CHAPTER 3- PREGAME

PART 1- CASE SELECTION

When Do I treat? When Do I refer?

The principle of “Intelligent case selection” is one that must be mastered. There is no reason for you to treat the exceptionally difficult cases when they can be referred to your endodontist. Start easy and work your way up to medium and slightly difficult cases. Why treat difficult cases that will take hours of your time, decrease your overall production, and cause major increases in blood pressure when those can be treated by an endodontist. Stay away from theses cases. Why lose confidence over the crazy ones (crazy teeth and/or crazy patients). Ship those out of the office!!!

Lets define the cases that you may want to “ship out”:

Difficult Cases

1) Calcified canals (you are unable to see the canals on the radiograph)

2) Extreme curved canals- Carefully examine the radiographs prior to treatment and visualize the way the roots curve. Is there the dreaded S curve, dilacertion, or long curve? If your intuituion starts to ring an alarm pay attention and refer the patient out.

3) Long canals- These canals can be difficult to shape and obturate due to increase surface area of the canal. Often these cases take 31mm “long” files and smaller taper gutta percha points to fit to working length.

4) Limited opening patients

5) Uncommon Anataomy- Lower Premolars with a bifuraction (the canal splits 1/2 to 3/4 of the way down the root)

6) PITA (Pain In The Ass) Patients

7) Kids- It’s difficult for an 11 year old to sit still for an hour and a half and often these cases have immature apices

Low Success Cases

1) Large, circular or well-circumscribed lesions, that have been present for more than a year (higher incidence of an Apical cyst)- Apical cyst incidence is about 8-10%. Some of the biopsy results from my apicoectomies come back with an Apical granuoma diagnosis. I always feel guilty and wonder if I could have done something more to achieve healing. Usually this diagnosis means something else was going on inside or outside the tooth. Either I was unable to fully clean the root canal system due to operator error, anatomical variation, or there was apical root plaque or biofilm that just wasn't going to be removed with conventional treatment.

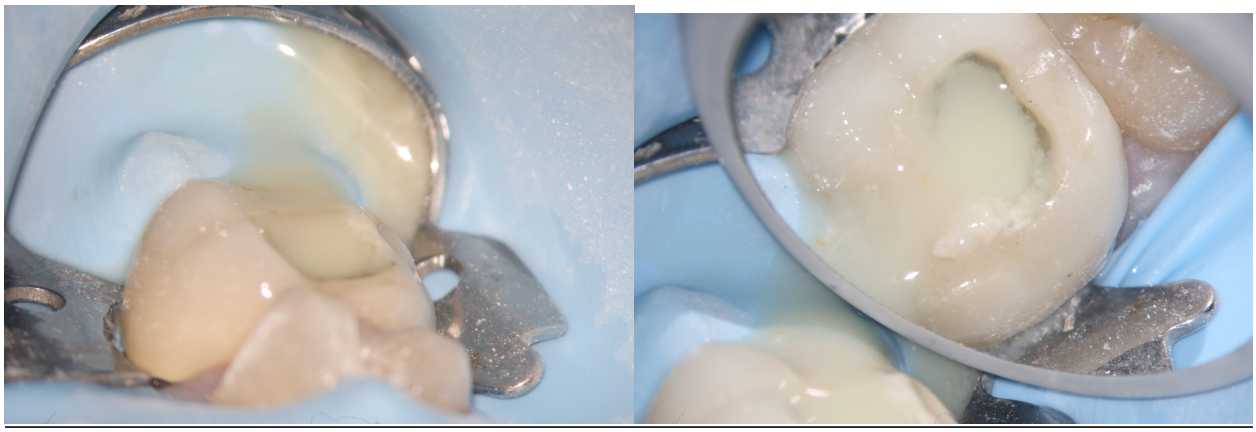
2) Furcal lesions- these lesions due to heal well and often need periodontal therapy

3) J Type lesions- These are radiolucent lesions that start apically but then extend vertically along the root on one side indicating a probable vertical root fracture. Vertical root fractures are a no win for you and the patient. They just don't heal and extracton/implant is the treatment of choice. The problem with vertical root fractures is that their difficult to spot on the CBCT and are rarely seen on a PA radiograph. If there is a deep, isolated probing in conjunction with vertical bone loss or a J Type Lesion then there is a probable vertical root fracture.

4) Lower molar distal marginal ridge crack lines that extend down to the pulpal floor or into the distal canal. If the crack extends down to the pulpal floor but not into the canal I tell the patient there is a 50% chance of success. If the crack extends into the canal I recoomend extraction.

The key is to know what you can do and know when to refer. I like to compare it to a 4th and long situation in football. Don't try to be a hero and go for it, instead **PUNT** the difficult or low success case to the endodontist.

PART 2- DIAGNOSIS



TOOTH #14 EXTREME PURULENCE

Diagnosis- SOAP Note

Do you remember the SOAP (Subjective, Objective, Assessment, Plan) format for notes from dental school? Most of the people I poll during lectures do not remember this or vaguely can recall something related to it. This is an excellent way to organize the patients thoughts (S), clinical testing (O), radiographic interpretation (O) in order to come up with a correct diagnosis (A) and form a treatment plan (P). After all, the correct diagnosis is often 50% of the cure.

S= Subjective

This is the detailed patient complaint or chief complaint. This is where we need to listen and ask the right questions and sometimes pull information out of the patient. My recommendation is to train your dental assistants to perform the patient interview and then after reviewing the notes can come in and ask more detailed, pertinent questions.

These are most of the questions we will ask a patient in order during the initial patient interview: "What is the main problem? Can you point to the problem tooth? When did it start? What makes it hurt? Do you have chewing pain? Do you have hot/cold pain? Does the pain linger after you drink hot or cold fluids? Are you taking Advil, Ibuprofen, or Motrin (say all 3), Tylenol or any other pain medications for the the pain? Do you avoid that side? Is it getting worse? Does the pain come and go? Does the tooth ache all day? Do you have spontaneous pain while you are watching TV or driving (not functioning on the tooth)? Does the pain wake you up at night? Does it hurt more in the morning (potential bruxism)? Do you grind or clench your teeth? Do you have a nightguard? Do you have chronic sinus problems (upper molars)? Do you feel that the tooth is "high"?Have you had nerve, tooth pain before and needed a root canal? Does it feel similiar?

Often you will be able to form a possible pulpal and periapical diagnosis just with an adequate patient interview. So be thorough in your questioning. It should almost feel like a gentle interrogation and you can use the dental light to apply a little pressure if the patient is refusing to answer your questions. Just kidding.

Sometimes during the patient interview, the patient states that the pain will be present for a day or two and will be gone for a week only to come back with a vengeance for two days. Over the years I have heard this pain trend over and over again in irreversible pulpitis and necrotic cases. I mention this because sometimes the patients refuse treatment because they are not having any pain at the moment even though their tooth clearly tested necrotic. This is where good

patient communication is vital. You definitely want to explain to the patient the diagnosis and the fact that the tooth pain or flare up will come at inopportune times: first day of vacation, Friday night, Christmas Day.

O= Objective

The objective phase of the SOAP note consists of clinical testing and radiographic interpretation.

Radiographs

Start with two radiographs of the suspected tooth or area. One straight periapical radiograph and one slightly angled, either mesial or distal. I instruct my assistants to take a third radiograph if either of the first two are not of high quality. I still see a high number of cone cuts and poor radiographs from my assistants and they all know the rule, "When in doubt, take another one." I also recommend a bitewing radiograph for any deep interproximal caries. I use the BWX to decide if the tooth is restorable or if it may need crown lengthening and I can clearly show the patient the deep caries and the caries approximating the pulp chamber or pulp horn. The dose of radiation with digital radiographs is so low it is worth taking two to four to help obtain an accurate diagnosis. I explain to the radiation phobics that "new" digital radiographs are equal to 8-10 of the conventional radiographs. I also believe that you do not, by law, need to place the lead shield on the patient anymore during radiographs, but I would check with your state dental association to be sure. And of course, you would definitely place the lead shield on any pregnant patient. We still use the lead shield for every radiograph mainyl becuase the patients are used to it and expect it and I don't want to explain eight times a day why we don't really need the lead shield anymore (collinated beam).

CBCT (Cone Beam Computed Tomography)

I purchased the Kodak 9000 3D CBCT five years ago. It has a limited or focused view and typically captures 4-6 teeth. There are a number of excellent CBCT's on the market and I would highly recommend one if you perform impants, extraction, root canals, retreatments or apicoectomy's. I take a CBCT of every possible apicoectomy and on most retreatments. I tell the patient that this "CT Scan" will give me the most information possible regarding your tooth. I use the book analogy: "It used to be we could only read the front and back cover of the book (digital two dimensional radiographs) but now we can open the book and look inside and really get the knowledge we are seeking." CBCT's on average cost around $80,000. My final bill with tax and shipping was $97,000 pain monthly over 5 years at a 6% interest rate. I started charging $265 per scan but reduced it to $150 because patients were refusing it due to cost. At $150, I have 98% compliance. I recently raised it to $175 and still have about the same compliance rate. Unfortunately, most dental insurances do not pay for the CBCT scan so its typically out of pocket for the patient. The CBCT company told me that we could bill medical insurance but that never panned out and I felt that it was very misleading. All in all, I cannot live without my Cone beam and I put it in the category of

must haves if you are an endodontist or GP who performs a lot of root canals, retreatments, tooth extractions and implants.

Clinical testing

I typically test an entire quadrant. If tooth #3 is suspected, I will test #2, #3, #4, and #5 and evaluate the radiographs for all those teeth. Often the patient thinks they know the problem tooth only to be one or two teeth off. I usually start pulp testing a "normal" tooth and not the suspected one because sometimes patients are very jumpy and can give you a false positive.

Here is my clinical testing routine:

I take the mirror and examine the quadrant of teeth and all the surrounding tissue. I'm looking for obvious caries, cracks and any redness, swelling, sinus tracts, or parulis. I then flip the mirror around and percuss each cusp of every tooth. I list the results of all tests as WNL, (+), (++), or (+++) being the most pain and (+), (++), (+++), No response or *lingering (greater than 10 seconds because most teeth do not have cold pain that lasts more than 5 seconds)* with Endo ice. Obviously, the plus grading system is very subjective but it still gives you a baseline that you can refer to if another visit is needed.

After percussion, I grab the periodontal probe and check mobility (WNL, Class I- slight movement, Class II- movement less than 1mm, Class III- movement greater than 1mm in horizontal and the tooth is depressible) of each tooth with the end of both instruments placed on the buccal and lingual areas. I then flip the periodontal probe around and check all probing sites (6 per tooth- MB, B, DB, ML, L, and DL) for all teeth in the quadrant.

After probing, I put down the periodontal probe and perform apical palpation by placing my finger on the apex of the root on the buccal aspect and pressing down to see if it illicits ny pain.

Now check bite pain with a bitestick. Again, I test each cusp and also the central fossa (you have to place the bitestick at a 45 degree angle).

Next I use a medium sized cotton pellet (DO NOT USE A Q TIP FOR COLD TESTING- the fibers are wound too tight to hold the cold for long) and spray the Endo Ice can for 2-3 seconds on the cotton pellet. Place the cotton pellet on the buccal aspect of each tooth. If the patient's chief complaint is extreme cold sensitivity then be nice and place the pellet on the surface ready to remove it as soon as the patient reacts. There are times that I test the lingual area of the upper second molars because it is too difficult to access the B aspect. I recommend Endo Ice over CO2 mainly because its accurate and much quicker and easier and less messy. Endo Ice works well through gold and porcelain crowns. There is cheaper version of Endo Ice ($24) called Endo Cool Spray (Henry Schein $14) and Endo Frost (Darby $10). One trend that occurs over and over again is that the maxillary premolars do not always respond to cold tests. It can be a

perfectly healthy, caries and restoration free premolar and yet the patient does not seem to feel the cold. So please keep this “premolar ice” phenomenon in mind when developing a diagnosis.

The Endo Ice test is my last pulp test performed because it “freezes” the pulp and further pulpal testing can be inconsistent. This is a subjectve and debatable finding but just one that I observe in my clinical practice. If the testing is unclear, I usually wait a few minutes and let the pulp “reset” prior to pulp testing again.

If the patients chief complaint (CC) is pain to hot fluids or food, which usually indicates a late irreversible pulpitis or possible missed canal on a prior RCT, then I will proceed to a hot test. Testing teeth for hot pain is obviously more difficult because we need it hot enough to activate the pain receptors in the tooth but not burn oral tissue. A normal response to heat from a healthy pulp is no response.

There a few different types of hot tests. My associate likes to heat water up in a microwave (you should be able to dip your washed, clean finger in the water and not burn it- about 105 degrees Fahrenheit) and dip a cotton roll into the hot water and have the patient bite down on the suspected tooth. This isn’t a perfect test, by all means, but it is probably the fastest and easiest. I really do think someone needs to invent a hot spray and call it Endo Heat!!! It would make it so much easier to diagnose the “hot” tooth.

Hot test #2 is more difficult but probably more tooth specific then the hot bite cotton roll test. Cut a hole in a rubber dam and place it on the frame. Heat up water in a microwave, test it with your finger and fill up a monoject syringe. Place the rubber dam over the tooth in question and hold it with two split fingers (index and middle finger) of one hand. Use the other hand and inject the hot water onto the tooth in question and record the response. Move the rubber dam to an adjacent tooth and repeat. By testing at least three teeth you are able to establish a hot test baseline. I rarely perform the hot test, mainly because the cold tests and all the other tests usually give me the answer. I perform hot tests five times a year in my practice. So its a pretty limited test.

Sometimes a symptomatic tooth will present the perfect results. I call this the “Baseball Syndrome.” This occurs when a suspected tooth tests Percussion (++ or +++), Bite Stick (++ or +++) and Endo Ice (++ or +++ and/or lingering). Baseball Syndrome= three strikes and your out syndrome (more like three strikes and your nerve is out). 3 strikes = RCT! I tell the patient that this tooth has three strikes against it and it definitely needs a root canal. I like the patient to OWN the tooth and OWN the root canal treatment. As you know, certain patients are certified crazy and will blame you for anything. I remove a lot of the confusion over which tooth needs a root canal by having a patient own the tooth. Once I have established a problem tooth I re-test and ask them, “This is the tooth, right?” I want them to OWN it so there will be no confusion in case another tooth in that quadrant needs treatment later on. I don’t always do this because some cases are so obvious and so painful that I don’t want to repeat the torture.

A= Assessment or Tooth Diagnosis

Every tooth that you are performing a root canal on must have an inside the tooth diagnosis (pulpal) and an outside the tooth diagnosis (periapical or periradicular). If you are ever sued over root canal treatment the lawyer will ask if you used a rubber dam and if you had a tooth diagnosis. The American Association of Endodontics (AAE) has worked hard to come up with a pulpal and periapical diagnosis that makes sense and takes out some of the ambiguity of the prior guidelines.

The following are the AAE pulpal diagnosis':

Normal Pulp= Pulp normal or tests normal

Reversible pulpitis (RP)= Vital pulp that is sensitive and inflamed after a restoration but is still reversible and can heal on its own.

Irreversible pulpitis (IP)- asymptomatic= Vital pulp with radiographic caries into the pulp chamber or carious pulpal exposure yet the patient is surprisingly asymptomatic

Irreversible pulpitis (IP)- Symptomatic= Vital pulp where one, two, and/or three of the pulpal tests (Percussion, Bite Stick, Endo Ice) are positive and the patient is symptomatic. This diagnosis is usually fairly easy to determine.

Pulp necrosis= necrotic pulp and tests No response to cold

Previously initiated therapy= prior pulpotomy or pulpectomy

Prior RCT= obvious- Do you see the white lines?

The following are the AAE's periapical or periradicular (either term is correct) diagnosis':

Normal periapical tissues (WNL)

Asymptomatic apical peiodontitis (AAP)- this occurs when a radiolucent lesion is present but the patient is asymptomatic

Symptomatic apical periodontitis (SAP)- this occurs with or without a radiolucent lesion, with or without PDL widening but the patient is symptomatic. **This is the most common Dx in my practice. It's a catch all**

Acute apical abscess (AAA)= this Dx occurs if the patient has swelling but a sinus tract is not present. **This is often the most painful periapical Dx and is the most difficult to**

deal with. Patients usually have limited opening and it is difficult to fully anesthitize for endodontic treatment and an Incision and drainage (I and D).

Chronic apical abscess (CAA)= this occurs if a sinus tract or parulis is present. Contrary to popular belief, you do not need to put this patient on antibiotics, but in saying this, always follow your intuition. **Over the years I have developed a fairly good intuition on which patients I should give antibiotics for even when the book answer is a definitive "NO!"**

Condensing apical osteitis (CAO)= this occurs when an expansion of bone is seen around the periapical area caused by pulpal inflammation and/or pulpal necrosis.

The two most common diagnosis' are IP-Symptomatic/Symptomatic apical periodontitis (SAP) and Pulp necrosis/Symptomatic apical periodontits (SAP). Always list the tooth number in front of the pulpal and periapical Dx. The second most common diagnosis that I see in my office is #3 or #14 Prior RCT/Symptomatic apical periodontitis (SAP) (Retreatment is needed usually because of a missed MB2). The third most common diagnosis is Pulp necrosis/Chronic apical abscess (CAA) (sinus tract). Remember any swelling (usually B space swelling) the periapical Dx is Acute apical abscess (AAA) I encourage you to use the AAE diagnosis tree and initially write out every diagnosis until you are confidant that you understand the Dx and then switch to the abbreviations.

P= Plan or Treatment

List a primary or recommended treatment and an alternative treatment. Typically the primary Tx is RCT or ReTreatment (Re-Tx) and the secondary Tx is typically extraction/ implant or in my office apicoectomy.

What do you do if you are unsure of the Dx?

I recommend to "Wait and Watch" and reevaluate the patient in 2-4 weeks or sooner if the symptoms (Sx) worsen. I make sure the patient understands that if the Sx increase that they can come back prior to 2-4 weeks. Also, I tell patients that reevaluating a tooth does not cost anything and that there is a one-time consult fee ($130) and then all future reevaluations and recalls are free. Some patients refuse to come back because they mistakenly believe that there is a cost to every office visit (medical model).

Practice cases: What's your full endodontic tooth Dx?

PATIENT ONE

S: Patient (Pt) states that they have cold pain duration 2 weeks in the URQ and that they are avoiding that side during function. "My tooth hurts when I drink cold beer." What other questions might you ask the patient? (remember: S= patient interrogation)-

You can glean a lot of great information if you ask the right questions and **LISTEN** to the response. The Dx picture can be much clearer from just the interview and prior to pulp testing.

Possible other Questions: Do you have lingering pain when you drink cold water? Does it hurt to chew on the tooth? Do you take pain meds for the tooth? Does the tooth wake you up at night? Do you have spontaneous pain (pain when you are watching television or not functioning on the tooth)? Train your assistants to ask all of these questions prior to you entering the room.

O: Radiographic- straight and an angled radiograph and BWX if there are interproximal caries present. Radiographs show a moderately deep radiolucent Occl. composite restoration on tooth #3 (maxillary right first molar) Clinical tests: Test #2, #3, #4, and #5. Percussion- #3 (+), #2, #4, and #5 WNL, Bite Stick- #3 (++)MB cusp, #2 (+) DB cusp, #4 and #5 WNL, Endo Ice or Cold Test- #3 (+++)lingering (I call lingering 10 seconds or more because most teeth do not have cold pain that lasts for more than 5 seconds). #2 (+), #4 and #5 WNL, Probing/Palpation/Mobility- All WNL

A: What is your Dx for tooth #3 (Maxillary Right 1st Molar)?

#3 IP-Symptomatic/Symptomatic apical periodontitis= Test results: Perc (+)/Bite Stick (++)/Cold (+++). Sometimes only one, two or three of these tests will be positive and then you must match the S (Subjective- patient interview and chief complaint of the symptoms) with the clinical and radiographic findings to come up with an accurate diagnosis.

P: What is the treatment or plan of choice? What is the alternative treatment? Primary Treatment (TX): RCT #3, Alternative Tx: Extracton #3

Tooth #3- Maxillary
Right 1st Molar

PATIENT TWO

S: Pt states that they have deep, boring ache in their lower left jaw. The ache extends along the jaw line to the front of the ear. The Pt has seen the ENT and has been cleared for an ear infection or other ear problems. Pt received a porcelain restoration one year ago on tooth #19 (mandibular left 1st molar) and the tooth has never felt right. (Patient interview is already starting to paint a clear picture for your Dx. The Pt did not mention any thermal pain and discussed a deep ache. So you should be starting to think Pulp necrosis with a probable apical lesion).

What other questions might you ask this patient?

Possible other Questions:

Do you have any hot or cold pain? BE CAREFUL because sometimes they say yes, but fail to mention that this was prominent one to three week ago and since that period that pulp has undergone pulp necrosis. Also, the patient is often avoiding function on that tooth or side entirely and may not know if they have thermal sensitivity. Sometimes patients just say yes not realizing how important the answer really is. Also, patients say yes to thermal pain because they have ”cold sensitive” teeth. Sometimes you have to ask the patient to be very clear and to think about the answer.

Some other good questions to ask this Pt: Does it hurt to chew on the tooth? What do you mean the tooth never felt right? How often do you have the “deep, boring” ache? Does the tooth pain keep you up at night? Do you take pain meds (Advil, Tylenol, Narcotics) for the pain?

O: Straight and angled radiographs reveal a widened PDL and a small apical radiolucenecy (RL) on the Mesial and Distal root of tooth #18.

Clinical assessment and Pulp tests: Test #18, #19, #20 and #21. All tests for #18,20, 21 were WNL. #19 porcelain restoration that appears to be sealed. #19 Perc (++), Bite Stick WNL, Endo Ice or Cold Test- No response. Probing/Palpation/Mobility- WNL

A: What is your Dx for tooth #19?

#18 Pulp necrosis/Symptomatic apical periodontitis

P: What is the treatment or plan of choice?

Primary Tx: RCT #19, Alternative Tx: Extraction #19

Tooth #19- Mandibluar
Left 1st Molar

PATIENT 3

Dental History: ER Pt from the Oral Surgeon in my building. Pt referred to the O.S. for Extraction #1. Pt in extreme pain and O.S. believes that #3 is the problem but asks to evaluate the entire URQ.

S: Pt states she is in **extreme** pain and has had cold pain but mostly it is just a continuous, severe ache. Pt is not sure which tooth is the culprit but points to tooth #2 or tooth #3 area

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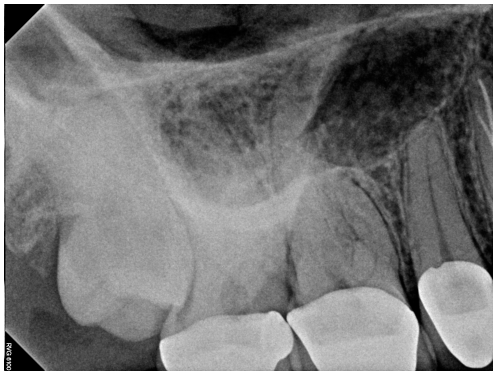
What other questions might you ask this Pt?

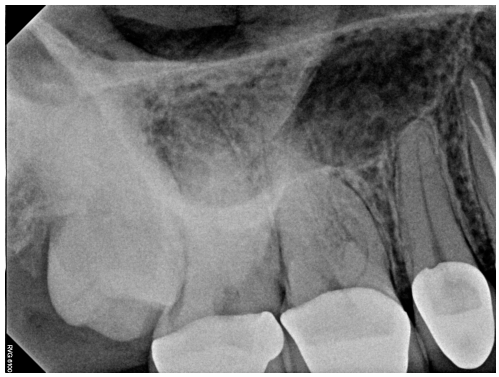
Possible other Questions:

When did the pain start? When was the last time you felt cold pain in the area? Does it hurt to chew on a specific tooth? Have you been taking Advil, Tylenol, or Narcotics recently for the pain? Can you point to the tooth you think is the main problem?

O: Straight and angled radiographs show a retained, impacted #1 and #2,#3, and #4 PFM's. #5 Prior RCT. It does not appear that there are any radiolucencies or evidence of pulpal disease in the URQ. I walk downstairs and read the CBCT of the URQ and do not see any evidence of a periapical radiolucency (PARL) in the URQ.

Clinical testing: Tested #2, #3, #4, and #5. Percussion- #2 (+), #3 (++), #4 (+), #5 WNL, Bite stick- #2, #3, #4 (++), #5 WNL, Endo Ice- #2 No response, #3 (++), #4 No response, #5 Prior RCT, Probing/Mobility- WNL, Buccal Palpation- #2 and #3 (+).





A: What is the diagnosis for the URQ?

Difficult Dx because #1, #2, #3, and #4 may be involved. Here is my Dx for the URQ: #1 Impacted molar, #2 Pulp necrosis/Symptomatic apical periodontitis, #3 IP-Symptomatic????/Symptomatic apical periodontitis???, #4 Pulp necrosis???/ Symptomaic apical periodontitis???

P: What is the recommended Tx for this quadrant?

Primary Tx: Extraction #1 by Oral Surgeon at a future date, RCT #2, Re-eval #3 with possibility of future RCT, Re-eval #4 with possibility of future RCT

Alternative Tx: Extraction #1, Extraction #2

Tx: #2 was necrotic and a pulpectomy was performed and calcium hydroxide was placed and antibiotics prescribed. Pt's severe pain resolved after 2-3 days.

7 month later the Pt presents with continuous cold pain and RCT #3 was completed. Pt remembers that I warned her that #3 may need treatment.

Tooth #2 and #3- Maxillary Right 1st and 2nd Molar

This was a very difficult Dx to make because 3-4 teeth were potentially involved. It took me thirty minutes to evaluate and Dx this quadrant in the middle of an extremely busy day. I warned the Pt that #3 and #4 may also need root canal treatment and that #1 should be extracted. Pt was in severe pain and near tears and understood that I was treating #2 but was not 100% sure that would solve all of her dental pain. I also was not 100% sure that #2 was necrotic even though both #2 and #4 tested No response to Endo Ice. Because her chief complaint was one of a extreme, continuous pain I errored on Pulp necrosis side and not the IP-Symptomatic side.