Pediatric Dentistry in a CHC setting

Dental Management Coalition Annual Conference

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What is the appropriate age for a child's first dental visit?

Timing of First Visit

- Guidelines of the American Academy of Pediatric Dentistry recommend:
  - An initial oral evaluation should occur within six months of the eruption of the first primary tooth and no later than twelve months of age
    - Revised in 1994
  - Supported by the American Dental Association

Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents

- Based on extensive review of scientific literature and best practices
- Represent consensus of more than 100 multidisciplinary experts: reviewed by over 1000 health professionals
- Developed with support of HRSA's Maternal and Child Health Bureau

Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents

- Make an appointment for the toddler's first dental examination and risk assessment at 12 months

Timing of First Visit

- Oral Health in America: A Report of the Surgeon General
  - Dental caries is the single most common chronic childhood disease-5 times more common than asthma and 7 times more common than hay fever
  - Over 50 percent of 5- to 9-year old children have at least one cavity or filling, and the proportion increases to 78 percent among 17-year olds

Timing of First Visit

- American Academy of Pediatrics
  - Oral Health Risk Assessment Timing and Establishment of the Dental Home
    - AAP policy statement- 2003

AAP Policy Statement Recommendations

- Integration of parental education about ECC into practice

AAP Policy Statement Recommendations

- Inclusion of topics related to oral health into medical curriculum

AAP Policy Statement Recommendations

- TIMING OF FIRST VISIT AND APPROPRIATE REFERRAL

AAP Policy Statement Recommendations

- Dental Home

If we are not willing to treat these patients, who will?

Rationale for Early Oral Exam

- Early intervention and risk assessment are essential components in assuring that oral health is an outcome for all children
- Not all children are at equal risk!

Risk Assessment

- Provides the dentist the opportunity to tailor periodicity and oral health supervision to the individual's level of risk for specific diseases, conditions, and injuries

Anticipatory Guidance

- Refers to the information provided to the child and family about the child's current oral health and what to expect as the child enters the next developmental phase

Early Childhood Caries (ECC)

- Presence of one or more decayed, missing (because of caries), or filled tooth surfaces in any primary tooth in a child under six
- Baby bottle tooth decay is a severe form of ECC

Definitions

- Dental Decay or Cavities - Cavitation of enamel
- Historically has relied on surgical model of treatment
- Dental Caries - Disease process
- Contemporary thinking urges medical model of treatment

Medical Approach to Caries Management

- Principles
  - reorient management from *treatment of cavities* to *management of caries*
  - surgical approach problematic when applied to dynamic process
  - better to treat cause rather than manifestation of disease

Medical Approach to Caries Management

- Strategy
  - determine child's current caries experience
  - *estimate risk* for future caries
  - develop plan to address current problem and prevent future disease
- Goal
  - minimize lifelong caries experience while using least intervention consistent with level of risk

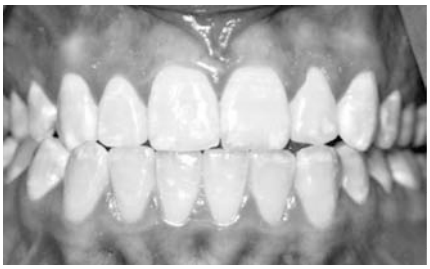
Risk Factors for Early Childhood Caries

- Fluoride History
- Dietary Habits
- Sleep time Habits
- Oral Hygiene Habits
- SES
- Special health needs
- History of BBTD
- High Mutans Streptococci count
- Poor family oral health

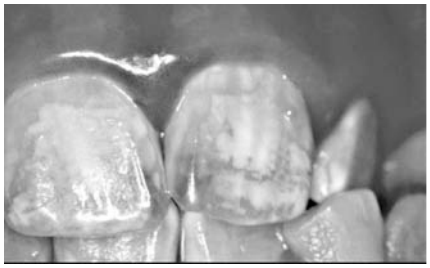
Risk Factors- Fluoride History

- Fluoridated community?
- Taking supplements?
- Well water? Fluoride level?
- Fluoride dentifrice?
- Bottled water?

Fluorosis



Fluorosis



Risk Factors- Dietary Habits

- Does/did child sleep with a bottle?
- Is/was child breastfed?
- Does child drink from a cup?
- Types, consistency, and <u>frequency</u> of food and liquid intake

Risk Factors- Sleep time Habits

Baby Bottle Tooth Decay

- Infants should not be put to sleep with a bottle
- If an infant uses a bottle at night- only water
- If a child is breastfed at will, nocturnal breastfeeding should be avoided after eruption of first tooth
- Introduce a cup at about 6 months and wean child from bottle at about 12 months

Risk Factors- Oral Hygiene

- Nature of care given
- Consistency
- Products used

Risk Factors- Poor Family Oral Health

- Caries rate of primary caregiver
- Transmission of S. mutans from caregiver to child
- Parental Attitude

Risk Factors- SES

- Striking disparities in dental disease by income
- Poor children suffer twice as much dental caries and their disease is much more likely to be untreated

Risk Factors- Special Health Needs

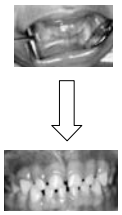
- Special diets
- Medications containing sucrose
- Physical limitations

Anticipatory Guidance- Topics to Incorporate

- Oral Development
- Oral Hygiene/Health
- Fluoride
- Diet and Nutrition
- Habits
- Injury Prevention

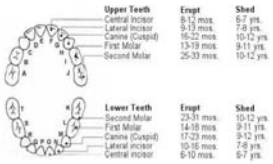
Anticipatory Guidance- Oral Development

- Teething
  - Drooling, desire to bite or chew, mild pain
  - No evidence of high fever, diarrhea or sleep problems
- Patterns of Eruption
- Occlusion
- Exfoliation



Eruption Patterns of Primary Teeth

- Tooth formation begins at about 7 weeks in utero
- Mineralization at about the 4th month
- Sequence more important than timing
- Symmetrical pattern
- Mandibular teeth erupt first



Approximate Eruption Schedule

"7+4" Guideline

7 Months = First Tooth Erupts

11 Months = 4 Erupted Teeth

- 7 months + 4 = 11 months
- 0 teeth + 4 = 4 teeth

15 Months = 8 Erupted Teeth

- 11 months + 4 = 15 months
- 4 teeth + 4 = 8 teeth

19 Months = 12 Erupted Teeth

- 15 months + 4 = 19 months
- 8 teeth + 4 = 12 teeth

23 Months = 16 Erupted Teeth

- 19 months + 4 = 23 months
- 12 teeth + 4 = 16 teeth

27 Months = 20 Erupted Teeth

- 23 months + 4 = 27 months
- 16 teeth + 4 = 20 teeth

Anticipatory Guidance- Oral Hygiene/Health

- Oral hygiene techniques
- Transmission of microflora to infant
- Use of dentifrice
- Child's role in oral hygiene
- Radiographs and sealants

Toothbrushing

- Should begin with eruption of first tooth
- Position child to assure ease of access and stabilization of head
- Proper size toothbrush
- Technique
- Toothpaste- When and how much?
- Supervised until about 6 years of age

Transmission of S. Mutans

Transmission of S. Mutans

- 'Classic data'
  - MS colonize oral cavity after eruption of teeth
  - *Window of infectivity*
  - Vertical transmission
- Recent data
  - Transmission may be at birth
  - Fissures of tongue may be niche
  - Horizontal transmission may occur
  - Wan et al. 2003
    - 50% of infants are infected by 6 months
    - At 24 months, 84% harbor MS
    - Mean age of MS colonization- 15.7 months in dentate infants

Transmission of S. Mutans

- Early infection with MS is a significant risk factor for future development of carious lesions
- Reduction of salivary levels of SM in highly infected mothers can inhibit or delay establishment of this microorganism

Transmission of S. Mutans

- Reduce reservoir in mother, siblings and all caretakers
- Alter saliva sharing activities

Anticipatory Guidance-Fluoride

- Assess fluoride status and determine if and what supplementation is needed
- Discuss toxicity and safety

Anticipatory Guidance-Fluoride

Age of Child	Water Fluoride Concentration (parts per million)		
	Less than 0.3	Between 0.3 - 0.6	Greater than 0.6
Birth to 6 Months	0	0	0
6 months to 3 years	0.25 mg liquid drops	0	0
3 to 6 years	0. 5 mg drops or tablet	0.25 mg	0
6 to 16 years	1.00 mg	0.5 mg	0

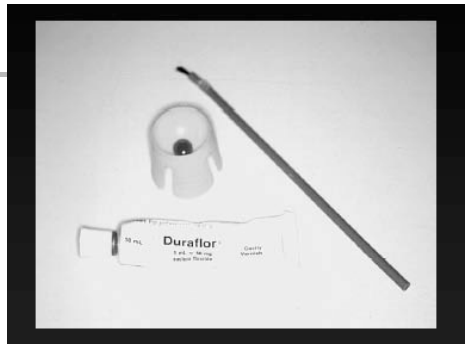
Fluoride Varnish

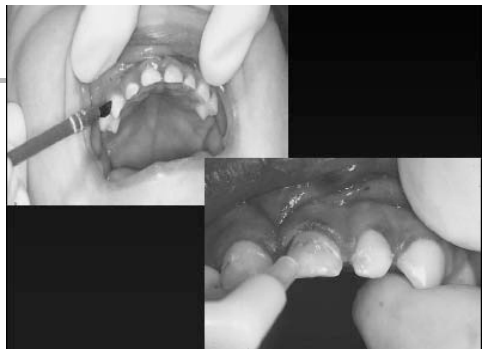
- Introduced in 1964 and has been widely used in Europe since 1980's
- Trials seem to show efficacy in reduction of caries greater than gel/foam
- In U.S. is approved by the FDA as a cavity liner and desensitizing agent

Fluoride Varnish

Fluoride Varnish

- General protocol for application
  - Isolate area with cotton rolls or gauze sponges
  - Apply thin layer to all surfaces of teeth with cotton applicator or disposable brush
  - Avoid getting varnish on soft tissue
  - Will set quickly in the presence of moisture





Fluoride Varnish

- Post-application instructions
  - Advise parent that any change in tooth color is temporary
  - Avoid eating for about one hour
  - Soft, non-abrasive foods for remainder of day
  - Parents should not brush until next day

Fluoride Varnish

- Advantages
  - Easy to use
  - Generally well accepted by young patients
  - Requires less patient cooperation
  - Carries less potential for ingestion of excessive fluoride

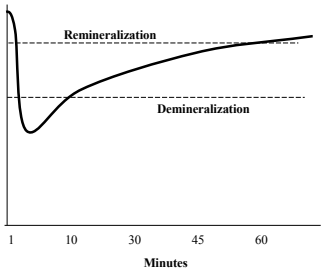
Anticipatory Guidance- Diet and Nutrition

- Nursing bottle decay
- Encourage weaning
- Role of sugar in the caries process
- Frequency of carbohydrate intake

Plaque pH after Sucrose Ingestion

- Frequent consumption of any fermentable carbohydrate is a major risk factor for ECC

Plaque pH after Sucrose Ingestion



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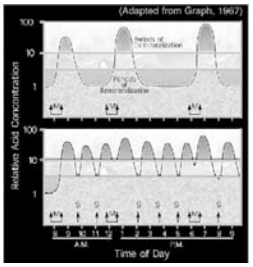


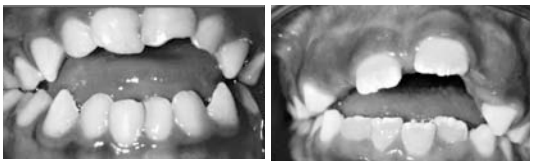
Anticipatory Guidance-Injury Prevention

- Give parents emergency numbers
- Simple instructions in the event of injury
- Electrical cord safety
- Mouthguards

Nonnutritive Sucking Habits

- Normal part of neonatal development
- Arise from rooting and sucking reflexes
- Habit normally ceases between two and four years of age
- Effects on dentition depends on intensity, frequency, and duration of habit
- Success of intervention depends on child's readiness

Effects of NNS



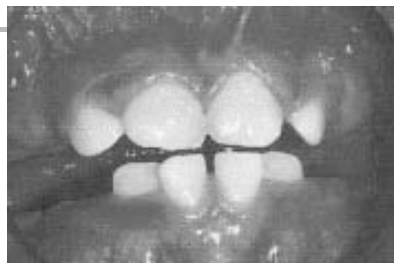
Clinical Examination

- Several techniques
- Should be performed as gently and efficiently as possible
- Limit discussion with parent during the exam
- **Crying ≠ failure**

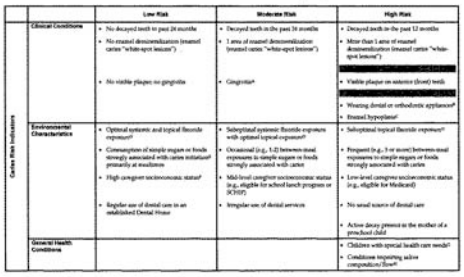
Lap Examination Procedure

- Dentist and caregiver make a 'cradle' by sitting face to face on chairs and joining knees
- Head in lap of dentist
- Parent supports child

Lap Examination



AAPD Caries-Risk Assessment Tool (CAT)



Caries Risk Indicators		Low Risk	Moderate Risk	High Risk
	Clinical Conditions	• No decayed teeth in past 24 months • No enamel demineralization (enamel caries "white-spot lesions") • No visible plaque; no gingivitis	• Decayed teeth in the past 24 months • 1 area of enamel demineralization (enamel caries "white-spot lesions") • Gingivitis[A]	• Decayed teeth in the past 12 months • More than 1 area of enamel demineralization (enamel caries "white-spot lesions") • Visible plaque on anterior (front) teeth • Wearing dental or orthodontic appliances[B] • Enamel hypoplasia[C]
	Environmental Characteristics	• Optimal systemic and topical fluoride exposure[D] • Consumption of simple sugars or foods strongly associated with caries initiation[E] primarily at mealtimes • High caregiver socioeconomic status[F] • Regular use of dental care in an established Dental Home	• Suboptimal systemic fluoride exposure with optimal topical exposure[D] • Occasional (e.g., 1-2) between-meal exposures to simple sugars or foods strongly associated with caries • Mid-level caregiver socioeconomic status (e.g., eligible for school lunch program or SCHIP) • Irregular use of dental services	• Suboptimal topical fluoride exposure[D] • Frequent (e.g., 3 or more) between-meal exposures to simple sugars or foods strongly associated with caries • Low-level caregiver socioeconomic status (e.g., eligible for Medicaid) • No usual source of dental care • Active decay present in the mother of a preschool child
	General Health Conditions			• Children with special health care needs[G] • Conditions impairing saliva composition/flow[H]

Footnotes for Application of the AAPD CAT:

A Although microbial organisms responsible for gingivitis may be different than those primarily implicated in dental caries, the presence of gingivitis is an indicator of poor or infrequent oral hygiene practices and has been associated with caries progression.

B Orthodontic appliances include both fixed and removable appliances, space maintainers, and other devices that remain in the mouth continuously or for prolonged time intervals and which may trap food and plaque, prevent oral hygiene, compromise access of tooth surfaces to fluoride, or otherwise create an environment supporting dental caries initiation.

C Tooth anatomy and hypoplastic defects such as poorly formed enamel, developmental pits, and deep pits may predispose a child to develop dental caries.

D Optimal systemic and topical fluoride exposure is based on the American Dental Association / American Academy of Pediatrics guidelines for exposure from fluoride drinking water and/or supplementation (Reference #4) and use of a fluoride dentifrice.

E Examples of sources of simple sugars include carbonated beverages, cookies, cake, candy, cereal, potato chips, French fries, corn chips, pretzels, breads, juices and fruits. Clinicians using caries-risk assessment should investigate individual exposures to sugars known to be involved in caries initiation.

F National surveys have demonstrated that children in low-income and moderate-income households are more likely to have dental caries and more decayed or filled primary teeth than children from more affluent households. Also, within income levels, minority children are more likely to have caries. Thus, sociodemographic status should be viewed as an initial indicator of risk that may be offset by the absence of other risk indicators.

G Children with special health care needs are those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally (Source: Newacheck PW et al. New estimates of children with special health care needs and implications for the state children's health insurance program. Maternal and Child Health Policy Research Center Fact Sheet, No. 4, March, 1998).

H Alteration in salivary flow can be the result of congenital or acquired conditions, surgery, radiation, medication or age-related changes in salivary function. Any condition, treatment, or process known or reported to alter saliva flow should be considered an indication of risk unless proven otherwise.

Alternative Restorative Treatment (ART)

- Also known as atraumatic restorative treatment or therapy
- Used to restore carious or defective teeth with minimal cavity preparation
- Promoted and endorsed by the World Health Organization with goals of preserving tooth structure, reducing infection and avoiding discomfort

ART Indications

- Very young patients
- Uncooperative patients
- Special needs patients
- “Traditional” techniques not possible

ART Technique

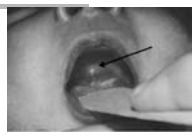
- Stabilize child
- Isolate area
- Remove “soft” or superficial decay
- Dry tooth until moist
- Restore with fluoride-releasing material, e.g. glass ionomer or RMGI

Common Oral Conditions

- Inclusion cysts
- Natal/Neonatal Teeth
- Iron Stain
- Primary Herpetic Gingivostomatitis
- Eruption Hematoma
- Ankyloglossia

Inclusion Cysts

- Epstein's pearls
  - Midpalatal raphe
  - Epithelial remnant
- Bohn's nodules
  - Side of alveolar ridge
  - Mucous gland remnant
- Dental lamina cyst
  - Crest of alveolar ridge
  - Odontogenic epithelial remnant



Natal/Neonatal Teeth

- Natal teeth- present at birth
- Neonatal teeth- erupt shortly after birth
- 85% lower incisors, 11% maxillary incisors
- Most are of normal primary complement
- Due to superficially positioned tooth bud
- Treatment

Natal/Neonatal Tooth

Natal teeth

Riga Fede

Iron Stain

- Extrinsic
- Often mistaken for caries
- Can be removed by prophylaxis

Primary Herpetic Gingivostomatitis

- Herpes Simplex Type I
- Usually occurs between 6 months and 6 years of age
- Fever
- Malaise
- Cervical lymphadenopathy
- Gingival erythema
- Fragile vesicles quickly progress to painful ulcers
- Acute phase lasts 7 to 10 days

Primary Herpetic Gingivostomatitis

Primary Herpetic Gingivostomatitis

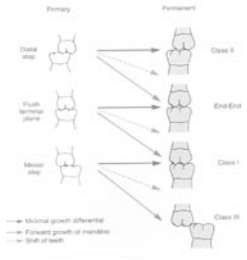
- Treatment is palliative and supportive
  - Rest, antipyretics, and analgesics
  - Patient is contagious
  - Be aware of dehydration!
  - Palliative mouthrinses
    - Diphenhydramine HCL (12.5/5ml) mixed with Kaopectate (or Maalox)- 50% mixture by volume
    - Local anesthetics (such as viscous lidocaine or dyclonine) are also used-either individually or in previous mixture

Eruption Hematoma

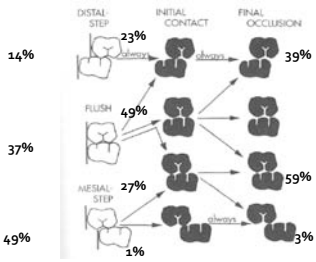
Ankyloglossia

The year one dental visit enables us to educate parents, identify those children most at risk for disease and focus our preventive strategies.

Classification of Occlusion: *Primary & Permanent Molars*



Classification of Occlusion: *Incidence at 3 Stages*



Classification of Occlusion: *Incidence at 3 Stages*

PRIMARY TERMINAL PLANE AT AGE 5 YEARS	INITIAL PERMANENT FIRST MOLAR OCCLUSION AT AGE 6½ YEARS	FINAL OCCLUSION AT ABOUT AGE 12 YEARS
	1% Class III	3% Class III
49% Class I (ms)	27% Class I	59% Class I
37% Flush	49% End-on	
14% Class II (ds)	23% Class II	39% Class II

Angle's Classification of Occlusion

- Class I
  - MB cusp of the permanent maxillary first molar occludes in the MB groove of the permanent mandibular first molar
- Class II
  - MB cusp of the permanent maxillary first molar occludes mesial to the MB groove of the permanent mandibular first molar
    - Divison 1 – labioversion of maxillary teeth
    - Division 2 – linguoversion of maxillary central incisors
- Class III
  - MB cusp of the permanent maxillary first molar occludes distal to the MB groove of the permanent mandibular first molar
- *Defined by permanent molar relationship*

Causes of Malocclusion

- Hereditary
  - Lack of arch length – small or large jaw
    - Growth of the mandible relative to the maxilla
  - Tooth size-arch length discrepancy
- Premature loss of primary teeth
  - Primary molars
  - Canines
- Space loss due to proximal caries
- Habits
  - Thumb or lip sucking, tongue thrust, etc.
- Ectopic tooth eruption
  - Idiopathic eruption of permanent first molars
  - Over-retention of primary molars due to trauma and/or ankylosis
  - Supernumerary teeth

Disruption of "Ideal" Eruption

- Affects normal eruption pattern of permanent teeth
- Failure to maintain space
- Reduction in arch length
- Resulting in MALOCCLUSION

How do we prevent this?!

SPACE MANAGEMENT!!!

NATURAL TEETH ARE THE BEST SPACE MAINTAINERS.

Space Management

Space Maintainer

- "A space maintainer is an intra-oral appliance used to preserve arch length following the premature loss of primary teeth/tooth."
- Allows the permanent teeth to erupt unhindered into proper alignment and occlusion
- Recommended after the untimely loss of a primary tooth

Causes of Space Loss

- Premature loss of primary tooth/teeth
  - Early extraction of second primary molar
    - High prevalence of caries on this tooth
  - Early loss of primary canine
    - Can cause reduced arch length due to mesial drift of posterior teeth and distal drift of incisors
- Abnormal eruption sequence
- Proximal caries
  - Space loss can occur from mesial tipping of tooth secondary to proximal caries
- Traumatic tooth loss

Failure to Maintain Space → Results in Malocclusion

- Drifting/tipping of teeth
- Loss of arch length
- Midline shift
- Crowding of permanent teeth
- Impactions
- Orthodontic intervention, including extractions

Basic Concepts

- Space closure occurs during the first 6 months after extraction. Therefore, it is best to insert the appliance ASAP following the extraction
- Loss of space occurs primarily through tipping movement of teeth (mesially or distally)
  - In maxillary molar region, space loss occurs due to rotation (mesial-in) in conjunction with mesial tipping
- Erupting premolars usually require 4-5 months to move through 1 mm of bone, as measured on a bitewing x-ray
- **Important: consider the role of chronological age and dental age**

Types of Space Maintenance Appliances

- Unilateral vs. Bilateral
- Anterior vs. Posterior
- Fixed vs. Removable

Types of Appliances

ANTERIOR

- Important for maintenance of normal speech, function, and esthetics

POSTERIOR

- Important for maintenance of space for development of normal occlusion

Types of Appliances

FIXED

- Bodily movements
- Bands, brackets, and wires must be acceptable to the patient
- Banded teeth must have clinical crown fully exposed
- Patient must have excellent oral hygiene
- Patient cooperation of wearing a removable appliance is doubtful

REMOVABLE

- Tipping movements
- Esthetics are important
- Enough teeth are present and sufficiently erupted for anchorage of appliance
- Does not interfere with proper oral hygiene
- Patient must be cooperative and responsible
- Less chair time

Anatomy of Appliance

- Clasps
- Hawleys
- Wires
- Acrylic
- Springs
- Screws
- Bands
- Brackets
- Auxillary attachments
- Cements

Space Maintenance Appliances – Examples

- Band and loop
- Bonded spacer
- Buccal bar
- Occlusal bar
- Crown and loop
- Distal shoe
- Transpalatal bar
- Nance appliance
- Lower lingual arch
- Removable appliances
  - Hawley retainer
  - Pedo partial
    - Lower
    - Upper
- Pedo bridge

Band & Loop

- Indication:
  - Unilateral or bilateral loss of a primary molar
- Holds molar position

Bonded Spacer

Bonded Spacer

- Indication:
  - Partially erupted tooth
    - Sufficient amount of tooth structure must be present
- Appliance is bonded to both buccal and lingual surfaces

Crown & Loop

- Indication:
  - Restores a grossly decayed abutment tooth
- Disadvantage:
  - Removal of appliance for adjustment is difficult

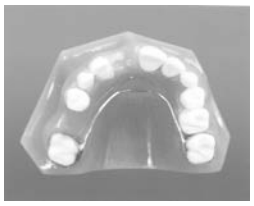
Distal Shoe

- Indication:
  - Loss of a primary second molar before the eruption of the first permanent molar
- Contraindication:
  - Poor oral hygiene
  - Medically compromised patient
- Components:
  - Single band
  - Distal extension

Transpalatal Bar

- Indications:
  - Bilateral loss of primary maxillary molars
    - Holds position of maxillary molars
    - Maintains leeway space
    - Prevents molar extrusion
- Advantages:
  - Hygenic
  - Comfortable
  - Does not interfere with normal speech
- Disadvantages:
  - May not prevent mesial tipping of teeth

Nance Appliance



- Indication:
  - Bilateral loss of multiple primary teeth in the maxillary arch
    - Maintains position of maxillary molars
    - Prevents arch length loss
- Advantages:
  - Acrylic button provides stability and anchorage
  - Appliance prevents tipping and rotation movement of molars
- Disadvantages:
  - Acrylic button may cause difficulty in maintaining hygiene

Lower Lingual Arch

- Indications:
  - Unilateral or bilateral loss of primary teeth in the mandibular arch during transitional dentition
  - Maintenance of arch length and incisor positions
- Contraindication:
  - Primary dentition
- Components:
  - Two bands
  - Arch wire
- Advantage:
  - Prevents both mesial and lingual tipping of molars

Lower Lingual Arch

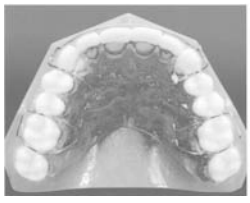
- Modifications:
  - Can be modified with omega loops, stops, and clasps
  - Can be fixed or removable

Removable Appliances

- Indications:
  - Bilateral loss of multiple teeth
    - Anterior and/or posterior
    - Maxillary or mandibular
  - In the absence of abutment teeth
  - Patient cooperation is essential
- Examples:
  - Hawley Retainer
  - Pedo Partial

Hawley Retainer

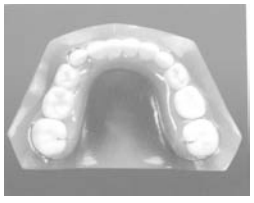
Hawley Retainer

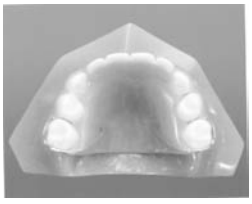


- Removable appliance
  - Can be upper or lower
- Components:
  - Adams clasps
  - Hawley type labial arch wire extending from distal of both canines
  - Acrylic palate
- Advantages:
  - Restore esthetics
  - Restore function
  - Prevent supraeruption of opposing teeth

Pedo Partial

LOWER **UPPER (AKA "FLIPPER")**

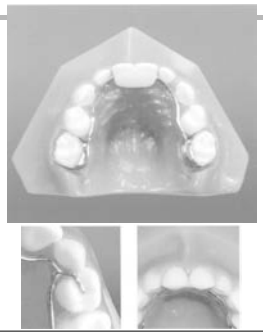




Pedo Partial

- Removable appliance
- Any number of teeth may be replaced

Pedo Bridge



- Indications:
  - Esthetics
- Components:
  - Up to 4 primary replacement teeth attached to maxillary lingual arch
  - Fixed appliance
  - May incorporate rest seats or bonded rests
- Disadvantage:
  - Easily bent and broken

Fabrication of a Space Maintainer

- Select molar bands
  - Trial and error leading to a snug fit
  - # on band indicates mesial surface of tooth
- Seat bands
  - Band should seat 1 mm below the marginal ridge with the aid of a band seater
  - Adapt bands to the contours of the tooth
  - Separators may be needed for tight contacts
- Take impressions
  - Take alginate impressions with bands in patient's mouth
  - Remove and place bands onto the impression, stabilize with wire/paperclips
  - Pour models
- Send to lab with order form

Oral Habits

Oral Habits – Definition

- **Any repetitive behavior pattern which utilizes the oral cavity**
- Learned patterns of muscular contraction
- Interfere with regular patterns of facial growth
- Arise from reflex and instinct
- Important factors:
  - **Frequency**
  - **Duration**
  - **Intensity**

Sucking Mechanism

- Seen in utero and infancy
- Sucking is the first coordinated and well-developed avenue of sensation
  - **It's instinctive!**
- 2 purposes:
  - 1. Nutritive
  - 2. Sensory pleasure

Sucking Mechanism

- Non-nutritive sucking behaviors are considered normal in infants and young children
- With further development, other neural pathways are established and the sucking mechanism becomes less important
- Thus, prolonged non-nutritive sucking habits can be associated with potential dentoalveolar consequences

Oral Habits – Behaviors

NON-COMPULSIVE

- Naturally modified or eliminated through the maturation process
- Not so entrenched in the child's behavior that they cannot be changed
- Resolve on their own as child grows out of it
- No detrimental effects seen

COMPULSIVE

- Fixated in a child's behavior pattern
- Malocclusion frequently results due to persistent and intense habit
- Reflects a psychologic dependency on certain behavior
- Compelling reason for the behavior to continue
  - Insecurities, fears, etc.

Consequences of Oral Habits

- Dentoalveolar-skeletal deformation
  - Constricted maxillary arch
  - Increased overjet
  - Reduced overbite
  - Anterior openbite
  - Anterior flaring of maxillary incisors
  - Excessive eruption of posteriors
  - Posterior crossbite
  - Long facial height
  - Class II molar relationships
- Speech problems
- Effects on the oral cavity & malocclusion
  - If treated → can often be reversed
  - If left untreated → permanent malocclusion
  - Can effect primary, mixed, and permanent dentitions

Oral Habits – Examples

- Thumb or finger sucking
- Pacifier sucking
- Tongue Thrust
- Nail biting
- Lip biting and lip sucking
- Grinding or bruxism
- Mouth breathing

Appliance Therapy

- Crib appliance
- Upper hay rake
- Blue Grass appliance
- Fixed tongue loops
- Tongue fence
- Lower tongue thrust inhibitor
- Lip biting inhibitor
- Occlusal splint

Thumb or Finger Sucking

Thumb or Finger Sucking

- Malocclusion depends on:
  - Position of the digit
  - Associated oro-facial muscle contraction force
  - Mandibular position during sucking
  - Facial skeletal genetic pattern
  - Amount, frequency, and duration of force applied

Thumb or Finger Sucking

- Offending digit
  - Red
  - Wrinkled
  - Exceptionally clean
  - Calluses

Thumb or Finger Sucking

- Consequences:
  - Before age 3 – damage is mostly confined to anterior dentition
  - After age 4 – habit is more established and damage is more significant
  - After the eruption of the permanent incisors – the worst amount of damage

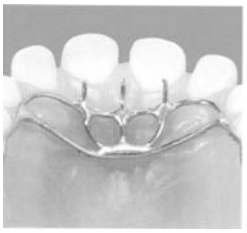
Thumb or Finger Sucking

TREATMENT OPTIONS

- Age related
  - Before 36 months
    - Patient/parent counseling
    - Behavior modification
  - After 36 months
    - More aggressive
  - 6-7 years
    - Appliance therapy
      - Crib appliance
      - Upper hay rake
      - Blue Grass appliance
      - Fixed tongue loops
      - Tongue fence

Palatal Crib Appliance

Upper Hay Rake



Blue Grass Appliance

- Teflon roller placed in most superior aspect of palate
- Roller prevents the satisfaction of suckling, yet patients feel they have acquired a new toy by using the tongue to spin the roller

Fixed Tongue Loops

- May be used to prevent thumb sucking or control tongue thrusting

Tongue Fence

- May be used to prevent thumb sucking or control tongue thrusting

Pacifier Sucking

Pacifier Sucking

- Safety precautions:
  - Never attach a pacifier to the infant with a string
  - Pacifier should be sturdy
  - Keep pacifier clean
  - Do not dip pacifier in sweetened foods to encourage sucking
  - Do not orally clean pacifier

Pacifier Sucking

- Safety precautions:
  - AAPD recommends pacifiers only in children that exhibit NNS behavior
  - Don't allow child to run or play with pacifier in mouth
  - Replace when worn

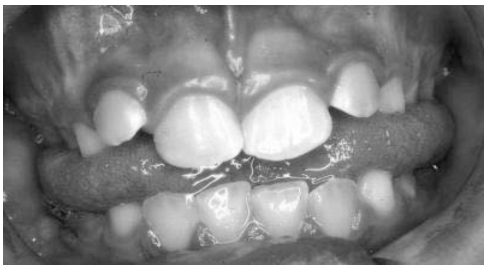
Pacifier Use

- AAP Policy Statement
  - The Changing Concept of of Sudden Infant Death Syndrome: Diagnostic Coding Shifts, Controversies Regarding the Sleeping Environment, and New Variables to Consider in Reducing Risk
    - PEDIATRICS, Vol.5., November 2005

AAP Recommendations

- Pacifier should be used when placing infant down to sleep throughout the first year
- Don't reinsert once asleep
- If infant refuses- don't force
- Don't coat in any sweet solution
- Clean often and replace regularly
- For breastfed infants-delay introduction until one month

Tongue Thrust



Tongue Thrust

- Abnormal tongue position and deviation from the normal swallowing pattern
- Causes:
  - Protrusion of the tongue against or between the anterior dentition
  - Delayed transition between infantile and adult swallowing pattern
    - Normal transition usually begins at age 2
    - 50% complete transition by age 6
    - 80% self-correct by age 12
    - 10-15% never fully complete the transition
- Functional adaptation of malocclusion, NOT the etiology

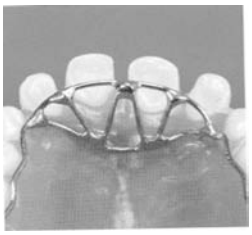
Tongue Thrust

Tongue Thrust

- Consequences
  - Anterior open bite
  - Abnormal speech – lisping
  - Anterior protrusion of the maxillary incisors
  - Mouth breathing
- Treatment Options
  - Simple habit control
  - Habit appliances
    - Fixed tongue loops
    - Tongue fence
    - Lower tongue thrust inhibitor

Fixed Tongue Loops


Tongue Fence

Grinding or Bruxism

- Habitual, nonfunctional, and forceful contact between occlusal surfaces
  - Can occur while awake or asleep
- Etiology is multifactorial:
  - Emotional stress
  - Parasomnias
  - Traumatic brain injury
  - Neurological disabilities
  - Malocclusion
  - Muscle recruitment

Grinding or Bruxism

- Occurrence in 20-24% of children
- Consequences:
  - Abrasion of both the primary and permanent teeth
  - Dental attrition
  - Headaches
  - Tempromandibular joint dysfunction
  - Soreness of the masticatory muscles

Grinding or Bruxism

- Treatment options:
  - Rarely requires intervention
    - Because mostly self-limiting, in juvenile cases
  - Patient/parent education
  - Occlusal splints
  - Psychological techniques
  - Medications

Treatment of Oral Habits

- Encourage treatment
- Individualize approach
- Factors to consider:
  - Age
  - Maturity
  - Parental support
  - Timely deliberation
  - Assessment of the deformity

Treatment Modalities

- Patient/parent counseling
  - Talk to the child
  - Discuss and explain why habit should stop
  - Parents can help monitor
- Behavior modification techniques
  - Reminder therapy
    - Aversive conditioning, adhesive bandage, cotton glove, arm wrap
  - Reward system
    - Prizes and/or self-esteem rewards
- Myofunctional therapy
- Appliance therapy
- Referral to other specialists

Pediatric Restorative Dentistry Consensus Conference

- Epidemiology, Risk Assessment and Clinical Decision Making
- Sealants
- Amalgam
- Tooth-bonding adhesives
- Glass ionomer materials
- Resin-based composites
- Stainless steel crowns
- Anterior restorations

Pediatric Restorative Dentistry Consensus Conference

- Epidemiology, Risk Assessment and Clinical Decision Making
  - Goal of caries risk assessment is to deliver patient specific diagnostic, preventive and restorative services based on an individual patient's needs
  - Numerous risk factors need to be considered
  - Dental caries management includes individualized prevention and restorative therapy

Pediatric Restorative Dentistry Consensus Conference

- Sealants
  - Safe, effective and underused in preventing pit and fissure caries on at-risk surfaces
  - Benefit is increased by placement on surfaces judged to be at high risk or surfaces that already exhibit incipient carious lesions
  - Best evaluation of risk is done by an experienced clinician using a variety of indicators

Pediatric Restorative Dentistry Consensus Conference

- Sealants (continued)
  - Caries risk and, therefore, benefit may exist in any tooth with a pit and fissure
  - Sealant placement methods should include careful cleaning of pits and fissures- a minimal enameloplasty may be indicated
  - A low-viscosity, hydrophilic bonding agent under the sealant has been shown to enhance long-term retention and effectiveness
  - Glass ionomers have not shown to be effective as pit and fissure sealants

Pediatric Restorative Dentistry Consensus Conference

- Glass ionomer materials
  - Literature supports use in following situations
    - Luting cements- SSC and ortho bands
    - Cavity base/liner
    - Primary teeth- Class I,II,III, V
    - Permanent teeth- for Class III and V in high risk patients or teeth that cannot be isolated
    - Caries control- high-risk patients, restoration repair and atraumatic restorative treatment

Pediatric Restorative Dentistry Consensus Conference

- Resin-based composites
  - Adequate isolation a must
  - Literature supports use for-
    - PRR's and occlusal caries extending in dentin
    - Class II in primary teeth when prep doesn't extend past proximal line angles
    - Class II in permanent teeth that extend one-third to one-half of the buccolingual intercuspal width
    - Class III, Class IV, Class V, and strip crowns

Pediatric Restorative Dentistry Consensus Conference

- Stainless steel crowns
  - Literature supports use in following situations
    - Children at high risk exhibiting anterior tooth decay and/or molar caries to protect remaining at-risk tooth surfaces
    - Children with extensive decay, large lesions or multiple surface lesions in primary molars
    - Strong consideration should be given in children who require general anesthesia

Pediatric Restorative Dentistry Consensus Conference

- Anterior restorations
  - Resin-based composites for Class III, IV and V restorations in primary and permanent dentition
  - Glass ionomer or RMGI for Class III and IV restorations for primary teeth that can't be isolated
  - Full coverage in primary teeth with
    - Multiple carious lesions, incisal edge involvement, extensive cervical decalcification, pulpal therapy, hypoplasia, poor moisture control

dental research in pediatric dentistry

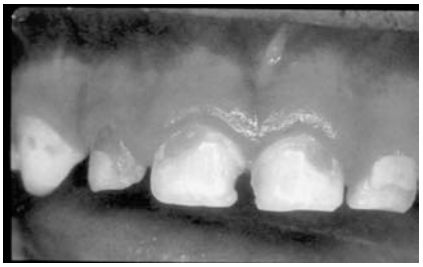
- Restorative
  - Anterior crowns
    - Stainless steel crowns
    - Open faced stainless steel crowns
    - Strip crowns
    - Veneered stainless steel crowns

The dilemna

Stainless steel crowns

Open faced SSC

Strip crowns-before

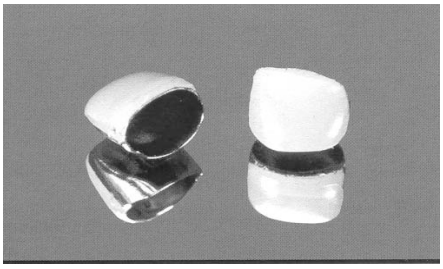


Strip crowns

Strip crowns

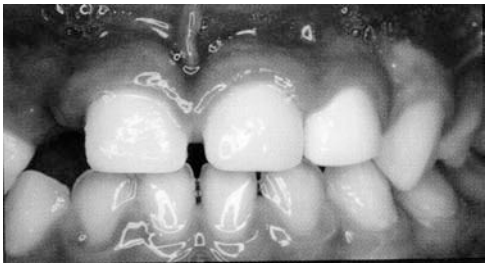
Strip crowns-after

Veneered SSC



Veneered SSC

Veneered SSC



Restorative

- Glass ionomer
  - Material that involves a significant acid-base reaction as part of its setting reaction
  - Acid is a water soluble polymer and base is a calcium fluoroaluminosilicate glass
  - Great improvements since their introduction

Glass ionomers

- Advantages
  - Fluoride ion release and uptake
  - Coefficient of thermal expansion similar to that of tooth structure
  - Biocompatibility
  - Chemical bonding to both enamel and dentin
  - Low setting shrinkage

Glass ionomers

- Disadvantages
  - Difficult to handle
  - Slow setting time
  - Sensitive to moisture and dehydration during set
  - Poor wear resistance
  - Poor fracture resistance

Resin-modified glass ionomers

- Major advancement in glass ionomer technology
- Liquid polyacid component includes a photopolymerizable resin
- Once resin hardens, the glass ionomer reaction continues in the hard resin framework

Resin-modified glass ionomers

- Base/Liner
  - Vitrabond (now spelled Vitrebond)
  - Decreased post-op sensitivity when placed under resin-based composites
  - Internal fluoride ion release
  - Antimicrobial action
  - "sandwich technique", "lamination" or "statification"

Resin-modified glass ionomers

- Restorative cements
  - Introduced in the early 1990s
  - Pre-disposed disposable capsules
  - Hand-spatulated

Resin-modified glass ionomers

- Advantages
  - Decreased initial hardening time
  - Improved handling
  - Improved fracture resistance and resistance to wear
  - These improvements come while maintaining the major advantages of glass ionomers

Resin-modified glass ionomers

- Suwatviroj P, Messer LB, Palamara JE. Microtensile bond strength of tooth-colored materials to primary tooth dentin *Pediatric Dent. 2004 Jan-Feb;26(1):67-74.*
  - University of Melbourne
  - Compared a packable composite resin with a RMGIC with and without conditioning dentin
  - Bond strength of Filtek P60 with Single Bond comparable to Fuji II LC
  - Cavity Conditioner did not improve bond strength of Fuji II

Resin-modified glass ionomers

- Qvist V, Manscher E, Teglers PT Resin-modified and conventional glass ionomer restorations in primary teeth: 8-year results. *J Dent. 2004 May;32(4):285-94.*
  - University of Copenhagen
  - RMGIC and GIC showed similar cariostatic effects on restored teeth and adjacent surfaces, but RMGIC should be used for Class II restorations in the primary dentition

Resin-modified glass ionomers

- Hubel S, Mejare I. Conventional versus resin-modified glass-ionomer cement for Class II restorations in primary molars. A 3-year clinical study. *Int J Paediatr Dent. 2003 Jan;13(1):2-8.*
  - Eastman Dental Institute, Stockholm, Sweden
  - 115 restorations-split-mouth and random assignment in 4-7 year olds
  - Marginal adaptation, anatomic form and secondary caries examined
  - Success rate of RMGIC significantly higher

Pulpal Therapy

- Indirect pulp treatment
- Pulptomy medicaments

Primary tooth anatomy

- Smaller in all dimensions, but pulp relatively larger
- Enamel is thinner
- Pulp horns slender and follow external anatomy of tooth very closely

Indirect pulp treatment

- Procedures or steps taken to protect or maintain the vitality of the carious tooth that, if completely excavated, the decay would result in a pulp exposure
- No precise method to determine how much carious dentin to be removed
- Medicament
  - RMGI
  - Calcium hydroxide

Indirect pulp treatment

- Recent studies indicate that indirect pulp treatment can be an acceptable procedure for primary teeth with reversible pulpal inflammation, provided the dx is based on a good hx, a proper clinical and radiographic exam, and the tooth is sealed well
  - Al-Zayer et al, 2003 (University of Michigan)
  - Farooq et al, 2000 (University of Maryland)

Pulpotomy medicaments

- Formocresol
  - The most universally taught and preferred technique for pulp therapy in primary teeth
  - Bacteriocidal and tissue fixative
  - Long history of clinical success
  - Animal studies have suggested that formocresol has mutagenic and carcinogenic potential
  - Search for alternative agents

Pulpotomy medicaments

- Ferric sulfate
  - Has been used as a coagulative and hemostatic agent for C&B impressions
  - Mechanism of action debated
  - Iron and sulfate ions react with blood proteins, causing them to agglutinate and form plugs over capillary orifices (Lemon et al, 1993)
  - For pulpotomies, action of ferric sulfate seems to be hemostatic rather than bactericidal or fixative

Pulpotomy medicaments

- Ferric sulfate
  - Recent studies comparing ferric sulfate pulpotomies to formocresol pulpotomies have found success rates to be very similar
    - Smith et al, 2000 (San Antonio)
    - Burnett and Walker, 2002 (University of Iowa)
    - Ibricevec and Al-Jame, 2003 (Amira Dental Centre, Kuwait)

Pulpotomy medicaments

- Sodium Hypochlorite
  - Preliminary evaluation of sodium hypochlorite for pulpotomies in primary molars.
    - Pediatr Dent. 2006 Nov-Dec;28(6):511-7
- MTA

Thank You!