Can You Really Save That (and Why Would You)?
Treatement Options for Carious Primary Teeth

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A Little Prevention Goes a Long Way
Trying to change parents and kids behavior (while keeping your sanity)

New York Times

The Ten Killer Questions
• “What do you mean that I should have brought my child in between 18 and 24 months?”
• or: “My pediatrician didn’t tell me that.”

The Answers
• The AAPD recommends the first visit when the first tooth erupts or sooner
• Provide counseling via risk assessment
• Nutrition and diet review
• Safety check
• Note that the pediatrician may see a child 15 times before the child visits the dentist
The Answers

- General Dentists and Pediatricians need to be trained in identifying and diagnosing oral diseases including hard and soft tissue pathoses.
- They are part of the team responsible for the "Dental Home" and fluoride applications.
- See www.AAP.org/oralhealth

Caries Risk Assessment

- Many available
  - AAPD www.aapd.org
  - CDA CAMBRA www.cda.org
  - ISDAS
  - Even the pediatricians are claiming this area
  - www.aap.org/oralhealth/cme
- All provide a systematic approach and a pathway for diagnosis and treatment
- Decide how complicated you want to be
- Must be recorded!

CDC Report on Oral Health

- 2014
- Increase in caries rates in preschoolers
- 23% will demonstrate ECC
- Stabilized rates in elementary and middle schoolers
- Increased rate in high schoolers

Definitions

- Cavity: a hole in a tooth; may be developmental or bacterial
  - +/- surface cavitation
- Caries: a biofilm mediated transmissible, bacterial disease
- Early Childhood Caries: caries of infants, toddlers, and young children affecting one or more teeth

Early Childhood Caries

- Early childhood caries (ECC) is the presence of 1 or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 72 months of age or younger.
- In children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC).
- From ages 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth, or a decayed, missing, or filled score of ≥4 (age 3), ≥5 (age 4), or ≥6 (age 5) surfaces constitutes S-ECC.
Sugar doesn’t cause cavities - acid does!

- Mutans strep and Lactobacillus make acid
- 5 fruits to an 8oz. glass of juice
- Approx. 1 tsp = 5 g sugar
- 12oz. Soda=39g. of sugar
- 3/4oz. JuiceBlast=40g. of sugar
- Carbonic acid/Phosphoric acid/Citric acid
- The two hour rule

Biofilms!

- 80% of infectious diseases are biofilm mediated
- Multiple organisms interacting
  - Can be benign individually; together wreak havoc
    - P. gingivalis
- Traditional treatment
  - Antibiotics
  - Mechanically debride
  - Opens up avenues to other potentially pathogenic at
- New treatment
  - Change environment and ecology
    - Unfermentable sweeteners
  - Prevent adhesion of biofilms
  - Xylitol
  - Honey
  - Change pH
  - Arginase as well

Erosion v Decay

- Erosion
  - Acidic breakdown of the enamel/dentin in which sugar substrate is metabolized by various bacteria. Their metabolic waste product demineralizes the tooth surface. Remineralization occurs at a rate slower than demineralization and the bacteria move into the cavitation that develops.

Attrition, Abrasion and Erosion

- Attrition: physiologic wear from mastication
  - Normal!
- Abrasion: pathologic wear of teeth from mechanical rubbing
  - Brushing, toothbrush and toothpaste wear
  - Brush lightly not hard - bristles don’t move
- Erosion: pathologic wear from chemical dissolution
  - Acidic foods/drinks, GERD

Saliva: the wonder drug

- Neutralizes acid with phosphate buffer returning oral cavity to basic environment
- Stops demineralization
- Promotes remineralization
- Contains Ca++, PO4, OH and F (exogenous)
- Remineralizes early decalcification in a basic environment
- Antibiotic/antiviral
- Enzyme system that breaks down food especially carbs to simple sugars!
- Washes away food substances
- The more the better!!!!!
Treatment Modalities

- Habit/Diet/Frequency of eating
- Decrease fermentable carbohydrate and sugar content
- Remove/disrupt biofilm
- Alternative Medicine Therapies: not tested/approved
  - Ozone
  - Oil Pulling (coconut oil)
- Chemotherapy
  - Ibuprofen/naproxen
  - Tetracyclines
  - Local penicillin
  - Chlorhexidine gel: does not decrease incidence of coronal caries
  - Silver diamine fluoride
  - Xylitol topical application
  - Gums/candy/wipes
  - Topical fluoride use
  - Gels/pastes/varnish
  - Chlorhexidine use does not decrease incidence of coronal caries
  - Silver diamine fluoride
  - Xylitol topical application
  - Gums/candy/wipes
  - Topical fluoride use
  - Gels/pastes/varnish

Definitive treatment

Oh No!!!

- Proceedings of the Symposium on Innovations in the Prevention and Management of Early Childhood Caries
  - Oct. 23-24, Ellicott, Md
  - Evidence of Effectiveness of Current Therapies to Prevent and Treat Early Childhood Caries; S. Twetman, V. Dhar
    - 877 reports, 33 met criteria
    - Fluoride toothpaste and varnish: insufficient evidence
    - Fluoride tablets and drops: insufficient evidence
    - Silver diamine fluoride, Xylitol, Chlorhexidine varnish/gel: insufficient evidence
    - Remineralizing agents (ACP-CP): insufficient evidence
    - Sealants, restorations, regular restorations: insufficient evidence
    - THERE IS NO EVIDENCE THAT ANYTHING WE DO WORKS!!!

Flossing Demo from Ouija (2013)

The Ten Killer Questions

- “Do you really have to do that?”
- Or “Aren’t they going to fall out anyway?”
  - Yes, they do
  - There is an infection in the tooth that must be cured
  - Baby teeth are important for:
    - eating
    - maintaining space for the permanent teeth
    - speech
    - growth and development of the face and arches

Restoring Primary Teeth
Caries in Primary Teeth

And What About Old Technology?!?

- **Silver Nitrate**
  - Silver is a natural antibiotic
  - 1000 BCE to treat water
  - Silver solution was used to treat ulcers and cancer sores
  - More effective than mercury containing compounds
  - Non-toxic
  - Has cariostatic effect
  - Can be mixed with fluoride and gives superior results
  - Silver Nitrate
  - Silver is a natural antibiotic
  - Used to treat water and ulcers
  - More effective than mercury compounds
  - Non-toxic
  - Has cariostatic effect
  - Can be mixed with fluoride for better results

The Ten Killer Questions

- "Aren’t silver fillings bad for my child?"
- Or: "Don’t you have anything else?"

The Answers

- There are no studies that definitively prove a link between alloys and any disease
- A very small percentage of patients may exhibit a Hg allergy
- Removing alloys increases Hg in the blood for a period of time
- Composite as an alternative is acceptable in children as well as adults
- Bisphenol vs. Bis-GMA sealants
  - Recommended rinsing following placement

GI v RMGI v Composites

- Chemical composition
  - GI: polyacrylic acid and fluorosilicate glass cleaved by HF
  - Composite: resin based matrix with a silicate filler and photoinitiator
  - Bisphenol A vs. Bis-GMA (bisphenol A-glycidyl methacrylate) or other dimethacrylate monomers

- Structure
- Bonding
  - Chemical vs mechanical
- Wear resistance
- Shear strength
- Pulp response
- F release
Bioactive/Bioactivity

- Marketing not scientific

Pain Control in Children

- Necessary for successful treatment
- Poor pain control often misinterpreted for disruptive behavior
- Requires special understanding of physiology and psychology of children

Pain in Children

- The response to the sensation of pain is often confused for disruptive behaviors
- May be socialized but is real
- Must be recognized as an important entity
- Changes in physiologic parameters
- Difficult to assess in children under 6
  - Use observation
- Self-reporting in children over 6
  - Pain scales
  - It is the key to a successful treatment (child and parent)

Use topical and make it red

- Ester anesthetic
- Hides the color of blood
- Numbs mucosa but not much deeper
- Still requires distraction and clenching
- Optimum time 1-3 minutes
- Don’t use too much
  - Risk of methemoglobinemia

Don’t waste your money on expensive anesthetics

- 2% Lidocaine with 1:100000 epi
  - Wide margin of safety
  - Full mouth with two carpules
  - Lasts too long?
  - Amide anesthetic
  - Metabolized in the liver
    - High pH therefore slower dissociation to free base
    - Infection has lower pH: limits free base
  - 4% Articaine with 1:100000 epi
    - Amide/ester
    - Transient methemoglobinemia

Don’t block children under 8 or use a full carpule

- Porous bone
- Teeth clenched
- Move needle along alveolar bone
- Interdental
  - Never do a “long buccal”
    - 1 hour anesthesia time
    - Controlled by volume
Peripheral Sensory Nerve Conduction

Anesthetic solution must cover 3 nodes (≈ 3 mm) to block nerve impulses.

Protein bound section active here blocking Na\(^{+}\) channels.

Commonly Used Local Anesthetic Agents
Dose Recommendations from AAP/AAPD

<table>
<thead>
<tr>
<th>Drug</th>
<th>Medical Use</th>
<th>Dental Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lidocaine</td>
<td>7.0</td>
<td>4.4</td>
</tr>
<tr>
<td>Mepivacaine</td>
<td>7.0</td>
<td>4.4</td>
</tr>
</tbody>
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Moore’s Rule of 25

- One cartridge/25 lbs (11 kg) body weight
- Any marketed local anesthetic used in dentistry
- Establishes a conservative dose
- Examples:
  - 50 lbs. (22 kg) 2 carpules
  - 75 lbs. (33 kg) 3 carpules
  - 100 lbs. (44 kg) 4 carpules
- May be too conservative in preschool child
- More accurately: 1 carpule/22 lbs (10 kg)
- mg/kg calculation provides greater accuracy


Factors Contributing to Increased Risk of Local Anesthetic Overdose

- Failure to calculate LA dose by weight
- Treating multiple quadrants at one appointment
- Failure to use LA with vasopressor
- LA administered in all quadrants at one time
- Concomitant use of sedation, especially opioids
- LA administered as standard volume per injection
- Selecting a high-concentration solution

Local Anesthetic Volume Administered

“For children under 10 years of age, it is rarely necessary to administer more than one-half cartridge (20 mg), even for mandibular blocks.”

Astra Pharmaceuticals Package Insert, 1997

Anesthesia Techniques in Children

- Short needle
- Smaller amount
  - Diffuses over a larger relative area
  - Less mylenization
- As few teeth and soft tissue areas affected as possible
Infiltration Technique

Influence of pH

- Most LAs are weak bases
  - $pK_a$ 7.5-9.5
- Only the base form can diffuse rapidly into nerve
- A high $pK_a$ means slower dissociation to free base
- Clinical result in onset of anesthesia?
- Tissue acidity lowers pH locally
  - Limits formation of free base
  - Leads to ionic entrapment in extracellular space

Buffering Local Anesthetics

Problems

- Pain from the pH incompatibility of local anesthetic and vasopressor with local tissue pH
  - LA: pH 5-9
  - Vasopressor: pH 3.5
- Tissue injury
- Latent uptake until pH "normalizes"
  - At acidic pH LA exists in non lipid soluble ionized form therefore unavailable to cross to nerve
- Infection lowers tissue pH

Buffering Local Anesthetics

Benefits

- Increases amount of lipid soluble active non ionized form
  - From pH 3.5 to buffered 7.4 there is a 6000 fold increase in lipid soluble form
- Patient comfort
- More rapid onset
- Decreased injury to tissue
- CO$_2$ release from HCl interaction with NaHCO$_3$ may potentiate action of LA and have its own anesthetic effect

Buffering Local Anesthesia

Armamentarium

- 8.4% NaHCO$_3$ available as 4.2g/50ml H$_2$O
- Tuberculin Syringe
- Alcohol wipes
- L.A. carpule: 1.7ml with epi 1:100000 or 1:200000
- Lasts about 1 week
  - Do before use

Buffering Local Anesthesia

Technique

from: youtube.com
And the Complications...

A Few Days Later

Use a rubber dam for all restorations
• Nothing worse than fighting lips, tongue, cheek in a gagging child
• 2 hole slit stretched over quadrant
• 2A, 6A, 00, 14A
• Wedges
• Or use isolation device
  • Mr. Thurs
  • Isotile
  • Optralite

Use a mouth prop
• The always useful mouth pillow!
• Helps the child relax
• Prevents unwanted “Code Red”
• Passive placement, not forced

Don’t extend for prevention
• G.V. Black had it all wrong!
• Small bonded restorations that preserve tooth structure
• Seal all vulnerable grooves
• Composite v. GI v RMGI
  • Wear resistance and acid dissolution
  • May need to cover GI and RMGI with composite

Use Metal Matrices
• Not plastic
  • Will have uncured layer of resin next to the band
Spot weld your matrices

- For back to back preps
- Use metal strips, not plastic

Use two curing lights

- Faster/Faster/Faster!
- More light & multiple cure directions
  - Material draws up to light direction
  - Still the most reliable at 40 usec.
- Always use large tip
- Must get 70% cure rate for maximum strength
- Or just buy a brighter light...
  - Does not lead to increased shrinkage
  - Cure in 5-8 seconds
- Always check for compatibility with materials
- Watch angulation
  - World’s lowest light
  - >1200 lumens
  - Check material compatibility

Other Composite Op Tips!

- Place a flowable material in the proximal box and then pack your composite into it:
  - Allows better adaptation and a little more resiliency at the margins
- Use a burnisher (not a plugger) to place and smooth composites
- Opaque/whiter materials need more light
- Bulk fill composites cure more thoroughly but most wear more rapidly
- 10-30 seconds and perpendicular!
- Trim using 12 fluted carbide flame and barrel shaped burs and a gingival trimmer
- When restoring a pulpotomized tooth, separate eugenol or silicone-based materials from the composite by placing a layer of glass ionomer
- No advice on the bruxer/GERD child!
  - The tooth flex and the composite is stiff
  - GI will grow but also erode

Stainless Steel Crowns v. Composite

Stainless Steel Crown Rule #1

- You fit the tooth to the crown not the crown to fit the tooth
  - Even more so for cosmetic crowns

Anterior and Posterior Esthetic (and not!) Restorations

- Composite
- Stainless Steel Crowns
- Stainless Steel Crowns with composite windows
- Stainless Steel Crowns powder coated in white
- Stainless Steel Crowns with bonded acrylic or composite
- Strip crown or Pedoform full coverage composite crowns
- Preformed composite crowns/polycarbonate crowns
- Silicate preformed crowns
- Ceramic Crowns (EZPedo)
Anterior Esthetic Restorations

Stainless Steel Anterior Crowns with Composite Facings

Resin Bonded Stainless Steel Crowns

• From Cheng Labs
• From Kinder Krows
• From NuSmileCrowns

Zirconium Presized Crowns

• EZPedo
• NuSmile

Composite Strip Crowns

Posterior Composite Crown

Extraction Alternative: Pedi Bridge

Modified Posterior Sandwich Restorations in Primary Teeth

• Sandwich Preparation
  • Fluoride releasing G.I. next to incipient lesion covered by wear resistant composite
  • Appropriate on proximal lesions in primary teeth
  • Extremely appropriate on distal lesions on 2nd primary molars abutting a permanent molar

And How About Sealants?

* Thanks Dr. Buonocone!
Reasons for Initial Caries in the Occlusal

- Mineralization defects
- Fissure morphology
- Lack of self cleansing
- Inability of mechanical cleansing

Indications

- Pit and fissures in molars and premolars
- Primary and permanent teeth
- Linguals on anteriors
- Geminated or fused teeth

Sealing Systems Currently Available

- Resin based bonded sealants without fluoride
- Resin based bonded systems with fluoride release
- Self-etching resin systems
- Glass ionomer systems
- Flowable composite over bond
  - Low fill: more shrinkage and leakage
  - High fill: less shrinkage
- Needed: ion flow system with remineralization capabilities!

Flash:

GI Sealant Systems Useful?

- Resin seals:
  - Higher retention rate with grooving
  - 32% loss at 2 years
- GI seals:
  - Higher retention rate without grooving
  - 40% loss at 2 years
- Caries rates at 2 years
  - Resin
    - With grooving 16%
    - Without grooving 12%
  - GI
    - With grooving 4%
    - Without grooving 8%

Pediatr Dent 2012; 34: pp46-50

Sealants Fail Because...

- Overetching
- Decay in grooves
- Moisture and other contaminants in grooves or on surface
- Air bubbles or pockets
- Dislodgement from occlusion
- No ion transfer prevents remineralization

Pulp Therapy
Pulp Therapy Primary Tooth

Primary Tooth Pulp Therapy

- Caries Control
- Pulpotomy
- Partial Pulpectomy
- Pulpectomy
- Extraction

Pulp Therapy Rule #1

- The pulp chamber in primary teeth is always in the middle of the occlusal surface

Primary Tooth Pulp Therapy

- Caries Control
- Active decay
- Elicited pain
- Absence of soft tissue findings
- Absence of radiographic findings
- Absence of mobility

Primary Tooth Pulp Therapy

- Caries Control/ Indirect Pulp Cap
  - Partial removal of decay
  - Palliative and hydroscopic material
  - ZOE
  - Ca(OH)2
  - Light cured Theracal
  - HM
  - Glass ionomers
  - Return for definitive pulp therapy and restoration (sometimes! Not always)

- Direct Pulp Cap
  - Rarely effective
  - MTA/Biodentine
  - Not Theracal

Primary Tooth Pulp Therapy

- Pulpotomy
- Active decay
- Elicited or spontaneous pain
- Absence of soft tissue findings
- Absence of radiographic findings
- Absence of mobility
- Controllably hemorrhagic pulp
- Infected coronal and radicular pulp
Vitapex

- One word for successful pulpotomies and pulpectomies
- Calcium hydroxide
- Silicone oil
- Iodophor paste
- Wonder drug?
- Are the results clinically better?

Mineral Trioxide Aggregate

- MTA is a cement composed of tricalcium silicate, dicalcium silicate, tricalcium aluminate, tetracalcium aluminoferite, calcium sulfate and bismuth oxide (modify setting properties)
- Alkaline similar to calcium hydroxide explaining properties
- Antibacterial?
- Mix powder with sterile water and pack into area with condenser or tool. Area should be moist to aid setting
- 4 hour set
- Use under SSC or GI then cover with composite
- Strength equal to IRM, seals better than amalgam
- Histologically induces dentinogenesis and cementogenesis with little inflammatory response
- Nonresorbable
- Expensive as a dental material, cheap as Portland cement

Two Basic Formulations

- ProRoot by Dentsply Tulsa
  - MTA
  - Changes tooth color
  - Requires lining coronal section with bonding agent to block dentinal tubules
  - ProRoot Septodent
  - Tricalcium Silicate
  - Color stable
  - Approved by FDA for pulpotomies
  - Can place composite directly over without floss after 15-30 minutes

- Biodentine Septodent
  - Tricalcium Silicate
  - Color stable
  - Approved by FDA for pulpotomies
  - Can place composite directly over without floss after 15-30 minutes

Primary Tooth Pulp Therapy

- Mycobacterium abscessus facial cellulitis
  - 30+ children in Atlanta
  - 40+ children in Anaheim
  - Hospitalized following pulpotomy procedures
  - Multiple antibiotics
  - MA normal bacterium in water lines
  - Iron is essential nutrient
  - Ferric sulfate for hemostasis?
  - Water line cleanliness
  - Use only sterile water

- Mycobacterium abscessus Infections Among Patients of a Pediatric Dentistry Practice — Georgia, 2015
  - CDC Report: Gianna Peralta, MPH1,2; Melissa Tobin-D’Angelo, MD1; Angie Parham, DVM1,3; Laura Edison, DVM1,4; Lauren Lorentzson, MPH1; Carol Smith, MSHA1; Cherie Drenzek, DVM1

Achieving Hemostasis

- Slightly moist cotton pellet and pressure
- Cotton pellet dipped in fibrin
- Electrosurgery/electrofulguration
- Cotton pellet dipped in anesthetic
  - Ferric sulfate
  - Astringent
  - Ferric chloride
  - Aluminum chloride
  - Gels
  - Aluminum chloride
  - Racedent thermogel (Septodont)
  - Traxodent (premier)
  - Absorb moisture and constrict vessels

Irrigating and Cleansing Solutions

- NaClO
  - Antibacterial
  - Dissolves organic material
  - No effect on dentin walls
  - Does not remove smear layer
  - Periapical damage to forming teeth and soft tissues
  - Chlorhexidine 2%
  - Potent antiseptic agent gm+<gm
  - Affected by pH
  - Cannot dissolve organic tissues or smear layer
  - Can form parachloroaniline in presence of NaClO (a carcinogen)
  - Ethylenediaminetetraacetic Acid (EDTA 17%)
Primary Tooth Pulp Therapy

• Pulpotomy
  - Remove ALL decay
  - Remove roof of pulp chamber
  - Extemporaneous pulp
  - Achieve hemostasis
    - Cotton pellets
    - FeSO₄ / AlCl₃ / astringent
      (Apply blended formocresol pellet for 5 minutes)
  - ZOE/Vitapex dressing or cover if bonded restoration
  - MTA (no formocresol / +/- FeSO₄) / GI cover if bonded
  - Full coverage restoration/bonded restoration

Primary Tooth Pulp Therapy

• Pulpotomy fail...
  - Define FAILURE!
  - Failure to remove entire roof of pulp chamber
  - Failure to remove all coronal pulp and pulp tags
  - Failure to achieve hemostasis
  - Failure in diagnosis
    - Necrotic pulp
    - Infected and hemorrhagic pulp
  - Failure to maintain clean field/ place appropriate nonleaking restoration

Primary Tooth Pulp Therapy

• Partial Pulpectomy
  - Doesn’t really exist
  - Active Decay
  - Elicited or spontaneous pain
  - Absence of soft tissue findings
  - Absence of radiographic findings
  - Absence of mobility
  - Uncontrollably hemorrhagic pulp

Primary Tooth Pulp Therapy

• Partial Pulpectomy
  - Access same as pulpotomy
  - Remove pulp tissue in canals
  - Achieve hemostasis
  - Formocresol for five minutes (NO MORE!!!)
  - Ferric Sulfate alternative/hemostatic agent
  - ZOE/Vitapex ONLY!
  - Full coverage restoration

Primary Tooth Pulp Therapy

• Pulpectomy
  - Necrotic pulp
  - Key, space maintaining tooth
  - +/- soft tissue findings
  - +/- radiographic findings
  - No potential damage to forming tooth
  - +/- pain

Primary Tooth Pulp Therapy

• Pulpectomy
  - Access same as pulpotomy
  - Remove ALL pulp tissue in canals
  - Irrigate with peroxide/bleach
  - Achieve dry canals
  - Obstruct with ZOE/Vitapex OR
  - Full coverage restoration
Restoring the Pulp Treated Tooth

And finally, if you can’t get a crown to fit...

• Turn the belling pliers backwards and reverse bell!

Primary Tooth Pulp Therapy

• Extraction
  • critical: may require space maintenance
  • noncritical: optional cosmesis
Space Maintenance

- Unilateral
  - Band and loop
  - Gerber (SML)
  - One armed BandH
- Bilateral
  - Mandibular
  - LLHA
  - Maxillary
  - TPA
  - Nance

Alternatives to Restorative Care

- Parent wishes
- Exfoliation within 6-9 mo
  - Tooth is asymptomatic
  - Child is comfortable
  - No risk to surrounding teeth
  - Oral hygiene is maintained
  - Finances
- Palliative care
- Orthodontic treatment
  - Future planning for space management

The Ten Killer Questions

- “Will my child need braces?”
- Or: “Won’t it cost a fortune?”
- Or: “What’s this two phase garbage anyway? Isn’t it a way for orthodontists to make more money?”

The Answers

- Cannot predict from primary teeth
- No correlation between 1 & 2 teeth
- May evaluate skeletal patterns of parents and child
- AAO recommends screening at age 7 or as primary teeth are lost
- Old theory:
  - Two phase treatment may lead to more stability
  - Impact bone growth
  - Fewer peri problems
- Even orthodontists don’t agree
  - AAO, 1999
  - JADA, 2010

Orthodontics in the Primary and Early Mixed Dentitions

- Controversial based on recent longitudinal studies
- JADA, 2010
- Two phase therapy appropriate for
  - Extremes of crowding or spacing
  - Skeletal problems
  - Buccal crossbites with facial asymmetry
  - Anterior crossbites with normal skeletal pattern
  - Space loss due to caries or early tooth loss
  - Ectopic eruption
Orthodontics in the Primary and Early Mixed Dentitions

- Two phase therapy has not shown:
  - An increase in stability
  - Additional arch width
- Two phase therapy has shown:
  - Decreased peri problems
  - Increased caries
  - Burnout
  - Increased costs

All Bone is not the Same!

- Skeletal or basal bone
  - Intramembranous or Endochondral
  - Thick cortical plate
  - Vascular with marrow spaces
  - Unyielding
- Alveolar bone
  - Develops embryologically with cement
  - Exists only for the teeth
  - Porous
  - Allows orthodontic movement

Extremes of Crowding or Spacing

Skeletal Problems

- Cl II Skeletal or Cl III Skeletal
- Impinging Bite

Buccal Crossbite with Facial Assymetry

- Check midline
- Treat with RPE
  - Fixed vs removable
- Check and correct cause
  - Habits
  - Airway problems
    - Evaluate oral vs nasal breathing
    - Look for the triad
  - Without facial assymetry may delay treatment until permanent molars erupt and reevaluate

Anterior Crossbite with Normal Skeletal Pattern

- Ectopic eruption of maxillary central because of
  - Delayed exfoliation of primary tooth
  - Mesiodens
  - Habits
Anterior Crossbite with Normal Skeletal Pattern

- Treatment
  - Tongue blade
  - Toothbrush
  - Hawley retainer with occlusal coverage to open bite

Ectopic Eruption

- Distalize permanent molar
- Depends on how much damage
- Amount of crowding
- Plan for future ortho care
- Spontaneous correction in 50+%
- Which ones???
- Appliance therapy
  - Brass ligature
  - Fullerman appliance
  - Spring bonded to button
  - Simple ortho separators

Space Loss

- Distalize to regain space

Bonus Question

- "Shouldn't you just take out those extra baby teeth?"
- or: my child looks like a shark

The Answers

- Though it may appear necessary and may look uncomfortable, it is not necessary
- The teeth will exfoliate
- During normal swallowing the tongue pushes the teeth forwards
- Does not mean the child is predisposed to crowding
- Always a caveat!
  - Maxillary anterior teeth erupting into crossbite
  - Maxillary anterior teeth erupting into unattached gingiva

Tips to Make It Through a Day

- Always give options but...
  - Never ask a question to which no is the unintended answer
  - If a situation escalates to the point where you are getting uncomfortable
    - Walk away for a few moments
  - Always go home feeling good about what you’ve done and whom you’ve treated
Thank You for Listening

• Any questions?