1

Affirmation

- No financial ties to drug or equipment companies to disclose
- I have received supplies for workshops given at meetings
  - No direct payments to me

David L Rothman DDS 2021

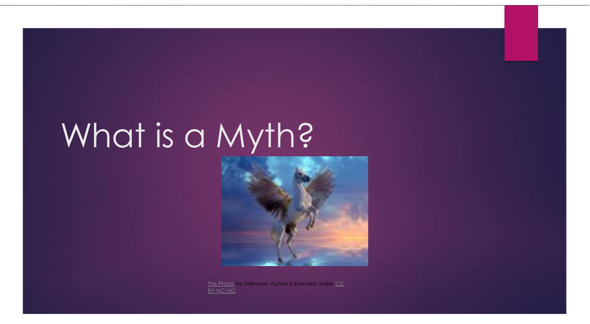
2

3

4 out of 5 Dentists RECOMMEND Sugarfree Gum

- HUH???
- WHAT ABOUT THE ONE WHO DOESN'T???
- Where's the science?
- Perception versus Reality

4



5

The average attention span today is 8 seconds

- Microsoft Corporation/Canadian researchers 2015
  - Dropped from 12 seconds in 2000
  - The younger you are the shorter the span
  - Goldfish have a 9 second attention span

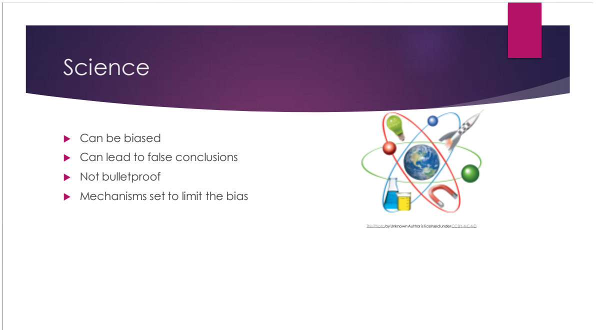
6

7

What is science?

- Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. The earliest roots of science can be traced to Ancient Egypt and Mesopotamia in around 3500 to 3000 BCE
  - Wikipedia
- A branch of knowledge or study dealing with a body of facts or truths systematically arranged and showing the operation of general laws: the mathematical **sciences**. Systematic knowledge of the physical or material world gained through observation and experimentation.
  - Dictionary.com

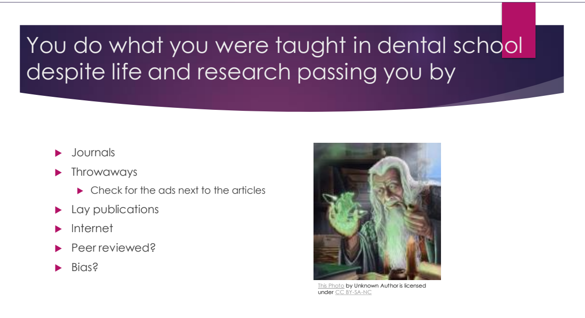
8



9

Were you taught myths in Dental School?

10

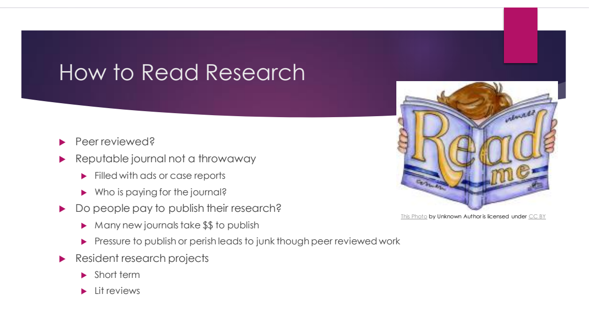


11

Oh No!!!

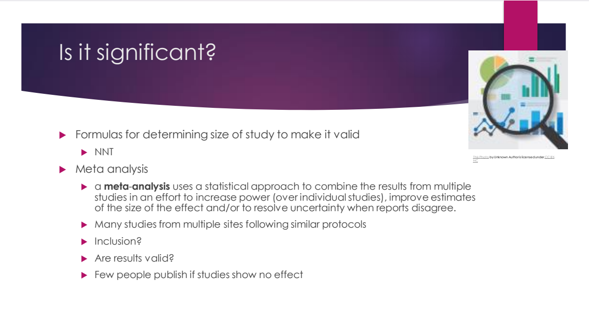
- Proceedings of the Symposium on Innovations in the Prevention and Management of Early Childhood Caries
  - Oct. 23-24, 2014 Ellicott, Md
- Evidence of Effectiveness of Current Therapies to Prevent and Treat Early Childhood Caries; S. Twetman, V. Dhar (2015)
  - 877 reports, 33 met criteria
  - Fluoride toothpaste and varnish: *limited evidence*
  - Fluoride tablets and drops: *insufficient evidence*
  - Silver Diamine Fluoride, Xylitol, Chlorhexidine varnish/gel, Povidine Iodine, Probiotic Bacteria, Remineralizing agents (ACP-CPP): *insufficient evidence*
  - Sealants, restorations, regular restorations: *insufficient evidence*
- ***THERE IS NO GOOD QUALITY EVIDENCE THAT ANYTHING WE DO WORKS!!!***

12



13

14



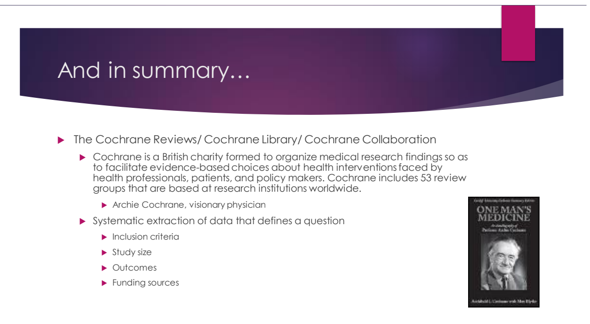
15

What is and how large is the population? Control?

- If you don't get treatment what happens?
- Inclusion in study means you are seeking treatment but doesn't mean that people not seeking treatment are not doing well
- What's the control?
  - Is it people seeking treatment or the general population?
  - Demographics of the control population
  - Are you your own control?
    - R v L

This Photo by Unknown Author is licensed under CC BY-SA-NC

16

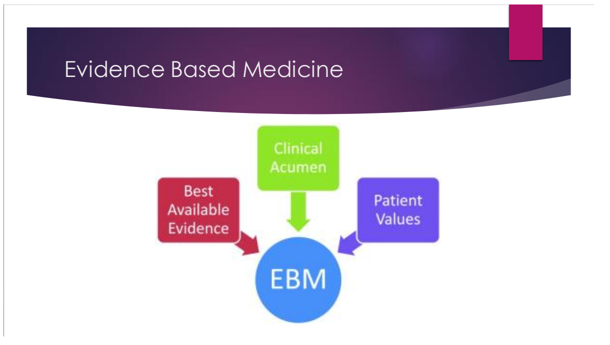


17

Evidence Based Medicine Evidence Based Dentistry

- … an approach to medical practice intended to optimize decision-making by emphasizing the use of evidence from well-designed and well-conducted research.
  - Wikipedia
- …conscientious, explicit, judicious and reasonable use of modern, best *evidence* in making decisions about the care of individual patients. EBM integrates clinical experience and patient values with the best available research information.
  - Swanson et al. Plast Reconstr Surg 2010 Jul; 126(1):286-294
- All in the name of creating practice guidelines

18

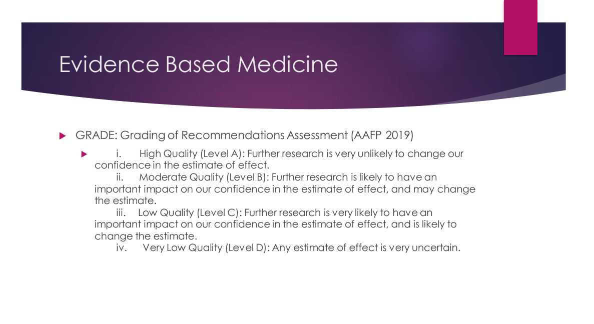


19

Evidence Based Medicine

- Quality of research
  - 1. Evidences obtained by meta-analysis of several randomized controlled research (RCR).
  - 1b. Evidences from only one RCR.
  - 2a. Evidences from well designed controlled research RCR.
  - 2b. Evidences from one quasi experimental research.
  - 3. Evidences from non experimental studies (comparative research, case study), according to some, for example Textbooks.
  - 4. Evidences from experts and clinical practice.

20

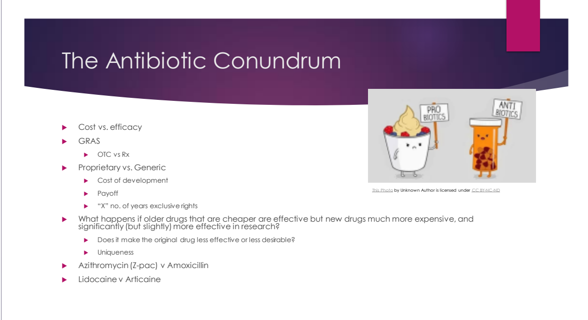


21

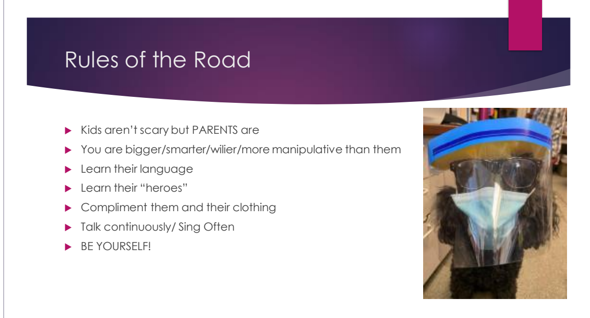
Evidence Based Medicine

- Strength of Recommendation of Guidelines
  - Strong Recommendation
    - Net benefit to the patient
  - Weak Recommendation
    - Net benefit is inconsistent or based on lower quality evidence
    - Patient choices will vary based on their preferences
  - Good Practice Points
    - No direct evidence to support recommendation but may be standard of care
    - Unlikely to ever be studied

22



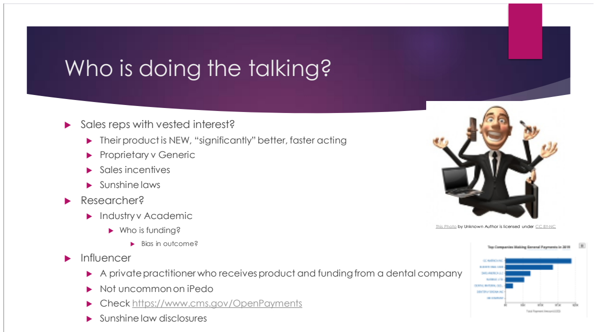
23



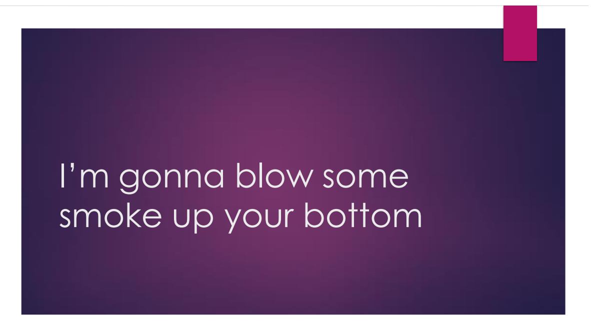
24

25

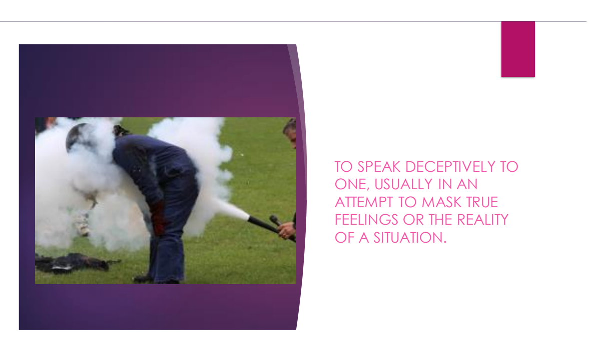
26



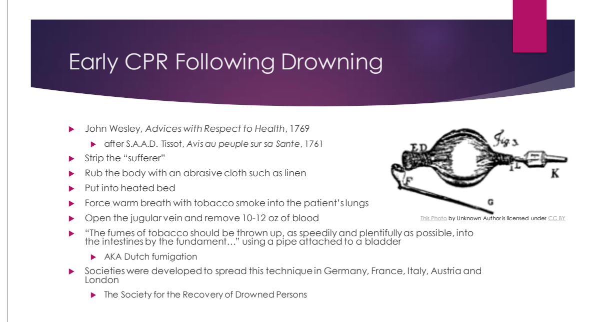
27



28

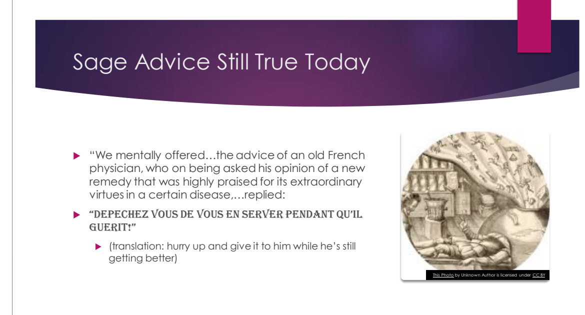


29



30

31



32

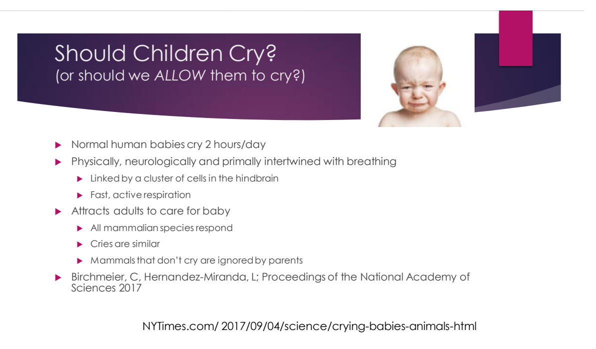
33

Tonsils and Tonsilectomies

34

35

36

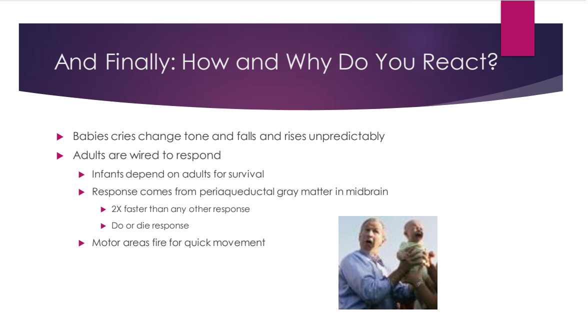


37

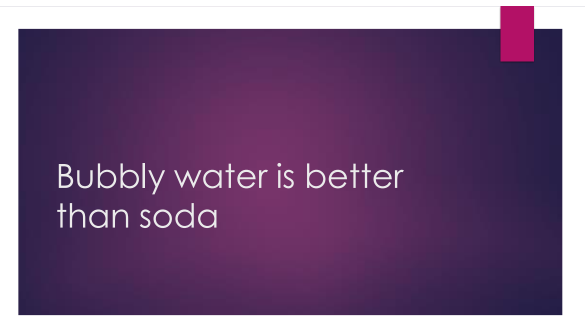
And What About That Cry?
Or: What's my little darling saying?

- Related to the gene that controls stress reaction and cortisol release
  - Sheinkopf, S, Lester, B, Brown University
- Analyzed by Choliz, M, Spanish J of Psychology
  - Angry babies
    - Eyes half closed gazing off to the side
    - Crescendo
  - Frightened babies
    - Hesitation, tensing of facial muscles, explosive cry and eyes open
  - Pained babies
    - Cried out immediately, squeezed eyes shut

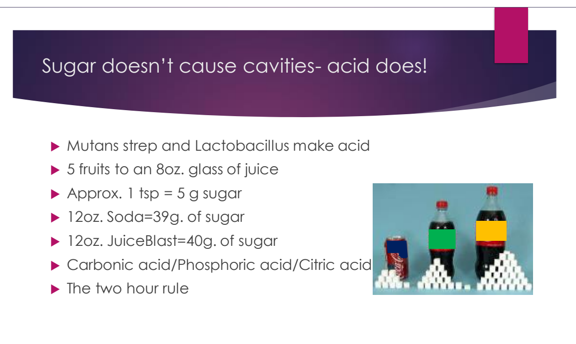
38



39



40

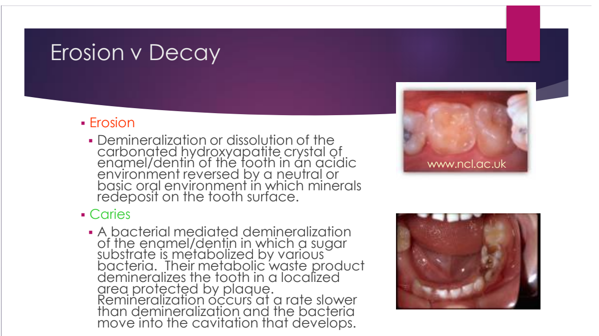


41

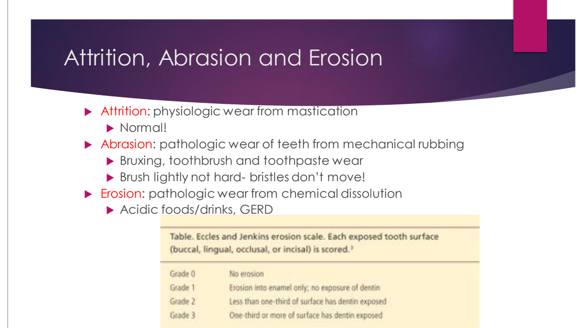
Saliva: the wonder drug

- Neutralizes acid with phosphate buffer returning oral cavity to basic environment
  - Stops demineralization
  - Promotes remineralization
- Contains Ca^{++}, PO_4^-, 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

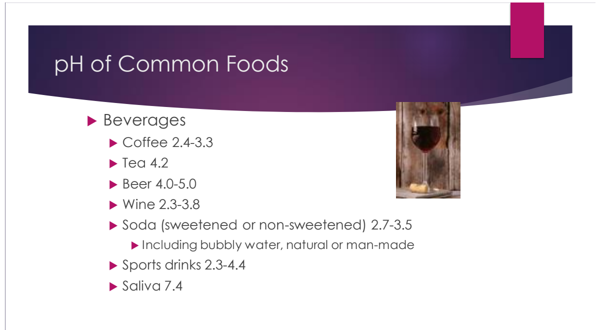
42



43



44



45

Salivary pH After Eating

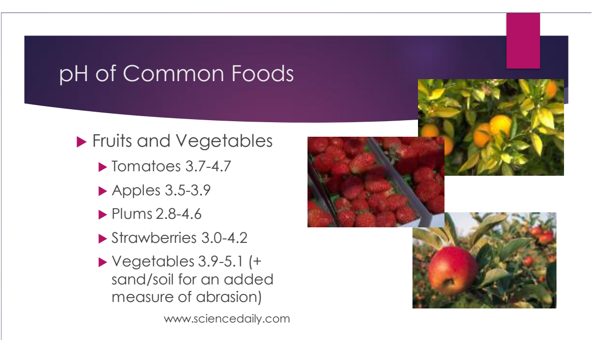
Saliva Buffer

Potential tooth damage

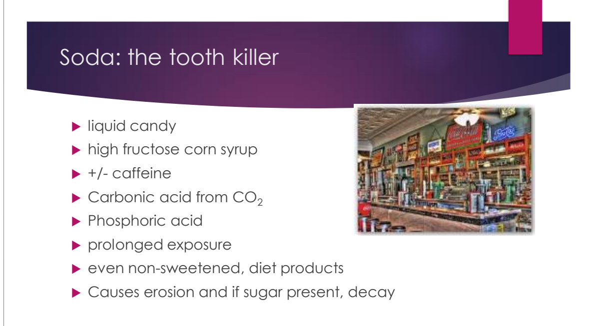
Regular Meals

Frequent Snacking

46



47



48

Soda: the tooth killer

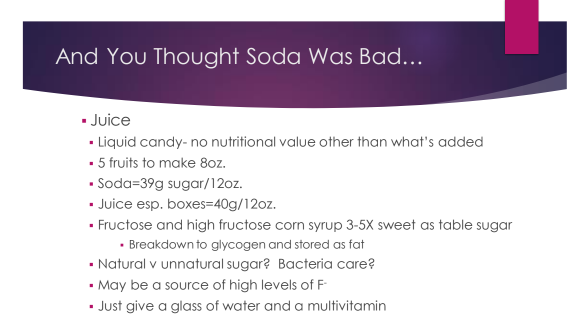
- And we're not done yet!
  - Sweet soft drinks, fructose linked to gout
  - Children's salt intake is reduced when soda is out of their diet
  - Weight gain is recorded on people who drink diet sodas
- But, thankfully, sales are on the decline!?!?
  - Juice sales are up
  - Sports drink sales are up

49

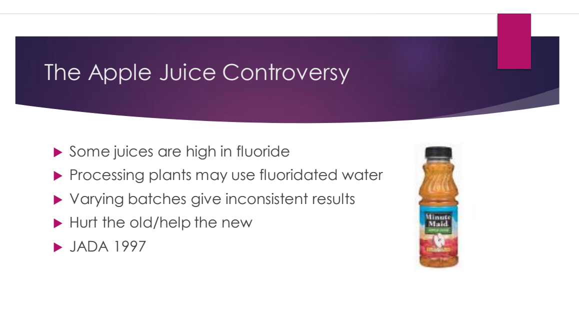
Soda: the kid killer

- Experts at ADA meeting debate the impact of sugary drinks
  Nutrition researchers from the Baylor College of Medicine and the University of North Carolina debated during this week's ADA conference whether sugary drinks are behind rising obesity levels in the U.S. Baylor professor Dr. Theresa Nicklas argued that the percentage of energy coming from sugary drinks is decreasing, so it is difficult to link that to rising obesity rates, while UNC professor Dr. Barry Popkin said such drinks do not fill people up like solid food so people are at risk of consuming too many calories. FoodNavigator (9/28/2011)

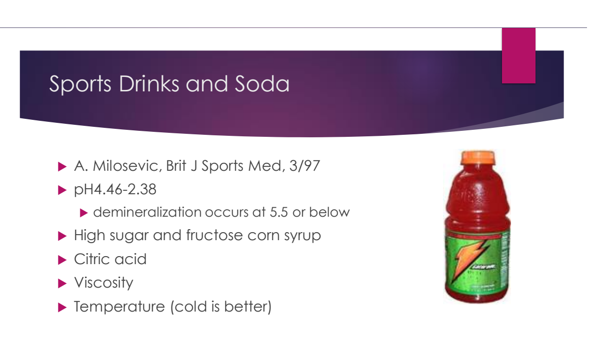
50



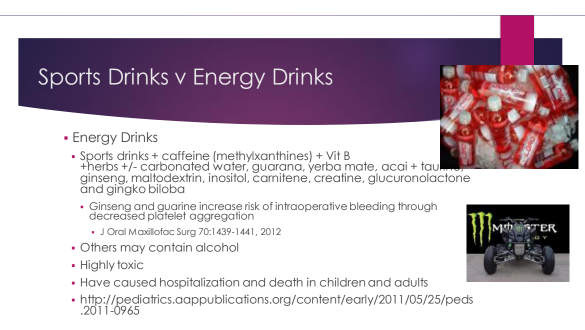
51



52



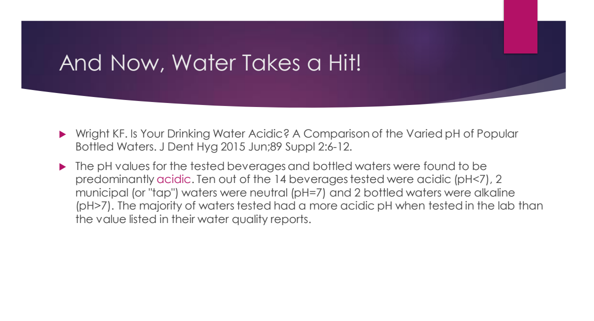
53



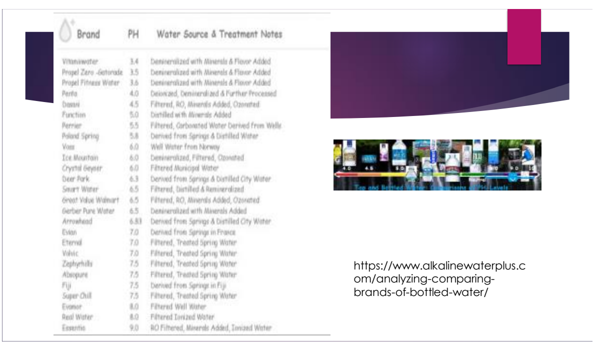
54

55

56



57



Brand	PH	Water Source & Treatment Notes
Vitaminwater	3.4	Demineralized with Minerals & Flavor Added
Propel Zero -Gatorade	3.5	Demineralized with Minerals & Flavor Added
Propel Fitness Water	3.6	Demineralized with Minerals & Flavor Added
Penta	4.0	Deionized, Demineralized & Further Processed
Dasani	4.5	Filtered, RO, Minerals Added, Ozonated
Function	5.0	Distilled with Minerals Added
Perrier	5.5	Filtered, Carbonated Water Derived from Wells
Poland Spring	5.8	Derived from Springs & Distilled Water
Voss	6.0	Well Water from Norway
Ice Mountain	6.0	Demineralized, Filtered, Ozonated
Crystal Geyser	6.0	Filtered Municipal Water
Deer Park	6.3	Derived from Springs & Distilled City Water
Smart Water	6.5	Filtered, Distilled & Remineralized
Great Value Walmart	6.5	Filtered, RO, Minerals Added, Ozonated
Gerber Pure Water	6.5	Demineralized with Minerals Added
Arrowhead	6.83	Derived from Springs & Distilled City Water
Evian	7.0	Derived from Springs in France
Eternal	7.0	Filtered, Treated Spring Water
Volvic	7.0	Filtered, Treated Spring Water
Zephyrhills	7.5	Filtered, Treated Spring Water
Absopure	7.5	Filtered, Treated Spring Water
Fiji	7.5	Derived from Springs in Fiji
Super Chill	7.5	Filtered, Treated Spring Water
Evamor	8.0	Filtered Well Water
Real Water	8.0	Filtered Ionized Water
Essentia	9.0	RO Filtered, Minerals Added, Ionized Water

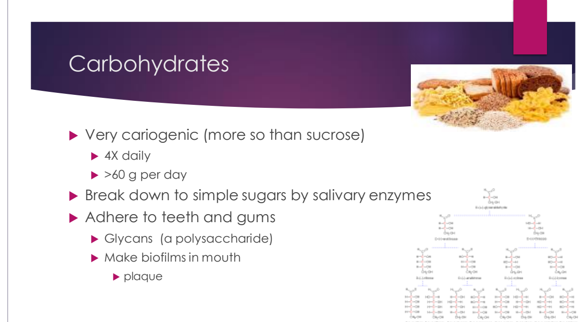
58

59

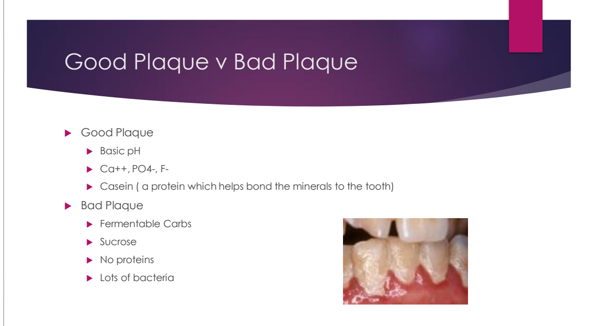
Brown Sugar is Better than Refined White Sugar
or
Refined Sugar is Worse than Natural Organic Fruit Sugar

60

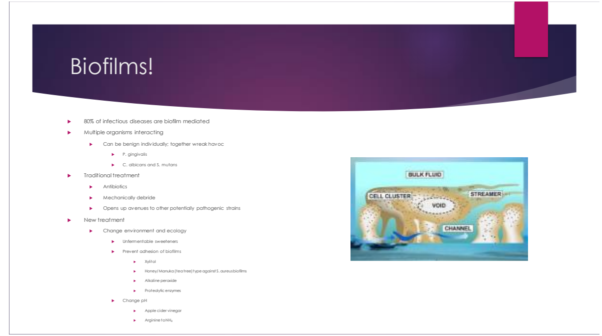
61



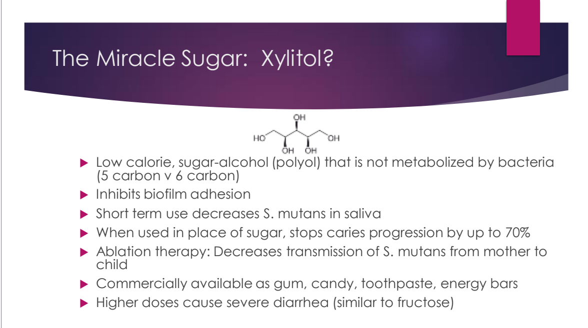
62



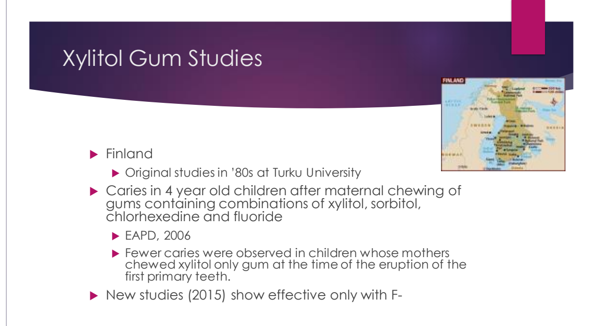
63



64



65



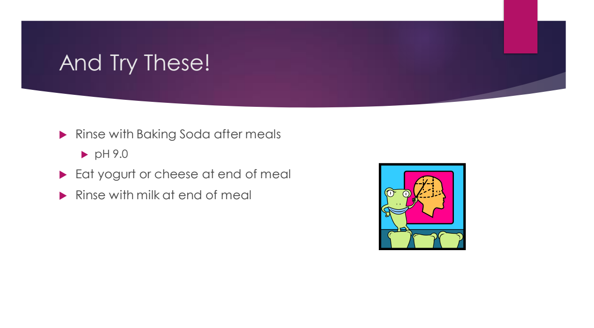
66

67

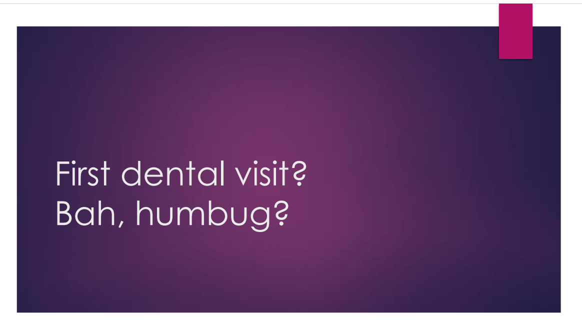
And What Else Is New?

- Liquorice lollipops prevent tooth decay
  - UCLA researcher Shi
  - 15 mg of liquorice root extract, Glycyrrhiza uralensis, reduces 99.9% of Strep mutans
- Chlorhexedine rinses and gels ineffective against coronal caries formation

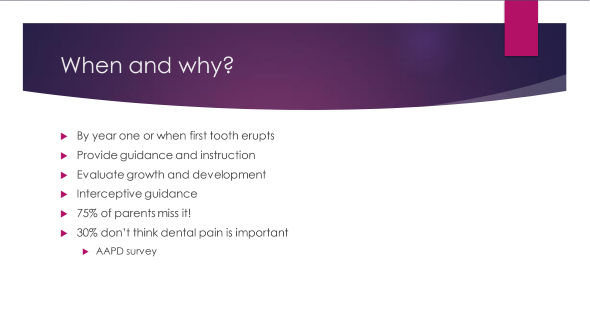
68



69



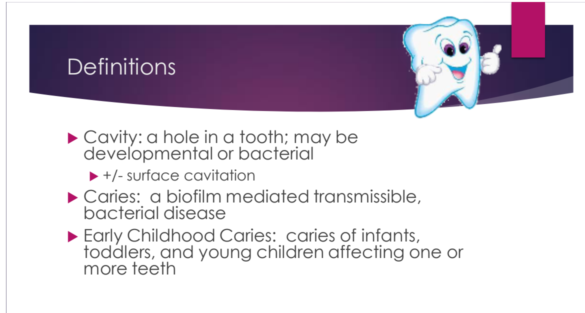
70



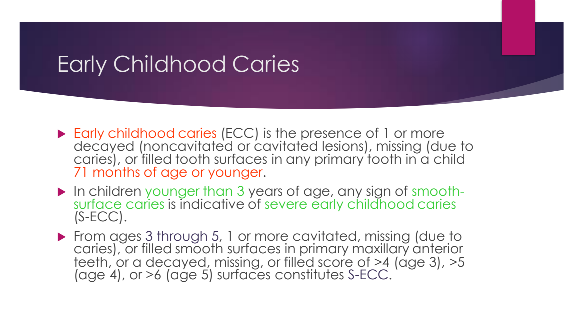
71

72

73



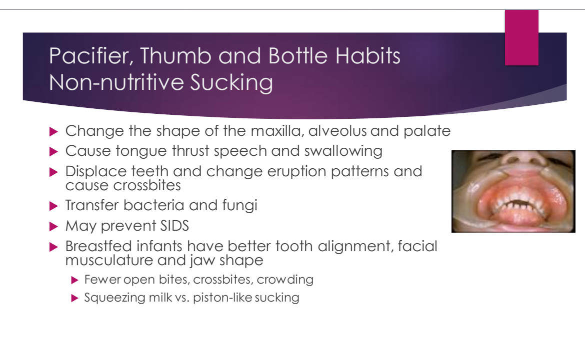
74



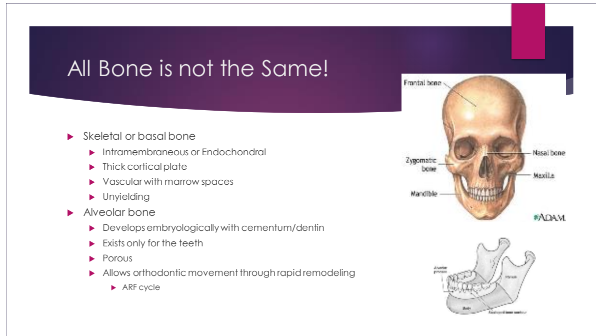
75

Pacifiers are OK to 3
(or maybe 2 or 5 or 6 or so or whenever the kid wants to give it up)

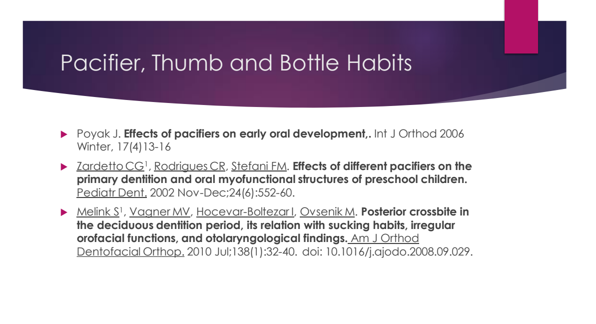
76



77



78



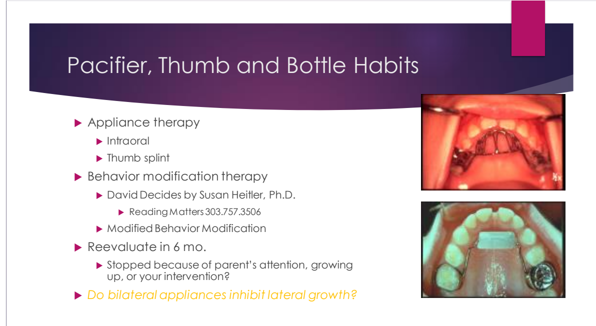
79

Pacifier, Thumb and Bottle Habits

- When to stop:
  - Pacifier: 12-18 mo.
  - Thumb: before eruption of permanent teeth
  - Bottle:
    - With juice or formula: when 1st tooth erupts
    - With water: 12-18 mo.
  - Recent research shows that permanent change can occur by 2-3 years of age

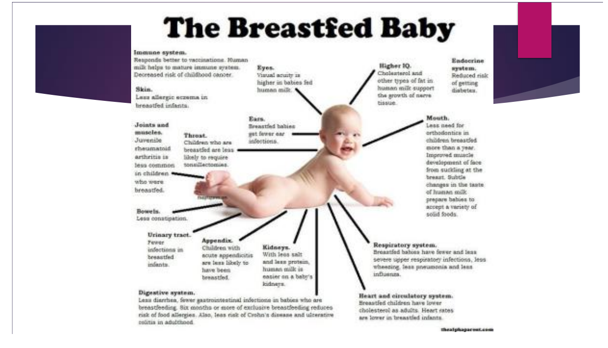
80

81



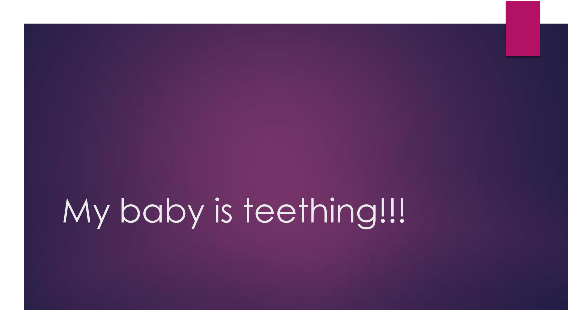
82

83

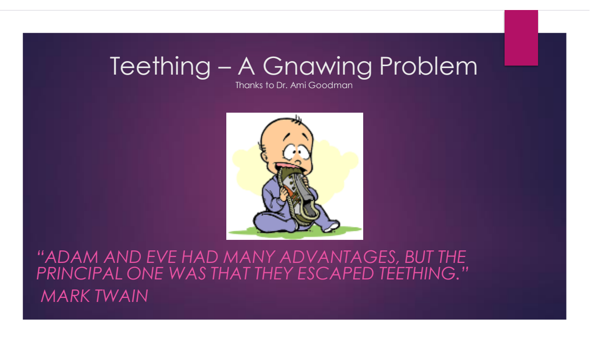


84

85

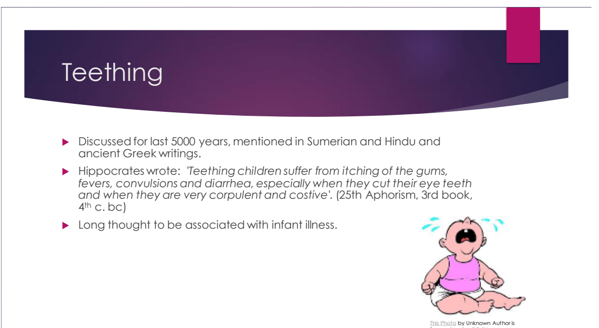


86

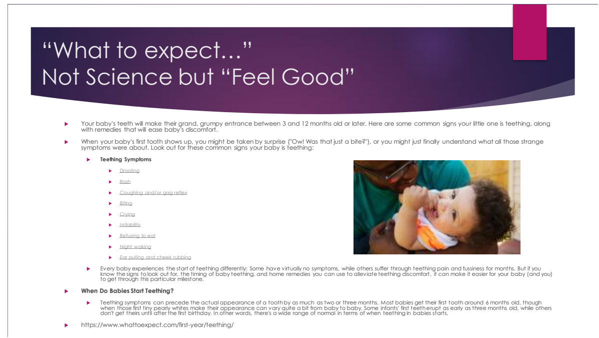


87

88



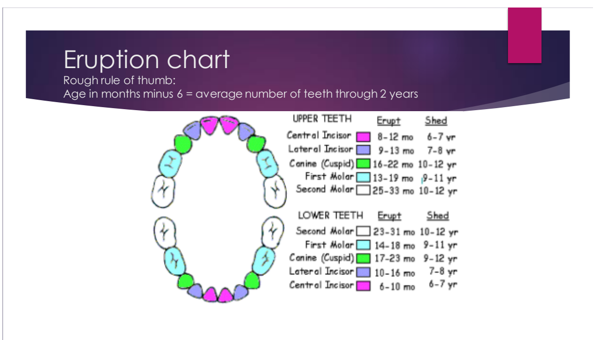
89



90

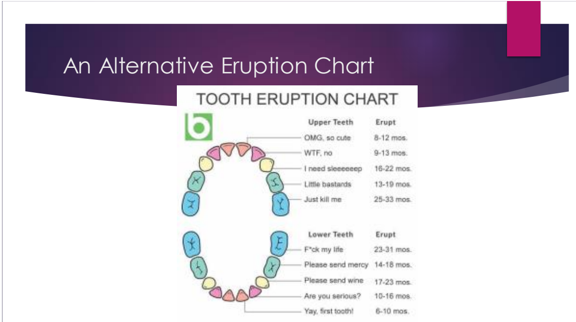
Eruption chart

Rough rule of thumb:
Age in months minus 6 = average number of teeth through 2 years



91

An Alternative Eruption Chart



92

Teething – timing from *websites*

- Eruption of primary teeth
  - Generally, one tooth erupts monthly between 6 to 24 months
    - Onset of teething symptoms: 3-4 days before eruption (SCIENCE?)
    - End of teething symptoms: 2-3 days after tooth eruption (SCIENCE?)
  - Rough rule of thumb: Age in months - 6 = average number of teeth through 2 years
  - Premies get 1st teeth at same corrected age as term infants
  - Delayed eruption: hypothyroid, hypopit, Down's, among other conditions
  - May appear as early 4 months and as late as 24 months.
    - Natal teeth 1/3000
      - Normal underdeveloped teeth that erupt into oral cavity

93

Symptoms associated with tooth emergence

Macknin, et al, *Pediatrics* 2000; 105; 747-752 – Prospective cohort study, 111 children)

Symptom: Biting, Drooling, Gum Rubbing, Irritability, Sucking, Rash-face, Temp > mean+SD, Wakefulness, Appetite-Solid, Ear Rubbing

Day: -4 -3 -2 -1 0 1 2 3

Fig 4. All days P values <.01 for the association between symptoms and tooth emergence on a given day 0.

94

Symptoms associated with tooth emergence

- Another smaller study (prospective cohort, 21 children) the same year in *Pediatrics* showed teething was found not to be significantly associated with mood disturbance, sleep disturbance, drooling, or diarrhea– Wake, M et al. *Pediatrics* 2000;106;1374-1379
  - self-confessed methodological flaws and limitations.

This Photo by Unknown Author is licensed under CC BY-ND

95

Teething – Remedies and Potions
Poetic summary of ancient cures

'Now when your baby's teeth appear, you must of these take prudent care.
For teething comes with grievous pain, so to my word take heed again.
When now the teeth are pushing through, to rub the gums thou thus shall do.
Take fat from chicken, brain from hare, and these full oft on gums shall smear.
If ulcers sore thereon should come, then thou shalt rub upon the gum.
Honey and salt and oil thereto. But one thing more I counsel you,
A salve of oil of violet, for neck and throat and gums to get.
And also bathe his head a while, with water boiled with chamomile.'

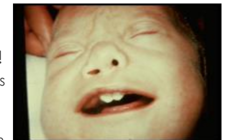
1429, Von Louffenberg (German priest)

This Photo by Unknown Author is licensed under CC BY-NC-ND

96

Tooth Eruption

- Early v. late
- Chance of trauma
- There is no such thing as teething!!!
  - Look for concurrent medical problems or physiologic growth changes
  - Associative not causative
  - Don't mistake a fever for getting teeth



97

Remedies –Careful with:

- Orajel – Contains Benzocaine 10% and FD&C Red 40, Flavor, Glycerin, Polyethylene Glycols, Water Purified, Sodium Saccharin, Sorbic Acid, Sorbitol; rare cases of benzocaine toxicity with overuse.
- Teething biscuits – may contain unnecessary sugar – dentists warn against caries promotion
- Frozen mini-bagel halves – popular, but same caveat as above.
- Hyland's Homeopathic Teething Tablets
  - Off the market?
    - Contain:
    - Calcarea Phosphorica (Calcium Phosphate), 3X HPUSChamomilla (Chamomile) 3X HPUSCoffea Cruda (Caffeine) 3X HPUSBelladonna 3X HPUS (Alkaloids 0.0003%).
    - Almost imperceptible amounts of these toxins, but drug is not regulated, potential toxicity with overdose from the belladonna alkaloids
    - In common use – ask if being used – many parents swear by them!

98

References

- Shusterman, S. Pediatric Dental Update. *Pediatr. Rev.* 1994; 15:311-318.
- Macknin, ML et al. Symptoms Associated with Infant Teething, *Pediatrics* 2000;105:747-752.
- Ashley, MP. It's Only Teething – A Report of the myths and modern approaches to teething. *British Dental Journal* 2001;191:4-8.
- Wake, M. Teething and Tooth Eruption in Infants. *Pediatrics* 2000;106(6):1374-9.

99

Bennet, HJ, et al. The Teething Virus. *Pediatr Infect Dis. 5:399-401, 1986. [April 1, 1986]*

- Method: prospective study, 500 teething infants to see if new "human teething virus, or HTV" could isolated from baby's saliva.
- Triple blinded study – patients weren't sure why they were in study, technicians did not know what was being tested, and authors didn't care – but hoped to get published anyway.

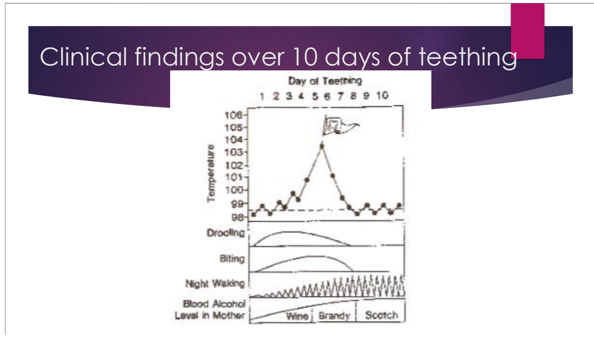
100

Results

- Teeth erupted at a rate of 10/year, providing 5000 tooth-years of data.
- 84% of patients became febrile during the teething process, attributable to the HT virus.
- 15 divorces were attributed to "irreconcilable differences" on how to manage a teething baby at 3 am.
- HT virus appears to remain dormant in the alveolar ridge once the primary infection subsides, and is revitalized with future teething episodes.

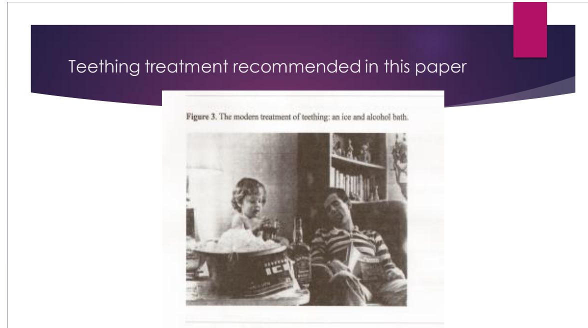
101

Clinical findings over 10 days of teething

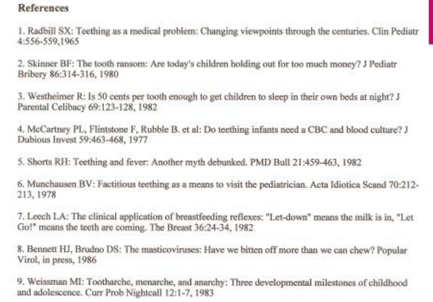


102

103



104



References

1. Radbill SX: Teething as a medical problem: Changing viewpoints through the centuries. Clin Pediatr 4:556-559,1965

2. Skinner BF: The tooth ransom: Are today's children holding out for too much money? J Pediatr Bribery 86:314-316, 1980

3. Westheimer R: Is 50 cents per tooth enough to get children to sleep in their own beds at night? J Parental Celibacy 69:123-128, 1982

4. McCartney PL, Flintstone F, Rubble B. et al: Do teething infants need a CBC and blood culture? J Dubious Invest 59:463-468, 1977

5. Shorts RH: Teething and fever: Another myth debunked. PMD Bull 21:459-463, 1982

6. Munchausen BV: Factitious teething as a means to visit the pediatrician. Acta Idiotica Scand 70:212-213, 1978

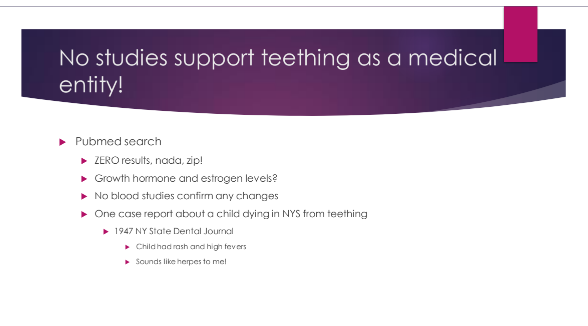
7. Leech LA: The clinical application of breastfeeding reflexes: "Let-down" means the milk is in, "Let Go!" means the teeth are coming. The Breast 36:24-34, 1982

8. Bennett HJ, Brudno DS: The masticoviruses: Have we bitten off more than we can chew? Popular Virol, in press, 1986

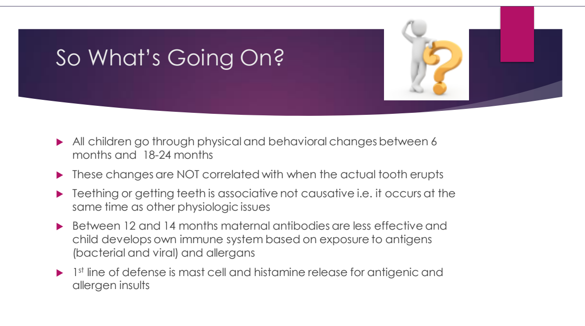
9. Weissman MI: Tootharche, menarche, and anarchy: Three developmental milestones of childhood and adolescence. Curr Prob Nightcall 12:1-7, 1983

105

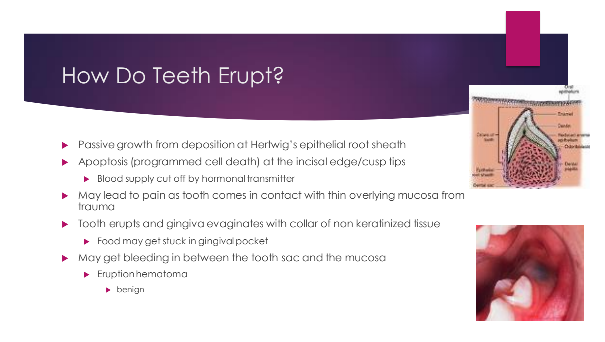
106



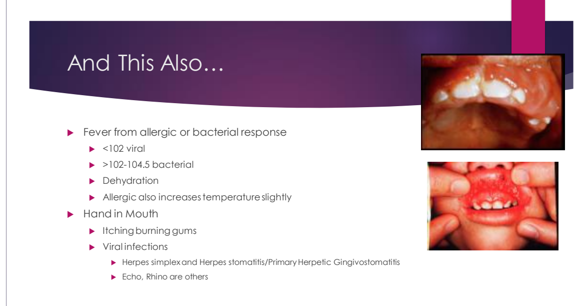
107



108



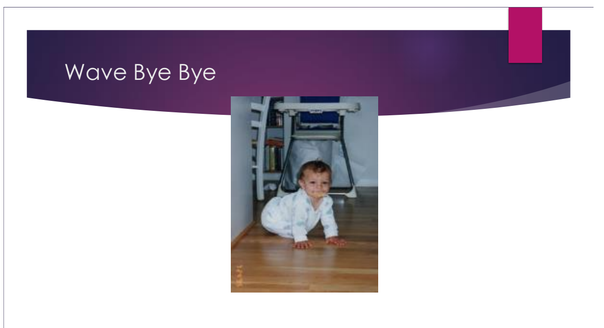
109



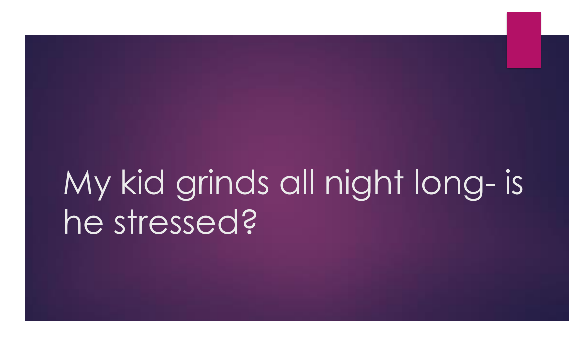
110

111

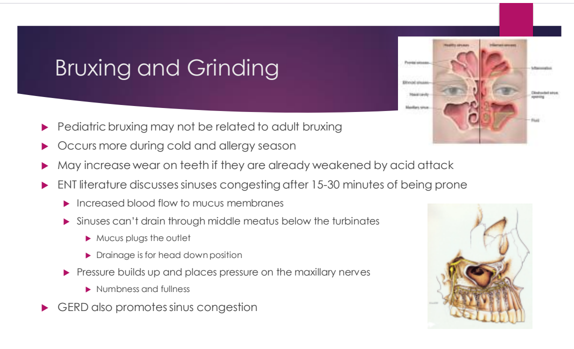
112



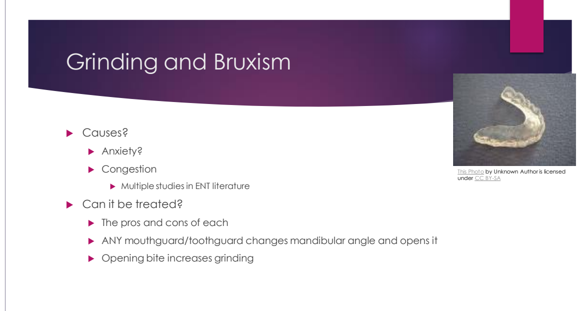
113



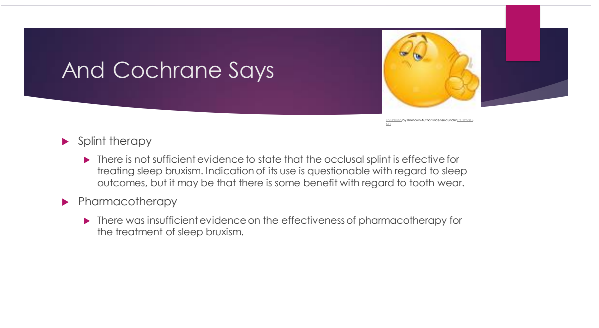
114



115

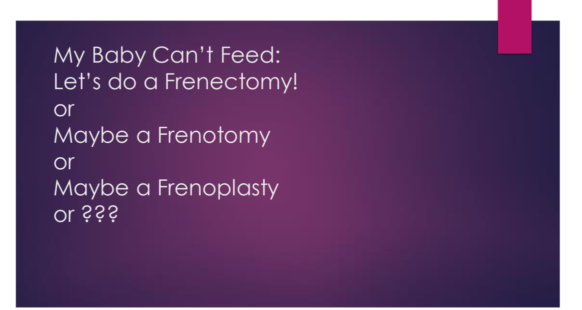


116

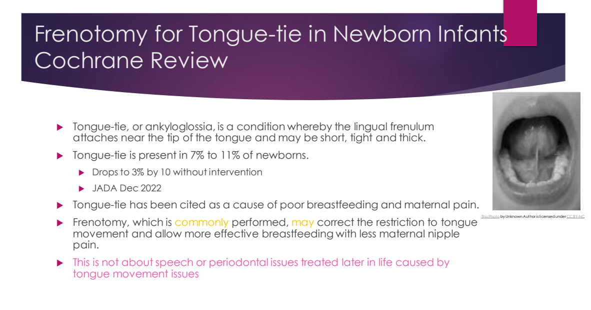


117

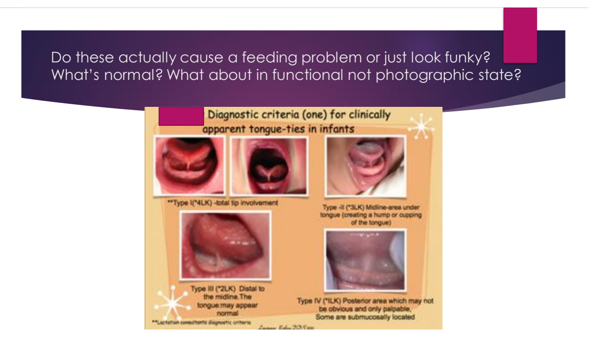
118



119



120

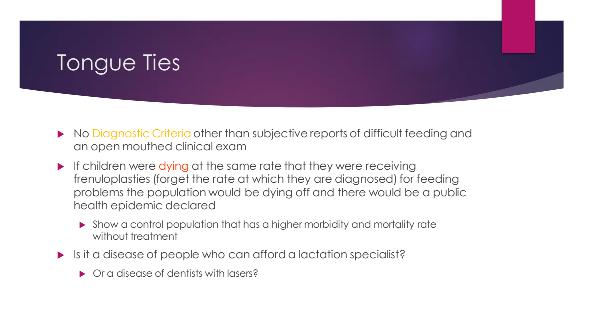


121

And, again, how frequently?

- Prevalence of ankyloglossia according to different assessment tools. Cruz PV et al. https://doi.org/10.1016/j.adaj.2022.07.011
  - Variations in assessment yield different numbers
    - Visual v functional classification?
    - It all depends on who is looking
  - Approximately 7-8% in infants and drops in children and adolescents to 3%
  - Moreover, we raise the question whether ankyloglossia is a condition that remains as a person becomes older or whether the tongue frenulum undergoes a change in its position with craniofacial development"

122



Tongue Ties

- No Diagnostic Criteria other than subjective reports of difficult feeding and an open mouthed clinical exam
- If children were dying at the same rate that they were receiving frenuloplasties (forget the rate at which they are diagnosed) for feeding problems the population would be dying off and there would be a public health epidemic declared
  - Show a control population that has a higher morbidity and mortality rate without treatment
- Is it a disease of people who can afford a lactation specialist?
  - Or a disease of dentists with lasers?

123

Tongue Ties: Cochrane Review

Surgical release of tongue-tie for the treatment of tongue-tie in young babies

- **Review question:** Tongue-tie is a potentially treatable cause of breastfeeding problems - if a baby is tongue-tied and is having feeding difficulties, does releasing the tongue-tie help?
- **Background:** Tongue-tie is a condition whereby the membrane between the tongue and the floor of the mouth is too tight or too short. This may cause feeding problems for the baby and/or nipple pain for a breastfeeding mother.
- **Study characteristics:** Five randomised controlled trials enrolling 302 infants met the inclusion criteria.
- **Key results:** In an infant with tongue-tie and feeding difficulties, surgical release of the tongue-tie does not consistently improve infant feeding but is likely to improve maternal nipple pain. Further research is needed to clarify and confirm this effect.
- **Quality of evidence:** The quality of the evidence is very low to moderate because overall only a small number of studies have looked at this condition, the total number of babies included in these studies was low and some studies could have been better designed.

124

Cochrane: Why it is important to do this review

- Diagnosis and management of tongue-tie remain controversial. It is uncertain whether ankyloglossia is a congenital oral anomaly requiring treatment or a normal variant.
- One survey (Messner 2000b) found that most lactation consultants believe tongue-tie to be a frequent cause of infant breastfeeding difficulties that could be solved by frenotomy.
- In marked contrast, 90% of paediatricians and 70% of otolaryngologists believe that tongue-tie never, or rarely, causes a feeding problem (Messner 2000a).
- Medical organisations such as the American Academy of Pediatrics (Coryllos 2004) and the National Institute for Health and Care Excellence (NICE 2005) now acknowledge that tongue-tie, or ankyloglossia, is a significant clinical entity that should be treated as early as possible to minimize breastfeeding problems.
- Given that breastfeeding benefits both infants and mothers, it is important for the clinician to address any condition that may impair breastfeeding (Edmunds 2011).

125

Tongue Tie Cochrane Review

- 497 studies reviewed
- 209 remained after duplicates removed
- 182 excluded because didn't meet quality or inclusion criteria
- 27 assessed for eligibility
- 1 study included for qualitative synthesis
- 5 studies in meta analysis

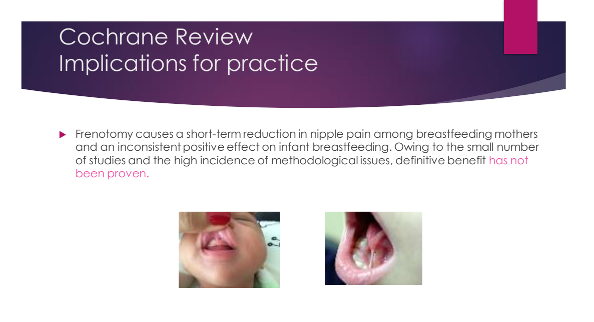
126

127

Cochrane Review on Tongue Tie
The Conclusions

- The effect of frenotomy on tongue-tied preterm infants has yet to be studied.
- The optimal age to perform frenotomy in infants remains unclear.
- The effect of tongue-tie on early infant weight gain and on maternal difficulties in establishing a breast milk supply remains to be clarified.
- It has yet to be demonstrated whether frenotomy in breastfeeding infants with tongue-tie and feeding difficulty leads to a longer duration of breastfeeding.
- Whether frenotomy is a painful procedure that requires analgesia or anaesthesia has yet to be established, as no study to date has quantified infant pain during and after frenotomy.
- There is NO increase in weight gain between a child who has undergone the procedure and one who has not

128



129

That being said…

- In older children, may lead to stripping of attached gingiva lingual to the lower incisors
  - No studies done on this
  - May be valid procedure?
  - Could it have been prevented?
- Does it lead to sleep apnea?
  - Quite the reach especially because the tongue is tethered and can't fall back in the airway

130

131

Policy on the Management of the Frenulum in Pediatric Dental Patients

- Recognizing evidence is limited, the American Academy of Pediatric Dentistry supports additional research on the causative association between ankyloglossia and breastfeeding difficulties or speech articulation problems and between hyperplastic labial frenulum and increased risk of caries or periodontal disease due to interference with adequate oral hygiene. Further randomized controlled trials and other prospective studies of high methodological quality are necessary to determine the effects of frenotomy/frenectomy. With all surgical procedures, an informed consent is necessary. Informed consent includes relevant information regarding assessment, diagnosis, nature and purpose of proposed treatment, and potential benefits and risks of the proposed treatment, along with professionally-recognized or evidence-based alternative treatment options – including no treatment – and their risks.[51]

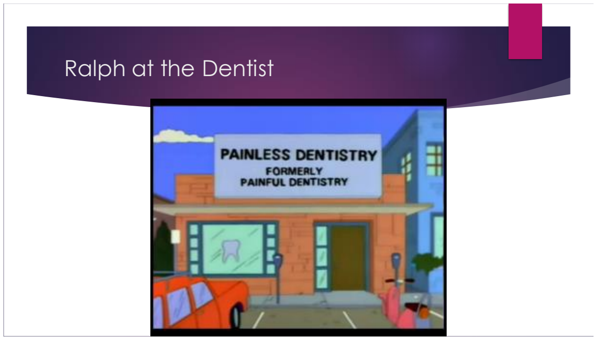
AMERICA'S PEDIATRIC DENTISTS
THE BIG AUTHORITY on little teeth

132

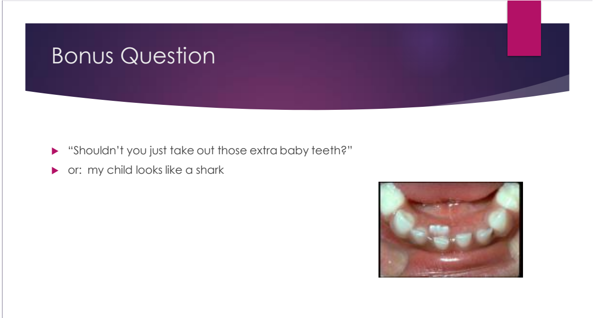
133

My Kid Looks Like a Shark: Can't You Just Take Out Those Teeth?

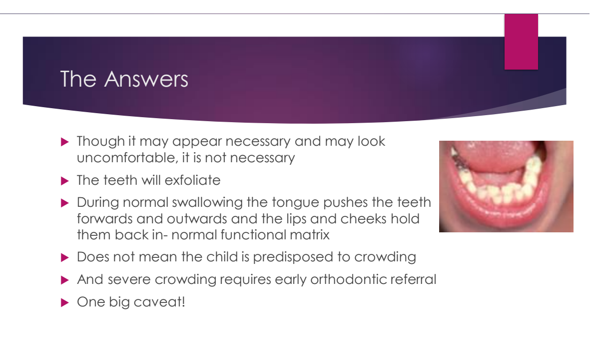
134



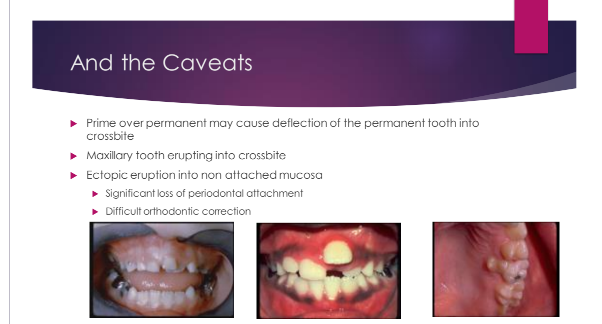
135



136



137

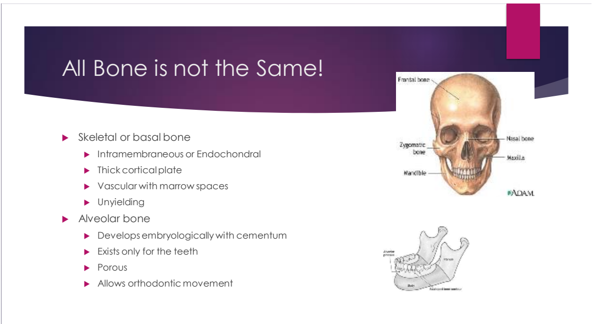


138

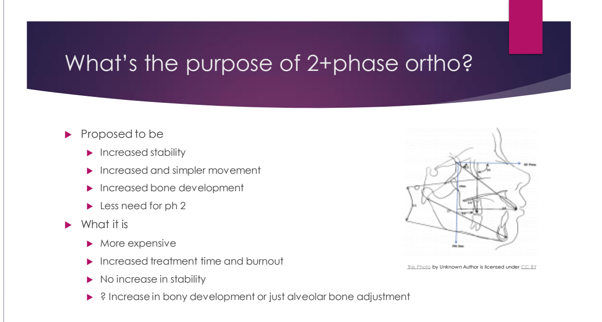
She’s got some crowding there. Let’s send her to the orthodontist for 2 phase, maybe 3 phase, maybe continuous, treatment

139

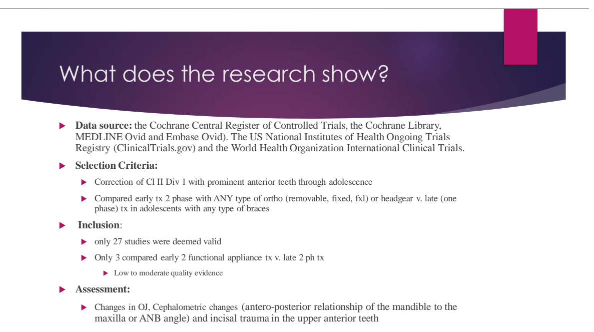
140



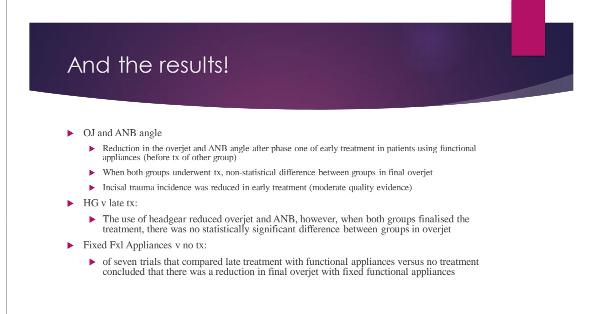
141



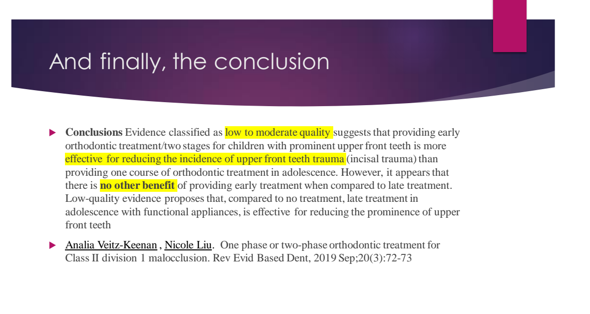
142



143



144

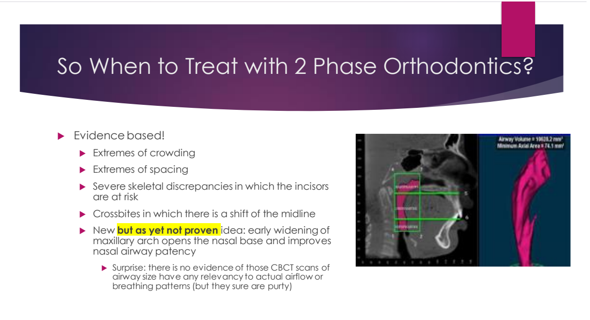


145

The Classicists Weigh In

- "Early phase of functional appliance treatment prior to fixed appliance therapy was of no measurable benefit whatsoever. They also stated that there was little or no objective support for those who claim that early functional appliance treatment somehow reduces both the need for extractions and the length and complexity of the subsequent fixed appliance phase of treatment."
  - Livieratos, F., Johnston L. A comparison of one-stage and two-stage nonextraction alternatives in matched Class II samples. AJODO 1995; 108:118-131.
- "There are few, if any, benefits that are unique to and dependent on earlier treatment. For more than 90 percent of patients, all treatment goals can be accomplished in one phase of treatment started in the very late mixed dentition."
  - Gianelly, A. One-phase versus two-phase treatment. AJODO 1995; 108:556-559.
- "For children with moderate to severe Class II problems, early treatment followed by later comprehensive treatment does not produce major differences in jaw relationship or dental occlusion compared with later one-stage treatment."
  - Tulloch, C., Phillips, C. and Proffit, W. Benefit of early Class II treatment: Progress report of a two-phase randomized clinical trial. AJODO 1998; 113: 62-71.

146



147

To Treat or Not to Treat? that is the question

Orthodontic emergency:

Time to treat before nature can self correct

148

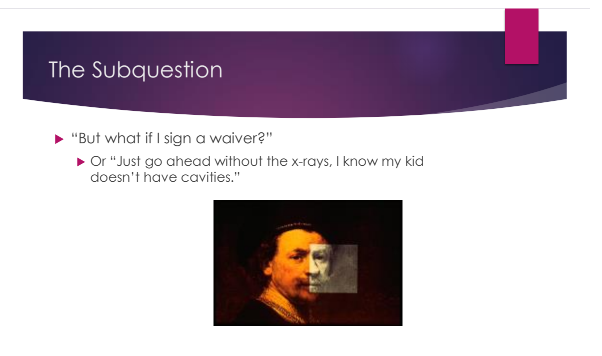
Oh, dang. He kicked off the lead apron and now he'll have kids with 3 ears

149

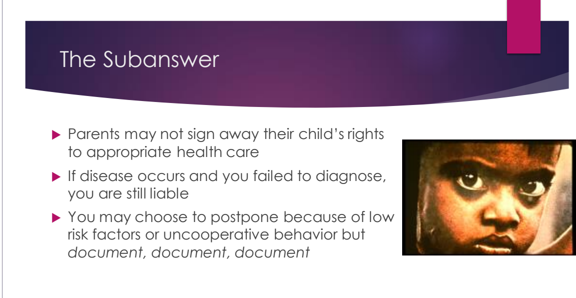
The Answers

- We do many things to minimize exposure
  - ALARA (as low as reasonably achievable)
- Don't have routine
  - Customized for the child
  - If I've determined they're necessary for complete diagnosis and treatment planning and you refuse, I am unable to treat your child

150



151



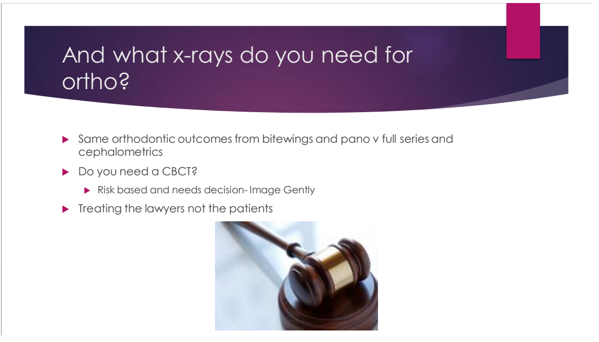
152

153

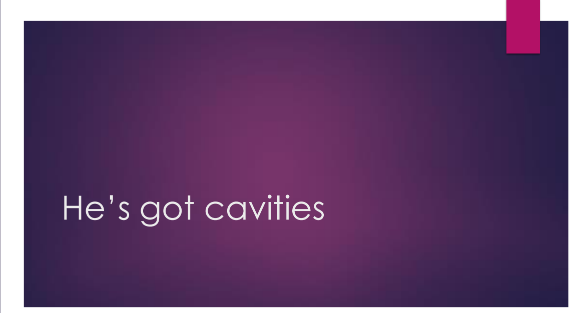
154

155

156

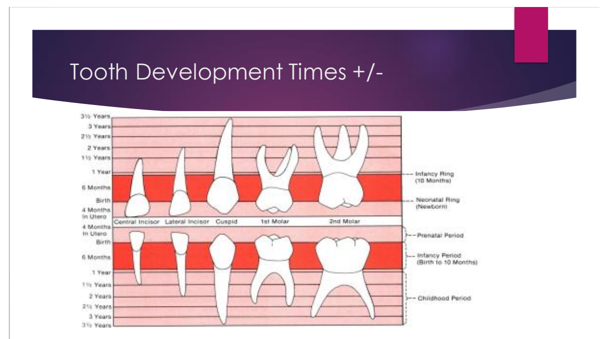


157



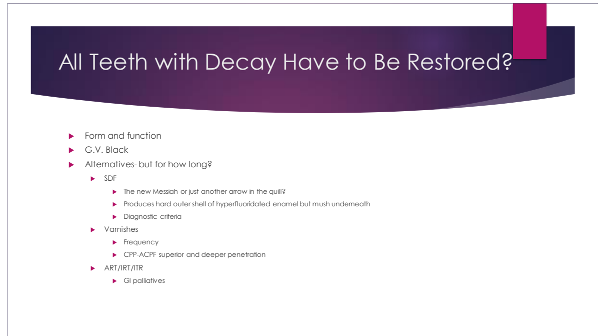
158

159



160

161

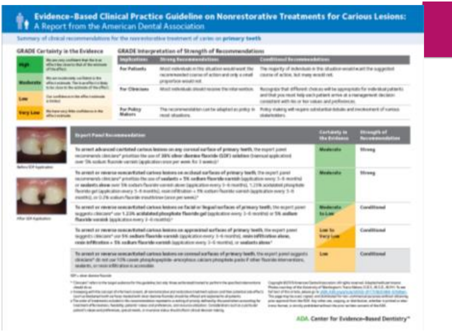


162

163

164

165


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	[illegible]
Moderate	[illegible]
Low	[illegible]
Very Low	[illegible]

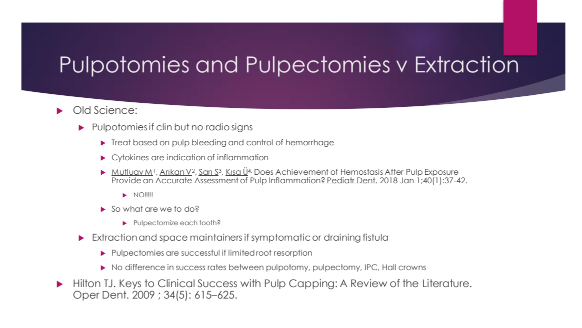
GRADE Interpretation of Strength of Recommendations

Implications	Strong Recommendations	Conditional Recommendations
For Patients	[illegible]	[illegible]
For Clinicians	[illegible]	[illegible]
For Policy Makers	[illegible]	[illegible]

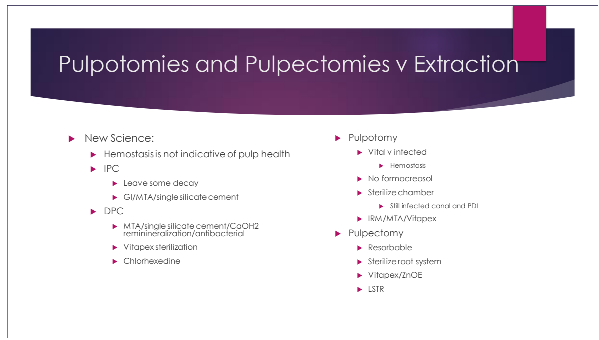
Expert Panel Recommendation	Certainty in the Evidence	Strength of Recommendation
To arrest advanced cavitated carious lesions on any coronal surface of primary teeth, [illegible] 38% silver diamine fluoride (SDF) solution [illegible]	Moderate	Strong
To arrest or reverse noncavitated carious lesions on occlusal surfaces of primary teeth, [illegible]	Moderate	Strong
To arrest or reverse noncavitated carious lesions on facial or lingual surfaces of primary teeth, [illegible]	Moderate to Low	Conditional
To arrest or reverse noncavitated carious lesions on approximal surfaces of primary teeth, [illegible]	Low to Very Low	Conditional
To arrest or reverse noncavitated carious lesions on coronal surfaces of primary teeth, [illegible]	Low	Conditional

ADA Center for Evidence-Based Dentistry

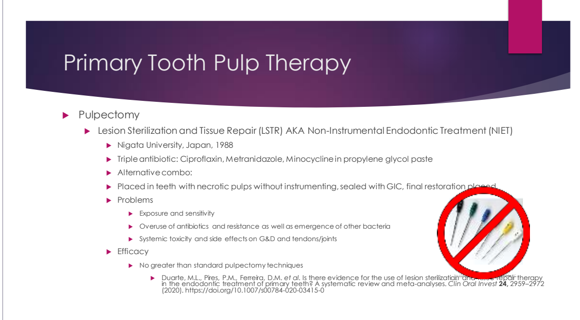
166



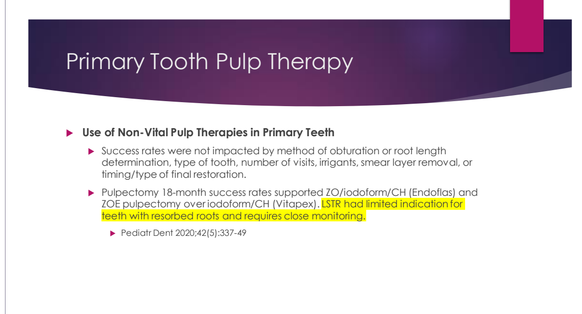
167



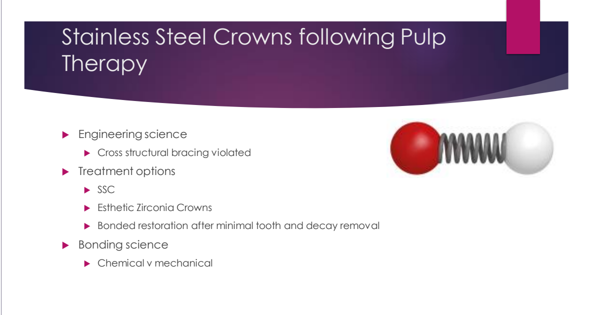
168



169



170

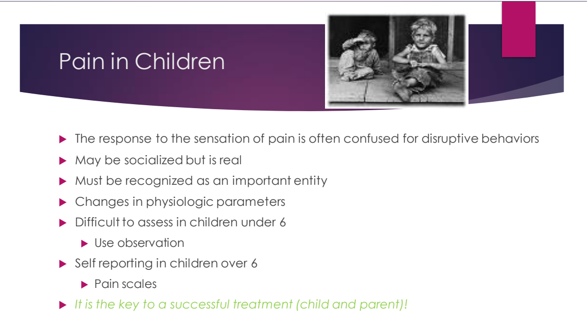


171

You can't give an injection to a kid because it hurts and they'll scream

172

173

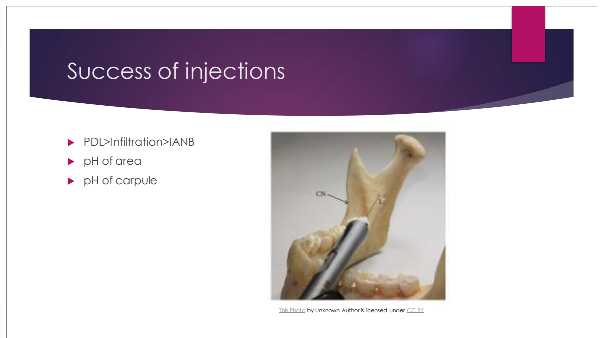


174

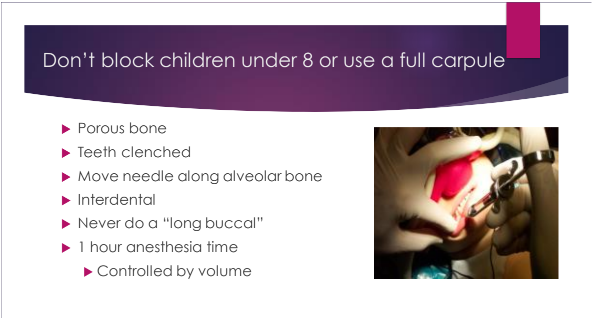
175

176

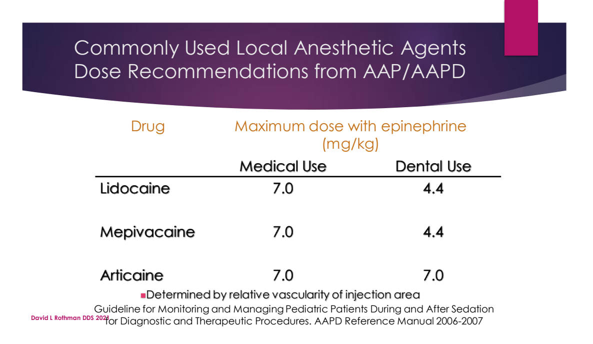
177



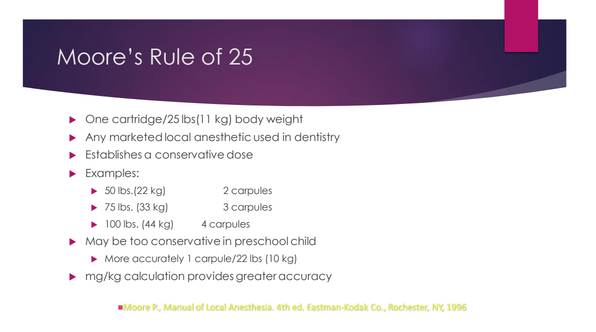
178



179



180



181

Local Anesthetic Volume Administered

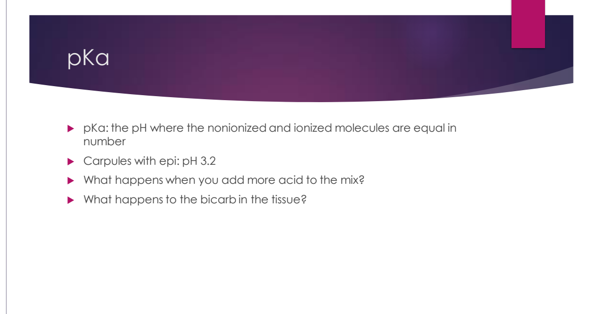
"For children under 10 years of age, it is rarely necessary to administer more than one-half cartridge (20 mg), even for mandibular blocks."

Astra Pharmaceuticals Package Insert, 1997

182

183

184

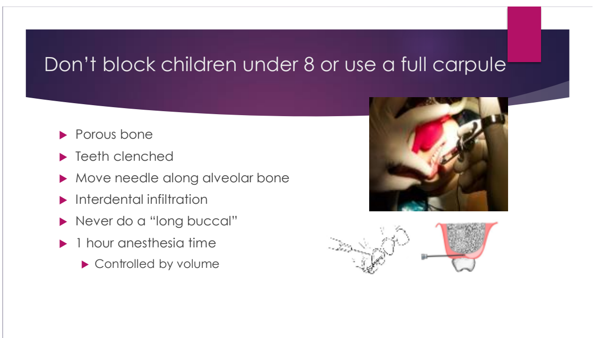


185

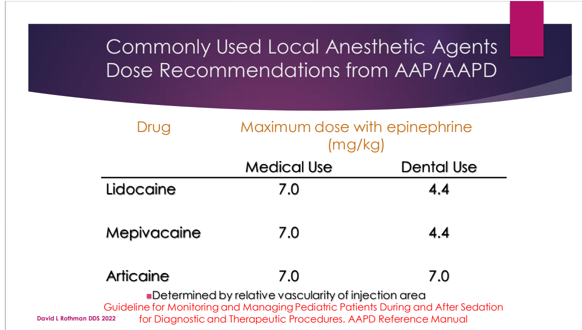
pKa

- pKa: the pH where the nonionized and ionized molecules are equal in number
- Carpules with epi: pH 3.2
- What happens when you add more acid to the mix?
- What happens to the bicarb in the tissue?

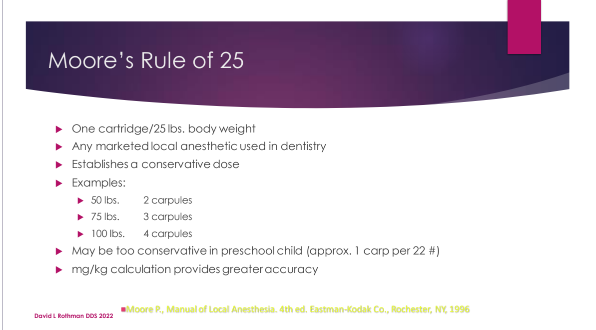
186



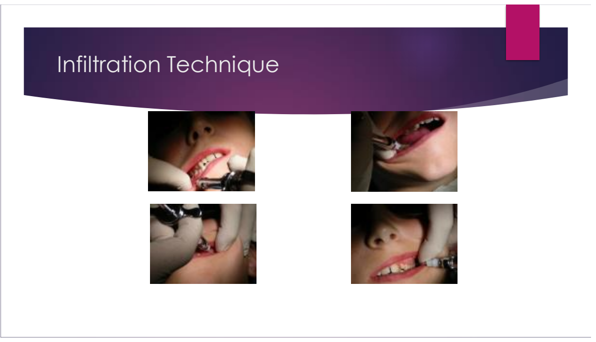
187



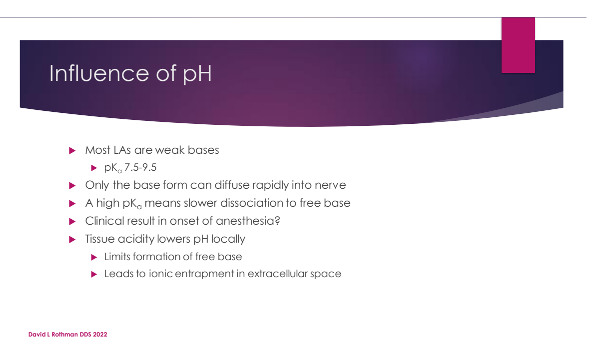
188



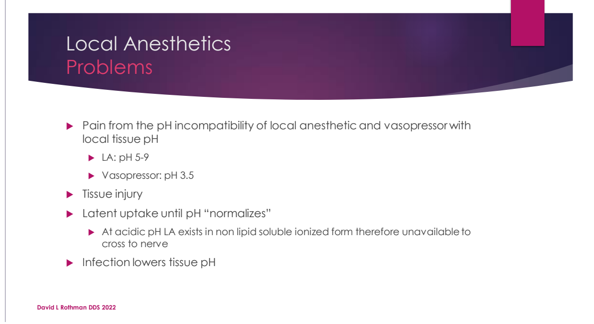
189



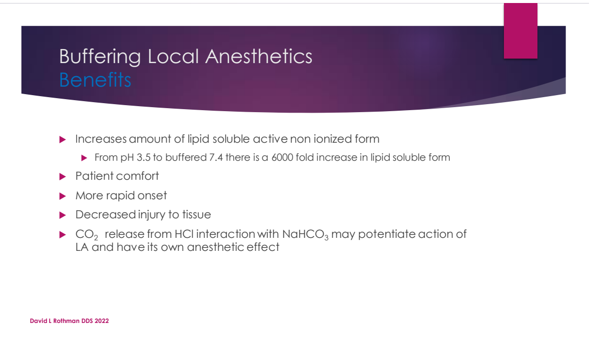
190



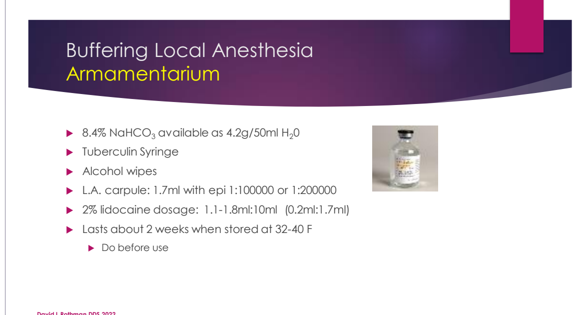
191



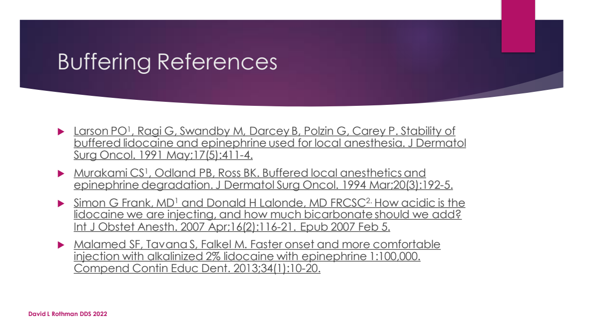
192



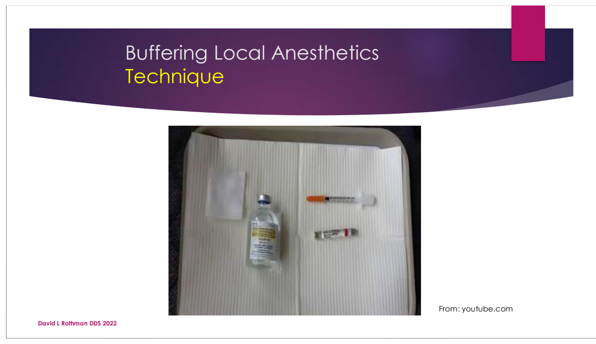
193



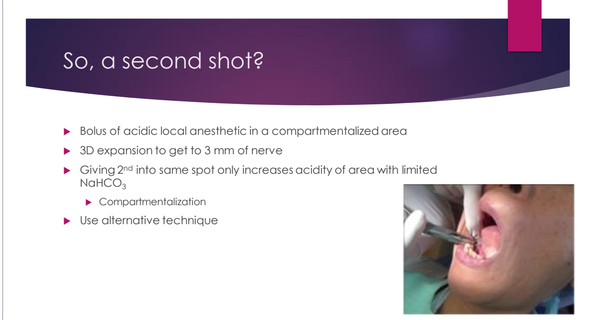
194



195

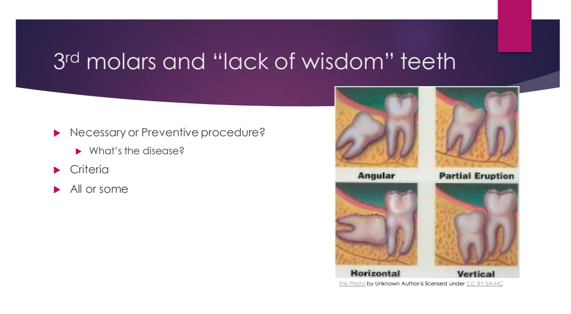


196



197

198



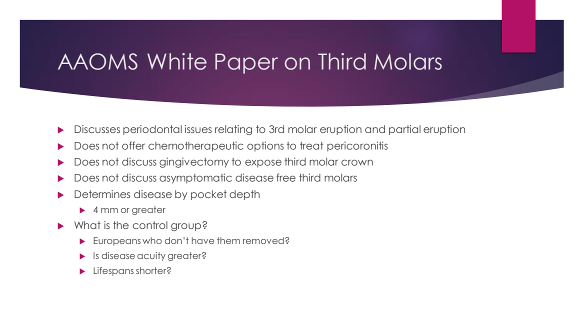
199

What About Those Third Molars?

- Not pathosis
- Do not cause crowding
- Disease of middle class children with insurance?
- Think tonsils and evidence based medicine
- #'s = to removing fingers for future chance of having hangnail
- More recent research discusses periodontal pocketing on distal of 2nd molars and chronic inflammation as cause for extraction

This Photo by Unknown Author is licensed under CC BY-SA

200



201

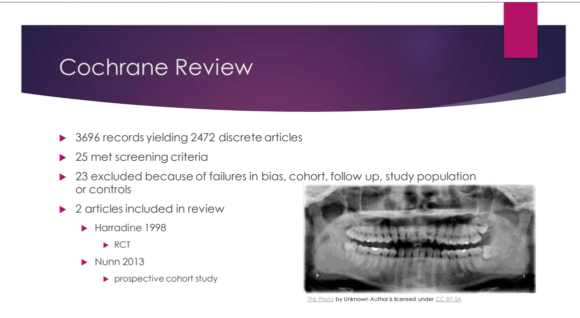
Speaking of Europeans

- Removal of wisdom teeth that may remain disease-free indefinitely is costly (Renton 2012)
- National Institute for Health and Care Excellence (NICE) (NICE 2000) and Scottish Intercollegiate Guideline Network (SIGN) (SIGN 1999) clinical practice guidelines (CPGs) support conservative management of wisdom teeth
  - removal of wisdom teeth has declined in recent years (McArdle 2012)
  - requires individuals to have regular dental reviews or 'checkups', so that the status of the wisdom teeth can be monitored.

This Photo by Unknown Author is licensed under CC BY-SA

202

203



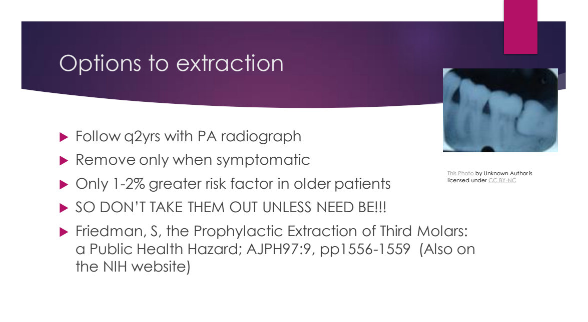
204

205

Indications for Third Molar Removal

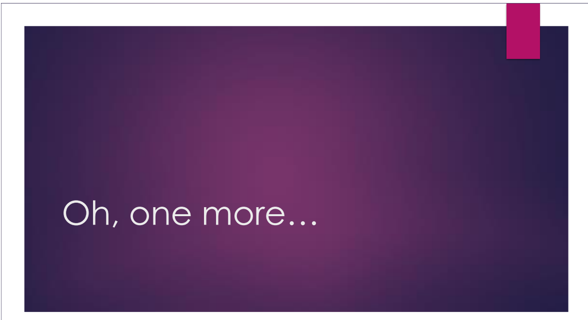
- Chronic periodontal disease/ pericoronitis
  - Recent research discusses periodontal pocketing on distal of 2nd molars
- Resorption of distal root of 2nd molar
- Nonrestorability
- Orthodontic concerns during distalization and uprighting
  - Ectopic eruption
- Cyst or abcess formation
- No association between third molars and lower incisor crowding (lack of stability)

206

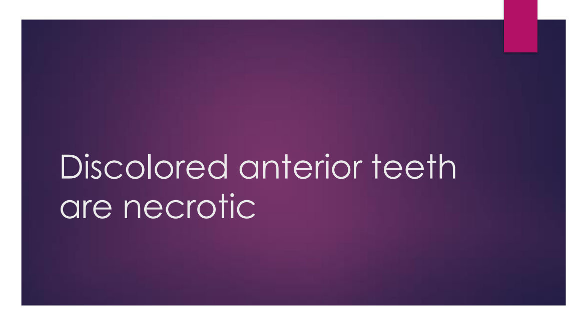


207

208



209

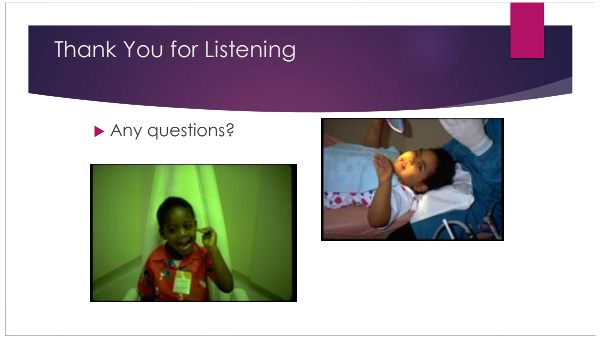


210

211

212

213



214