• Return the patient to presedation level
  • discharge from facility with supervision is safe
# Sedation Record

**Patient Selection Criteria**

- **Patient:**
  - **Name:** [Redacted]
  - **Age:** [Redacted]
  - **Weight:** [Redacted]
  - **Physician:** [Redacted]

**Indications for sedation:**
- [x] Intravenous patient for whom local anesthesia techniques have not been successful
- [x] Patient unable to cooperate in the lack of physical, psychological, or emotional, physical, or medical disability

**Medical History:**
- [x] Allergies: [Redacted]
- [x] Co-morbidity: [Redacted]
- [x] Previous sedation: [Redacted]
- [x] Tobacco: [Redacted]
- [x] Alcohol: [Redacted]

**Assessment on Day of Sedation**

**Baseline Assessment:**
- **Blood Pressure:** [Redacted]
- **Heart Rate:** [Redacted]
- **Respiratory Rate:** [Redacted]

**Additional Instructions:**
- **Supplemental Oxygen:** [Redacted]

**Discharge Instructions:**
- **Medications:** [Redacted]
- **Diet:** [Redacted]
- **Activity:** [Redacted]
- **Signatures:** [Redacted]

---

## Intermittent Monitoring and Post-Operative Monitoring

**EMR telephone number:** [Redacted]

**Time:**
- **Baseline:** [Redacted]
- **Supplemental Oxygen:** [Redacted]

**Additional Information:**
- **NPO:** [Redacted]
- **Pain:** [Redacted]
- **Nausea:** [Redacted]

**Signatures:** [Redacted]

---

**Discharge:**
- **Medications:** [Redacted]
- **Diet:** [Redacted]
- **Activity:** [Redacted]

**Signatures:** [Redacted]
What Are Our Main Concerns

• NPO Status
• Kids who have been ill
• Kids with too much dental work
• Anatomy
What Questions Can You Ask

• What is your experience?
• What is your education for using sedation?
• What is the protocol for sedation?
  • NPO status
  • Monitoring the patient
  • H&P prior to the appointment
  • How are sedation medications given
Cost of Treatment in the Operating Room

• Typical cost is about $1500-$2500 for the dental fees
• $2000-$3000 for an out-patient facility
• About $8000-$10,000 for treatment in the hospital

This Risk, Trauma & Expense is Preventable
What is the Cost to the State?

<2% of the children enrolled in the dental Medicaid system under age 6 accounted for 25% of the dental dollars spent.

Why Do We Use General Anesthesia

• Patients cannot cooperate due to lack of psychological or emotional maturity and/or mental, physical or medical disability
• Local anesthetic is ineffective
• Extremely uncooperative, fearful, anxious or uncommunicative child
• Patients requiring significant surgical procedures
• General anesthesia may protect developing psyche
• Requiring immediate, comprehensive oral/dental care
Contraindications

• Healthy, cooperative patient
  • minimal dental needs
• Very young patient
  • minimal dental needs
  • Can something be addressed with stabilization
• Patient/practitioner convenience
• Predisposing medical conditions
Questions to Ask

• Location of the services
• Who will be providing the anesthesia services
• What type of anesthesia is provided
  • IV
  • Intubation
Evidence-Based Clinical Practice Guideline on Nonrestorative Treatments for Carious Lesions: A Report from the American Dental Association

Summary of clinical recommendations for the nonrestorative treatment of caries on primary teeth

**GRADE Certainty in the Evidence**
- **High**: We are very confident that the true effect lies close to that of the estimate of the effect.
- **Moderate**: We are moderately confident in the effect estimate. The true effect is likely to be close to the estimate of the effect.
- **Low**: Our confidence in the effect estimate is limited.
- **Very Low**: We have very little confidence in the effect estimate.

**GRADE Interpretation of Strength of Recommendations**

<table>
<thead>
<tr>
<th>Implications</th>
<th>Strong Recommendations</th>
<th>Conditional Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Patients</td>
<td>Most individuals in this situation would want the recommended course of action and only a small proportion would not.</td>
<td>The majority of individuals in this situation would want the suggested course of action, but many would not.</td>
</tr>
<tr>
<td>For Clinicians</td>
<td>Most individuals should receive the intervention.</td>
<td>Recognize that different choices will be appropriate for individual patients and that you must help each patient arrive at a management decision consistent with his or her values and preferences.</td>
</tr>
<tr>
<td>For Policy Makers</td>
<td>The recommendation can be adapted as policy in most situations.</td>
<td>Policy making will require substantial debate and involvement of various stakeholders.</td>
</tr>
</tbody>
</table>

**Expert Panel Recommendation**

| To arrest advanced cavitated carious lesions on any coronal surface of primary teeth, the expert panel recommends clinicians prioritize the use of 38% silver diamine fluoride (SDF) solution (buccal application) over 5% sodium fluoride varnish (application once per week for 3 weeks).* | Moderate | Strong |
| To arrest or reverse noncavitated carious lesions on occlusal surfaces of primary teeth, the expert panel recommends clinicians prioritize the use of sealants + 5% sodium fluoride varnish (application every 3–6 months) or sealants alone over 5% sodium fluoride varnish alone (application every 3–6 months), 1.23% acidulated phosphate fluoride gel (application every 3–6 months), resin infiltration + 5% sodium fluoride varnish (application every 3–6 months), or 0.2% sodium fluoride mouth rinse (once per week).* | Moderate | Strong |
| To arrest or reverse noncavitated carious lesions on facial or lingual surfaces of primary teeth, the expert panel suggests clinicians use 1.23% acidulated phosphate fluoride gel (application every 3–6 months) or 5% sodium fluoride varnish (application every 3–6 months).* | Moderate to Low | Conditional |
| To arrest or reverse noncavitated carious lesions on approximal surfaces of primary teeth, the expert panel suggests clinicians use 5% sodium fluoride varnish (application every 3–6 months), resin infiltration alone, resin infiltration + 5% sodium fluoride varnish (application every 3–6 months), or sealants alone.* | Low to Very Low | Conditional |

**SDF** – silver diamine fluoride

*Clinicians* refers to the target audience for this guideline, but only those authors/clinicians trained to perform the specific interventions should do so.

**Evidence-Based Clinical Practice Guideline on Nonrestorative Treatments for Carious Lesions: A Report from the American Dental Association**

| JADA. 2018; 149: 837–849 | ADA. Center for Evidence-Based Dentistry |

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TREATMENT PLANNING
Same Day Space Maintainers

• The reality
  • Patient population
  • Materials needed
  • Immediate need for space maintenance
What Does the Data Show

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Mean age at insertion N±SD in mos</th>
<th>Gender</th>
<th>Total patients</th>
<th>Appliances initially placed</th>
<th>Recemented appliances</th>
<th>Remade appliances</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandibular band and loop</td>
<td>6 yrs, 6 mos ± 13.1</td>
<td>M 15</td>
<td>F 8</td>
<td>23</td>
<td>33</td>
<td>11</td>
<td>45</td>
</tr>
<tr>
<td>Maxillary band and loop</td>
<td>6 yrs, 4 mos ± 15.1</td>
<td>M 22</td>
<td>F 19</td>
<td>41</td>
<td>46</td>
<td>21</td>
<td>67</td>
</tr>
<tr>
<td>Lingual arch</td>
<td>8 yrs, 0 mos ± 23.5</td>
<td>M 57</td>
<td>F 58</td>
<td>115</td>
<td>115</td>
<td>18</td>
<td>142</td>
</tr>
<tr>
<td>Nance</td>
<td>7 yrs, 10 mos ± 18.8</td>
<td>M 31</td>
<td>F 25</td>
<td>156</td>
<td>59</td>
<td>7</td>
<td>69</td>
</tr>
<tr>
<td>Total</td>
<td>7 yrs, 6 mos ± 21.9</td>
<td>M 125</td>
<td>F 110</td>
<td>235</td>
<td>253</td>
<td>57</td>
<td>323</td>
</tr>
</tbody>
</table>

Pediatr Dent 29(6): 500-506
## Appliance Outcome Expressed As a %

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Success</th>
<th>Failure</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Placed</td>
<td>Successful</td>
<td>Still in use</td>
</tr>
<tr>
<td>Mandibular band and loop</td>
<td>45</td>
<td>20 (44)</td>
<td>8 (18)</td>
</tr>
<tr>
<td>Maxillary band and loop</td>
<td>67</td>
<td>22 (33)</td>
<td>15 (22)</td>
</tr>
<tr>
<td>Lingual arch</td>
<td>142</td>
<td>34 (24)</td>
<td>60 (42)</td>
</tr>
<tr>
<td>Nance</td>
<td>69</td>
<td>17 (25)</td>
<td>27 (39)</td>
</tr>
<tr>
<td>Total</td>
<td>323</td>
<td>93 (29)</td>
<td>110 (34)</td>
</tr>
</tbody>
</table>
What is the Reason for Failure

• Patient’s age (younger and more uncooperative)
• Higher decay experience
• Diet (Stickier foods)
• Anatomy of the teeth
• Gingival margin shape of the tooth
Inventory Needed
Other Tools Required
How Long Do These Last

- Failure occurred in 63% of the space maintainers
- Loss of cement is the most common reason for failure
- Median survival time was 7 months
- Band and Loop had the highest survival
- Remade space maintainers had longer survival

Where Can You Get Great Education

• You Tube--Denovo
Can You Save Tooth T?

- Pulpotomy versus Pulpectomy
- Realistic Look at this situation
- Hall Crown or IPC
Hall Crowns

• Shown to be effective with 30 years of experience
• Need to pick the right patient
  • No anesthetic
  • No caries removal
• Need to pick the right tooth
  • must be a good band of dentin present
  • no history of pain
Research

Scotland Study
• Looked at 132 split mouth study after 60 months Major and Minor failures
  • Major—Irreversible pulpitis, pathology
  • Minor—New decay, lost restoration
• 3 Major failures for Hall crown
• 15 Major failures for conventional

American Study
• Study design has its flaws
• About the same success rate between groups
• Conclusion is that there needs to be more research

JADA 145(12): 1248-1253, 2014
Table 1 Indications and contra-indications for (teeth) using the Hall Technique for managing primary molars with caries lesions assessed as at risk of progressing and causing pain/sepsis before exfoliation

<table>
<thead>
<tr>
<th>Indications include teeth with:</th>
<th>Proximal lesions, cavitated or non-cavitated Occlusal lesions, non-cavitated if the child is unable to accept a fissure sealant Occlusal lesions, cavitated if the child is unable to accept selective caries removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contra-indications include teeth with:</td>
<td>Where no ‘clear band of dentine’ can be seen on a radiograph Signs or symptoms of irreversible pulpitis, or dental infection (sepsis) Clinical or radiographic signs of pulpal exposure, or periradicular pathology Crowns/teeth so broken down they would be unrestorable with conventional techniques Children where the airway cannot be managed safely</td>
</tr>
</tbody>
</table>
Fig. 1 Series of three photographs showing a crown being fitted to tooth 84 (lower right 1st primary molar). a) Different crowns are tried over the tooth until the correct size is found (covering the cusps and giving a feeling of ‘spring back’. Note that gauze is being used for airway protection. b) The crown is filled with glass ionomer cement. c) The crown is seated over the tooth (there is no local anaesthetic, tooth preparation or caries removal) and, in this case, the child has used their bite force to seat the crown with cotton wool to help distribute the force. The gingiva is blanching as the crown is sitting slightly subgingivally, further improving the seal and preventing the lesion progressing. Same child as Fig. 3
If This is so Great--What is the Argument

• Against
  • Hiding bacteria rather than eliminating it
  • What about marginal ridges
  • Ethics of treatment versus non-treatment
  • Medico-legal consideration

• For
  • Been in use for 30+ years
  • New way of thinking
  • Failure rates are similar
Use of Silver Diamine Fluoride for Dental Caries Management in Children and Adolescents, Including Those with Special Health Care Needs

Developed by
American Academy of Pediatric Dentistry

Abstract

Background: This manuscript presents evidence-based guidance on the use of 38 percent silver diamine fluoride (SDF) for dental caries management in children and adolescents, including those with special health care needs. A multidisciplinary working group formed by the American Academy of Pediatric Dentistry developed guidance and an evidence-based recommendation regarding the application of 38 percent SDF to arrest cavitated caries lesions in primary teeth.

Types of studies reviewed: The basis of the guideline’s recommendation is evidence from an existing systematic review “Clinical trials of silver diamine fluoride in arresting caries among children: A systematic review” (EUR Oral Health 2016;5(1):1-10). A systematic search was conducted in PubMed, MEDLINE, Embase, Cochrane Central Register of Controlled Trials, and gray literature databases to identify randomized controlled trials and systematic reviews reporting on the effect of silver diamine fluoride and address peripheral issues such as adverse effects and cost. The Grading Recommendations Assessment, Development, and Evaluation (GRADE) approach was used to assess the quality of the evidence and the evidence-inference framework was employed to formulate a recommendation.

Results: The panel made a conditional recommendation regarding the use of 38 percent SDF for the arrest of cavitated caries lesions in primary teeth as part of a comprehensive caries management program. After taking into consideration the low cost of the treatment and the disease burden of caries, panel members were confident that the benefits of SDF application in the target populations outweigh its possible undesirable effects. Per GRADE, this conditional recommendation is based on low-quality evidence.

Conclusions and practical implications: The guideline intends to inform the clinical practices involving the application of 38 percent SDF to enhance dental caries management outcomes in children and adolescents, including those with special health care needs. These recommendations are based upon the best available evidence to date. A 38 percent SDF protocol is included in Appendix A.

Keywords: Silver diamine fluoride, Clinical recommendations, Cariology, Anti-cariogenic agents, Caries management, Silver, Cariology, Cariology, Cariology

Scope and purpose

The guideline intends to inform the clinical practices involving the application of silver diamine fluoride (SDF) to enhance dental caries management outcomes in children and adolescents, including those with special health care needs. Silver diamine fluoride in this guideline’s recommendation refers to 38 percent SDF, the only formula available in the United States. These recommended practices are based upon the best available evidence to date. However, the ultimate decisions regarding disease management and specific treatment modalities are to be made by the dental professional and the patient or parent, representative, acknowledging individuals’ differences in disease propensity, lifestyle, and environment.

The guideline provides practitioners with tools to understand evidence-based recommendations. The American Academy of Pediatric Dentistry’s (AAPD) evidence-based guidelines are being produced in accordance with standards created by the National Academy of Medicine (formerly known as the Institute of Medicine) and mandated by the National Guideline Clearinghouse™ (NGC), a database of evidence-based clinical practice guidelines and related documents maintained as a public service by the Agency for Healthcare Research and Quality (AHRQ) of the U.S. Department of Health and Human Services (USDHHS).

Health intents and expected benefits or outcomes: The guideline is based on analysis of data included in a recent systematic review and meta-analysis and summarizes evidence of the benefits and safety of SDF application in the context of dental caries management, mainly its effectiveness in arresting cavitated lesions.

ABBREVIATIONS
Use of Vital Pulp Therapies in Primary Teeth with Deep Caries Lesions

Developed by
American Academy of Pediatric Dentistry

Issued
2017

Abstract
Purpose: This manuscript presents evidence-based guidance on the use of vital pulp therapies for treatment of deep caries lesions in children. A guideline panel convened by the American Academy of Pediatric Dentistry formulated evidence-based recommendations on three vital pulp therapies: indirect pulp treatment (IPT), also known as indirect pulp cap, direct pulp cap (DPC), and pulpotomy.

Methods: The basis of the guideline's recommendations was evidence from literature. A systematic search was conducted in PubMed, MEDLINE, Embase, Cochrane Central Register of Controlled Trials, and trial registries to identify randomized controlled trials and systematic reviews addressing peripheral issues of vital pulp therapies such as patient preferences, treatment and impact of cost. Quality of the evidence was assessed through the Grading of Recommendations Assessment, Development, and Evaluation approach; the evidence to decision framework was used to formulate recommendations.

Results: The panel was unable to make a recommendation on superiority of any particular type of vital pulp therapy using too little studies directly comparing these interventions. The panel recommends use of mineral trioxide aggregate (MTA) and minocycline in pulpotomy treatments; these are recommendations based on moderate-quality evidence at 24 months. The panel made weak recommendations regarding choice of medication in both IPT (irreducible cavity evidence [4 months], low-quality evidence [4 months]) and DPC (very-low-quality evidence [24 months]). Success of both treatments was independent of type of medication used. The panel also recommends use of ferric sulfate (low-quality evidence), lasers (low-quality evidence), sodium hypochlorite (very-low-quality evidence), and triclosan cetyl ether (very-low-quality evidence) in pulpotomies; these are weak recommendations based on low-quality evidence. The panel recommends against the use of calcium hydroxide or pulpotomy medication in primary teeth with deep caries lesions.

Conclusions and practical implications: The guidelines intend to inform the clinical practices with evidence-based recommendations on vital pulp therapies in primary teeth with deep caries lesions. These recommendations are based on the best available evidence to date.

Keywords: Pulpotomy, Pulp Therapy, Vital Pulp Therapy, Indirect Pulp Therapy, Indirect Pulp Cap, Direct Pulp Cap, Mineral Trioxide Aggregate, ferric sulfate, calcium hydroxide, triclosan cetyl ether.

Scope and purpose
The American Academy of Pediatric Dentistry (AAPD) intends this guideline to aid clinicians in optimizing patient care when choosing vital pulp therapies to treat children with deep caries lesions. Vital primary teeth diagnosed with a normal pulp requiring pulp therapy or with reversible pulpitis should be treated with vital pulp procedures. Currently, there are three vital pulp therapies (VPTs) available for the treatment of deep dentin caries lesions approximating the pulp in vital primary teeth: (1) indirect pulp treatment (IPT), also known as indirect pulp cap; (2) direct pulp cap (DPC); and (3) pulpotomy.

For the purpose of this guideline, various interventions for vital pulp therapy were evaluated, including indirect pulp treatment using calcium hydroxide and alternate cements such as bonding agents/louvers; direct pulp cap using calcium hydroxide and alternate cements such as bonding agents, mineral trioxide aggregate (MTA), or formocresol; and pulpotomies using formocresol, MTA, ferric sulfate (FeS), sodium hypochlorite (NaOCl), and triclosan cetyl ether. In addition to the reported adverse events, the evidence on outcome moderators such as type of final restorations and use of rubber dam was reviewed for this guideline.

Abbreviations
Where Can You Get Information

- *Pediatric Dentistry: Infancy through Adolescence* (Sixth Edition) by Arthur J. Nowak
- *McDonald and Avery's Dentistry for the Child and Adolescent*
Recommendations: Clinical Practice Guidelines

Use of Silver Diamine Fluoride for Dental Caries Management in Children and Adolescents, Including Those with Special Health Care Needs

Use of Pit-and-Fissure Sealants

Use of Vital Pulp Therapies in Primary Teeth with Deep Caries Lesions

Recommendations: Best Practices

Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance/Counseling, and Oral Treatment for Infants, Children, and Adolescents

Caries-risk Assessment and Management for Infants, Children, and Adolescents

Recommendations for Pediatric Oral Health Assessment, Preventive Services, and Anticipatory Guidance/Counseling

Prescribing Dental Radiographs for Infants, Children, Adolescents, and Individuals with Special Health Care Needs

Perinatal and Infant Oral Health Care

Adolescent Oral Health Care

Oral Health Care for the Pregnant Adolescent

Management of Dental Patients with Special Health Care Needs

Oral and Dental Aspects of Child Abuse and Neglect

Fluoride Therapy
http://www.aap.org/oralhealth/
http://www.mchoralhealth.org/OpenWide/index.htm
http://www.dentistry.uiowa.edu/pediatric-videos
http://www.aapd.org
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Our mission is to improve the oral health of infants, children, adolescents and their families with special emphasis given to improving the oral health of children with special health care needs and children of low-income backgrounds or with limited access to oral health services.
Healthy Smiles for Young Children