ENDO II

(FALL JR. YEAR)

TO SAVE SOME TIME:

- My notes from lectures that there were no powerpoint / handouts from...

- REMEMBER THE FINAL IS CUMULATIVE FROM BOTH SOPH. + JR. YEARS!!!

ENDO. INCSKDD

Lec. 2

Traumatic Injury to Teeth 9/5/06

Subluxation - abnormal loosening of tooth w/in socket - NOT displaced.
Luxation - physical displacement of tooth w/in socket

Types of Luxation:

1) Lateral - B or L displacement
2) Extrusion - out of socket
3) Intrusion - into socket * Bad to have
⇒ complete destruction to PDL ∈ this injury.

NORL NOR

Complications of luxation injuries (LORN)

1) Necrosis
2) Obliteration - injury causes pulp canal to become calc.
3) * Root Resorp. (not a problem ∈ root fx.) - luxation inj. = inj. to PDL → causes resorp
4) * Loss of Marginal Bone - due to crashing of bone

(3 & 4: not imp. to know)

Clinical signs:

- ⊖ vitality
- discoloration

Radiographic:

- ⊕ or ⊖ radiographic lesion
- arrest of root formation (immature)
- external inflamm. root resorp. ⇒ sign of necrosis

Root Resorp:

1) Internal - inside tooth ⇒ pulp responsible for resorption ∈ vital tooth. (VITAL)
2) External - outside tooth ⇒ from external tissue (99%) ∈ Nonvital tooth; has to do ∈ PDL (VITAL)

→

Lt. Mr. T

Diff. Dx. btw Internal + External Root Reorp.

(Internal: vital (pulp); External: non-vital (PDL))

Radiographic

Canal:
- can follow canal thru lesion = Ext. (ragged margin walls.)
- cannot follow canal, well-defined margins of lesion = Int.

*can only get reorption if it is alive hence
Internal - pulp vital (cannot follow canal)
External - pulp non-vital (can follow canal thru lesion

Internal Reorp.

Tx: RCT b/c vital pulp
- NaOCl (5.25%) (antibacterial) (Full strength bleach)
- CaOH (necrotizing effect) "Intracanal medicament" (antibact.)
- change CaOH every 7-10 days
- obturation c gutta percha (after all tissue has been removed)

(Full strength NaOCl = 5.25% internal root reorp. (Full strength for apexification))

External Reorp.

* 99% lesions usually ext. reorp.

Types:
1. surface
2. * Inflamm.
3. * Replacement
4. Cervical

(SIRC)

A) * ⇒ **Inflammatory root reorp**
- injury to PDL + cementum
- significant inflamm. of PDL
- dentinal tubules exposed
- infected necrotic pulp tissue present
- progressive if endodontics not instituted.

Tx: Endodontics

→

Ext. Root Resorp:

* ① Inflammatory
* ② Replacement
  ③ Surface
  ④ Cervical

Tx: Endodontics (For external root resorp. due to inflamm.)

- pulp is removed
- CaOH placed (antibact.)
- CaOH placed every (3 mo).
- Final obturation ē gutta percha @ 1 yr.

B) * **Replacement Root Resorp.** (=Ankylosis) (Ext. - Root Resorp.)

- Injury to PDL causes some PDL cells to die and body no longer recognizes tooth and starts to replace tooth ē bone.
- Doesn't matter if endo. performed – it's over
- loss of PDL cells and bone touches tooth and they become one.
  - Absence of vital PDL
  - Fusion alv. bone ē root surface
  - Replacement tooth substance. ē bone.

DX:

Radiographic ⇒ disappearance of PDL

Clinical ⇒ percussion = metallic sound / dull
NO MOBILITY.

TX:

No known TX!

Avulsion – tooth knocked out of socket

- must respect integrity of surviving PDL cells

Tx: Immediate Reimplantation

- want to maintain vitality of PDL bc will die when exposed to air.
- look for a more serious injury
- As little tx. of tooth as possible should occur as reimplantation ⇒ Rinse ē saline, anesthetic, H2O
  * No chemicals, No scraping, No apicoectomy.

→

Alvulsion, Tx. in office:

- Rinse ē Sterile saline
- Immediate Replacement
- **splint 7-14 days** (max - usu. 10 days)
- Endo. therapy if necessary (before splint removed)
  ⇒ if apices open, leave alone
- Tetanus prophylaxis
- ABs

Root Fx. splint 2-3 mo.
Avulsion splint 7-14 days.

ē closed apices:
- Endo. tx after 7-14 days.
- CaOH placed
- CaOH replaced every 3 mo.

ē open apices:
- recall every month for development
- tx. accordingly.

Splinting Technique:

- do not traumatize tissues
- allow proper OH
- allow physiologic mvt. (luxation + avulsion)
- Peridex mouthrinse given to pt.

* Longer teeth out of mouth = ↓ success rate

Avulsion Storage medium:

Best
- Hanks Balanced salt soln. (HBSS)
- milk
- saliva
- tap H_2O — undesirable

Worst
- dry storage — "

⇒ HBSS + Milk

- essential nutrients
- neutral pH + physiologic osmolality
- no bacteria
- lack of toxic components.

Adjunctive Tx to Avuls.

- Tetanus Booster
- AB.

S26 PA granuloma
Radicular Cyst
122 Apical Scar

PA granuloma - chronic, low grade, **ASX**
VICE
Radio: PA radiolucency
Dx: Necrotic
Tx: RCT

differentiate via Bx.

Radicular Cyst - chronic, **ASX**
MICC
Radio: PA radiolucency (± cortical bony)
Dx: Necrotic
Tx: RCT

* Rushton Hyaline Bodies

AAA - symp.
SAA - severe inflamm., **Symp**.
Radio: NONE
Dx: Necrotic
Tx: I+D
Ab
Access + Debride
RCT

Phoenix A. (sim. SAA) - acute inflam of chronic, **Symp**.
Radio: PA radiolucency
Dx: Necrotic.
Tx: I+D
Ab
A&D
RCT

suppr. Apical Abs. (OVX.)
AAA (Suppressive) - parulis - **ASY**
Radio: PA radiolucency / bone loss @ apices of teeth.
Dx: Necrotic

Apical Scar - **ASY**
sinus tract across CT @ end of endo. tx tooth.
from perf. cortical plate
Dx: necrotic RCT already done.
Radio: PA radiolucency
Tx: NONE

Condensing osteitis - **ASY** < vital / non-vital
Radio: ↑ bone density
caries
Tx: Reversible pulpitis - caries control
irrev - RCT
necrotic - RCT.

PA Lesions of Endodontic Origin

Lec. 3

(ASX)

Periapical Granuloma – chronic inflamm. (~5% all cases) *most common root path. 9/12/06

PA granuloma
Radicular Cyst
Apical Scar

Low grade, long standing response to canal bacterial irritants.

Periapical Granuloma
– most common root path (~5% of all cases)

Periapical Granuloma

1) Vascular Elements
2) Inflamm. Cells
3) Epithelial Cells
4) Collagen Granules

Forms via:
Microbial
Mechanical
Chemical

Dx: Clinical: non-vital
Radio: PA radiolucency

Tx: RCT

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① PA granuloma (5%)
② Radicular cyst
③ Apical scar (12%)

(ASY)

Radicular Cyst

- 2nd most common pathologic of root Σ pa radiolucency
- 20% are true cysts

Defn: Chronic inflamm. response of periapex developing from chronic lesions Σ previous granulomatous tissue.

Etiology:

1. Microbial (caries / bacteria)
2. Mechanical (preparations)
3. Chemical (dentin desensitizing agents)

Histo: PA granuloma char. by central fluid-filled and epithelial lined cavity.

- **Lining:**
  - stratified sq. epithelium
  - Rushton Hyaline bodies (*characteristic of Radicular Cyst)
- **CT Wall:** MICC
  - cholesterol slits
  - multinucleated giant cells
  - Inflammatory filtrate adjacent to epi
  - Collagen, fibrin, etc.

PA gran. tissue: Vessels, inflam. cells, collagen, epithel cell

DX:

- Clinical → Non-Vital
- Radio → pa radiolucency Σ a distinct thin layer of cortication (not always)
- Bx → only definitive dx.

Tx: RCT

(Symptomatic)

Acute Apical Abscess

Defn: Severe inflamm. response of the pa connectiv tissue caused by contaminants from pulpal canal

Etiology = anything that causes pulp to become necrotic
(⊕ percuss. + palp.)

Dx: Clinical → symptomatic, Non-vital
Radio → NONE. pain + swelling.

Clinically
- swelling
- ↑ Temp.
- Malaise
- Tooth feels elevated out of socket

Histo: WBCs
microorgs.

Tx:
- I + D — If drainage not performed, infec. may spread thru fascial planes of H+N.
- Access and debridement.
- Ab
- RCT (final treatment)

Symptomatic

Phoenix Abscess

Defn: Acute exacerbation of an existing chronic inflammation

Dx: Clinical:

↳ same as acute apical abscess (non-vital, symptomatic)
- pain
- swelling
- ↑ temp
- malaise

Radio:

↳ pa radiolucency + pain + swelling.

Tx: (same as acute apical abscess)
- I + D
- Access + Debridement
- Ab
- RCT

Suppurative Apical Periodontitis (Fistula)

Defn: Formation of a papule and active pus formation draining thru the stoma of a sinus tract.

Dx: Clinically - looks like a pimple ± sinus tract

Radio - PA radiolucency.

Method ⇒ tracing fistula tract ± GP

Apical scar → 3rd most common (12% of cases) pa pathology

Defn: Dense mass of fibrous tissue @ the apex of an endodontically tx. tooth.

Etiology:
Perforation of cortical plate(s)

Dx: Clinically → (Asx) to percuss. + palp.
Radiographic → root canal (c or c/o pa surgery)

= after RCT performed = Healing process

Tx: If dx. apical scar made, NO TX NEEC.
(it is a healing process + is not pathologic)

Condensing Osteitis → in 4.5% of patients

Defn: Very low-grade subclinical inflamm. response, that may lead to an ↑ in bone density which creates a barrier against the irritant

Etiology: Long standing, low grade irritation of pulp tissue such as decay, occlusal trauma, etc.

Dx: Clinical: Asx. → vital / non-vital
Radiographic: Decay (vital tooth) → irritant
Increased bone density
= condensing osteitis

*would happen Before a RCT performed.

Histo: ↑ proliferation vs. destruction
Thickening of Trabeculae (↑ osteoblastic vs. osteoclast)
↑ size of marrow space

condensing osteitis

Tx:

- If Reversible pulpitis → Caries control + restoration
- If Vital Inflammed Tissue → RCT
- If Necrotic → RCT

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1. Periapical Granuloma (59%)
2. ~~Acute Apical Abscess~~ Rad. cyst.
3. Apical Abscess (12%)

PA gran. 59
Radicular Cyst
Apical Scar 12

Endo

Lec. 6

10/3/06

Problems c Cvek pulpotomy
(sim. to apexogenesis)
= "calcific metamorphosis"
"Bridge formation adjacent to $Ca(OH)_2$"

IF PULP TISSUE REMOVED or BECOMES NON-VITAL, APEXOGENESIS NOT an option.

Apexogenesis: (vital tooth)
- 2-3 mm $Ca(OH)_2$
- 3+ mm IRM
- Semi-permanent resto. (re-eval. 1 wk - / 3 mo. for CaOH)

Cvek Pulpotomy - 96% remain vital. - when trauma - NOT caries.
A variation of apexogenesis - if endo. tx. will NOT be done.

Apexification (non-vital)
non-vital ~~vital~~ tooth
- root formation will not continue
- goal: get rid of any necrotic debris (NaOCl dilute / Instrumentation / $Ca(OH)_2$ ⇒ reeval 1 s.i.e

Thin walls
Short roots
open apex.

Be careful c apex locaters - may give false reading.

Intracanal Medicament
$Ca(OH)_2$ ⇒ Fill entire canal.

placement of $Ca(OH)_2$
① glass slab - mix anesthetic c $CaOH_2$ and mix to get thick paste material.
② premixed ⇒ may have concern about cross contamination

Intentional Reimplantation

Removing and replacing a tooth to do therapy such as an apicoectomy.

Indications:

ex: lower molar c nearby nerve — do not want to hit nerve

* Do not dry out tooth, do not traumatize tooth

- Handle ~~tooth~~ by crown only.
- if have to handle tooth, do c wet gauze

- Place retrophil in apex = MTA

Endo

(skip 8)

Lec. 9 Mgt. and Tx. of perforations + other procedural accidents 10/24/06

Perforation

1) Chamber access - Floor + roof of pulp chamber may be close together.
2) Canal access
3) filing/instrumenting canal
4) root preparation

When see pulp chamber narrow on pre-op, pay extra attention to prevent perforation thru floor.

Chamber access

- Pulp recession
- misjudgement of long axis of tooth.
- location
- orifice opening ⇒ gates glidden - if too big may perf.
- Furcation wall
  - maxilla - pm + m
  - mandible - m

* ⇒ The D wall of m canal was found to be less thick after use of Gates Glidden.

- Internal furcation wall most likely to perforate.
- Failure to maintain a curve
- Attempt to overcome a ledge or sep. instrument
- Attempt to overcome a calcified canal
- Root preparation ⇒ Furcation walls = DANGER ZONE
  - mistake ↑ size + direction of root in tooth.

max. perf: 74%
mand. perf: 26%

RCT perf: 47%
post perf: 53%

* perf. away from perio and near apex = good prog

10/24/06.

Root Perforation

- 55 cases of root perf.
- max. (74%) } diff. b/c using a mirror and difficult to see placement + depth of bur.
- mand. (26%) }
- During RCT (47%)
- During post prep (53%) post prep perf. > RCT perfs
  ↳ perf. here almost equal to chance of perf. when performing RCT.

Post Preparation

- Furcation walls are DANGER ZONE
- Post too big for size of canal
- Post space prep. not w/in long axis of tooth.

Dx - Perforations

- Direct visualization - microscope
- Tight canal that became "very loose"
- Bleeding - paper point (will see blood - not @ tip)
- Apex Locators

Histological Considerations

- Cementum Damage
- Perio. damage
- Wound Healing

⇒ perf. away and near apex (away from perio.) = good prognosis
⇒ perf. higher and near perio. attachment = poor prognosis.

* POST PLACEMENT: ⇒ most posts 65-100

D – mand. molar
L – max. molar

Tx. of Perforation

BEFORE

- Prevention:
  - Eval. radiograph ⟵ size chamber + canals
    orientation
    long axis of tooth.
  - stay away from danger zone (FURCATION)
  - curve stainless steel instruments (EXCEPT for max. central incisor)
  - Take X-ray when in doubt
  - match post size to size of canal.
    * most posts are size 65-100 ∴ be careful!
    ⇒ posts usually go into D mand. molar
    L canal max. molar.

AFTER

- Don't panic
  - do not tell patient while its happening
  - close tooth, sit patient up and explain.
- Non-Surgical ⇒ seal
- Surgical → Lift flap to fix
- Extraction

Materials

- GP
- GI
- Cavit
- Amal.
- $Ca(OH)_2$
- * MTA ⇒ most used material today to seal perforations.

"medical grade concrete"

* * Achieving Hermetic seal = MOST DIFFICULT

Seal perf via internal matrix concept
- MTA / $Ca(OH)_2$ seal perf.
- MTA / GI on top
  ↳ 6-12 mo. til see healing 10/24/ore.

Seal Perf:

"internal matrix concept"

- place MTA / $Ca(OH)_2$ into perf area and then seal w GI or MTA
- leave space to place GP

* need 6-12 mo. after placement of sealer to see any type of healing.

⇒ use of ultrasonic to vibrate sealer into canal to seal perf. area.

Prognosis of Root Perf.

Time related to repair:
- Long - poor
- Short - good

If apical 1/3 perf. = good (away from perio. attach apparatus)
middle 1/3 = fair
coronal 1/3 = poor
↳ b/c becomes a perio problem instead of endo.