Mixed Dentition PEARLS

South Carolina Dental Association
2011 Meeting

Martha Ann Keels DDS PhD

Thursday, April 28, 2011
2:00 pm – 5:00 pm

Are We Evaluating Everything We Should With Our Pediatric Patients ?

ACID EROSION

ERUPTION

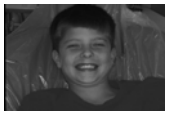
TRAUMA

Is the "tooth structure loss" you are seeing on the teeth a sign of something more serious?

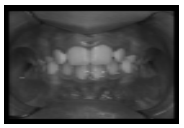
Referral from Peds GI
1991 – "eureka moment"

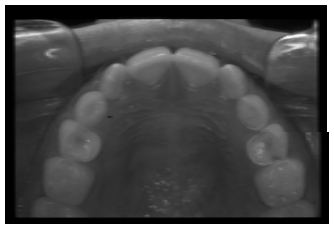
JW – age 8
- had a pH probe & endoscopy
positive Dx for GERD
Rx - Prilosec

What's going on with his teeth?



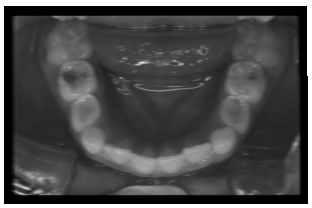
JW – age 8



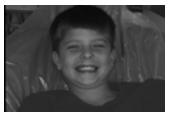


JW's maxillary arch

JW's mandibular arch



Possible etiologies ?



1) BRUXISM

2) ACID EROSION in children
Diet (acidic drinks and foods)
GERD
Bulimia
Environmental (chlorine)

OUTLINE

- Review of tooth structure loss
- What is GERD ?
- Diagnosing GERD
- Medical Management
- GERD and Erosion – lit review
- Erosive Tooth Wear Scale
- Cases
- Differential Diagnosis – Bruxism, Bulimia
- Dental Management

REVIEW of TOOTH STRUCTURE LOSS

Noncarious loss of tooth structure is a normal physiologic process occurring throughout life.

Normal wear and tear.

Problem = excessive rate of loss

Anthropologists perspective

REVIEW of PATHOLOGIC LOSS

ATTRITION - tooth to tooth destruction
ie…bruxism

ABRASION – abnormal rubbing of tooth structure by nondental object
ie…toothbrushing after an acidic exposure

EROSION-chemical destruction of tooth structure by intrinsic and/or extrinsic acids (pH<5.5) – Prof Pindborg (1970)

* Not included - Abfraction – loss at the CEJ

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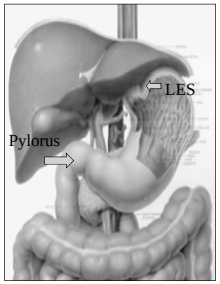
Gastro Esophageal Reflux Disease



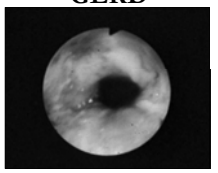
3 PATHWAYS

1. **Decreased LES tone**
2. **Short Abdominal Length**
3. **Reduced Esophageal Motility**

⇩

Reflux

Endoscopic view of JW's esophageal damage from GERD



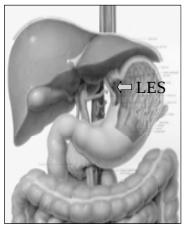
Barrett's Esophagitis - precancerous

NEJM Landmark Paper

The Significance of Untreated GERD

The risk of developing esophageal adenocarcinoma is approximately 43 times greater in individuals with UNTREATED reflux than in those without reflux.

Lagergren etal, NEJM 340(11):825-31, 1999



Decreased LES tone

⇩

Reflux

⇩

Repeated esophageal damage

⇩

Increased risk of adenocarcinoma (Odds ratio = 43.5)

Ref: *Lagergren J, Bergström R, Lindgren A, Nyrén O. Symptomatic gastroesophageal reflux as a risk factor for esophageal adenocarcinoma. NEJM 340(11):825-31, 1999.*

OUTLINE

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- **Dental Management**

First USA Guidelines for Treatment of Pediatric GERD published in 2001, revised 2009

At Risk Children for GERD

- *Poor eating habits*
- *Emotional Stress / Nervous stomach (school/divorce/Iraq)*
- *Obesity (= 3rd trimester of pregnancy)*
- *Premature Birth (prolonged closure of LES)*
- *Multiple Births*
- *History of excessive infant regurgitation*
- *Family History (chromosome 9 & 13)*
- *Asthma*
- *ADHD*
- *Males > Females*
- *Special Needs - Cerebral Palsy*

Diagnosis of GERD by MDs

- **Empirical Treatment (most conservative)**
  - **Diet changes, Stress management, Medications**
- **Esophageal pH monitoring**
  - **BRAVO capsule or pH probe - GOLD STANDARD**
- **Endoscopy/Biopsy (most invasive)**
- **Gastric Emptying Scan (Nuclear Scintigraphy)**
- **Barium Contrast Radiography (Upper GI series, Fluoroscopy)**

OUTLINE

- **Review of enamel loss**
- **What is GERD ?**
- **Diagnosing GERD**
- **Medical Management**
- **Erosive Tooth Wear Scale**
- **GERD and Enamel Erosion – lit review**
- **Case Study – JC**
- **Differential Diagnosis – Bruxism, Bulimia**
- **Dental Management**
- **More Cases**

Medical Treatments for GERD

- **Lifestyle changes (most conservative)**
- **Medications**
- **Surgery (most radical)**

Life style change … The American Diet

Gulp, Guzzle and Go Generation

DUKE's Healthy Life Style Rule for Kids 5-4-3-2-1-almost none

- 5 fruits / vegetables
- 4 glasses of water
- 3 structured meals
- 2 hours or less of screen time
- 1 hour or more of activity
- Almost none – almost no sugar
  - (NO juice)

Dr. Daniel Hale's – I DARE YOU

- 1. Turn off the TV
- 2. Children walk (run, bike, hike, swim)
- 3. Water/Low Fat Milk are the only beverage choices at home
- 4. Fast food is a 1 time per week treat after the family exercised together
- 5. Fruits and vegetables are the only snacks

Last Child in the Woods

saving our children from nature-deficit disorder

Richard Louv - 100 actions we can take

- Invite nature into your life – birdbath
- Walk on the beach – collect seashells
- Adopt a Tree
- Build a tree house or fort
- Plant a garden
- Go fishing

LEAVE NO CHILD INSIDE

HARA HACHI BU

3 Keys to living until 100 years old

1) EAT UNTIL 80% FULL

2) EXERCISE REGULARLY

3) CONNECT SOCIALLY

Medical Treatments for GERD

- **Lifestyle changes (most conservative)**
  - **Prefer dietary changes to medication**
  - **Eat dinner 2 hours before bed**
  - **Chew slowly and savor each bite**
  - **Stress – diaphragmatic breathing**
  - **Relax before bed**
- **Medications**
- **Surgery (most radical)**

GERD Medications

Antacids Maalox®, Mylanta®, Milk of Magnesia®, Gaviscon®, Tums®

Acid Reducers/ Histamine-2 Receptor Antagonists
Zantac®, Pepcid®, Tagamet®, Axid®

Acid Blockers/ Proton Pump Inhibitors
Prevacid® or Prilosec®

GERD Medications

Anti-ulcer/ Esophagitis Medications
Carafate® suspension

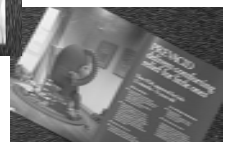
Motility Medications/ Prokinetics
Reglan®

ZANTAC (3mg/kg)

AXID (elixir)

PREVACID (15/30)

PRILOSEC (20/40)



Duke's Protocol for GERD

1) Try Zantac 75mg BID for 6-8 weeks, then off for 2 weeks and see if child can tell a difference
   * Zantac elixir for gaggers

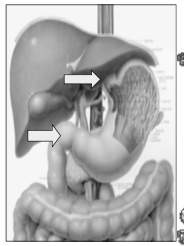
2) If Zantac is not helping refer to MD for assessment & possibly switching to Prevacid or Prilosec

Medical Treatments for GERD

- **Lifestyle changes (most conservative)**
- **Medications**
- **Surgery (most radical)**

Surgical Tx for GERD

1. **Nissen Fundoplication**
2. **Pyloroplasty**
3. **G-tube Surgery**



Surgical Treatment of GERD

Nissen fundoplication is the THIRD most common form of major surgery performed on children

Rare procedure for a well child

Source: American Gastroenterological Association, News release, Nov. 3, 2004

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What do we know from the literature about GERD and the TEETH ?

- first study 1971 – case report
- few lit reviews and several case reports 1991 - 2011
- few descriptive studies 1995 - 2011
- few case-control studies
- few prospective studies

Dental Erosion --- Prevalence

- *Ages 2-5yo 6-50% (primary teeth)*
- *Ages 5-9yo 14% (on permanent teeth)*
- *Ages 9-17yo 11-100%*
- *Ages 18-88yo 4-82%*

- *Males >>> Females*
- *Occlusal surfaces of molars>>> facial surfaces of max anteriors*

Jaeggi &Lussi Monogr Oral Sci 2006; 20:44-65

Teeth may play a critical role in diagnosis of GERD

…. The child may deny any symptoms and may be experiencing "silent GERD". In this case, dental erosion, especially of the posterior teeth, is an important finding with respect to the diagnosis of GERD.

Ref: Ali DA, Brown RS, Rodriguez LO, Moody EL, Nasr, MF. Dental erosion caused by silent gastroesophageal reflux disease. JADA 133:734-7, 2002.

Dental Erosion --- GERD

Schroeder PL et al reported that 10/12 patients who were referred to a GI specialist for idiopathic dental erosion had abnormal amounts of reflux on 24-h esophageal pH testing.

…. simultaneous factor ???

Ref: *Schroeder PL, Viller SJ, Ramirez B, Lazarchik DA, Vaezi MF, Richter JE. Dental erosion and acid reflux disease. Ann Int Med 122:809-15, 1995.*

Dental Erosion --- GERD

Critical Point

…. simultaneous factor ???

GERD can be an episodic disease with potential triggers (diet, stress, ???…)

Ref: *Schroeder PL, Viller SJ, Ramirez B, Lazarchik DA, Vaezi MF, Richter JE. Dental erosion and acid reflux disease. Ann Int Med 122:809-15, 1995.*

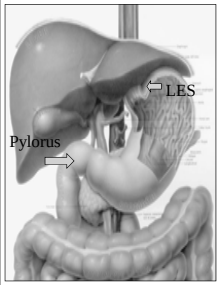
2002 Dashan Prospective Study

- **purpose - to evaluate the presence of dental erosion in children with confirmed diagnosis of GERD**
- **37 children had endoscopy for possible GERD**
- **24/37 children truly had GERD based on endoscopy**

2002 Prospective Study

- **24/37 children had GERD based on endoscopy (episodic)**
- **20/24 had dental erosions (83%)**
  - **not all reflux reaches oral cavity**
  - **not all reflux is acidic**
- **erosions involved only posterior teeth**

Ref: *Dahshan A, Patel H, Delaney J, Wuerth A, Thomas R, Tolia V. Gastroesophageal reflux disease and dental erosion in children, J of Pediatrics 140(4): 474-8, 2002.*



KEY POINTS

Not all involuntary regurgitations will reach the oral cavity

GERD can be episodic

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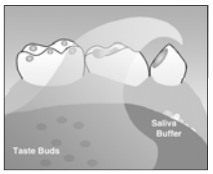
What can the teeth tell us?



What measurement scales do we have ?

Clinical Indices for Erosion

- BEWE - Bartlett, Ganss, Lussi 2007 (Basic Erosive Wear Examination)
  - developed by consensus of experts
  - partial scoring system
  - record the most severely affected surface in each sextant
  - sum the scores of each sextant
  - assign risk -> preventive strategies

Simplified Chairside Tool

#1 simple, fast & convenient -> compliance, easy for staff

#2 tooth specific -> track progression

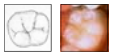
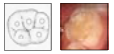
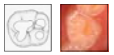
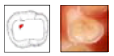
#3 visual for parent and child vs a number -> teaching tool

#4 reproducible (rule – in doubt score low)

#5 apply to primary & permanent molars

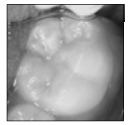
Simplified Chairside Tool

The Keels-Coffield Clinical Severity Scale of Dental Erosion

		Suggested Treatments (specifically for GERD):
Level 0 NO EROSION		None
Level 1 MILD Only the cusp tips are affected; shallow "moon craters" are present		•If the child confirms a positive history of GERD symptoms, refer to his/her pediatrician or a GI specialist for testing and management. •If there is no dental sensitivity, routine fluoride applications and sealants may be adequate. •If dental sensitivity occurs, protect the teeth with occlusal composite resin build-ups. •Monitor and document the erosive lesions with photographs and/or casts (as tolerated by the child).
Level 2 MODERATE Deep "moon craters" or depressions are present and may coalesce		•Same recommendations as for MILD erosion, however, teeth with MODERATE erosions will require occlusal composite resin build-ups or SSC's to protect against further loss of tooth structure.
Level 3 SEVERE Teeth are slick with little or no anatomy present; possible pulpal exposures		•Same recommendations for MILD and MODERATE erosions, however teeth with SEVERE erosions may require pulp therapy or extraction (if non-restorable).

Keels-Koffield Clinical Severity Scale of Erosive Tooth Wear

Level 0 – NO EROSION

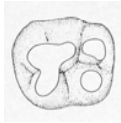


Keels-Koffield Clinical Severity Scale of Erosive Tooth Wear

Level 1 – MILD

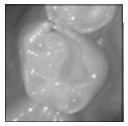
Only the cusp tips are affected; shallow "craters" are present; also see glistening of occlusal surface

Keels-Koffield Clinical Severity Scale of Erosive Tooth Wear

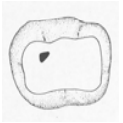


Level 2 – MODERATE

Occlusal surface glistens with "craters" spreading beyond cusp tips

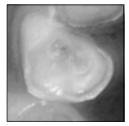


Keels-Koffield Clinical Severity Scale of Erosive Tooth Wear



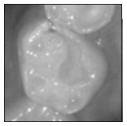
Level 3 – SEVERE

Occlusal surface glistens with little or no anatomy present; possible pulpal exposure

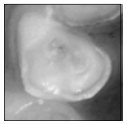


PROGRESSIVE EROSION

1) ACID EROSION (diet or GERD is ACTIVE
2) MEDICATION is no longer effective
3) NISSEN has FAILED



Level Two



Level Three

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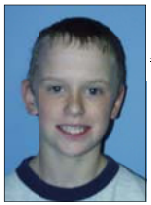
- **Differential Diagnosis – Bruxism, Bulimia**
- **Dental Management**

Case Study - JC



Seen at Peds Dental clinic at 9y2m referred for severe bruxism

Medical Hx:

- *Premature birth at 25 weeks*
- *PDA surgery – 1 week old*
- *Continuing problems from 8yo*
  - *Asthma*
  - *Sleep apnea – treated with Advair*

JC's Dental Erosion

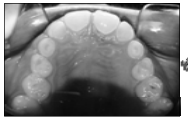
Erosion on primary molars

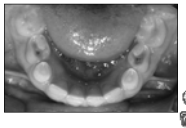
+

"hot burps every day"

=

GERD





JC's Treatment to Date

3/2002 – DDS recommended Zantac BID & referred to GI

4 month wait for GI doctor

7/2002 first pH probe

Diagnosis of GERD

- **Esophageal pH monitoring (pH probe)**

Diagnosis of GERD

Esophageal pH monitoring

- 72 episodes of reflux in 25 hours 12 minutes
- Longest episode = 21 minutes at 04:22 (sleeping)
- Total of 91 minutes of reflux
- Johnson+Demeester Score = 34.4 (normal <22)

Confirmed Diagnosis of GERD

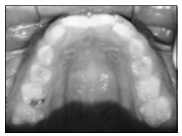
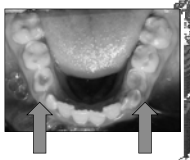
Esophageal pH monitoring

- 72 episodes of reflux in 25 hours 12 minutes
- Longest episode = 21 minutes at 04:22 am (sleeping)
- Night time swallowing issue
- Total of 91 minutes of reflux

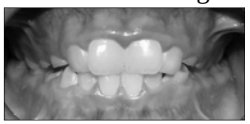
JC's Treatment to Date

- *7/2002 first pH probe confirmed reflux*
  Tx - Prilosec 20mg BID
- *1/2005 Dental erosion is progressively worse – REFER BACK to GI (new levels)*
- *3/2005 – sleep apnea study & second pH probe significant reflux*
  Tx - changed to Prevacid

A Signal for Action

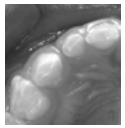
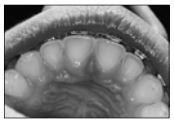
Soda Swishing



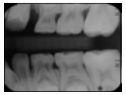
Dylan's Bad Habit

- *What else can we see?*
- *"Polished stone" appearance of anterior incisors – loss of a thin layer of enamel*

HOW DO YOU DISTINGUISH GERD from BRUXISM and BULIMIA ?

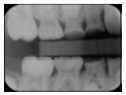
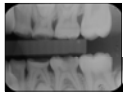



Differential Diagnosis of Tooth "Wear"
Bruxism

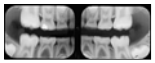
- ***Teeth appear completely flat on the bitewing radiographs***

Diagnosis of GERD with Radiographs

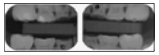



- ***Teeth appear "scooped out" on bitewing radiographs, or may be sloped at an angle***

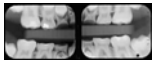
2 year progression



7/2/03

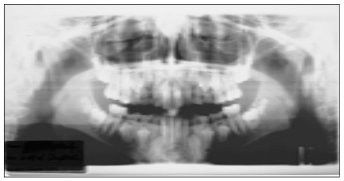


6/14/04



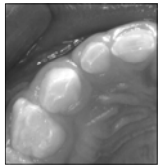
7/6/05

Panoramic View of GERD



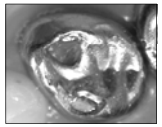
Differential Diagnosis of Enamel Loss
Bruxism

- ***Enamel and dentin <u>attrition</u> characterized by flatly-worn tooth surfaces***



Differential Diagnosis of Tooth "Wear"
Bruxism

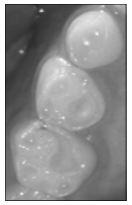
- ***Uniform wear of both tooth and restoration***



Differential Diagnosis of Enamel Loss

GERD

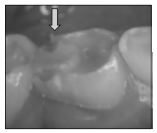
- ***Enamel and dentin <u>erosion</u> characterized by slick and glossy "moon craters" on tooth surfaces***
- ***Hint – ignore the canines!***



Differential Diagnosis of Tooth "Wear"

GERD

- ***Restorations appear "raised" or standing taller than the tooth surface***
- ***Clearly distinct from bruxism !***



Differential Diagnosis of Enamel Loss

GERD vs Bulimia

GERD – erosion involving the posterior teeth

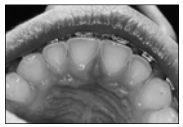
swallowing the bolus

Bulimia – erosion of lingual of upper incisors and posterior teeth

expelling the bolus

Differential Diagnosis of Enamel Loss

Bulimia



Courtesy of Dr. Betty Barr

- *Each bulimic episode results in 8-10µ of enamel*
- *Avg of **2 years** to visualize enamel erosion from bulimia*

Differentiating Dental Erosion

Step One - Acid Erosion vs Bruxism
wear pattern

Step Two – Acid Erosion vs Bulimia
posterior teeth vs anterior teeth
age in general

Step Three – Which Acid Erosion Source?
GERD / DIET / Environmental
patient history
GERD work up

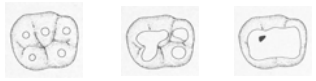
SYNERGISTIC REACTIONS

- GERD and DIETARY ACIDS
- GERD and Bruxism

Sour Candy Eaters (no GERD)

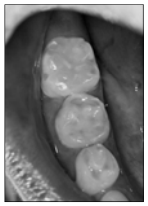
Mainly
Level One

DEFINITELY GERD



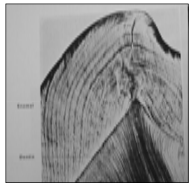
1) See all levels with GERD
   - especially level 2 and 3
2) Early medical intervention is protective
3) Correlates w/ side child sleeps on

Clinical Pearl



- *Progression of Enamel Erosion*
  - *First primary molars will be more eroded than second primary molars*
- *Why?*
  - ***Eruption order***

Why the cusp tips?

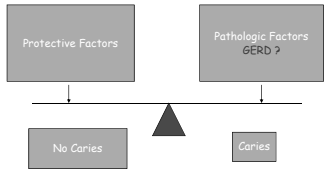


Incremental Lines of Retzius

GERD - few pondering thoughts

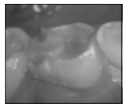
- *Can GERD exacerbate dental caries process ?*
- *Can GERD have an affect on health of the pulp*
- *What about GERD and research ?*
- *Can GERD trigger aphthous ulcers ?*

The Caries Balance

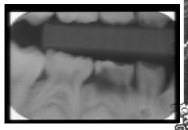


- Ref - JDB Featherstone. J Dent Res 83 (Spec Iss C): C39-C42, 2004.

Megan's Story

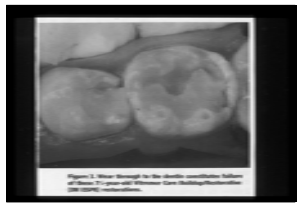


Six weeks later



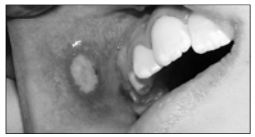
Impact of GERD on Dental Materials Research

Margin Failure or GERD ???



Other Interesting Observations with GERD patients

- **Ulcers associated with GERD**



Similar to acid ulcers from strawberry season and fresh tomatoes

OUTLINE

- Review of enamel loss
- What is GERD ?
- Diagnosing GERD
- Medical Management
- GERD and Enamel Erosion – lit review
- Erosive Tooth Wear Scale
- Cases
- Differential Diagnosis – Bruxism, Bulimia
- Dental Management

What to do in your office ?

- If enamel erosions are present, QUESTION the child(or the parent) regarding any reflux symptoms he or she may be experiencing.

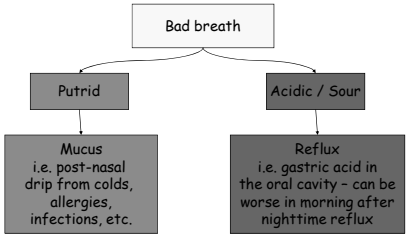
Signs and Symptoms of GERD reported by the CHILD

- Hot or spicy burps (Vurps)
- "Bad tasting ice cream" or "Baby Vomit"
- Burning pain in the chest area
- Nocturnal Coughing (not wheezing)
- Sour taste in mouth (may complain of "baby vomit" taste or "hot, wet burps") especially in the morning

Signs and Symptoms of GERD reported by the parent

- Nocturnal Coughing (not wheezing)
  - pathognomic for GERD
- Sour breath especially in the morning
- Frequent stomach aches
- Poor weight gain or weight loss – food avoidance
- Frequent choking episodes, gagging, or swallowing problems, throat clearing
- Rumination behaviors

Diagnosis of Halitosis in Good OH patients



Signs and Symptoms of GERD reported by the parent

- Nocturnal Coughing (not wheezing)
  - pathognomonic for GERD
- Sour breath especially in the morning
- Frequent stomach aches
- Poor weight gain or weight loss – food avoidance
- Frequent choking episodes, gagging, or swallowing problems, throat clearing
- Rumination behaviors

Chairside steps ?

- If symptoms are not initially confirmed, suggest that the patient keep a **DIARY** for a few weeks to document any potential symptoms, including any diet-related or sleep-related discomfort.
- If the patient is symptomatic, **REFER** the patient to his or her pediatrician or primary care provider for further evaluation.

Chairside steps

- **DOCUMENT** the severity of erosion at recalls (photograph, use a scale, models).
- **CHECK STRESSORS** - they can exacerbate the condition. Consider a psychology referral.

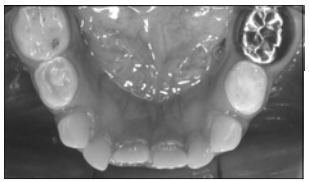
Chairside Steps

- Recommend **WATER** as the preferred beverage. The individual should rinse with water after experiencing any bad taste.
- Encourage a better **DIET** -- **avoid high-fat foods, acidic foods, and large volumes** of food, all of which will make reflux worse.
- **ELEVATE** the esophagus while sleeping - 2x4 at the head of the bed vs extra pillows

Chairside Steps

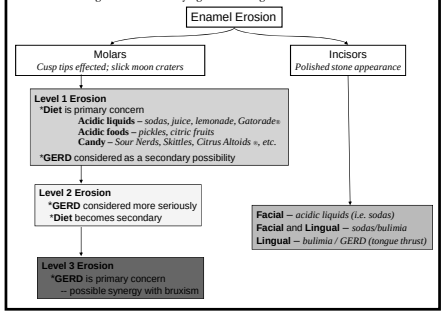
- If the reflux is under control and the erosions are mild, routine **TOPICAL FLUORIDE** treatments may be adequate, provided the patient is not experiencing dental sensitivity.
- If the reflux is uncontrolled or significant loss of tooth structure has occurred, protect the teeth and prevent pulp exposures with **RESTORATIVE CARE** - composite build-ups or stainless steel crowns as indicated. **PREFER to DELAY TX – to be able to monitor progressive disease.**

Protective Restorations for teeth with GERD damage



Untreated Side vs. Treated Side

Basic Algorithm for Identifying Contributing Factors to Enamel Erosion



GERD REMINDERS

Episodic
Unique wear pattern (clinically & radiographically)
Chart Progression of Wear
BE A DETECTIVE

DIET CORRECTED

Eliminate triggers
Eat slower
Eat earlier

STRESS RELATED
NERVOUS STOMACHS

Need medication
Stress Reduction

ANATOMIC

Surgery

GENETIC
???

"In the fields of observation chance favors only those minds which are prepared"

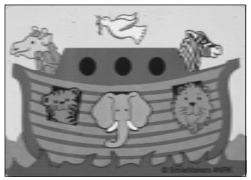
- Louis Pasteur

Our Job – Monitor Eruption

Timing & Vigilance

Own the Eruption Time Table

Infant Talk for Primary Dentition

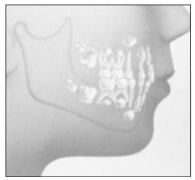


NOAH's Ark

Teeth erupt in pairs

SYMMETRY is KEY

Eruption Basics for parents

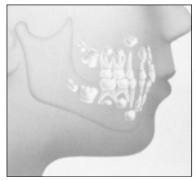


20 Baby Teeth in Total

8 fall out around first to third grade

Last 12 fall out around age 10-12

What if…



TOO EARLY ?
Born with teeth

UNUSUAL Eruption Pattern ?
Baby Molar first

TOO LATE ?
Delayed eruption

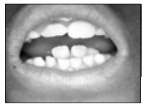
Changing Teeth – age 6-12

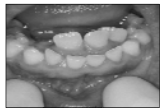
Double Row

Missing One or Two

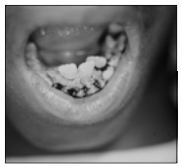
Eruption Concerns … the double row

Narrow face syndrome

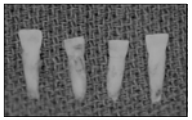




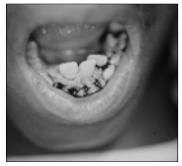
Eruption Concerns … the double row



aka – the sunshine tx



Eruption Concerns … the double row

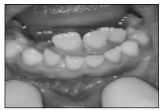


Who is the first orthodontist ?

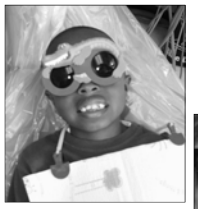
Eruption Concerns … serial extractions

If you have to extract any primary incisors to facilitate the eruption of the permanent teeth, then study the crowding and prepare the child and parent for future extractions if indicated.

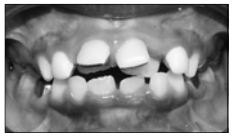
ANTICIPATORY GUIDANCE



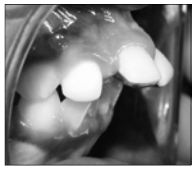
Eruption Concerns … the double row



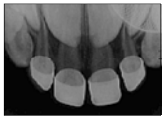
Tyre – 6y2m

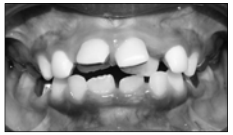


Eruption Concerns … the double row



Eruption Concerns … the double row



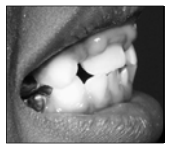


Eruption Concerns … the double row

Treatment:
1) Extracted
#D,#E, #F, #G

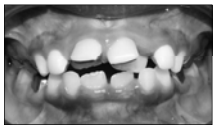
2) Tongue blade

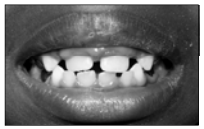
Eruption Concerns … the double row



3 month progress

Eruption Concerns … the double row





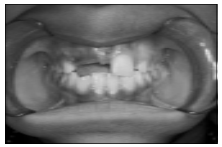
Initial overjet of # 8, 9 = -1 mm

3 month progress

Easy Orthodontic Treatment

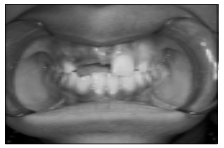
Mesiodens Timing

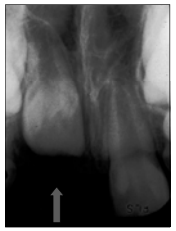
Where is my front tooth?



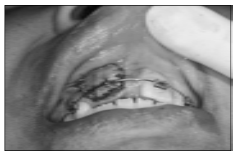
NOAH's ARK STORY

Eruption Concerns ….. Where is my front tooth?





Eruption Concerns ….. surgical uncovering

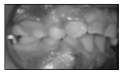


Before

After surgery and braces

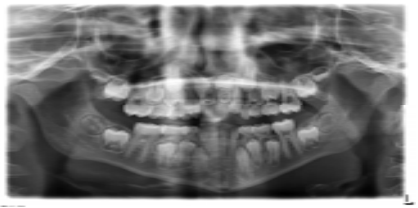
MARK age 9y0m – referred by DDS in June 2008

Mildly Autistic



Concern: two mesiodens

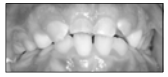
MARK's PANOREX taken June 4, 2008 by DDS



Key – age 9y0m – root development maybe complete on 8 and 9

MARK age 9y0m – the plan

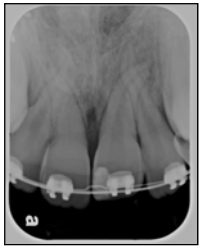
- Cone Beam CT
- Consult Oral Surgeon
- OR case
- Extract E and F
- Extract Mesiodens
- Clear path for 8 and 9
- Fit for Quad-helix to expand upper arch
- Possible Forced Eruption with braces



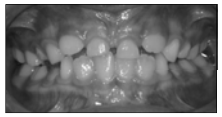
NOT what family was expecting to hear !

KEY - ALIGNING EXPECTATIONS

Mark
PA #9 (21) September 2010

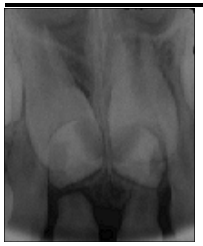


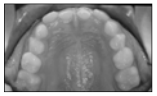
Maggie Initial Exam 7/2007 - referred age 8



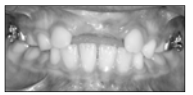
AGE EIGHT --- maybe TOO LATE

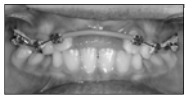
Maggie Initial Exam 7/2007 - referred age 8





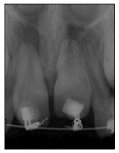
Maggie - Progress 5/08

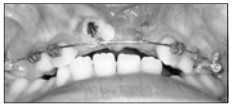




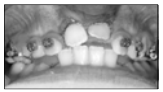
Place orthodontic appliances and Quad-helix
Progress to heavy rectangular wire
Expose and bond 8 and 9

Maggie 4 Month Progress 9/2008



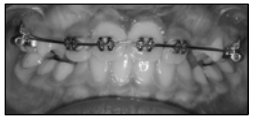


Maggie - Progress 11/2008 (six months to extrude)



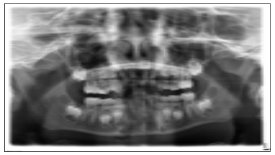
1) Remove gold chains and bonds – change to Smartclip brackets
2) Note - Calcification of 8 and 9 crowns okay

Maggie – progress March 2009

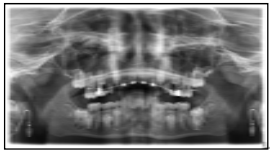


Smartclip – 5 months to align

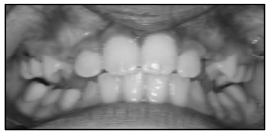
June 2007



April 2009

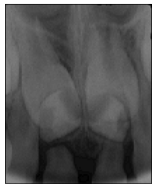


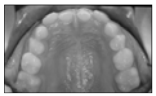
Maggie – debonded 4/2009



Retention – passive Maxillary Hawley

Maggie - lessons learned

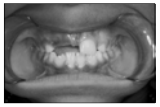


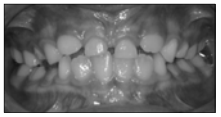


1) Be expecting 8 and 9 by age 7
2) Remove mesiodens BEFORE laterals erupt !

MAK PEARL ---

Don't be paralyzed by pathology





Life's Lessons

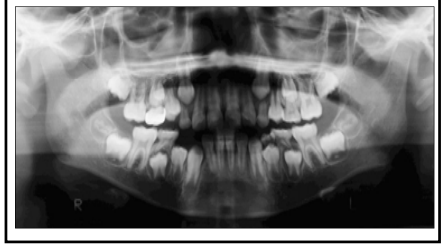
- Your own screw ups are the best teachers
- Seeing someone else's screw ups is the best substitute teachers

Panorex Pearls

When should we get our first Panorex ???

After eruption of 23,24,25,26
Average age 7-8

PANOREX PEARLS --- track eruption path

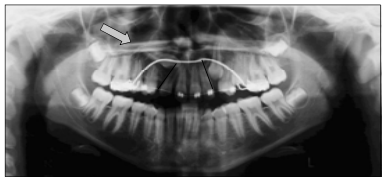


PANOREX PEARLS --- monitor eruption !

Which teeth go astray ???

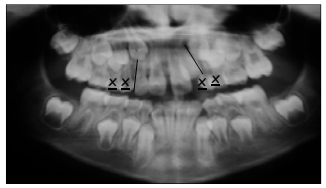
- ✓ Maxillary Canines – most talked about
- ✓ Mandibular Premolars
- ✓ Mandibular Canines

Far from the --- the GUIDING PLANE



#6 has gone astray

Email case from Atlanta --- Upper Canine Overlap

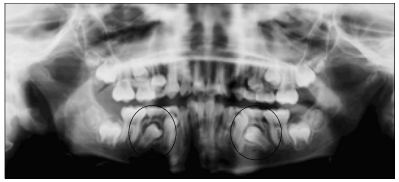


Extract B,C, H and I and deliver a Nance

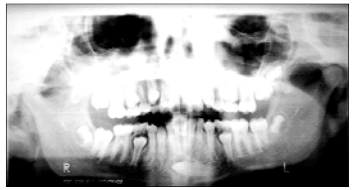
Warning Signs for MAX Canines

- BEWARE of PEG LATERALS
- BEWARE of odd shaped Canines
- BEWARE of Max Crowding

Lost Lower Second Premolars



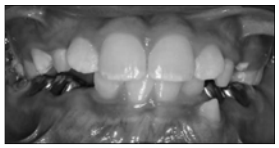
A very lost lower canine --- 2001
4 years later ☹



OH DEAR !

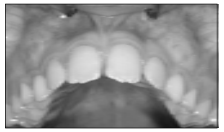
Managing the Eruption of Permanent Teeth

PEARL --- age 8 PALPATE for 22 and 27
MANDIBULAR CANINE BULGE
DOCUMENT STATUS



Managing the Eruption of Permanent Teeth

PEARL --- age 10 PALPATE for 6 and 11
MAXILLARY CANINE BULGE
DOCUMENT STATUS



Albert Einstein's Three Rules of Work

1. Out of clutter, find simplicity
2. From discord, find harmony
3. In the middle of difficulty lies opportunity

Permanent Dental Trauma

MTA is Magical

Permanent Tooth Trauma

THE IADT Guidelines (2007)

- Guidelines for Fractures & Luxations of Permanent Teeth
  Dental Traumatology 23(2) April 2007
- Guidelines for Avulsion of Permanent Teeth
  Dental Traumatology 23(3) July 2007

WHAT IS MTA
Mineral Trioxide Aggregate = Portland Cement

MTA = calcium, silica, bismuth

Properties – long setting time, high pH, low compressive strength, some antibacterial & antifungal effects

MTA = BIOACTIVE – influences its surrounding environment

3 great reviews in JOE 2010 – by Drs. Parirokh and Torabinejad

MAIN BENEFIT of MTA
Mineral Trioxide Aggregate = Portland Cement

MTA (unlike CaOH) = stimulates calcific bridging directly without inflammation

Reservoir of Calcium

3 great reviews in JOE 2010 – by Drs. Parirokh and Torabinejad

MAIN BENEFIT of MTA
Mineral Trioxide Aggregate = Portland Cement

1) CVEK with MTA
2) Apexiogenesis with MTA
3) Control External Root Resorption with MTA
4) Treat prolonged periapical abscess

GOAL --- STABLE ROOT STRUCTURE

Shania – MTA Cvek

May 2007 – fell jumping rope

June 2007 – came to clinic

Dx = Complicated Crown Fracture

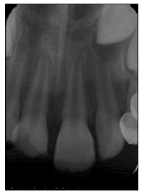
Tx = sealed over exposure

Panic Attacks with Med/Dent Care

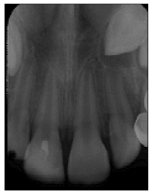
Med Hx --- Cystic Fibrosis

Scheduled for GA

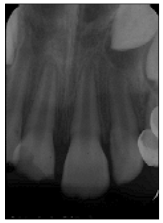
Initial film June07



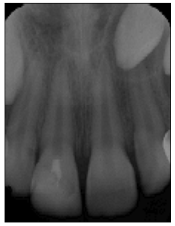
OR post-op Aug 07



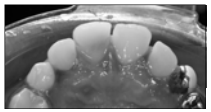
June 07



Nov 08 (1 year 5 mon)



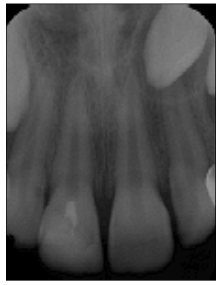
Shania – consequence MTA discoloration



Solution – RCT & bleach or Veneer / PFM

Achieved Goal – Stable Root Structure

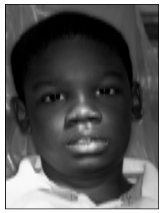
Nov 08 – see dentinal bridging with #8 (11)



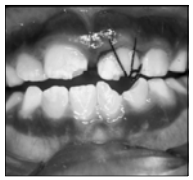
note #11 (23) position

Catcher's Nightmare

- Rodney 7yo
- see 5yr follow up
- s/p metal baseball bat to his mouth
- Avulsed a tooth-
  Now what ???



MTA and Inflammatory Resorption

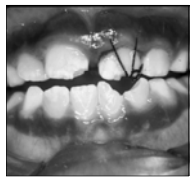


Avulsed #9 (21)

Subluxated #10 (22)

Uncomplicated crown fractures
#8 (11), #23 (32), #24 (31)

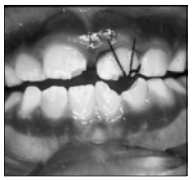
Catcher's Nightmare



Avulsed #9

- Dry time <60 minutes
- Wet time 2 hours –
  - Save-a-Tooth Kit
- TOTAL TIME OUT = 3 hours

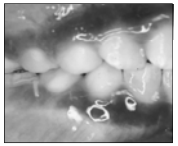
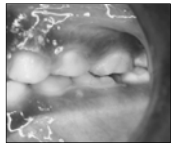
Catcher's Nightmare



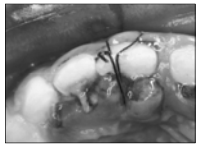
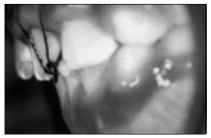
KEY – ER doc placed a sling suture to hold the tooth in place

3-O silk suture

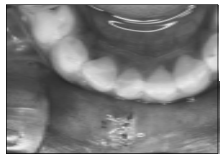
Catcher's Nightmare
--- checking occlusion

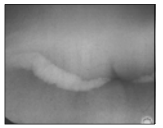
Catcher's Nightmare
--- critical suture

Catcher's Nightmare

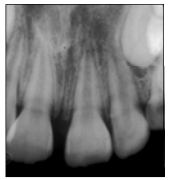
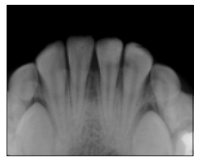


Lip xray

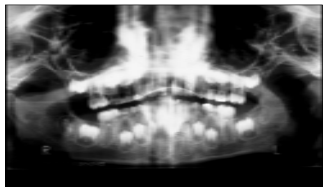


Lip laceration

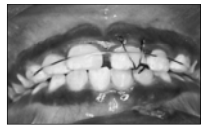
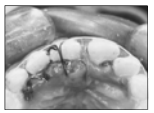
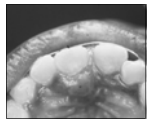
Catcher's Nightmare
--- initial films

Catcher's Nightmare



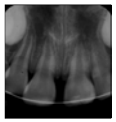
Catcher's Nightmare
--- place flexible wire splint

Left in suture for healing ->

one week post-op

Catcher's Nightmare
--- immediate pulpectomy




#9 --- 98% closed apex

TX – pulpectomy and CaOH within 7 days

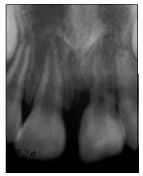
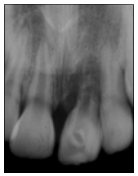
Catcher's Nightmare
--- when to remove the splint ?

*** reinjured tooth
bumped heads w/friend

Loosened #9

Removed splint after 22 days

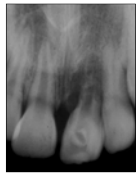
Inflammatory Root Resorption
--- root is disappearing

Six weeks – post CaOH

Three months –
post more CaOH

Catcher's Nightmare
--- what happened ?



DAMAGE TO THE ATTACHMENT

Dry too long ?

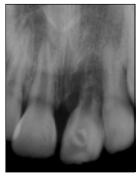
Mishandled ?

Reinjury ?

Splinted too long ?

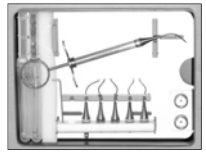
Needed Emdogain (pig fibroblasts)?

Catcher's Nightmare
--- what to do next ?

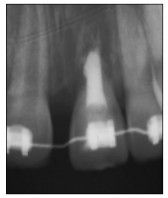


Call Dr. Joe Camp !

Sullivan Schein - $640



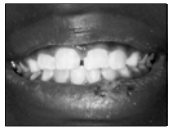
Catcher's Nightmare
--- experiment w/ PRO ROOT



MTA
Portland Cement
Orthodontic Intrusion

Catcher's Nightmare
--- 3 year follow-up

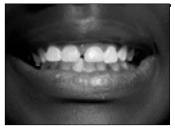
Rodney 10 yo

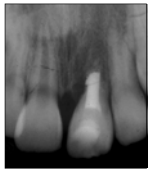


Do we need a
bonded retainer?

Catcher's Nightmare
--- 5 year follow-up

Rodney
12yo





9 extruded
slightly mobile

Catcher's Nightmare ---
switching to basketball

UNC Tar Heel
sports mouthguard

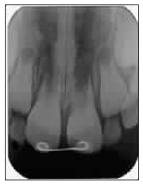
She's been hit in mouth !

- Jackie 7y9m
- Hit with baseball in mouth at school – avulsed #9
- Over 4yr follow-up

Apexogenesis with MTA

- Meet Jackie
  7y9m <- AGE ALERT
- BIG WORRY –
- Young permament tooth – OPEN APEX

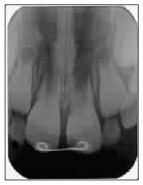
Avulsed #9 (21)



#9 also Fractured on incisal edge

Repositioned #9
Splinted 1-1

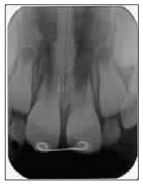
Reposition & Stabilize



Treatment
- Perioguard rinse
- Amoxicillin TID for 10 days

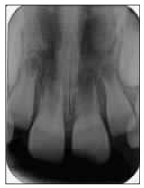
2 week follow-up
- #8,9 stable – open apices
- Plan to remove splint in 2 weeks (1 month after accident)

Monitor for Stability



1 month after the accident
- Removed splint – stable with mild class II mobility
- Stressed good OH, soft foods, and mouthguard for sports
- Plan to check in 2 months

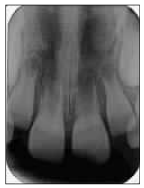
2 month trauma check



Uh oh…

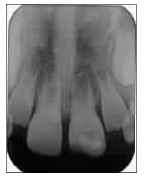
Jackie presents with:
- Localized abscess #9
- Possible root resorption

2 month trauma check



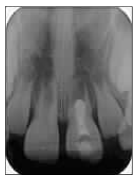
Treatment Plan
- CaOH and TERM
- Amoxicillin TID for 10 days

4 month trauma check



- No discoloration and mobility for both #8 and 9
- Monitor closely – abscess facial to #9 persists

4 month trauma check



Treatment
- Changed CaOH to MTA

Uh oh… 5 months after accident

Jackie presents with
- Small abscess facial to #9 – no pain
- #9 grey, Class I mobility

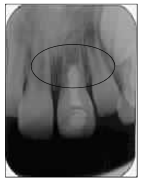
Treatment
- Curetted 1mm necrotic tissue
- Augmentin BID for 10 days
- Monitor closely

7 months after trauma

Jackie's progress
- #9 stable – see root development

Re-evaluate progress in 3 months

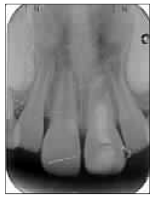
10 month followup



Jackie's progress
- #9 stable
- See apex closure
- Calcific bridge under MTA after 6 months

Plan to see in 6 months

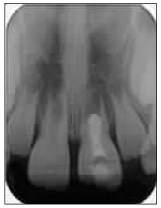
1 year 4 months later…

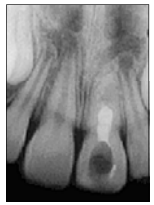


Jackie's progress
- #9 stable
- Calcific bridge under MTA

Plan – monitor for need of final endodontic care

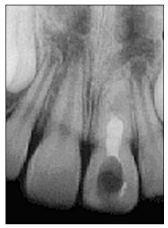
1 year 11 months later… apexogenesis !



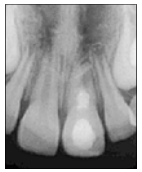


Initial MTA placement

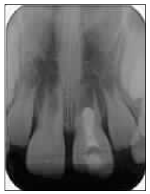
1 year 11 months later…

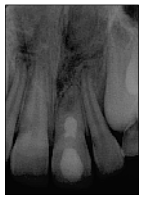


Final Resin Restoration

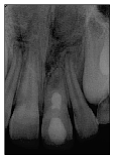


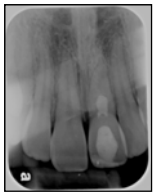
2 years and 6 months later…

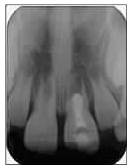


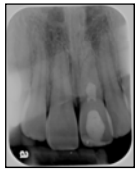


3 years later…



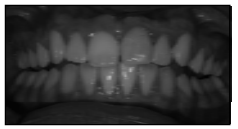


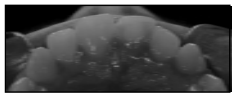




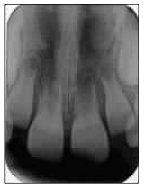
Total 5 year follow-up

Jackie
Progress Photos May 2010



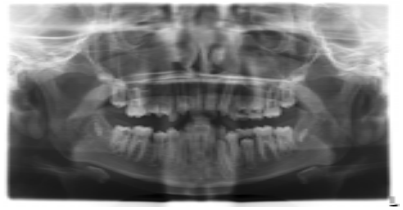


Question – Revascularation ?

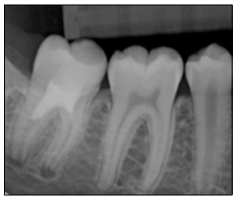


- #9 had bleeding on entry
- consider revascularization if necrotic / dry canal

Christian's #31 – pre-eruptive caries



Christian MOLAR MTA #31



Two year follow-up

MTA Drawbacks

1) Long setting time

2) HIGH cost

3) Discoloration

2011 Good Books for Positive Inspiration

- Too Soon Old Too Late Smart
  - by Gordon Livingstone, MD
- Stumbling on Happiness
  - by Daniel Gilbert

2011 Good Books for Positive Inspiration

- The One Thing You Need to Know
  - by Marcus Buckingham
- Chasing Life
  - by Sanjay Gupta, MD
- Things We Can Learn from a DOG

Winston Churchill's advice for solving problems

- Never make a decision before a nap
- Make sure to feed the wife too!

Thank you for your time !

Any questions?