

Pediatric Dentistry, Orthodontics, and Endodontics

Dental Materials Lecture #7

Lecture Outline

Pediatric Dentistry:

- Pediatric vs Adult Caries
- Silver Diamine Fluoride
- Sealants
- PRR
- Fillings
- Pulpotomy/SSC
- Space Maintainers

Orthodontics:

- Braces
- Platypus Flossers
- Invisalign
- Palatal Expanders
- Removable Retainers
- Bonded Retainer
- Cleaning with Braces or bonded Retainer

Endodontics:

- Root Canal Anatomy
- Root Canal Treatment
- Root Canal Retreatment
- Post and Core Buildup
- Vertical Root Fracture
- Apicoectomy

Learning Objectives

- Identify materials and procedures specific to Pediatric Dentistry, Orthodontics, and Endodontics
- Understand rationale behind certain Pedo, Ortho, and Endo treatments
- Learn how to clean around space maintainers, braces, Invisalign, and retainers
- Understand the difference between anatomy and caries in Primary and Permanent Teeth
- Understand importance of “Space Maintenance”
- Develop a basic understanding of Root Canal Treatment, Root Canal Retreatment and Apicoectomy

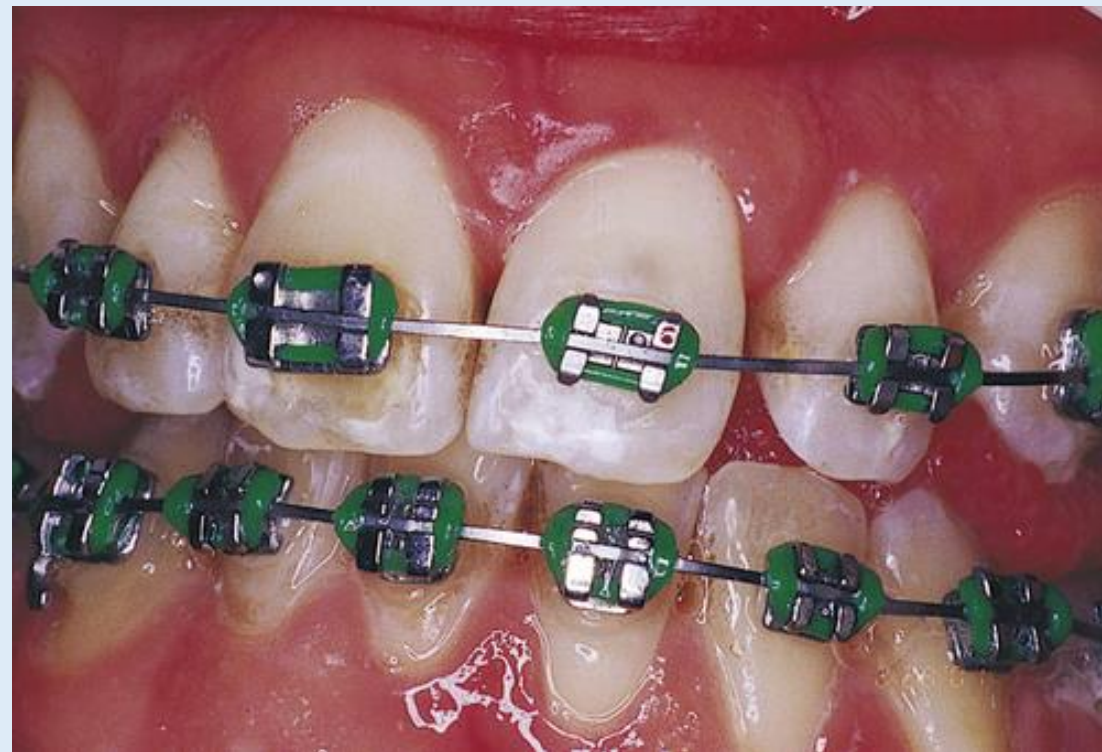
Role of Dental Hygienist

- Learn how to clean around orthodontic appliances during hygiene visits
- Learn proper Oral Hygiene Instruction for orthodontic appliances
- Be able to successfully clean around space maintainers
- Learn how to apply silver diamine fluoride to arrest incipient decay
- Be able to provide patient-specific oral hygiene instruction
- ***Be able to answer patient questions***

Orthodontics

- Braces
- Platypus Flossers
- Palatal Expanders
- Invisalign
- Removable Retainers (Hawley vs Essix)
- Bonded Retainer
- Cleaning with Braces or bonded Retainer

Traditional Braces



Traditional Braces (Fixed Appliances)

- “Brackets” Are bonded to facial surfaces of teeth
- Routine adjustments include changing of wires. These wires can be Nickel Titanium, Stainless Steel, or Beta-Titanium
- Difficult to Floss (Highly Recommend Platypus Flossers)
- Oral Hygiene is Extremely Important. Many patients develop interproximal caries while in ortho due to lack of flossing and overall poor oral hygiene
- Patients should ideally have prophys more than twice a year while undergoing ortho treatment (we usually recommend every 3 months).
- It is important to stress using fluoride toothpaste and fluoride mouth rinse. Prevident 5000 (Colgate) is a high fluoride toothpaste that is frequently prescribed. ClinPro 5000 (3M) is another high fluoride toothpaste. Recommend at home nightly rinse with a fluoride mouthrinse (such as ACT).
- Patients with poor oral hygiene get decalcifications (White Spot Lesions) where brackets were bonded (looks like white squares on their teeth)
- Treatments for decalcifications can vary. ICON (ICON Resin Infiltration) is the least invasive, but sometimes it requires fillings or veneers to eliminate the white spot lesions. Tooth bleaching can also used to “blend in” the decalcifications, but results can vary for both bleaching and ICON.

Platypus Ortho Flosser

- Easy, convenient way to floss teeth during traditional ortho
- The “skinny arm” can fit between the teeth and the ortho wire



White Spot Lesions and ICON Resin Infiltrate

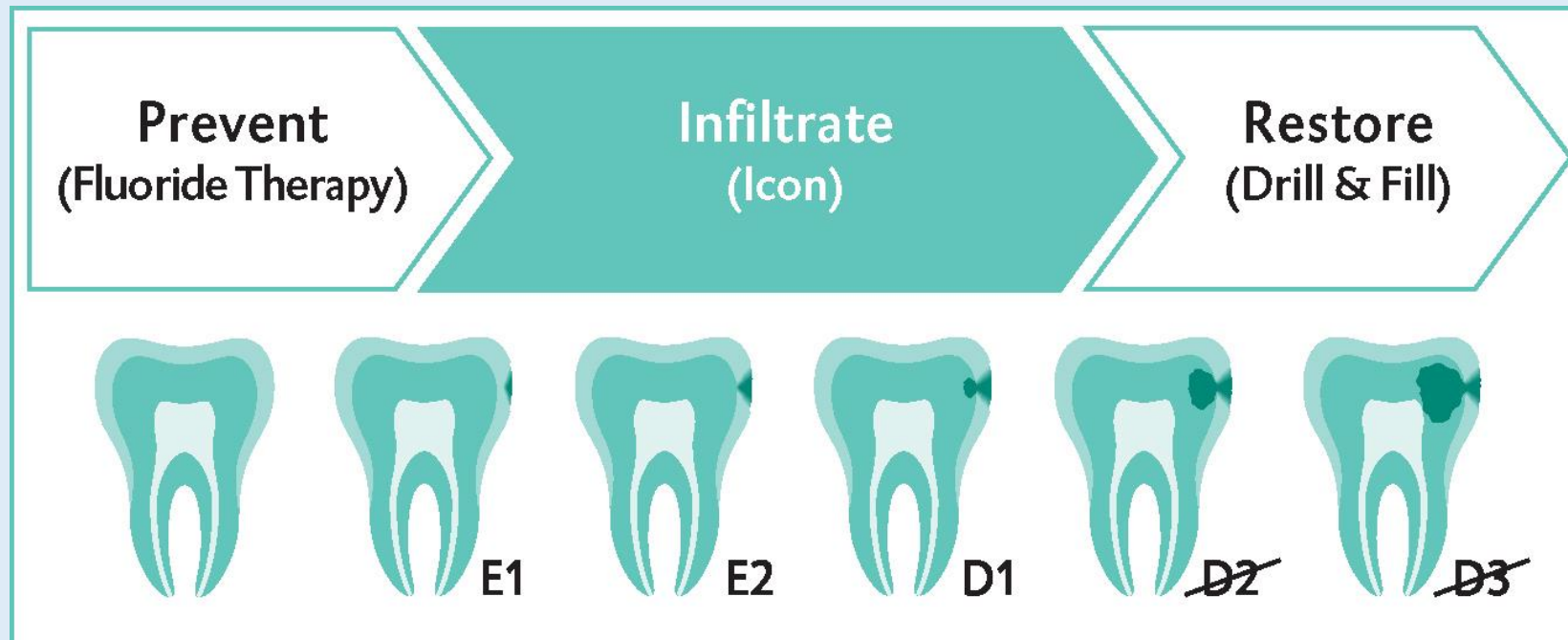
From the Website:

- The breakthrough caries infiltrant
- Esthetic results on smooth surfaces
- Arrests caries at an early stage
- Preserves healthy tooth structure
- Micro-invasive technology, no anesthesia or drilling
- One quick patient visit



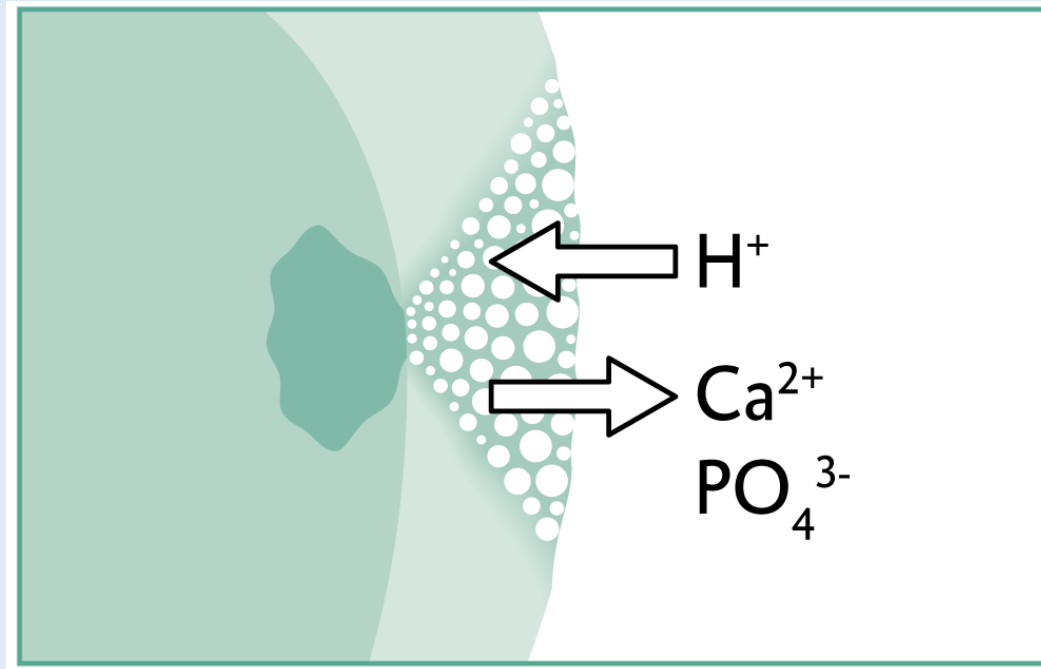
ICON

- Icon represents a revolutionary new approach to treat incipient caries: a caries infiltrant. This breakthrough micro-invasive technology fills and reinforces demineralized enamel without drilling or anesthesia, up to the first third of dentin (D1).

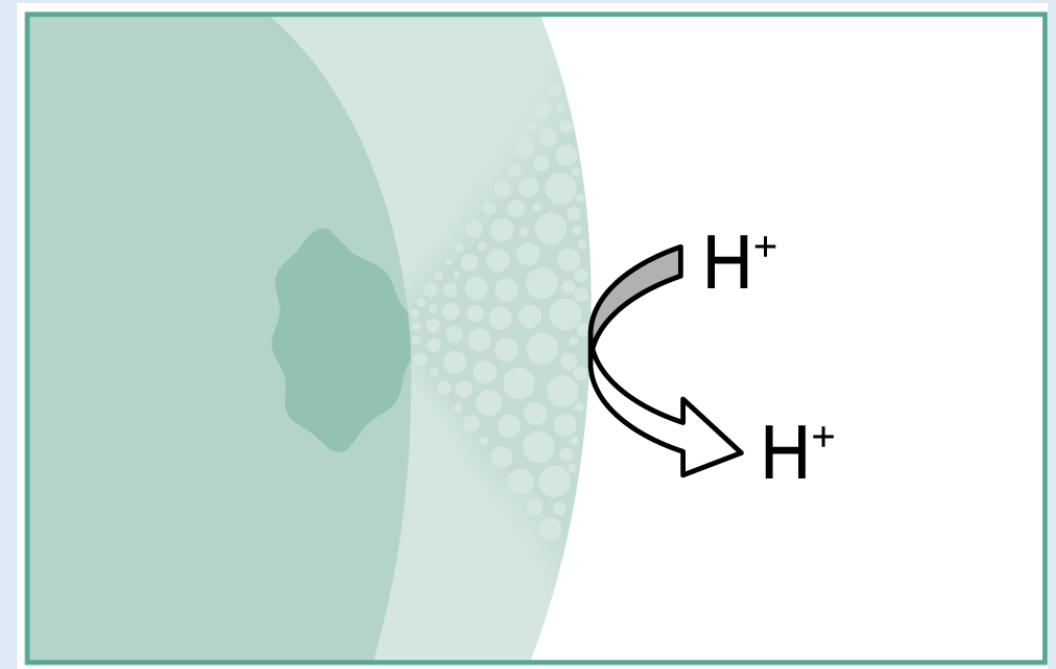


ICON

How Icon effectively infiltrates early caries:



With the onset of caries, cariogenic acids attack the enamel and draw out minerals.



After treatment with Icon, the pore system is closed, blocking the progression of caries.

MI Paste



*Can only be purchased from a dental office.

Hygiene Visit with Braces

- Review Oral Hygiene Instruction (OHI)
- Review Platypus Ortho Flossers
- Waterpik can help, but it is NOT a substitute for flossing
- Scaling may be challenging due to brackets and wires
- Try to use ultrasonic when possible, but don't touch brackets
- Prophy angle with tapered brush may be more effective than rubber cup.
- Consider Fluoride (Varnish or Fluoride Treatment)
- With Braces, it is most ideal to have the ortho wire taken out prior to the appointment, but that requires extra visits to the orthodontist's office before and after.

Palatal Expander

- Used to widen the maxilla.
- There are several different types of palatal expanders.
- This particular palatal expander is called a Hyrax Expander

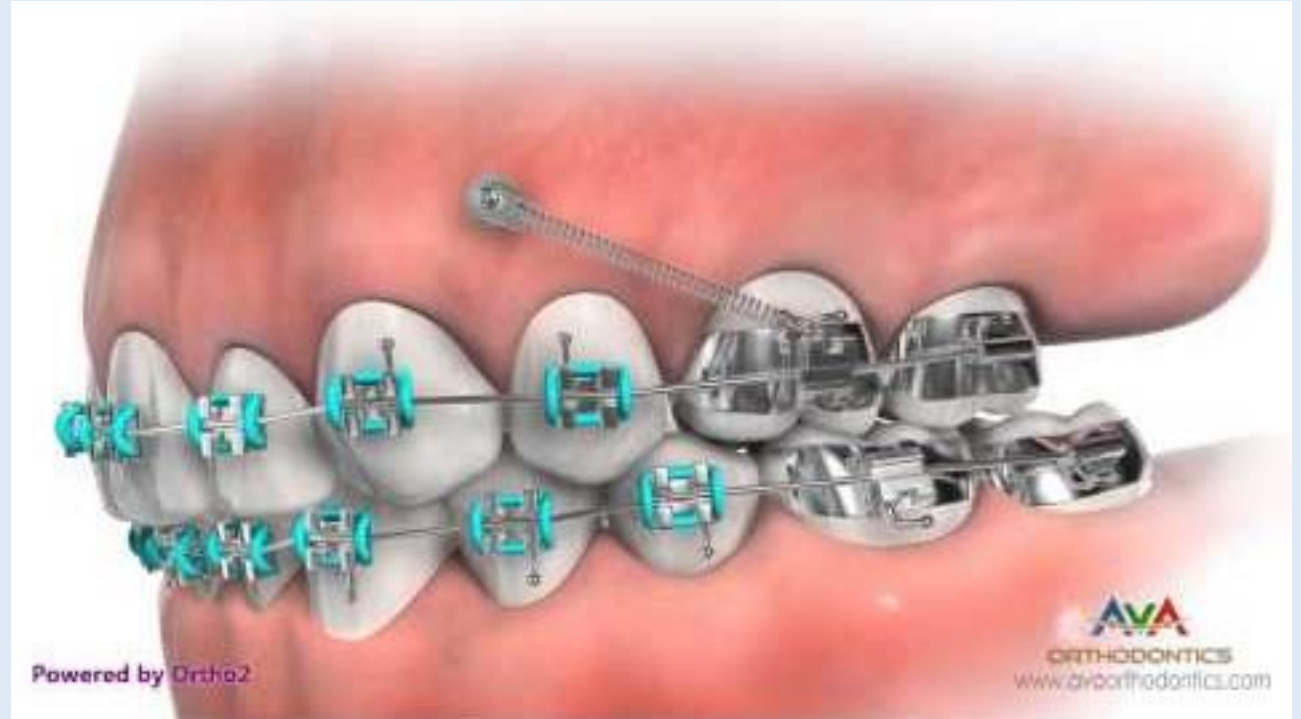


Palatal Expander Video

- <https://www.instagram.com/p/CF1V6b1gaFW/?igshid=5pln1qbyq4mr>

TAD: Temporary Anchorage Device

- Biocompatible devices fixed to bone for the purpose of moving teeth
- Removed once orthodontic treatment is completed
- If you see them during a perio visit, leave them alone



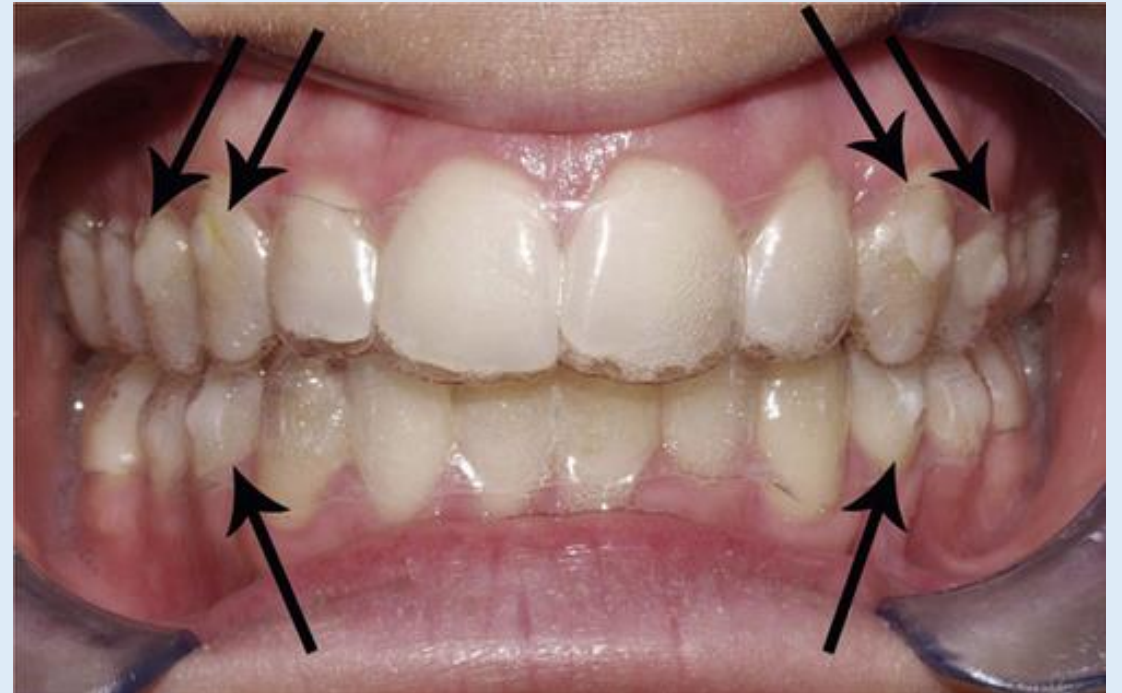
Clear Aligner Therapy

- Patients must wear the clear plastic aligners 22hrs/day
- Patients switch aligners every 1-2 weeks until completion of treatment
- Following completion of treatment, patient must wear a retainer, otherwise relapse will occur
- Can bleach teeth while teeth are being straightened
- If patient has poor compliance, teeth will not move as desired
- Flossing is much easier with aligners than with traditional braces
- If patient loses an aligner, she/he can wear the previous week's aligner until a new one is ordered.



Clear Aligner Therapy: Attachments

- Composite “attachments” are placed on key teeth at the beginning of treatment
- This allows the aligners to grab on better and achieve different types/amounts of force
- Attachments are removed at the end of treatment

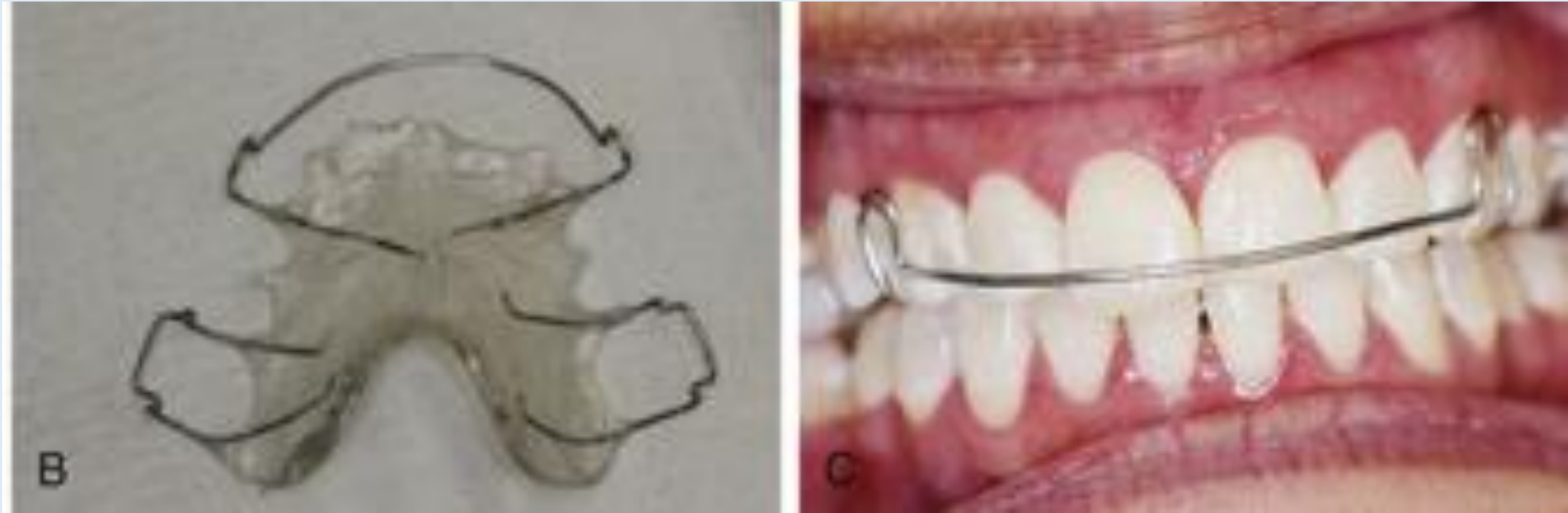


Retainers

- 1) Traditional Hawley Retainer (Removable)
- 2) Clear Essix Retainer (Removable)
- 3) Bonded Lingual Wire Retainer (Fixed)

The main purpose of a retainer is to maintain the teeth in their current orientation/alignment and
PREVENT ANY NEW TOOTH MOVEMENT

Traditional Hawley Retainer



Hawley Retainers are Made of Acrylic with Wrought Wire

Clear Vacuform Retainer



Figure 1 The Align Vivera retainer product packaging.



Figure 2 Close-up view of the Vivera retainer.

Removable Retainers

- The main purpose of a retainer is to maintain the teeth in their current orientation/alignment aka PREVENT ANY NEW TOOTH MOVEMENT
- Requires two appointments
 - 1st Appointment: Alginate Impression or Digital Scan
 - 2nd Appointment: Delivery
- Wash with toothbrush and soap and water
- TELL PATIENT NOT TO PUT IN NAPKIN WHEN EATING (very often thrown into the garbage by accident)

Fixed Ortho Retainer: (Bonded Lingual Wire Retainer)

- Improved Patient Compliance
- Very difficult for patient to floss (must use superfloss or floss threader)
- Accumulates significant calculus
- Usually #22-27. Can be bonded on each individual tooth or just #22 and #27
- Usually recommend wearing these for life. If they debond or come out, the patient should go to orthodontist for a new one OR get a mandibular removable retainer, such as a Vivera.



Break Slide



Pediatric Dentistry



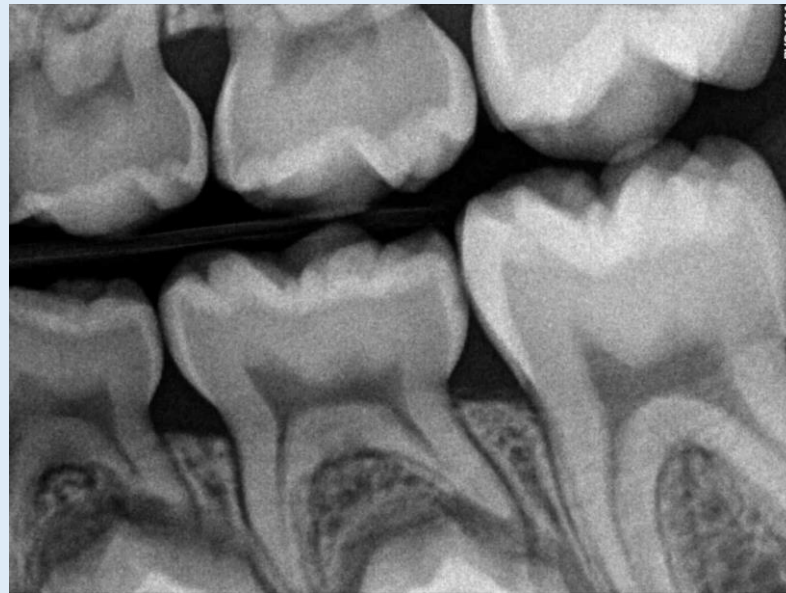
- Pediatric Caries vs Adult Caries
- Silver Diamine Fluoride (DEN Seminar)
- Sealants
- Protective Resin Restoration (PRR)
- Pulpotomy/SSC
- Space Maintainers

Primary Teeth vs Adult Teeth

- Thinner enamel layer on Pediatric Teeth
- Pediatric teeth have thinner roots and cervical constrictions
- We are less likely to “watch” incipient interproximal lesions in pediatric teeth because they progress much faster.



Patient #1



Patient #2



Patient #3

Dental Sealants

A dental sealant “seals” or covers anatomical pits and fissures on the smooth surfaces of teeth (occlusal/buccal/lingual) in order to keep out biofilm and prevent decay.



PRR: Protective Resin Restoration

- Similar to a dental sealant
- When there is already decay present, but confined to the enamel layer
- The preparation is confined to the enamel layer and a resin restoration is then placed. This is referred to as a PRR
- A PRR is slightly more aggressive than a sealant
- A PRR is less aggressive than a filling

Stainless Steel Crowns

- **Indicated for pediatric teeth that have caries on two or more surfaces or very large caries on one or more surfaces**
- Instead of doing both a DO and MO on pediatric teeth, the recommendation is to do one stainless steel crown.
- Indicated on any tooth where pulpotomy is performed
- Requires minimal tooth preparation
- Also used for high caries risk patients when undergoing general anesthesia, or patients that grind.



Stainless Steel Crowns



Pulpotomy

- If there is a deep cavity that extends into the nerve of the primary tooth, then a pulpotomy is formed.
- A pulpotomy is when the dentist removes the dental pulp from the PULP CHAMBER ONLY, but leave healthy nerve tissue in the roots.
- A stainless steel crown should be placed on top of a pulpotomy.
- The goal of a Pulp/SSC is to preserve the tooth until it exfoliates.

Space Maintainers



-If a primary tooth must be extracted prior to its normal exfoliation, then we want to preserve that space for the adult tooth to erupt into in the future.

-In order to avoid space loss, a space maintainer is placed.

-This maintains a pathway for the underlying permanent tooth to have a normal eruption.

Put Your Knowledge To The Test!!



Patient #3

Break Slide



Endodontic Treatment for Adult Teeth



Endodontics

- Root Canal Anatomy
- Root Canal Treatment
- Root Canal Retreatment
- Post and Core Buildup
- Vertical Root Fracture
- Apicoectomy

Tooth Anatomy Review

A Tooth is like a Pencil:

- The Eraser is the Crown
- The Wooden Handle is like the root of the tooth
- The lead filling is the Nerve



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What Happens during a Root Canal?

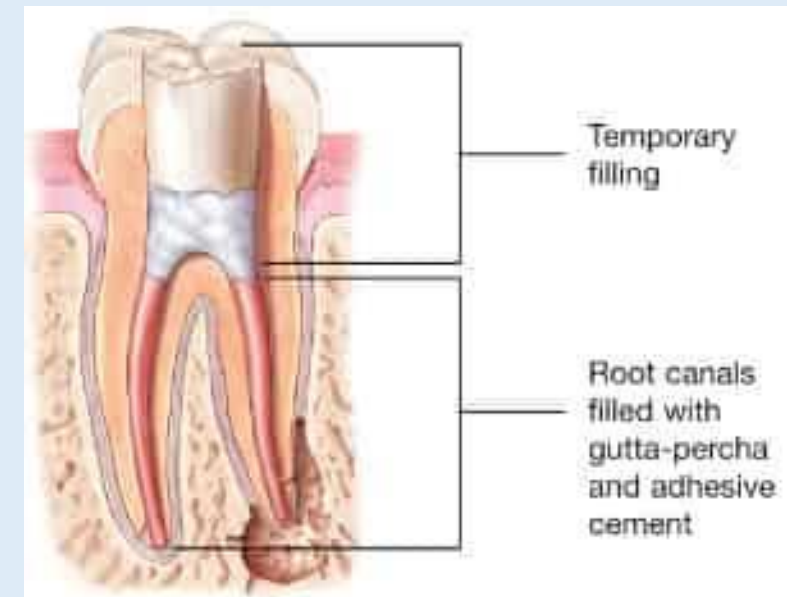
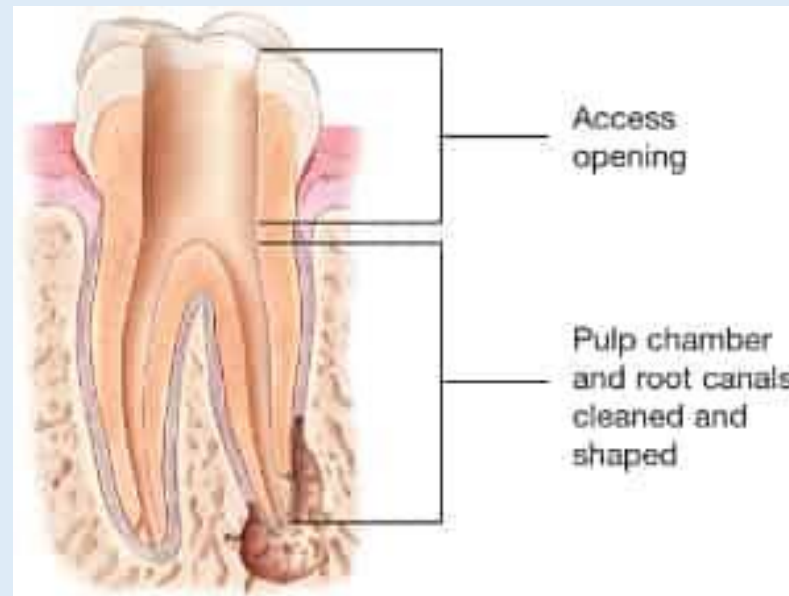
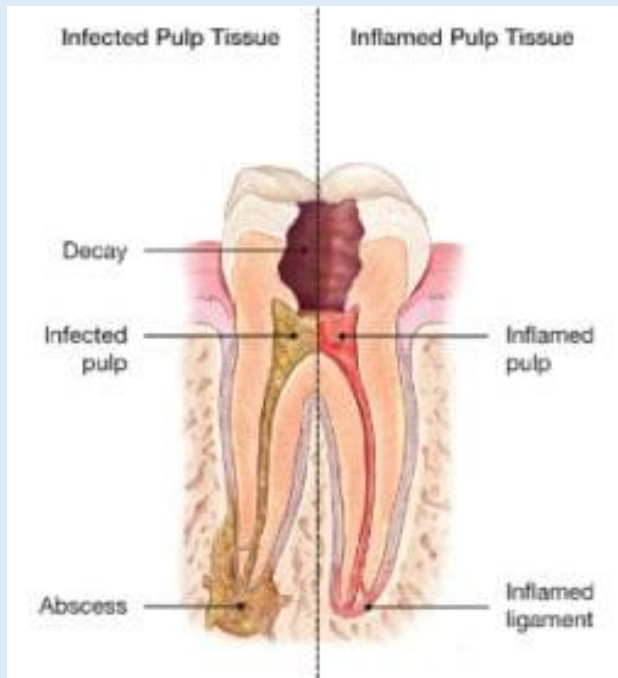
- During a root canal the inflamed or infected nerve is removed, the inside of the tooth is carefully cleaned and disinfected, then filled and sealed.
- Nerve Removed; Filler Material placed
- The Filler material is called Gutta Percha

What is a root canal?



What is a root canal?

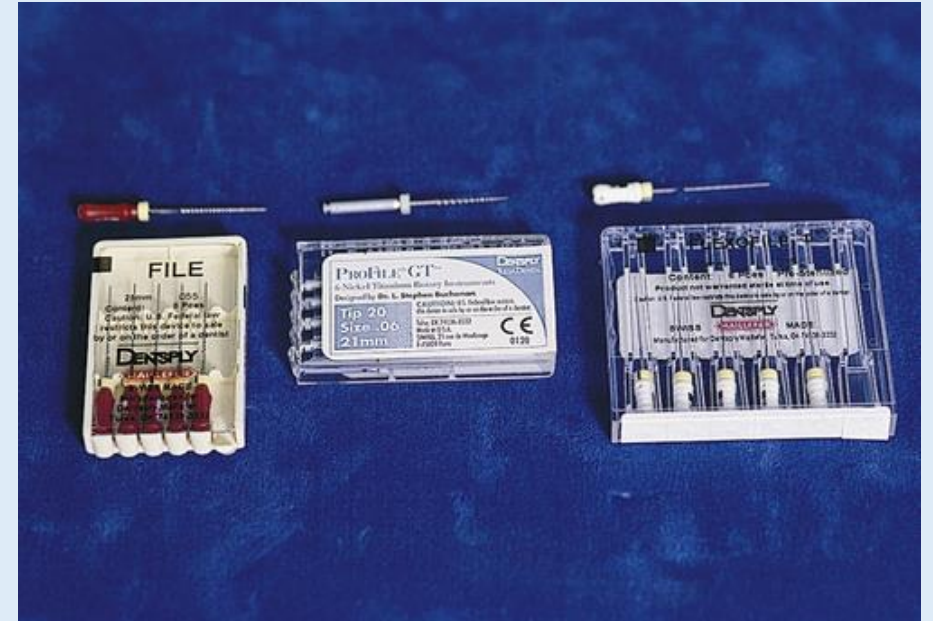
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Root Canal Video



- Hand Files and Rotary files are used to remove the nerve from the tooth.
- Once the nerve is removed, the root canal is filled with a material called Gutta Percha. Gutta Percha is a rubber based material
- Usually a temporary filling is then placed until the next visit.

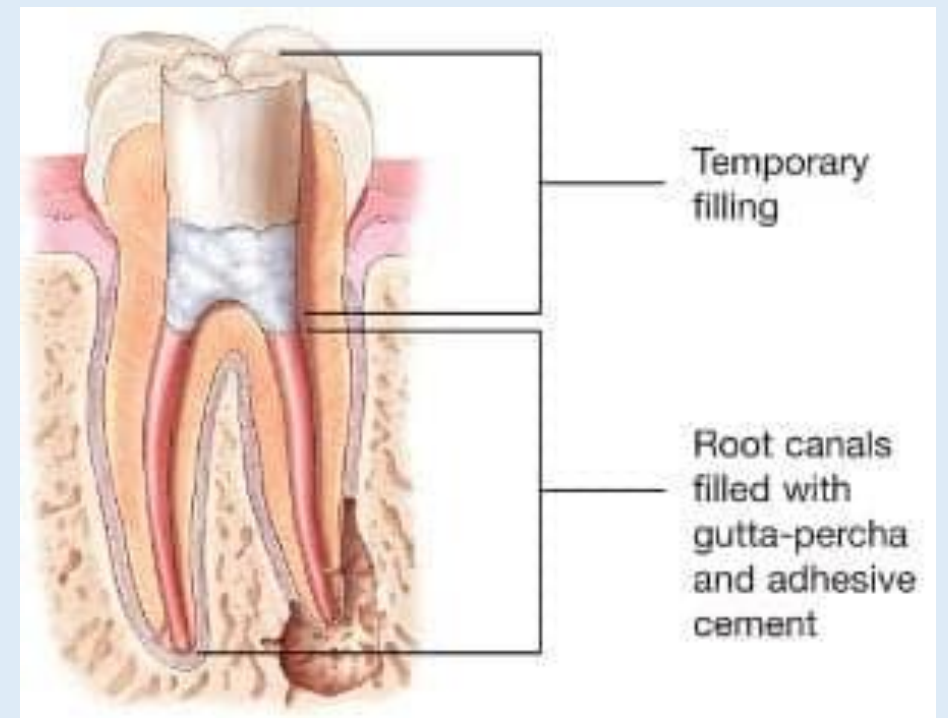
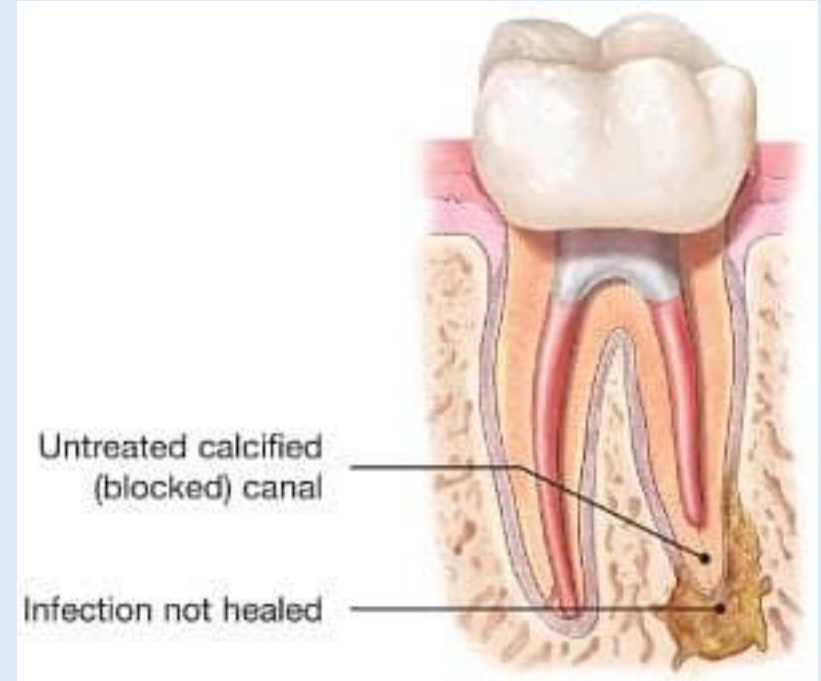


Root Canal Retreatment

If a root canal has already been performed, but it is failing, a root canal retreatment can be performed.

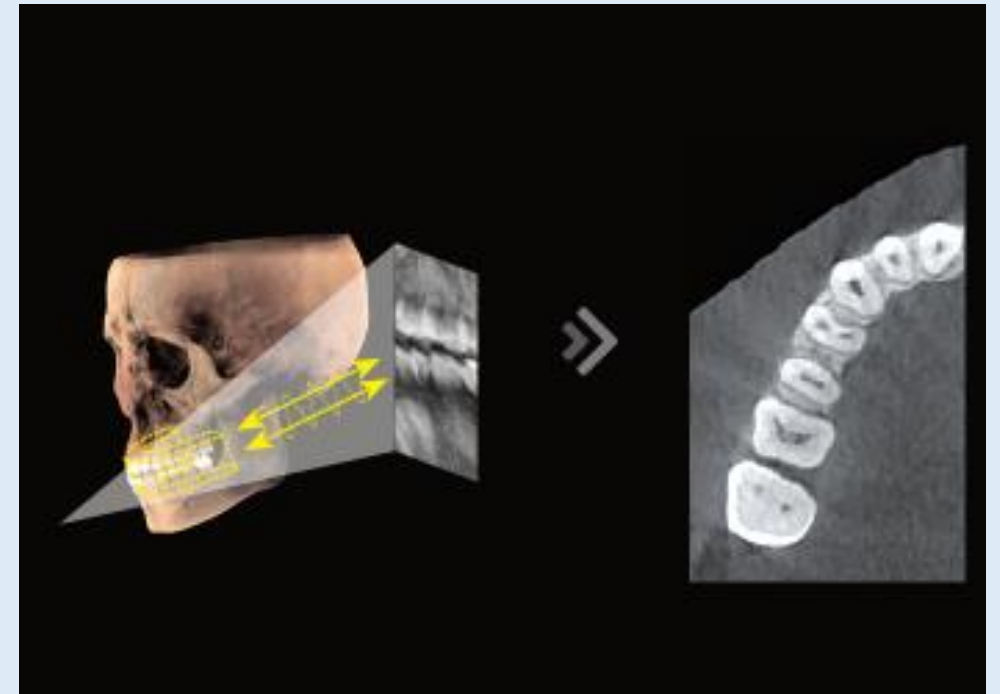
During a Root Canal Retreatment, the existing gutta percha is removed, the root canal is cleaned out and then new gutta percha is placed. Root Canal retreatments are usually performed by an Endodontist.

Generally speaking, root canal retreatments have a very high success rate.



Endodontics and CBCT

- CBCTs allow the dentist to view teeth in three dimensions
- This is extremely helpful for diagnosis
- CBCTs help to understand a tooth's anatomy as well as the number of roots and/or root canals
- CBCT's show the spatial relationship between the tooth and vital anatomic structures (IAN, mental nerve, maxillary sinus, etc)



Endodontics and Rubber Dam

- A rubber dam must ALWAYS be used during endodontic treatment.
- If a Root Canal or Root Canal Retreatment is performed without a rubber dam, it is below the standard of care.

Endodontics: Disinfection of the Canal System

- The most common chemical used to disinfect the root canal system is Sodium Hypochlorite
- Sodium Hypochlorite = BLEACH

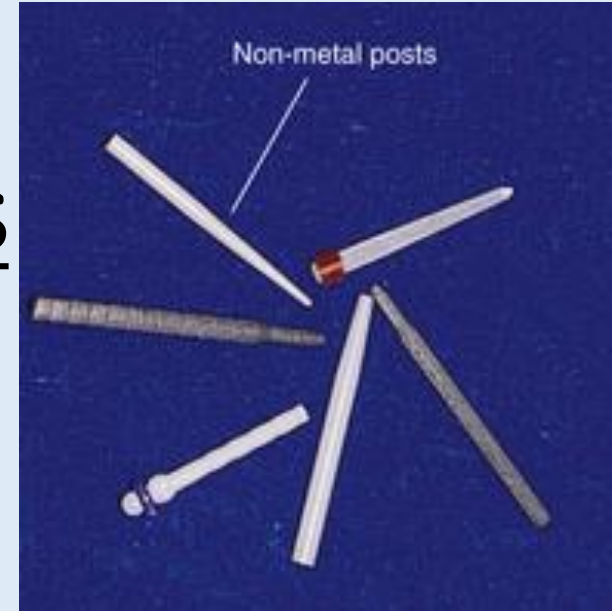


Post and Core

- The purpose of a core buildup is to create enough structure to retain the final crown
- Following Endodontic Treatment, most teeth will require a core buildup and crown preparation
- In cases where there is not a significant amount of coronal tooth structure remaining, instead of just a core buildup, a post + core buildup will be placed.
- **The purpose of the post is to retain the core buildup.**
- Posts do not make teeth stronger, in fact, teeth with posts are more susceptible to fracture.
- A tooth treated with RCT needs a post to help build a strong foundation, to reinforce crown stability.



Titanium Posts vs. Fiber Posts



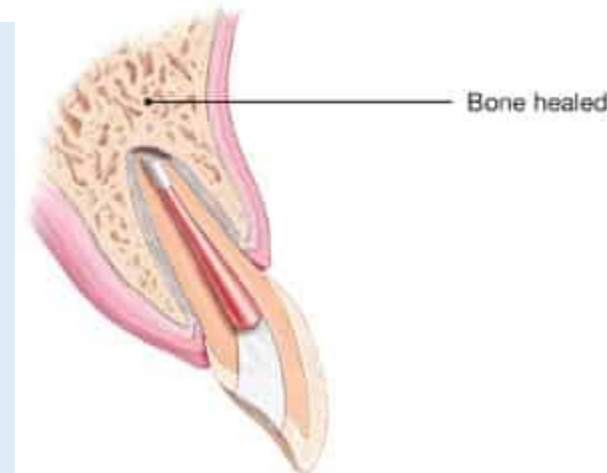
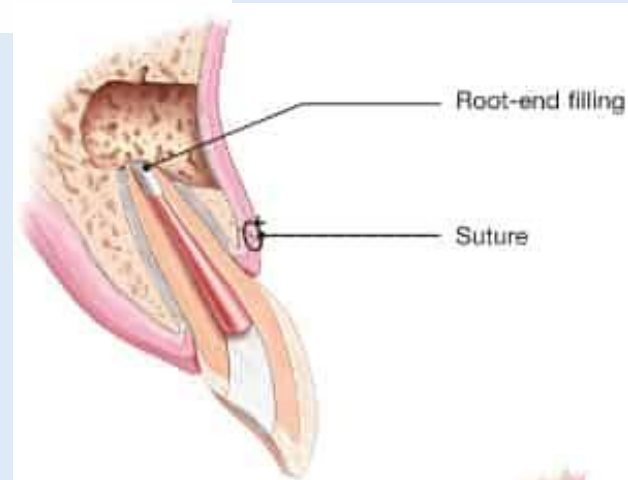
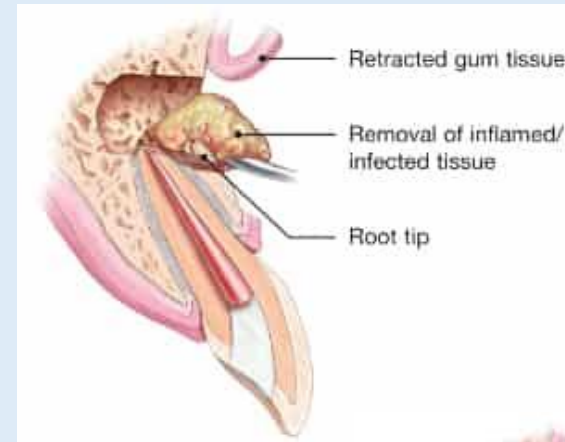
- Posts are used to retain the Core
- Posts do not make the tooth stronger
- Fiber posts have a modulus of elasticity closer to that of dentin
- Fiber Posts show higher bond strength and can be more esthetic

Endodontically Treated Teeth and the Dental Hygienist

- Endodontically treated teeth are more brittle and prone to fracture
- Posterior teeth that have received endodontic treatment are recommended to have a Crown or Onlay restoration (cuspal coverage) as soon as possible
- If you see a back tooth with history of root canal and it doesn't have a full coverage crown, point it out to the patient and dentist
- Endodontically treated teeth should have normal probing depths
- When probing endo-treated teeth, especially if they have a post, if you find a single, isolated deep pocket, that is often a sign of a vertical root fracture

Apicoectomy

- Can be thought of as a “reverse root canal”
- A surgical procedure where an endodontist removes the apical most 3mm of root and places a retrograde restoration.
- This can be an option if root canal retreatment has failed OR if the patient has cosmetic coronal restorations over an existing root canal and you want to treat the tooth without disturbing the coronal restoration
- Apicoectomies have a very high success rate (>90%)



The End

Silver Diamine Fluoride

- Can be applied to arrest dentin and enamel caries
- Great for incipient lesions on primary teeth
- Turns caries black.
- Must be careful to avoid staining
- Must get parental consent before applying



How does Silver Diamine Fluoride Work?

➤ Silver Ion

- Antibacterial Properties
- Decreases Demineralization
- Interacts with proteins to form protective shell layer

➤ Fluoride Ion

- Promotes Remineralization

➤ Ammonia

- Stabilizes the solution

SDF Evidence Based Literature

- History of being safe.
- Effective at arresting caries.
- Increased efficacy when applied multiple times per year.
- More effective than the following strategies in children:
 - Interim therapeutic restorations
 - Fluoride Varnish Alone
 - Oral Hygiene Instruction every 6 months

SDF Indications

- Carious lesions which are difficult to treat
- No access to care
- Sensitivity
- Hypoplastic Teeth
- Molar Incisor Hypomineralization

Steps for SDF Use

- Put Vaseline on the Lips
- Isolate the tooth with gauze/cotton rolls.
- Dry The teeth with air.
- Apply SDF
- Let it sit for one minute.
- Apply fluoride varnish or let it dry completely.
- Reapply at 4 weeks then a regular interval (intervals up for debate).
- REMIND PARENT/PATIENT THIS IS NOT A SUBSTITUTE FOR DEFINITIVE DENTAL TREATMENT! (unless the tooth is about to exfoliate in the next six months)

SDF Use for Interproximal Lesions

- Can be used for interproximal lesions
- Expanding Floss
- Super Floss

SDF Additional Notes

- TURNS CARIOUS LESIONS BLACKBLACK!
- Bad taste (Burning sensation with sores)
- Stains everything:
 - Carious Teeth and Soft Tissue
 - Counter tops
 - Clothing
 - Instruments
- NOT A FINAL TREATMENT!

SDF More Notes

- Do **NOT** do the following:
 - Blow air after placement
 - Place on all teeth at once
 - Restore a tooth immediately after application
 - Place it near a restoration with an open margin

SDF Contraindications

- Silver Allergy
- Pulp Exposure
- Irreversible Pulpitis/Necrotic Tooth
- Sores/Ulcers in the Mouth
- Cosmetics
- Use caution in patients with demineralization such as Orthodontic White Spot Lesions

Occlusal SDF Application



Interproximal SDF Application



Post-Application of Silver Diamine Fluoride

