Beyond the Cavitron and Curette:

Why Pockets Don't Always Resolve After Even The Best Initial Therapy…And What To Do About It

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Okanagan Periodontal Study Club

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Last year….

…we discussed examination, diagnosis, and treatment planning of initial therapy, right up until the end of phase I – the evaluation of initial therapy

Course Objectives

By the end of today's afternoon session, you should be able to:

- understand why deep pockets do, or don't, resolve after appropriate initial therapy
- decide for yourself whether residual deep pockets need to be eliminated, or can be "maintained"
- understand the basic approach to surgical pocket reduction
- understand alternative modalities, and what their indications and contraindications are

Overview

1. Why don't all pockets resolve?
2. Can deep pockets be maintained indefinitely?
3. The classic – osseous resective surgery
4. Alternative pocket-reducing therapies

Overview

1. Why don't all pockets resolve?

Overview

1. Introduction
2. Controlling local and systemic factors
3. Osseous etiology of pocket depth

Overview

1. Introduction

The Ideal

- In a perfect world, our ideal treatment goal would be to always **regenerate** all of a patient's lost attachment
- Unfortunately, anatomy and biology conspire against us such that this is often an unpredictable treatment goal

The Enemy

- Thus, a large proportion of what periodontics is concerned with is reduction of probing depth

The Ideal

- In a perfect world, all the deep pockets our patients presented with would have resolved after initial therapy

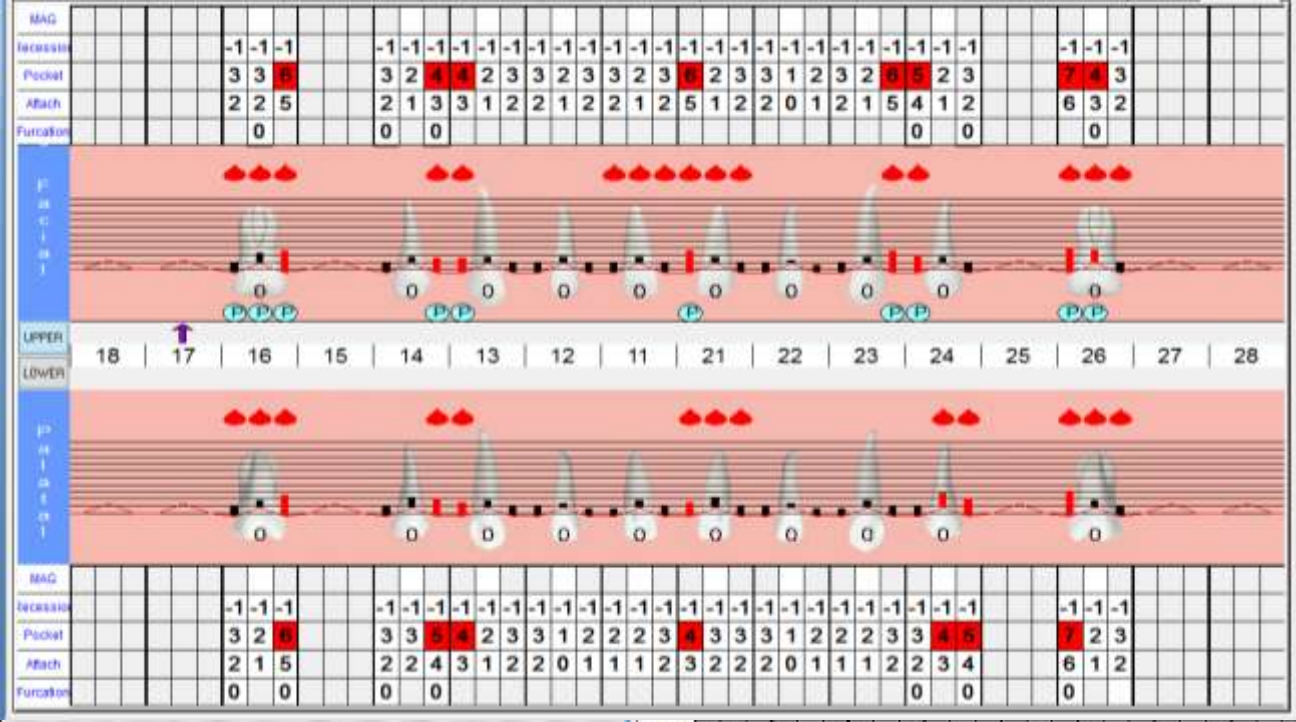
The Enemy

- Unfortunately, initial therapy is unable by itself to always control all of the etiological factors which lead to deep pockets

Recall our patient from last year's Case 2, Patient B….

Patient B

- 50 year old ♀ with Type 2 diabetes mellitus (unknown level of metabolic control) presents for initial exam
- No history of periodontal treatment
- Brushes and flosses 1x/day
- A previous dentist, with OMFS, had treatment planned bilateral sinus lifts and implants 15 and 25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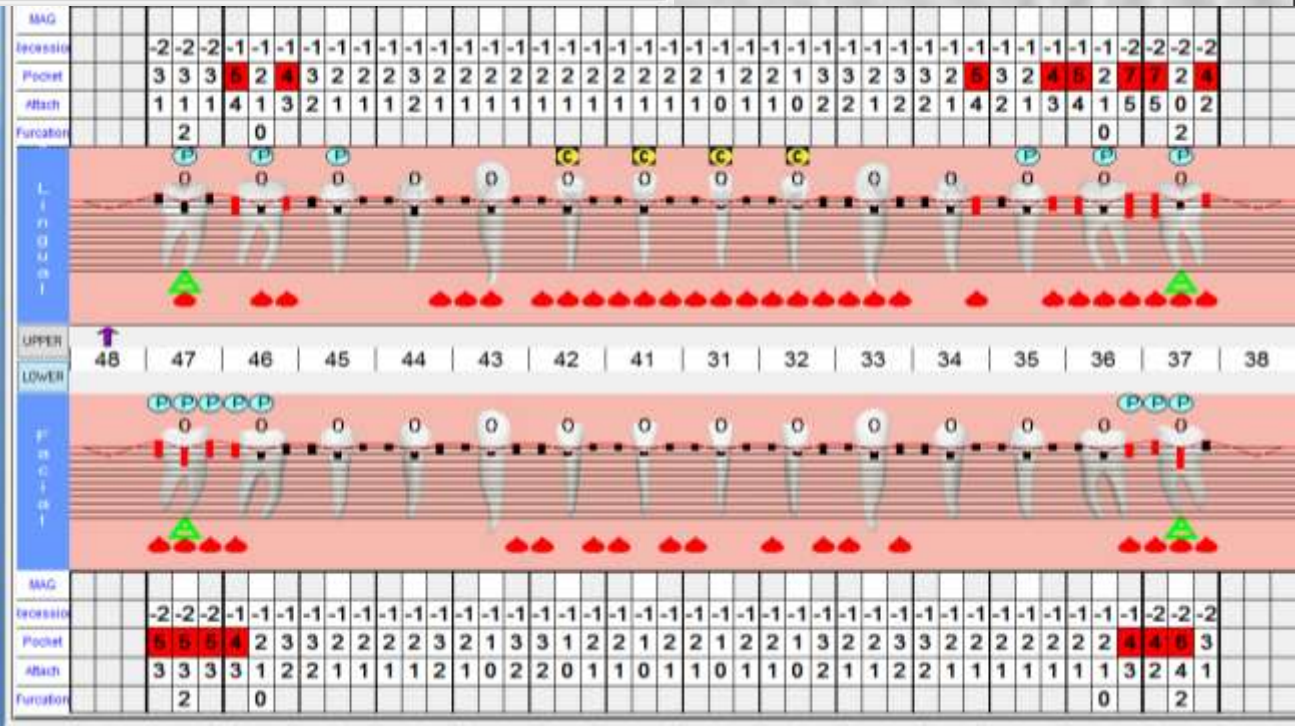
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Patient B

- Pt. B has:
  - ☑ PD ≥4mm and BoP
  - ☑ 25% of teeth with severe AL/BL, 29% of teeth with moderate AL/BL, and 46% of teeth with mild AL/BL
  - ☑ No family history (or other aggressive features) nor predisposing systemic conditions (remember DM Type 2 doesn't count)

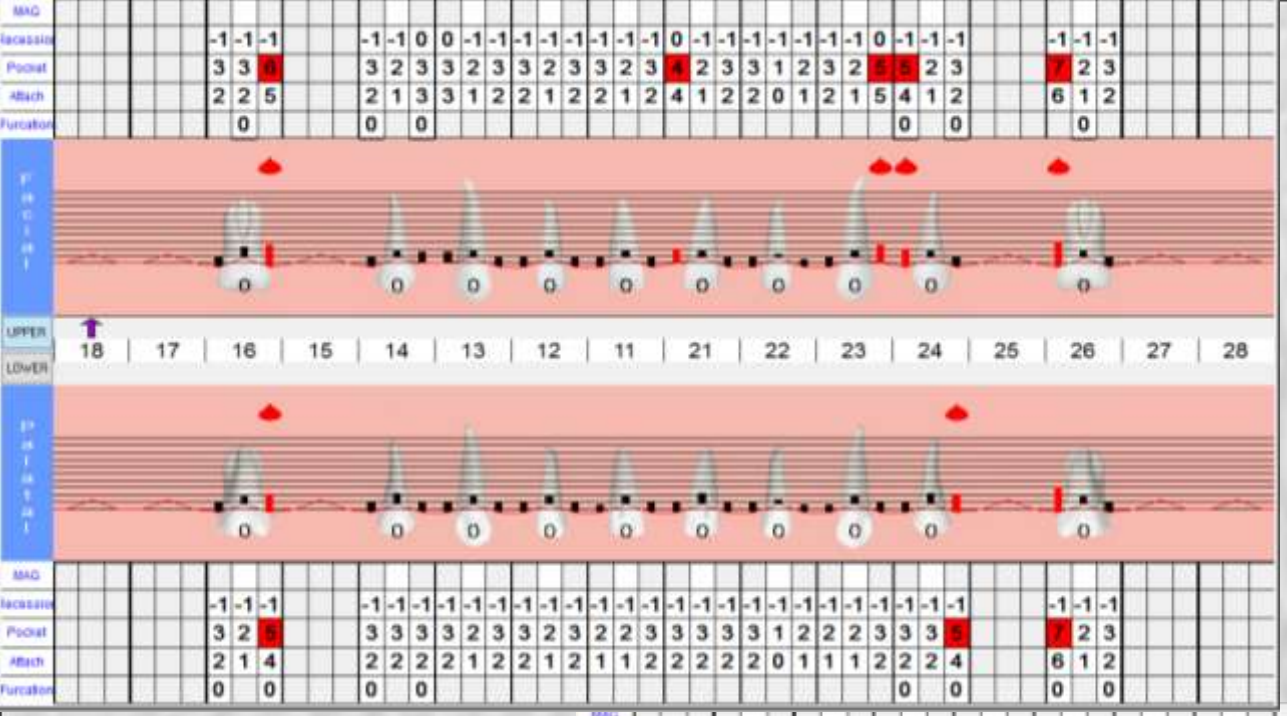
Dx: Generalized mild chronic periodontitis with localized moderate chronic periodontitis on teeth 14, 13, 24, 35, 34, 46, 47 and localized severe chronic periodontitis on teeth 16, 23, 26, 37, 36

Patient B

- Tx Plan:
  - **STOP THE RESTORATIVE TX PLAN!**
  - Medical consult to assess patient's HbA1c
  - Sc/RP of affected teeth
  - Oral hygiene instruction
  - (endo consult 24)
  - Consider closing contacts 14/13, 21/22
  - EIT after 6 weeks etc.

Patient B

- Pt. B got her medical consult, which showed her $HbA1_c$ to be at 8.5%. Her physician adjusted her meds, and it came down to 6.5%
- Sc/RP was performed, and OH was STRESSED
- 6 weeks later, at EIT….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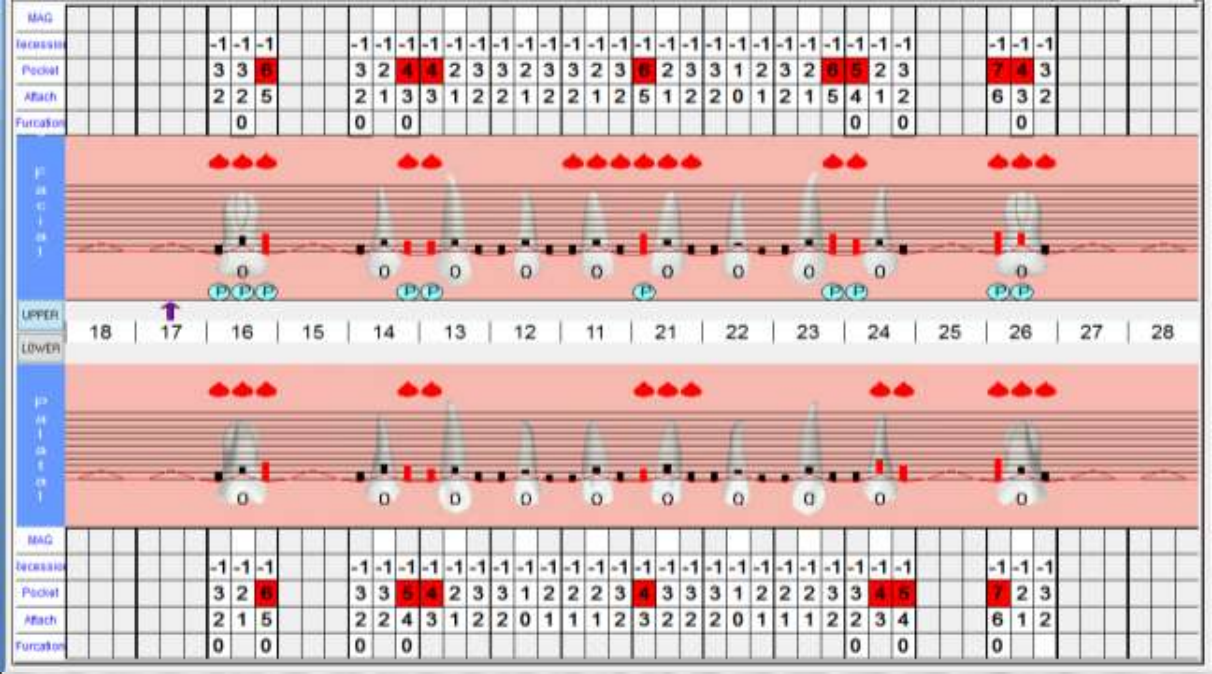
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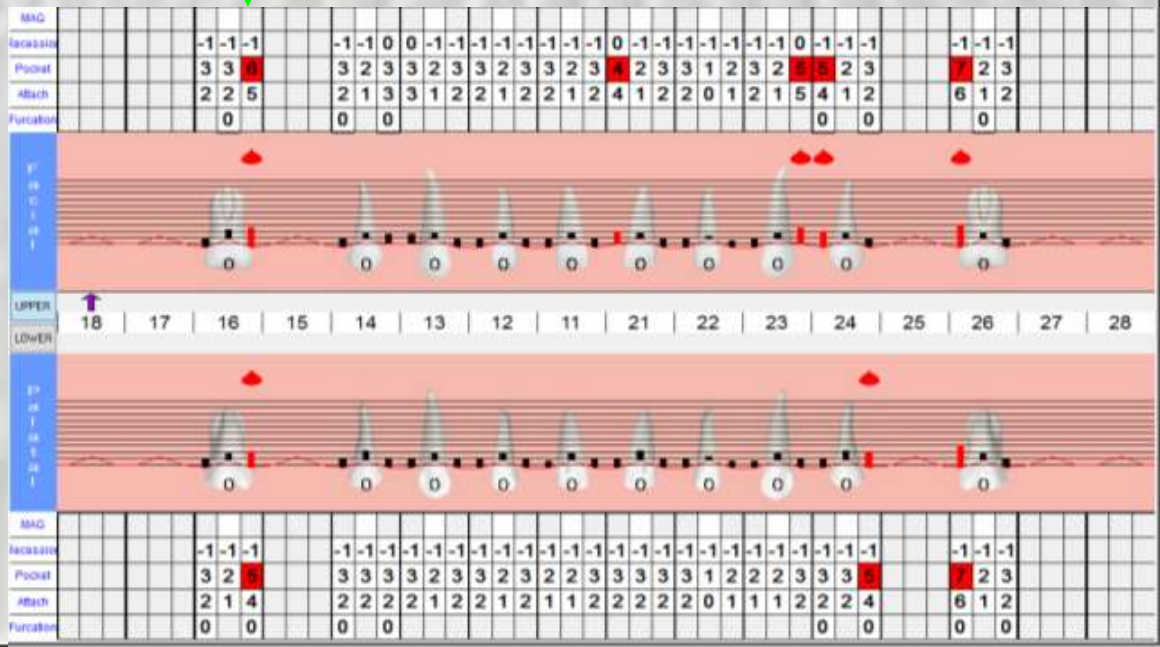
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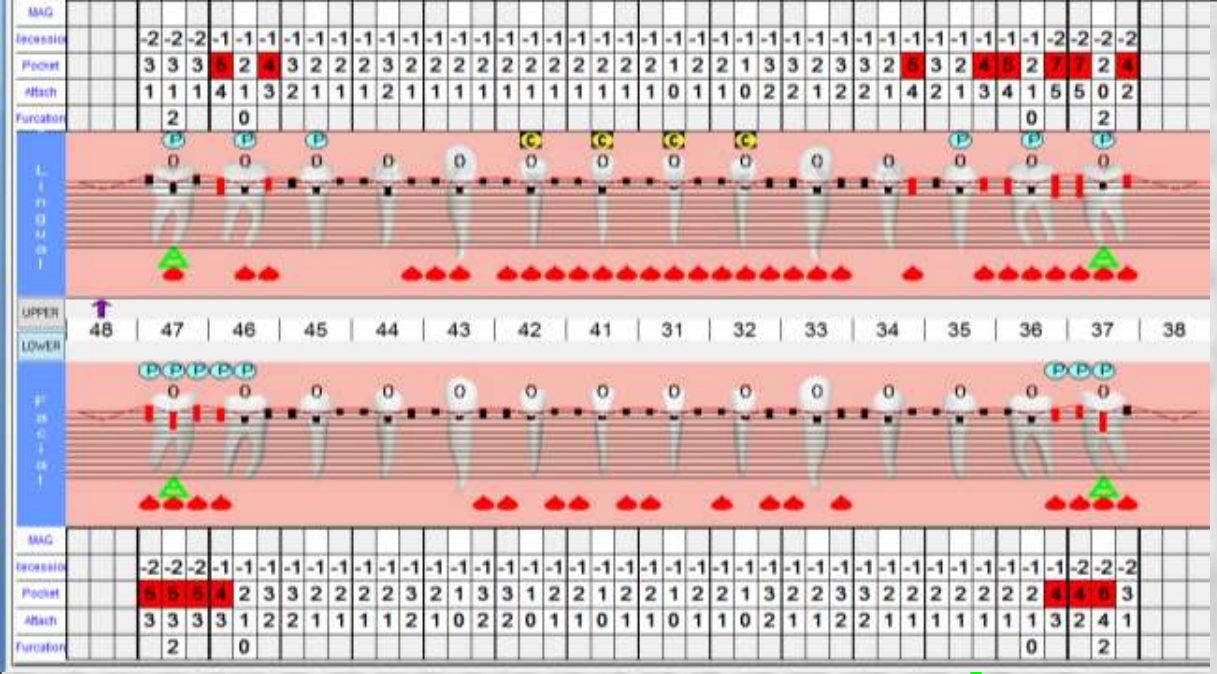
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EIT Update

Updated Diagnosis: Localized severe chronic periodontitis on 16, 23, 26, 36, 37 and localized moderate chronic periodontitis on 24 on a ***healthy reduced periodontium***

- Treatment Plan:

Sextant 1 ???	**Sextant 2** No sx	**Sextant 3** ???
Sextant 6 No sx	**Sextant 5** No sx	**Sextant 4** ???

- Maintenance: q3months

Re-evaluation

- Some of Patient B's sites got better, and some did not
- Thus we can neither blame anything systemic, nor the skill of the operator (as both of these would have either led to no improvement anywhere, or complete resolution everywhere)

Local Etiology

- Clearly, something localized is going on, and has to be addressed more…aggressively

Overview

1. Introduction
2. Controlling local and systemic factors

Etiology

- When treating periodontitis, treating the signs and symptoms alone won't solve the problem
- The underlying cause must be identified and addressed

Residual Pockets

- When deep pockets remain following initial therapy, there might be local reasons or systemic reasons
- Before deciding on what future therapy a patient might need, you need to go through all these different possibilities, to see if:
  a. They might have been present and you didn't notice, and/or
  b. You knew they were present, but didn't address them

Local Factors

- Assuming your scaling and root planing removed all the plaque and a critical mass of the calculus (and assuming acceptable oral hygiene on the part of the patient), what other local factors might be present?

Possible Secondary Etiologies

- "Hopeless" teeth
- Mal-posed teeth
- Impacted teeth
- Caries
- Overcontoured restorations
- Open margins
- Overhangs
- Occlusal trauma
- Ill-fitting prostheses
- Narrow embrasures
- Open contacts
- Tissue-invasive bacteria

So as part of initial therapy, did you/your dentist/your periodontist perform….

…Initial Therapy? ☺

- Select extractions
- Caries control
- Contouring restorations
- Patching/replacing margins
- Removing overhangs
- Adjusting/replacing prostheses
- Occlusal adjustment/ fabrication of occlusal guard
- Creation of physiologic embrasures
- Closing contacts
- Systemic chemotherapeutics *(specifically for cases of aggressive)*

Systemic Factors

- Once local factors have been ruled out, and in the case of a more generalized problem, what systemic factors might be present?

Smoking

- All other things being equal, smokers respond less well to initial therapy[1]
- It's not enough to just be aware that a patient smokes
- You have to know how much a patient smokes, as a dose-response effect for smoking has been identified[2]

Diabetes

- All other things being equal, poorly controlled diabetics (HbA1c >7%) may respond less well to initial therapy[3]

By the way….

Naughty Hygienist!

- Did the pockets not resolve because you left calculus behind?
- Should you re-scale and root plane everywhere there remains a deep pocket?

Why not re-Sc/RP everywhere?

- Why can't you just redo your Sc/RP a second time, for all the sites that don't respond, to see if this time, you can remove ALL the calculus?

Reason #1 – You Can't

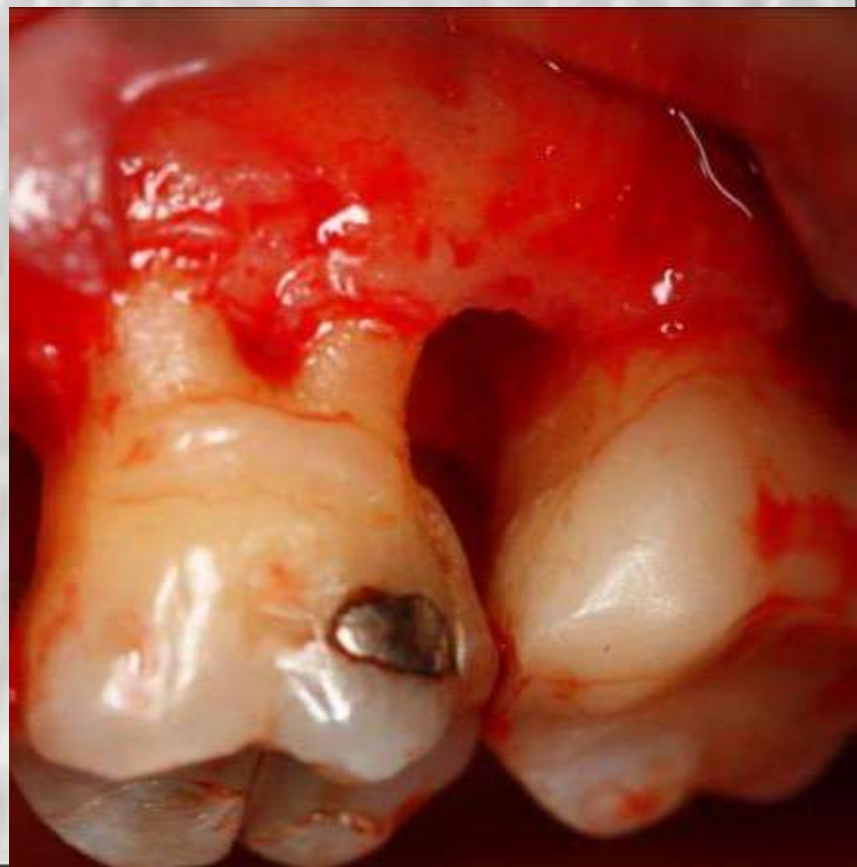
- **You never remove 100% of the calculus**[4,5,6,7]
- Not even surgical access can remove 100% of the calculus[4,5,6,7]

Reason #2 – It Doesn't Matter

- You don't need to remove all the calculus in order to get a good clinical response[8,9]
- Even in the presence of residual calculus, pocket depths/bleeding on probing can resolve[8,9]…assuming no underlying osseous etiology
- Epithelial attachment can occur on a disinfected calculus surface[10]

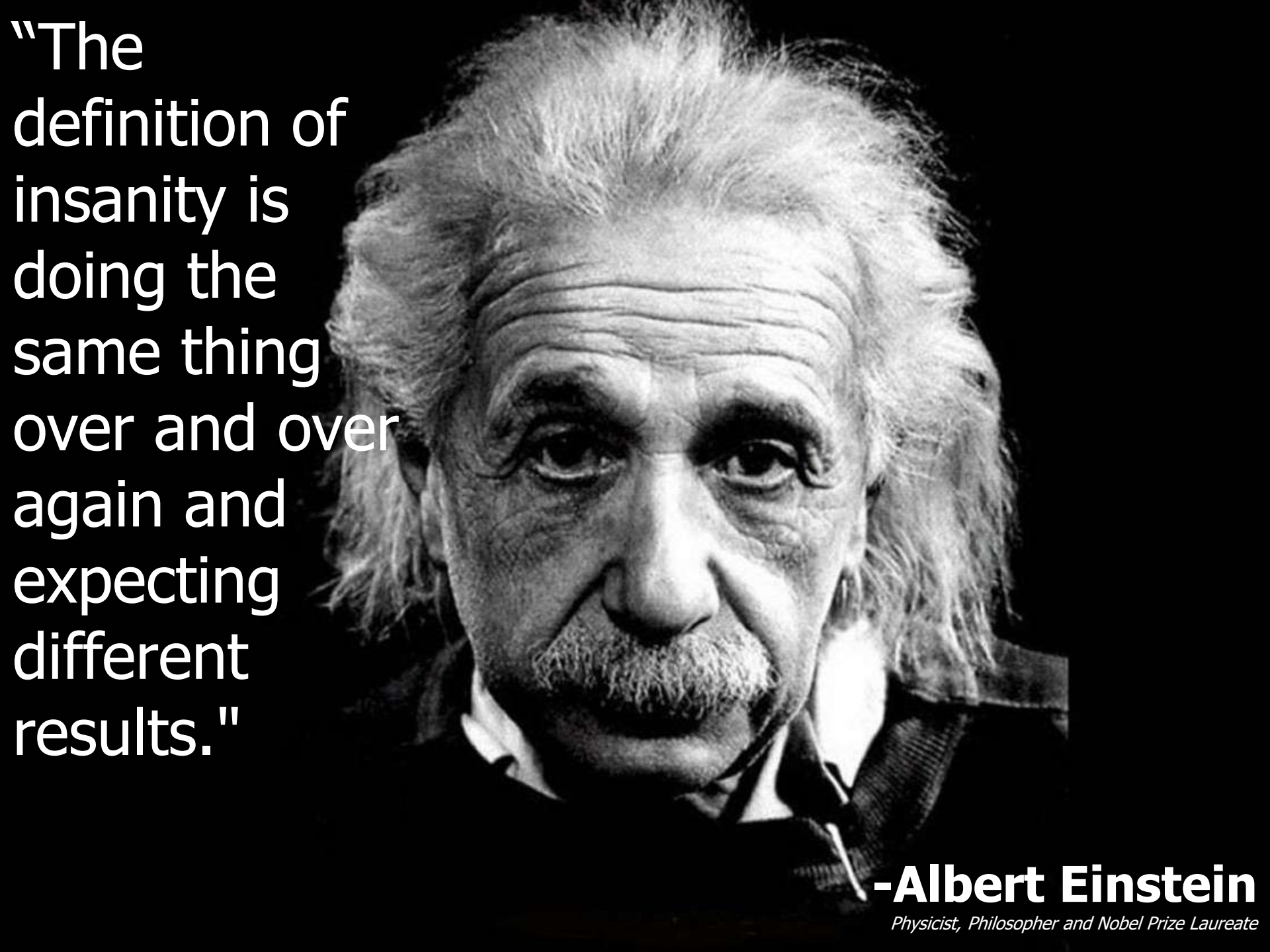
Reason #3 – It Doesn't Treat the Cause

- Why not?
- Because underlying osseous defects are:
  - Very common[11,12,13]
  - Not addressed by scaling and root planing



Reason #4 – We Have Something Better

- Studies have shown that for pockets ≥5mm, surgical therapy is most predictable at reducing their depth[14,15,16]
- Long-term studies demonstrate that sites which have only been subjected to Sc/RP are at higher risk of disease recurrence than sites which received surgery[17,18]


"The definition of insanity is doing the same thing over and over again and expecting different results."
-Albert Einstein
Physicist, Philosopher and Nobel Prize Laureate

And Also….

- …were you all aware of the damage you can cause with too much Sc/RP?

Courtesy of Dr. Tom Koertge

Courtesy of Dr. Sharon Lanning

Overview

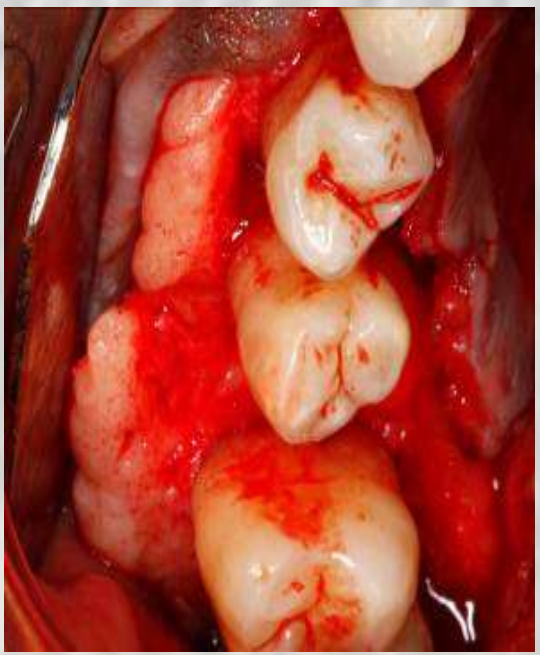
1. Introduction
2. Controlling local and systemic factors
3. Osseous etiology of pocket depth

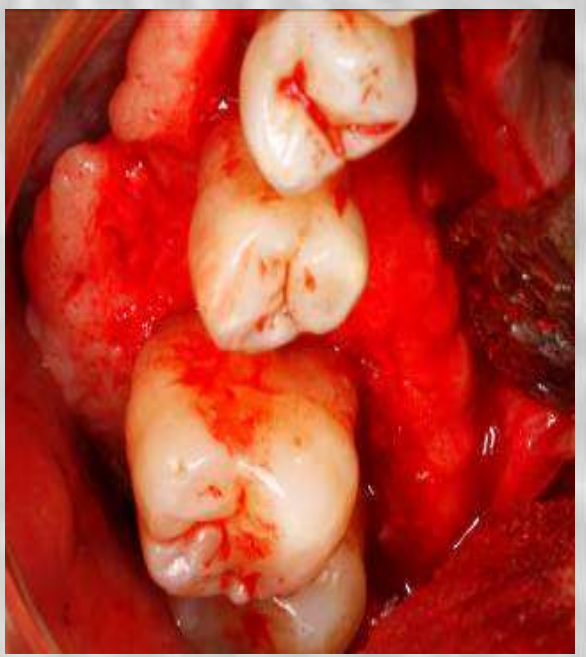
Osseous Etiology of Pockets

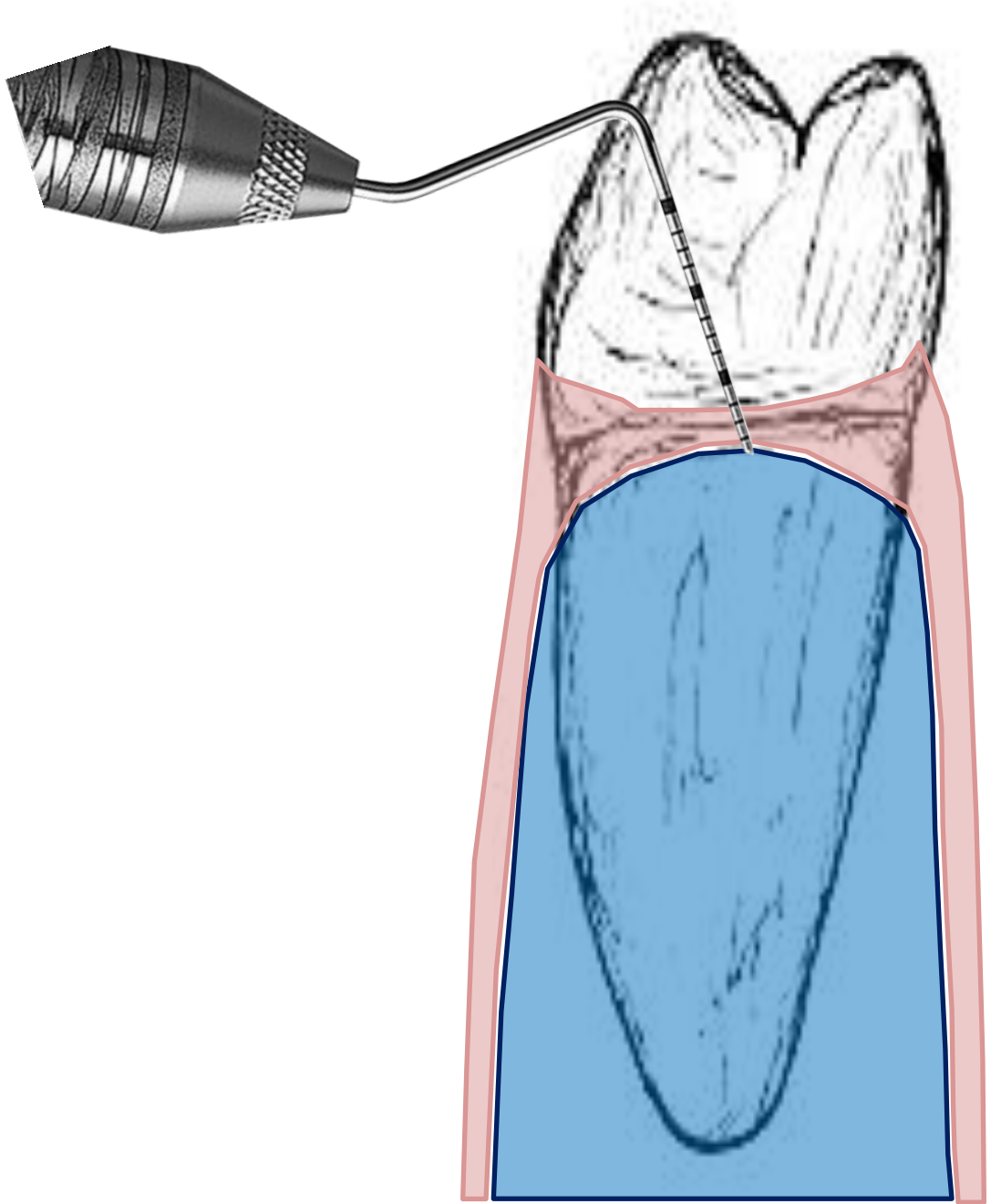
- There are **three** features of aberrant osseous anatomy which contribute to deeper pockets:
  1. Bony ledges and exostoses
  2. Intrabony defects (craters, vertical defects etc.)
  3. Negative architecture

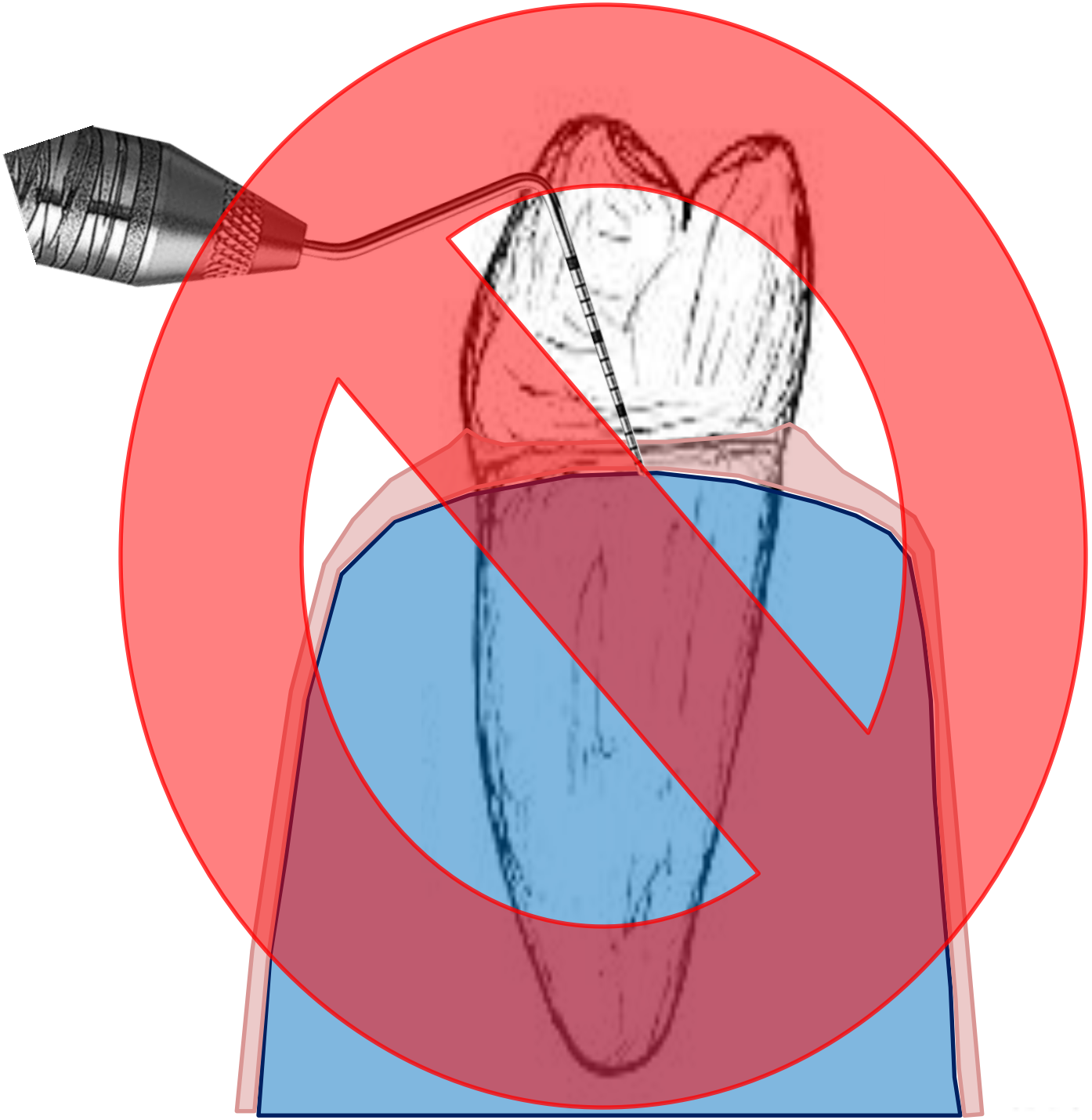
Bony Ledges and Exostoses

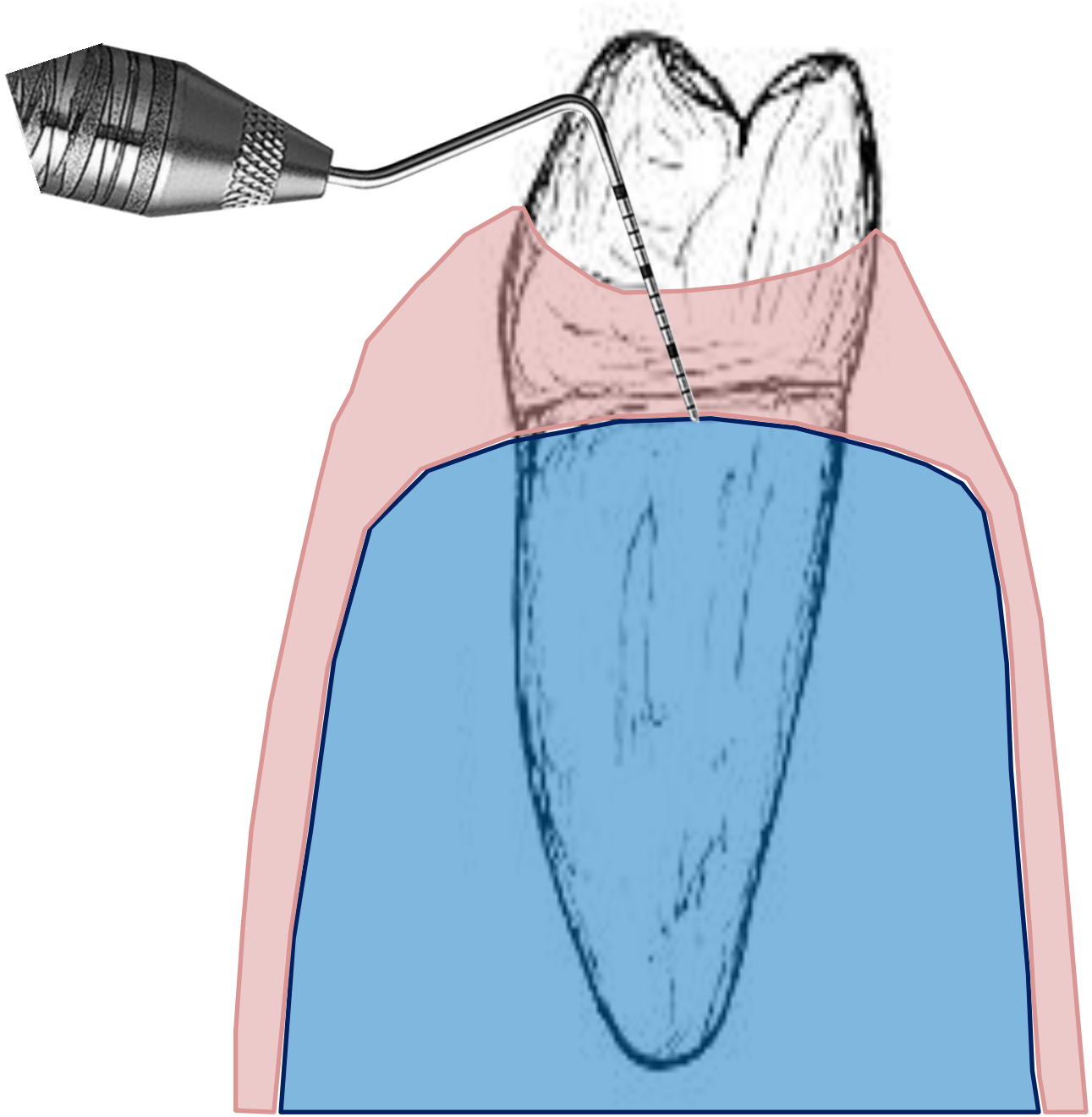
- Thick ledges of bone around the cervical areas of teeth, as well as lingual tori or other exostoses, can contribute to pocket depth
- How so?

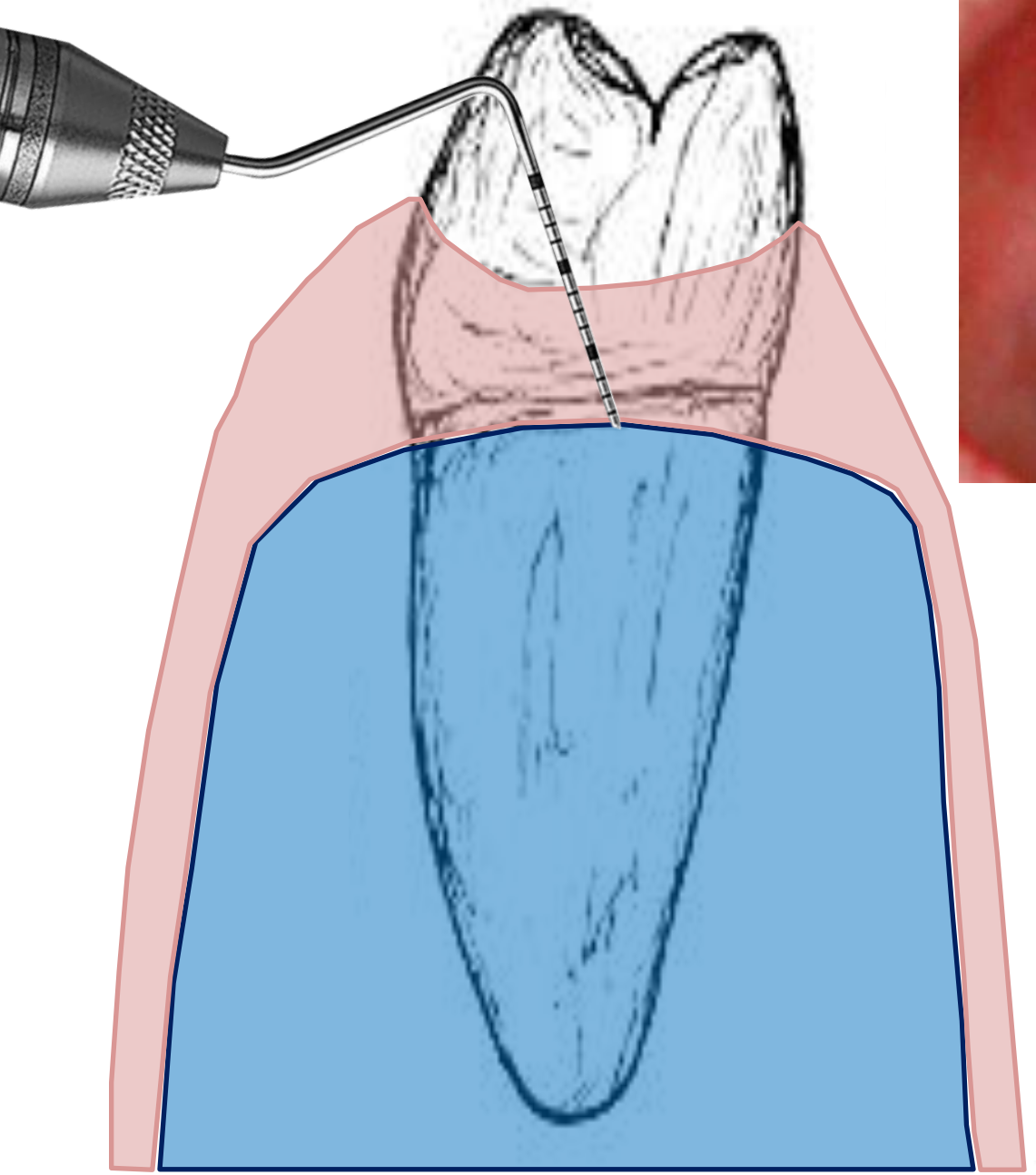






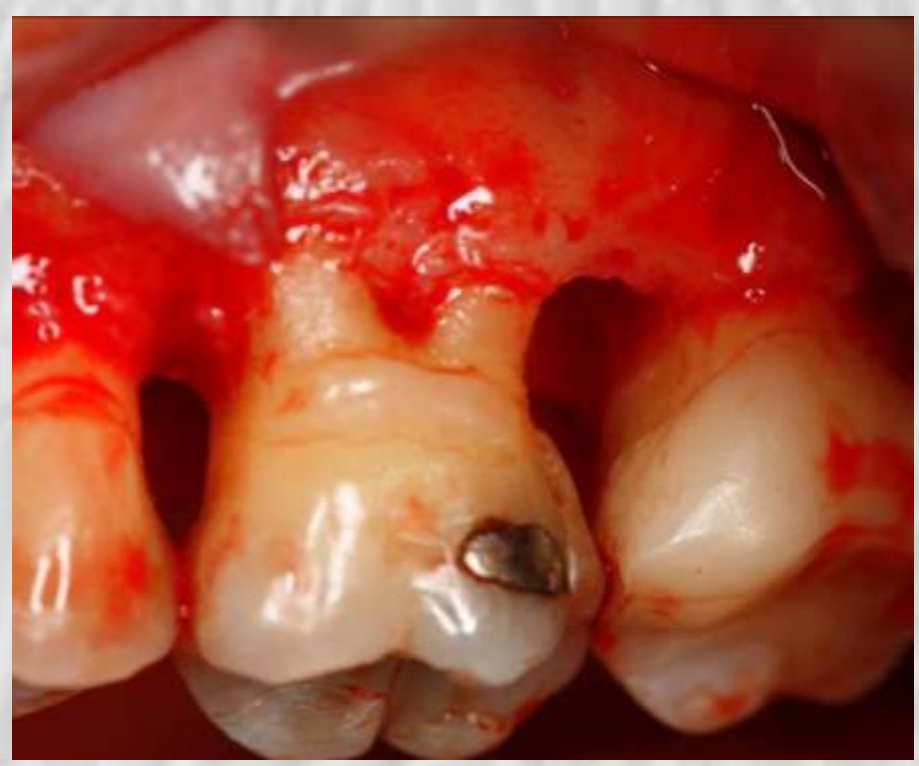






Osseous Defects

- Last year, we saw how craters contribute to increased pocket depth

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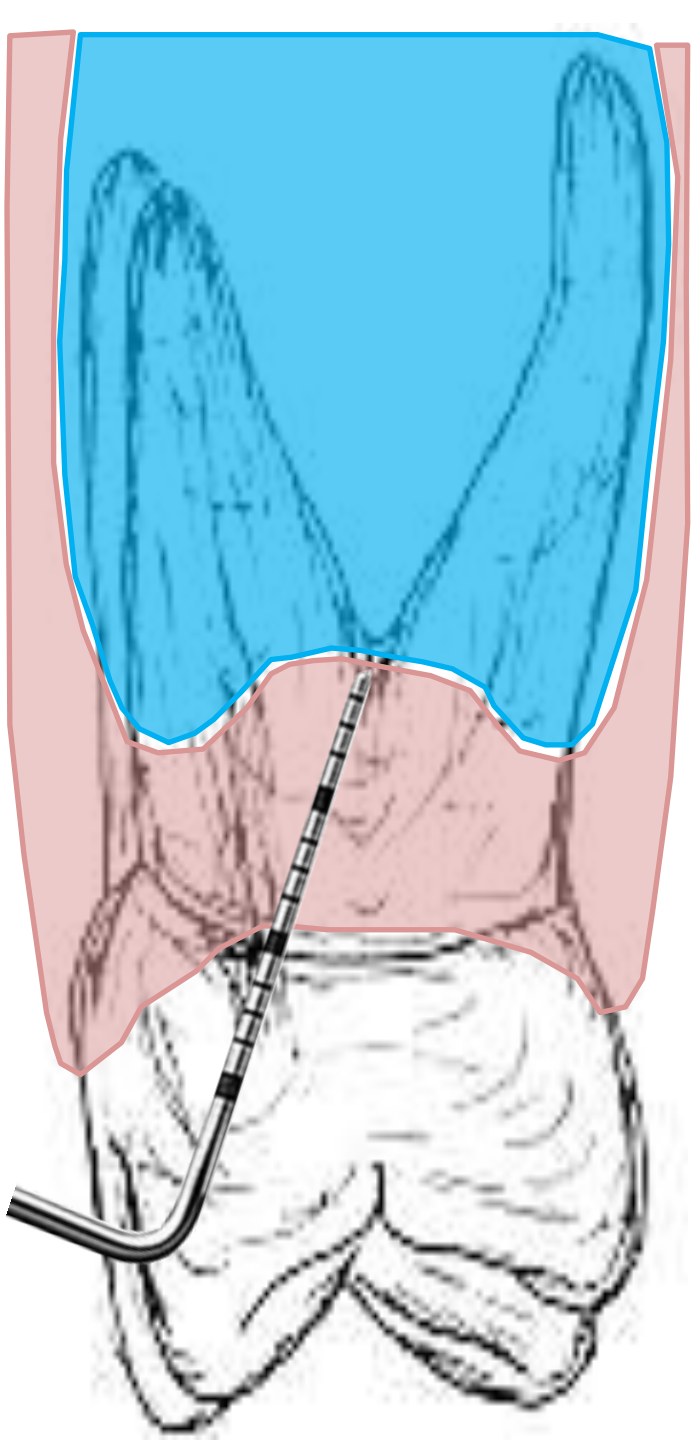
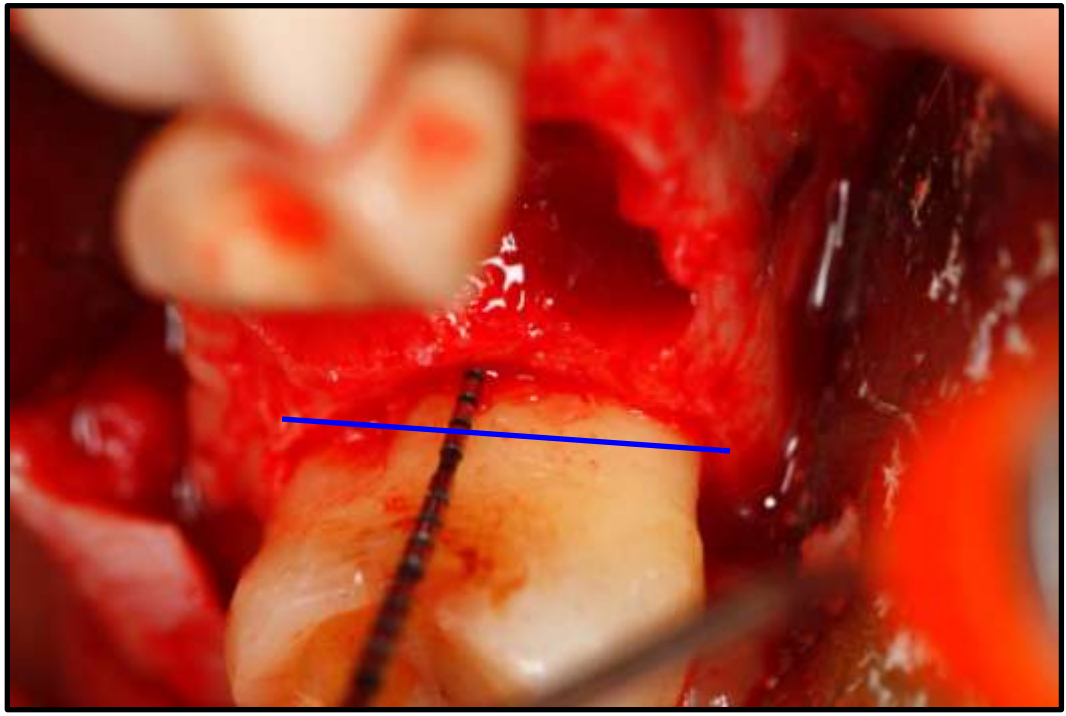


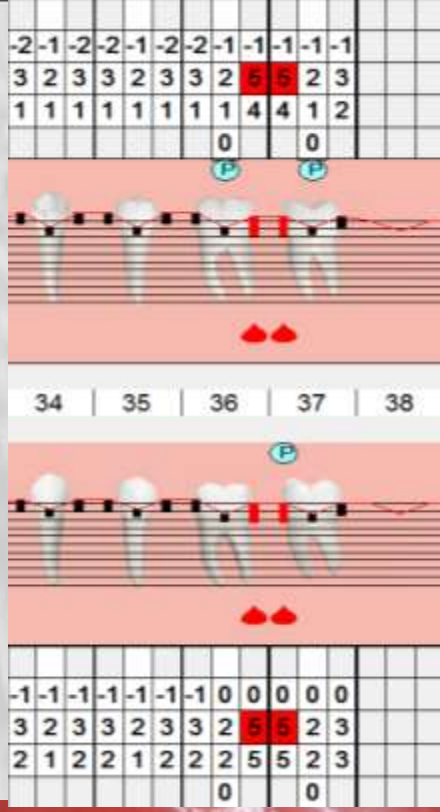


By the way….

Etiology of Craters

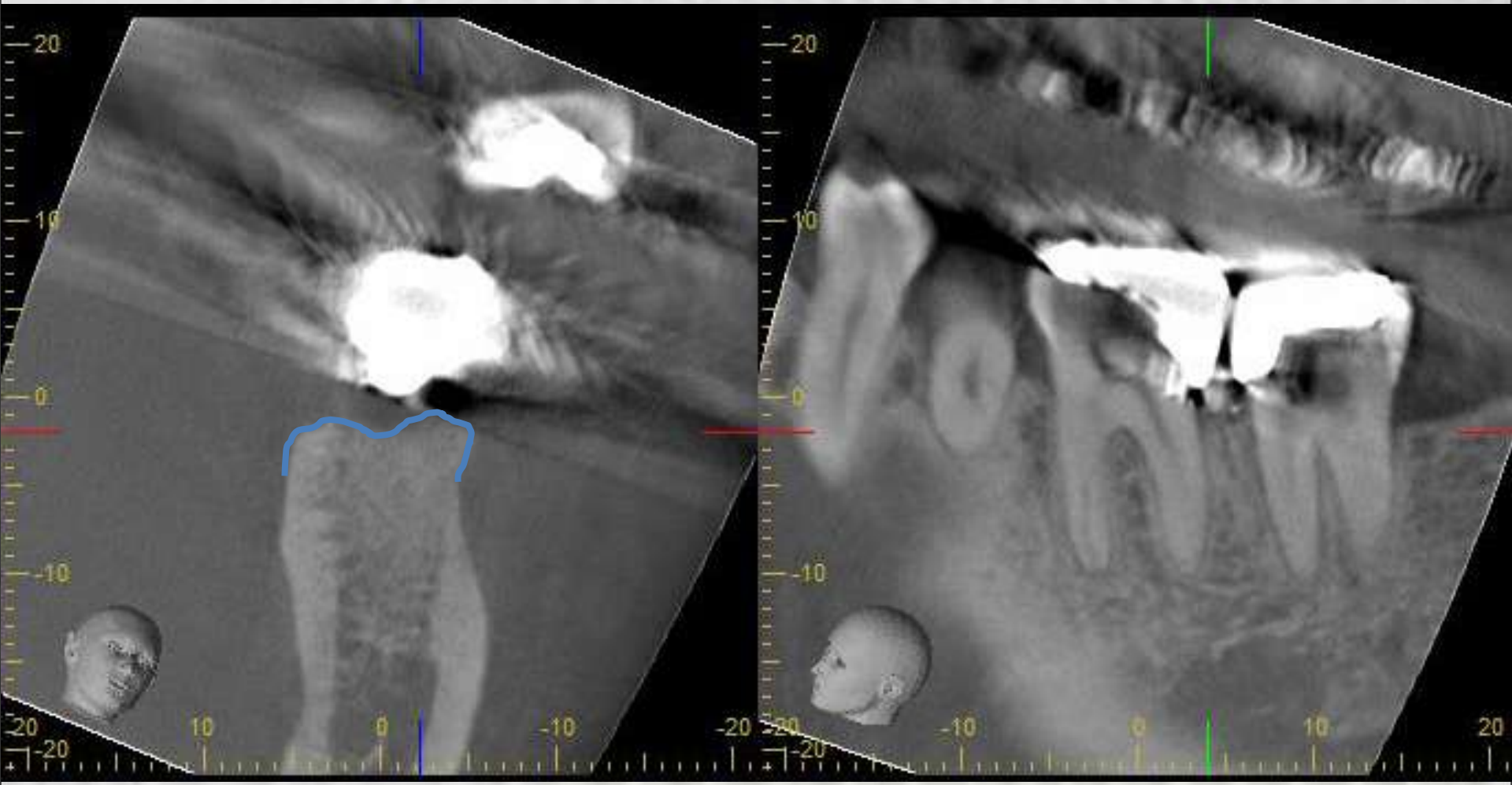
- Crater formation is the body's inflammatory response to an interproximal insult (as it is with any type of bone loss)
- The response in question can be initiated by a variety of factors….

Case 1 – Patient LR



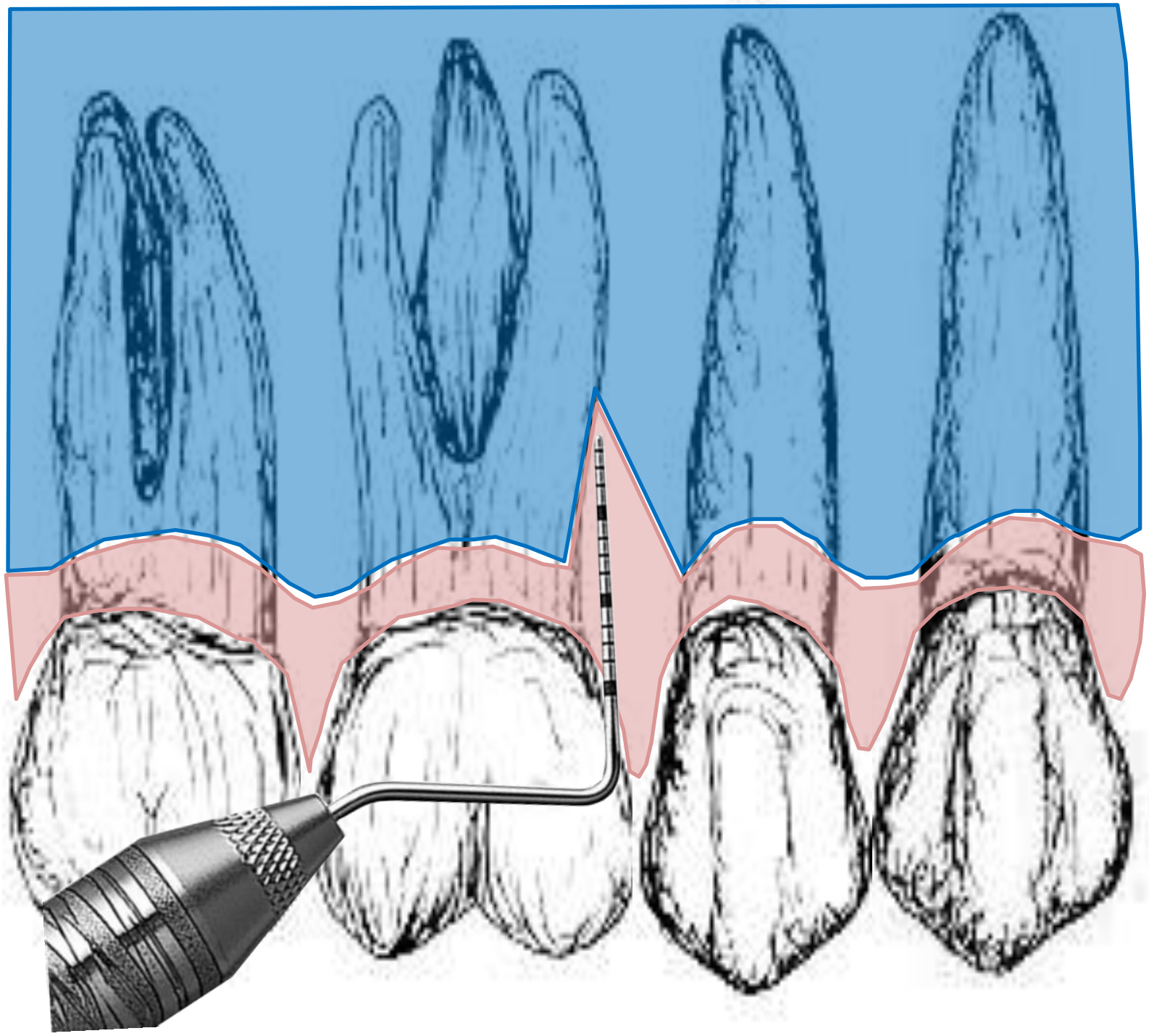
Case 1 – Patient LR

Case 1 – Patient LR



Osseous Defects

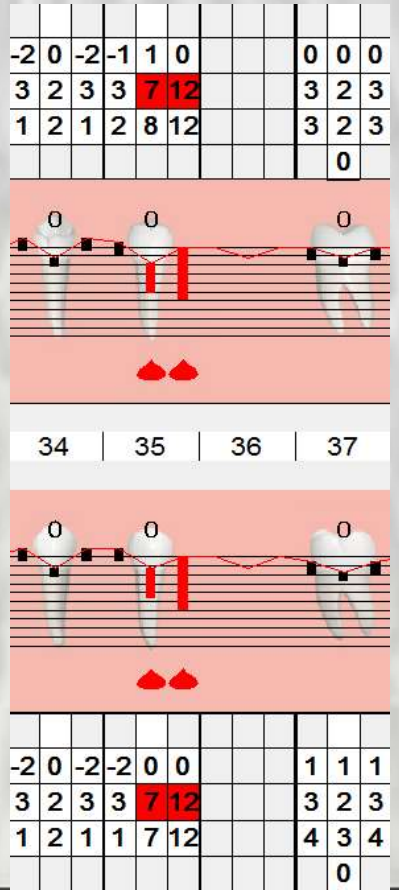
- Vertical defects also contribute to increased pocket depth



Osseous Defects

- Circumferential defects are vertical defects which encircle the tooth, in whole or in part

(Case 5 from this morning's Periodontal Prognosis)



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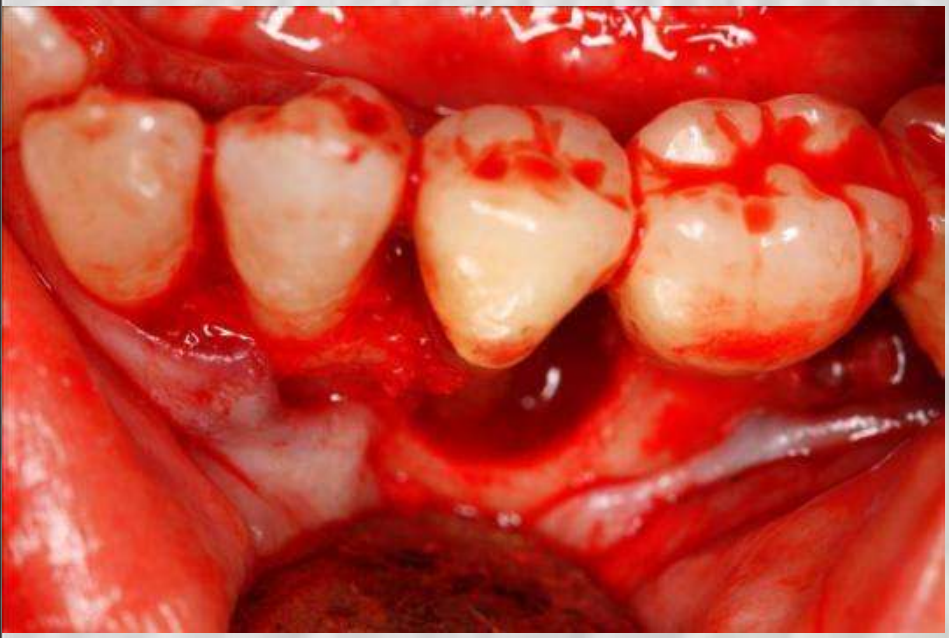
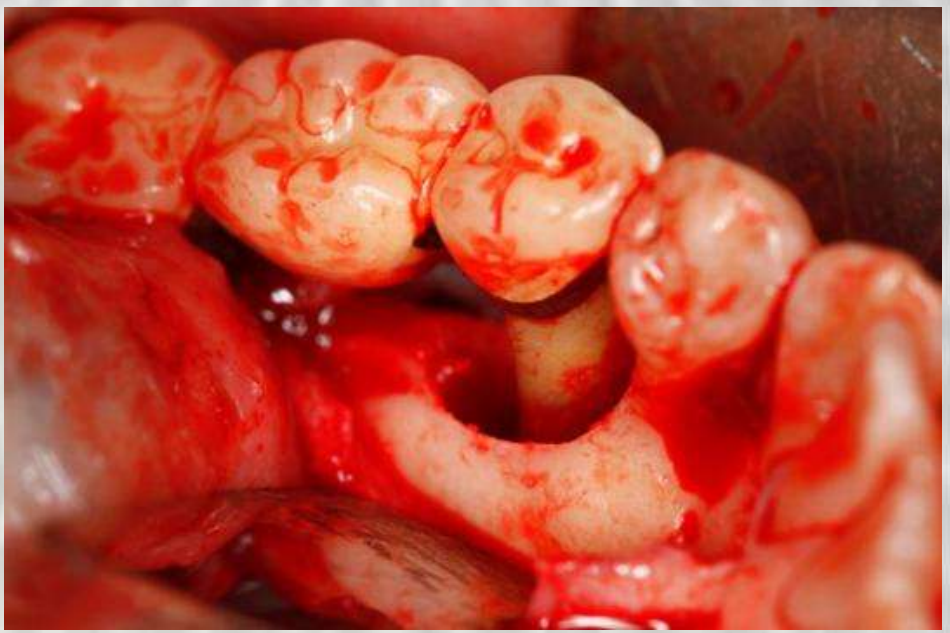
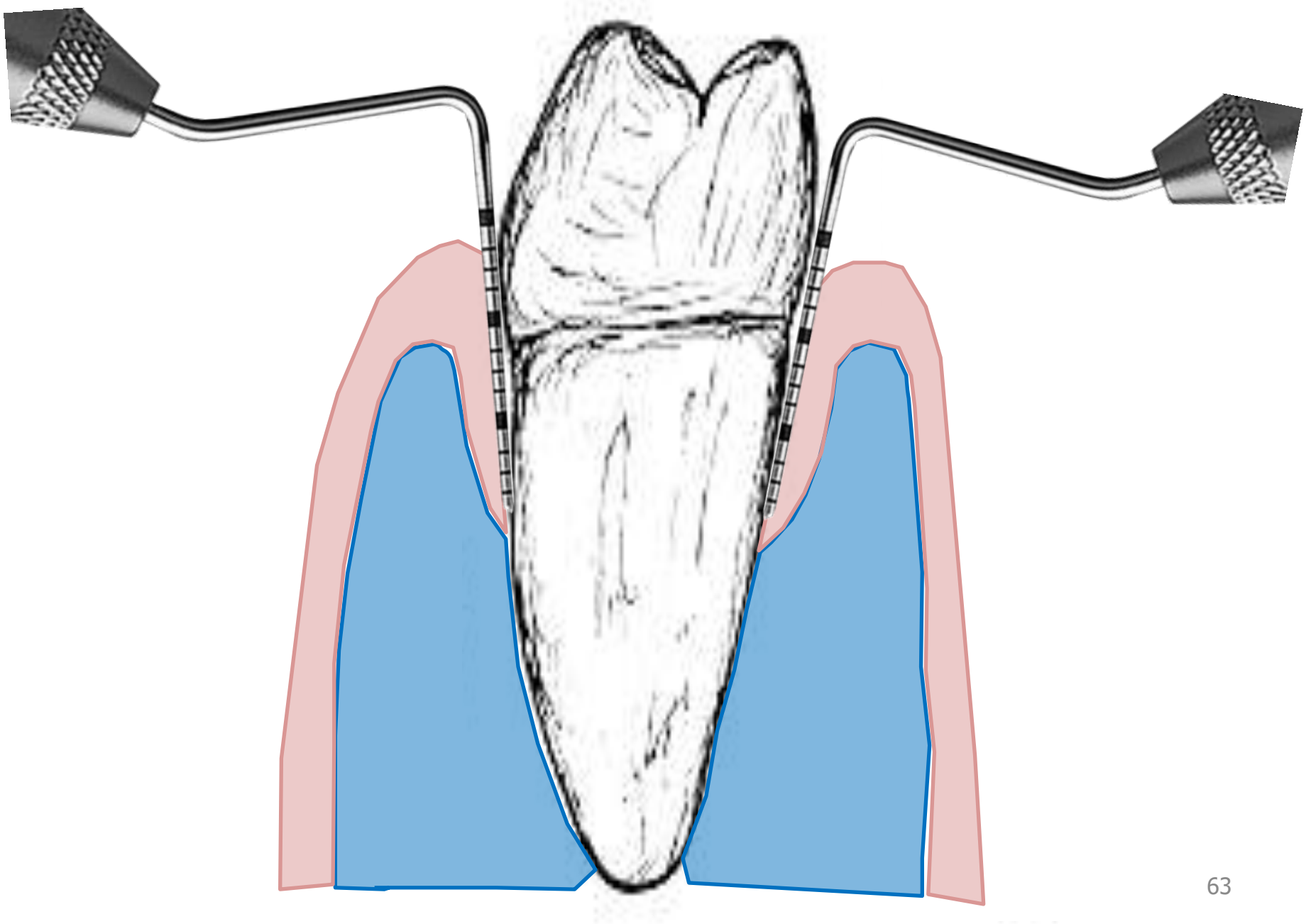
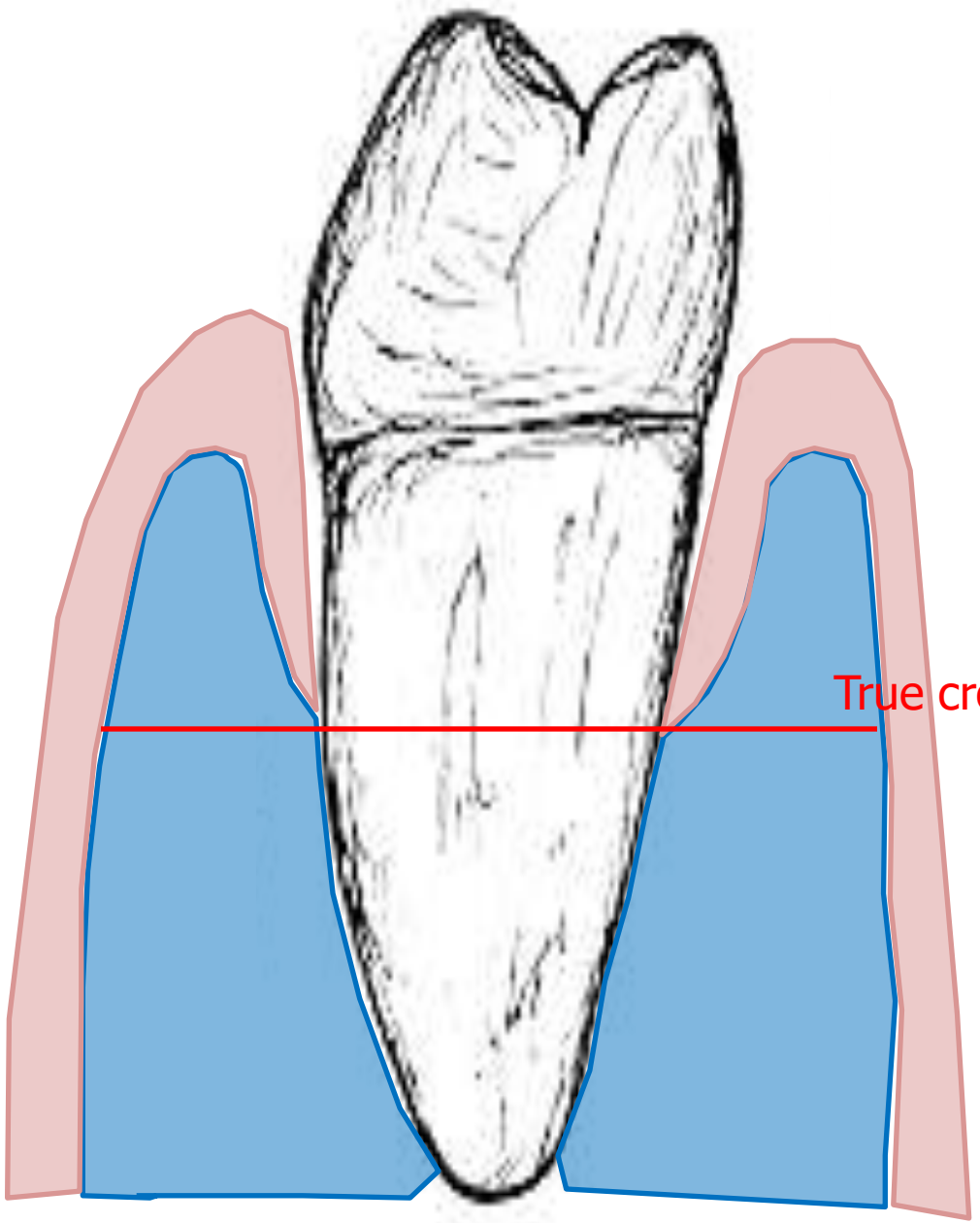


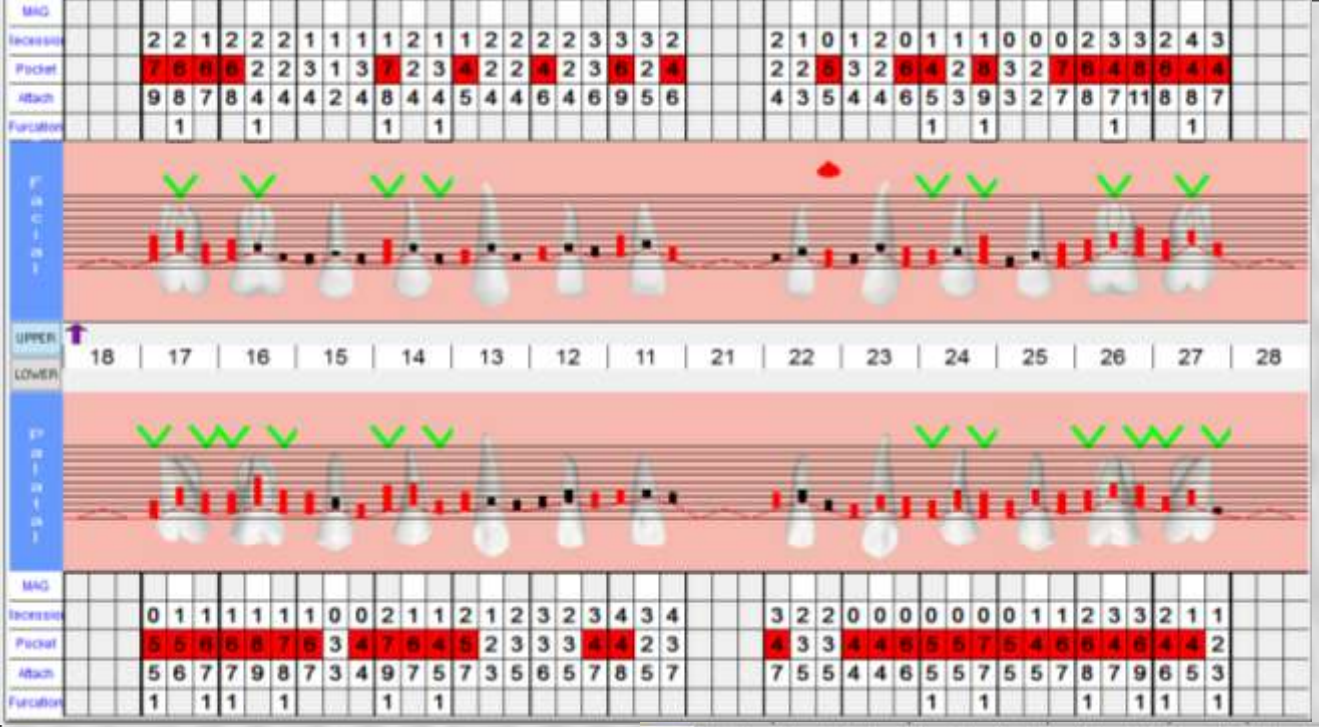






True crown:root ratio

Pt. EK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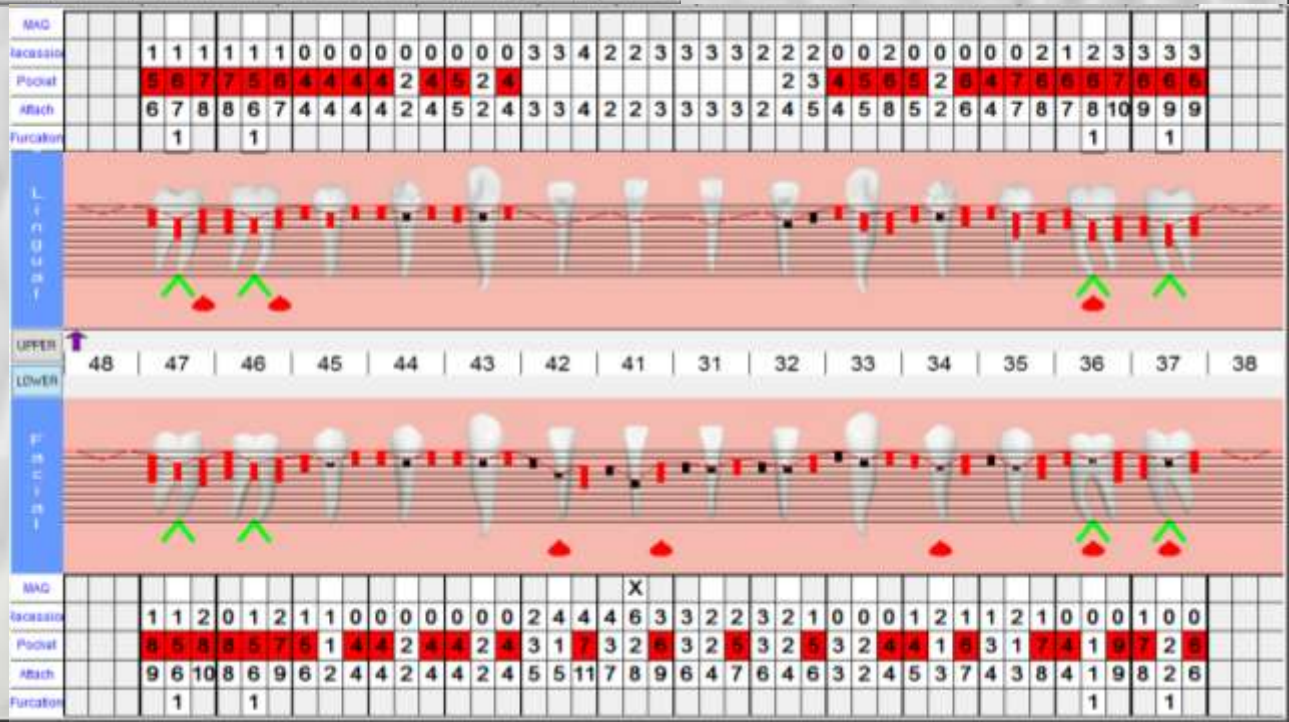
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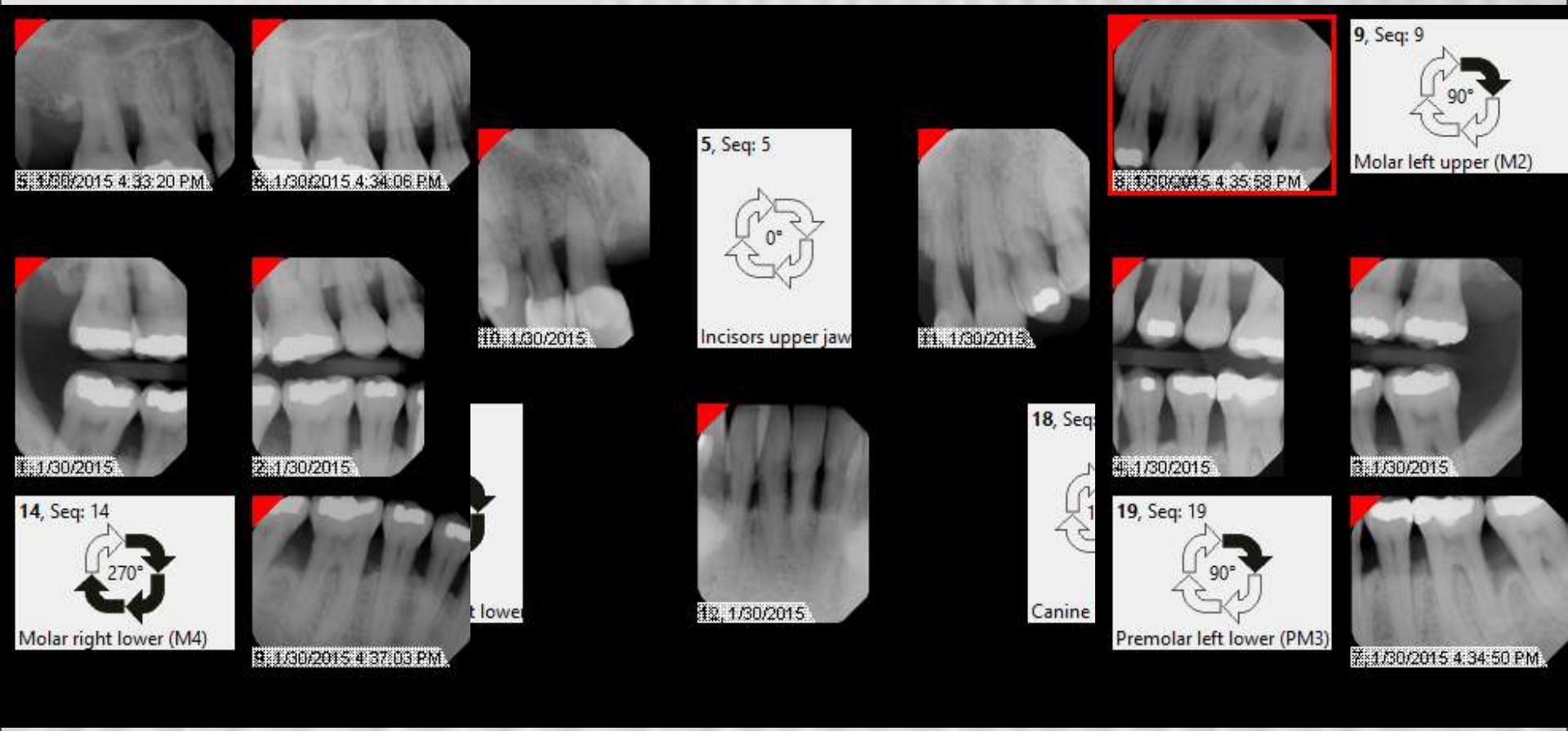
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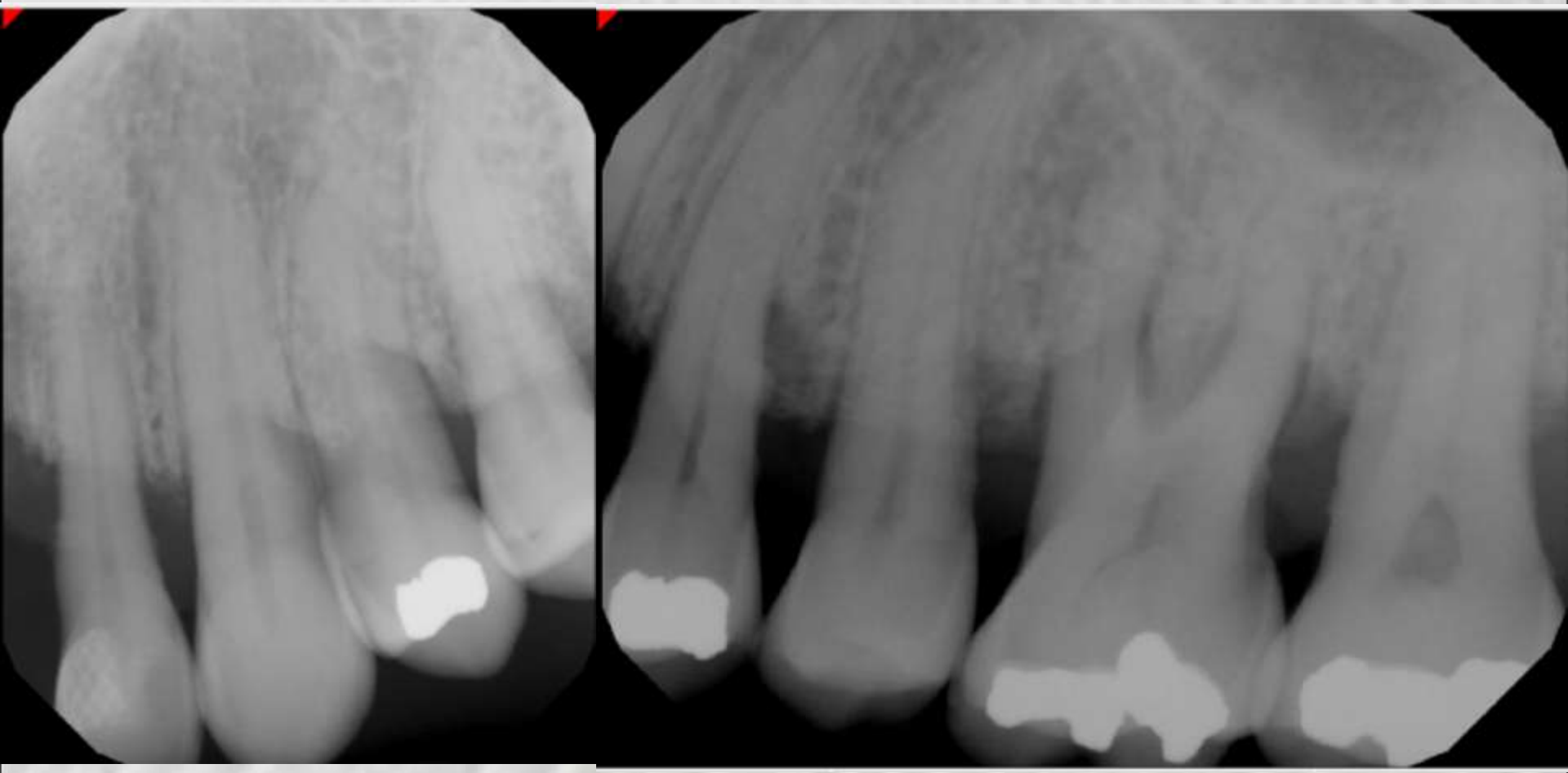
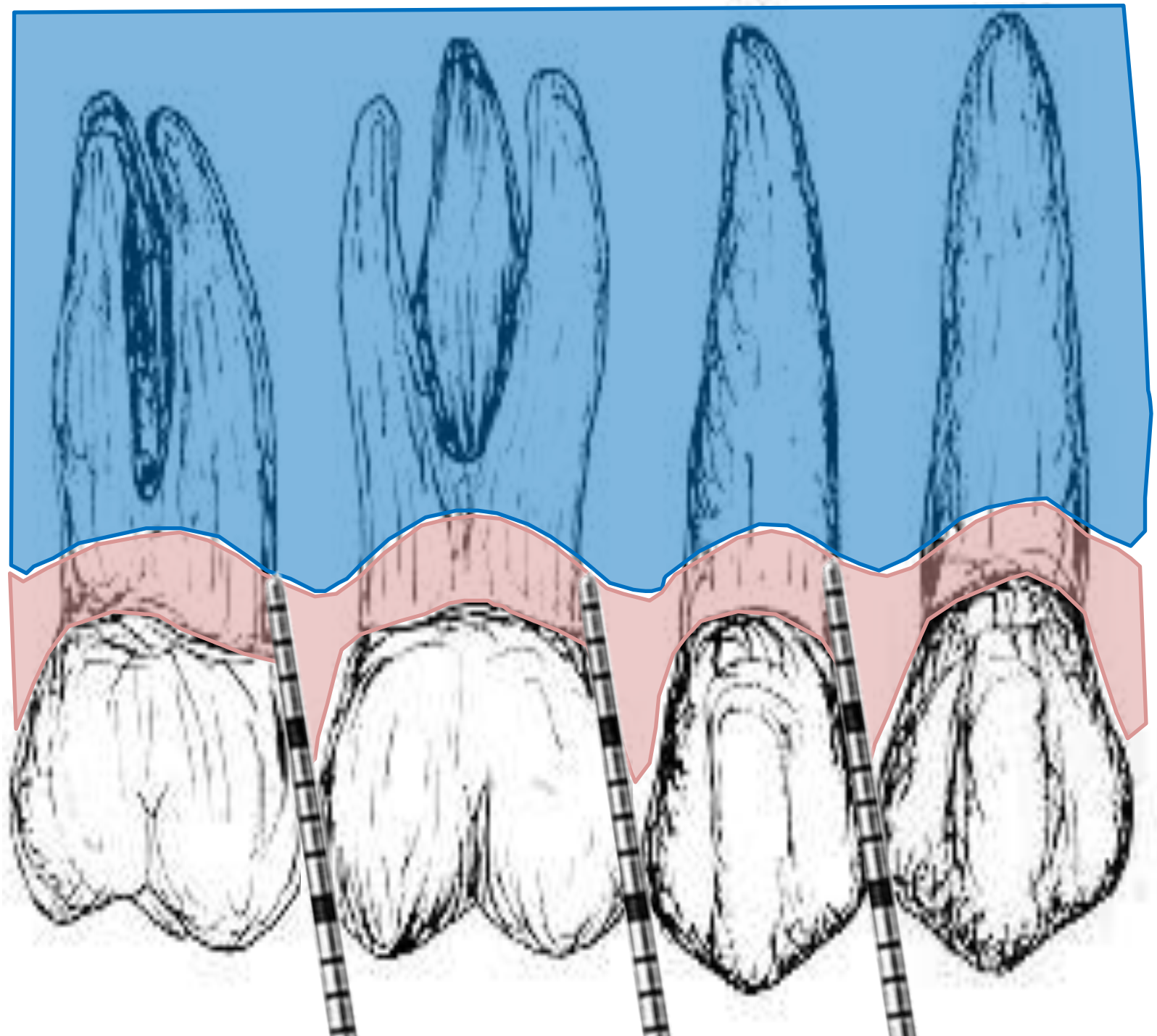


Positive Gingival Architecture

- Look at someone's smile:

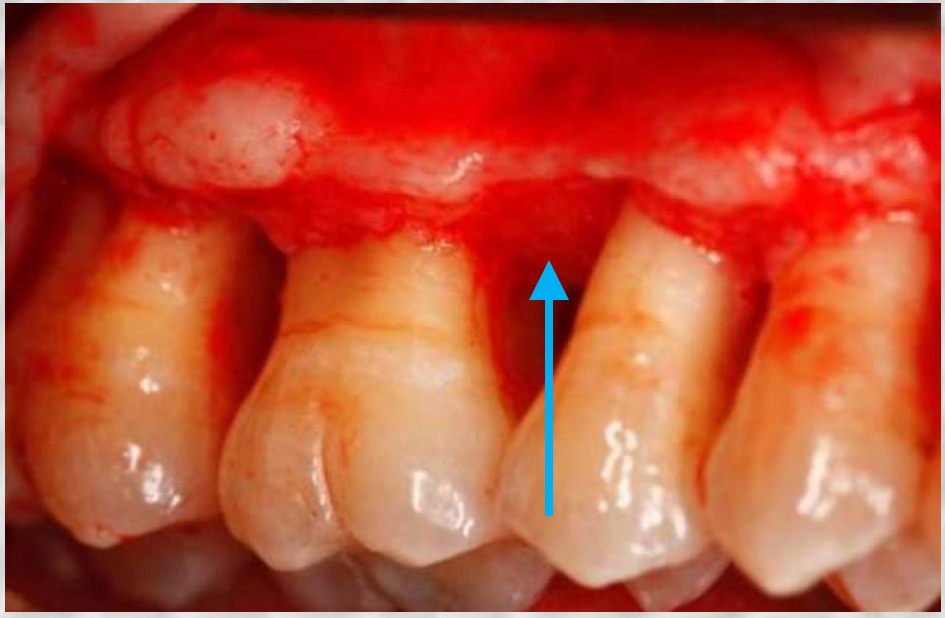
Positive Gingival Architecture

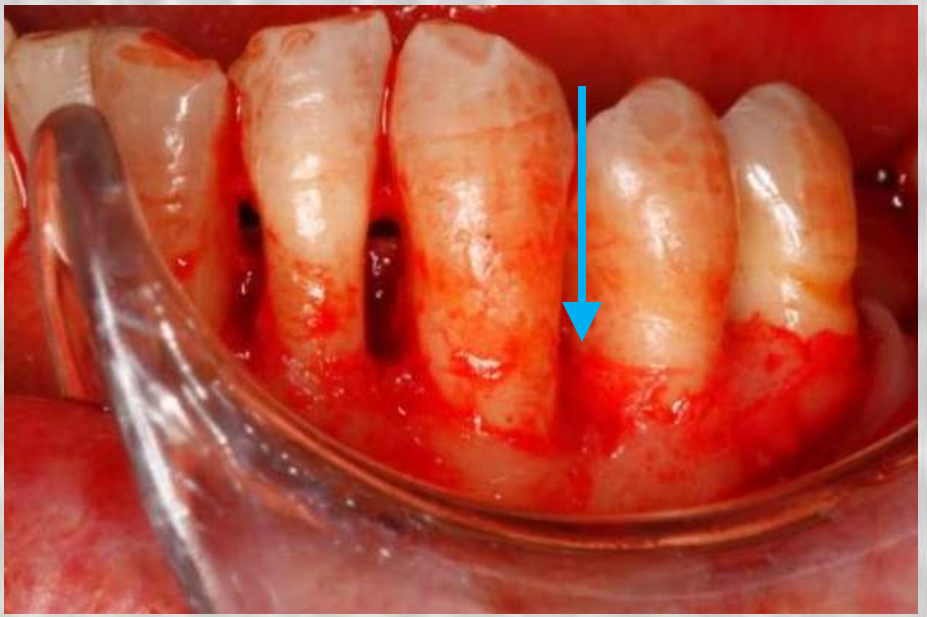
- Note that the gingival architecture is not flat, but scalloped
- Note that the scallop involves the interproximal gingiva being more coronal than the mid-buccal gingiva

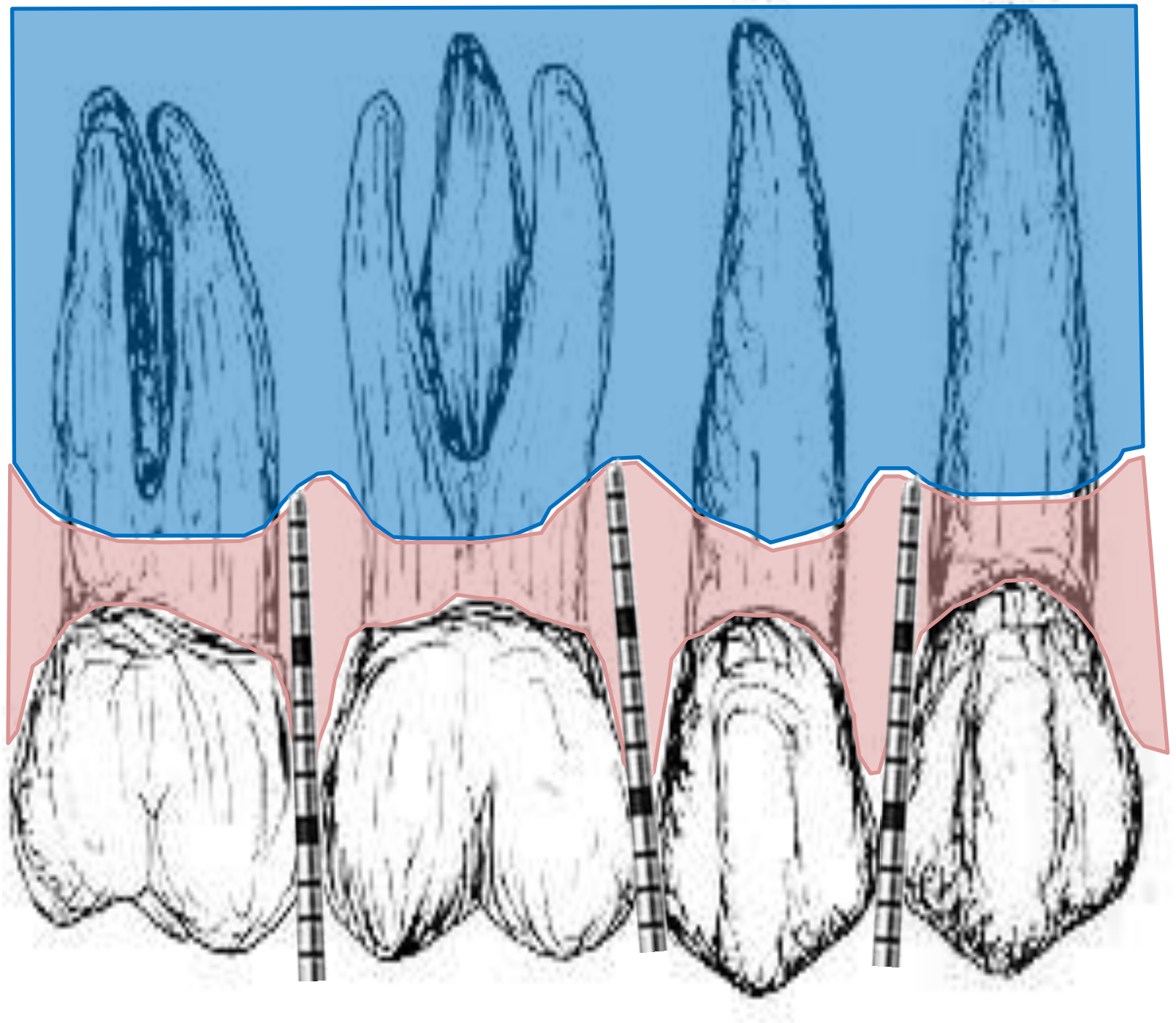


Negative Architecture

- Our third osseous etiology is negative architecture







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Overview

1. Why don't all pockets resolve?
2. Can deep pockets be maintained indefinitely?

Overview

1. Introduction
2. What does "maintained" mean?
3. Evidence for maintaining deep pockets
4. Evidence against maintaining deep pockets
5. The verdict

Overview

1. Introduction

Introduction

- It is generally understood that deep probing depths associated with bleeding are at risk for progressive attachment loss[1,2]
- This leads to a common statement, "You're justified in maintaining a non-bleeding deep pocket non-surgically, indefinitely."

Let's Design a Study!

- Every study should have a focused research question
- Let's make ours: "What happens when you maintain a non-bleeding ≥5mm pocket over time?"
- Ethical considerations aside, how would you design a study to answer this question?

Let's Design a Study!

- Step 1: get a very large number of people, so large that they represent a complete cross-section of the population:
  - All different ages
  - Men/women
  - White/black/Asian etc.
  - Smokers/non-smokers
  - Diabetics/non-diabetics
  - Etc.
- Make certain that they all have deep pockets ≥5mm

Let's Design a Study!

- Step 2: divide them into different treatment groups:
  1. No treatment
  2. Nonsurgical treatment only
  3. Non-surgical treatment followed by surgical treatment as necessary
- And for each of these groups, further subdivide them into patients who get perfect maintenance, and patients who don't

Let's Design a Study!

- Step 3: follow these patients for a long time, and every time you see them, record:
  1. Where they still have deep pockets ≥5mm
  2. Which of these pockets are bleeding
  3. If the attachment loss/bone loss is stable or getting worse on these teeth
  4. If any of these teeth have been extracted due to periodontal reasons

Does This Study Exist?

- No
- However, as you'll soon see, there are many studies that have elements of this ideal study
- The trouble is, they have tried to make inferences to fill in the gaps, and sometimes, they have added up 2 and 2 to equal 5

Overview

1. Introduction
2. What does "maintained" mean?

Analogy: How Quickly Does Periodontitis Progress?

- A pair of very famous studies attempted to quantify the progression of periodontitis over a short term period – 6 months
- In order not to miss active disease, each study had more than one threshold for "attachment loss" (0.4mm vs. 2.4mm in one, and 0.58mm vs. 1.16mm vs. 1.74mm in the other)
- Not surprisingly, the lower the threshold of acceptable attachment loss, the more the periodontitis progressed[3,4]

"Maintainable?"

- Whether or not a tooth is "maintainable" in a particular condition depends on your threshold for "maintainable":
  - Does "maintainable" mean that the tooth is still present in the mouth?
  - Does "maintainable" mean the tooth is periodontally stable (i.e. no further attachment loss)?
  - Does "maintainable" mean the tooth is asymptomatic (i.e. NOT suffering from dentinal sensitivity, mobility, un-aesthetic appearance)?

Tooth Loss as an Outcome

- Remember from this morning's Periodontal Prognosis lecture, **TEETH DON'T EXTRACT THEMSELVES!**
- If all you're aiming for is keeping the tooth in the mouth, in whatever state, never mind surgical vs. non-surgical therapy, or pocket reduction vs. maintenance…why treat at all?

Periodontal Stability as an Outcome

- If periodontal stability is your goal, then what you should be asking yourself is: 'What combination of clinical/radiographic findings carries the highest chance of maintaining the periodontal stability of the tooth/teeth in question?'

Patient Comfort/Aesthetics as an Outcome

- If patient comfort/aesthetics is your outcome, then you need to make your patient aware that some periodontal therapies do have as sequelae recession, dentinal sensitivity and increased mobility
- This is often used as a justification for not performing pocket reduction therapies, "But patients don't like _____ (insert negative sequelae here)."

Patient Comfort/Aesthetics as an Outcome

- Do the negative sequelae of pocket reduction therapies make them mutually exclusive to having "patient-centered" outcomes[5]

It depends….

…on if you think ***this*** is a desirable patient-centered outcome

Overview

1. Introduction
2. What does "maintained" mean?
3. Evidence for maintaining deep pockets

May it Please the Court….

- Let's dissect some common arguments on either side of the question
- We'll begin with arguments in favour of "maintaining" non-bleeding deep pockets

Argument #1

Absence of BoP is an excellent indicator of stability[6]

- One of the all-time most famous perio studies by Lang et al.
- Demonstrated that no bleeding at sites more reliably predicted non-progression of attachment loss than did bleeding at sites predict progression of attachment loss
- The only problem? **86% OF THE SITES WERE 1-3MM**

Argument #2

Long-term studies show that deep pockets can be maintained[7,8,9]

- Multiple long-term studies following deep pockets over a five-year period demonstrate that deep pockets can maintain attachment levels, and teeth with deep pockets can be retained
- The only problem? **NONE** of these studies classified the treated pockets into their depths during the maintenance phase (they only classified them into their initial probing depths), and none of these studies subdivided the deep pockets being maintained as bleeding or not

Argument #3

Untreated periodontitis does not necessarily progress[10]

- A very famous long-term study of periodontitis identified that in an untreated, unmaintained population (in this case, Sri Lankan tea labourers), not all sites with periodontitis develop progressive attachment loss
- The only problem? The study used neither probing depth nor bleeding on probing as clinical measures to decide on presence, or progression, of periodontal disease

Overview

1. Introduction
2. What does "maintained" mean?
3. Evidence for maintaining deep pockets
4. Evidence against maintaining deep pockets

Argument #1

The deeper the pocket, the more likely it is to bleed[4]

- Back to one of the all-time most famous perio studies by Lang et al.
- Demonstrated that pockets deeper than 4 mm were much more likely to bleed than pockets 3 mm or less: *"residual periodontal pockets ≥4 mm appear to bleed more frequently on probing than sites with probing depths of less than 4mm. This may indicate a higher risk for deep pockets to lose further attachment than shallow sites"*

Argument #2

Long-term studies show that shallow pockets are least likely to have recurrent disease[11,12,13]

- Multiple long-term studies following treated and maintained pockets over a 5 to14-year period demonstrate that pockets of 1-3 mm are:
  - less likely to develop disease recurrence
  - less likely to require additional therapy
  - less likely to be extracted

than their counterparts with deeper pockets of 4 mm or more.

Argument #3

Untreated periodontitis is very likely to progress[10]

- Back to the very famous long-term study of periodontitis in an untreated, unmaintained population (the Sri Lankan tea labourers)
- 8% of individuals exhibited rapidly progressing periodontitis (average attachment loss of 9mm over 16 years)
- 81% of individuals exhibited moderately progressing periodontitis (average attachment loss of 4mm over 16 years)

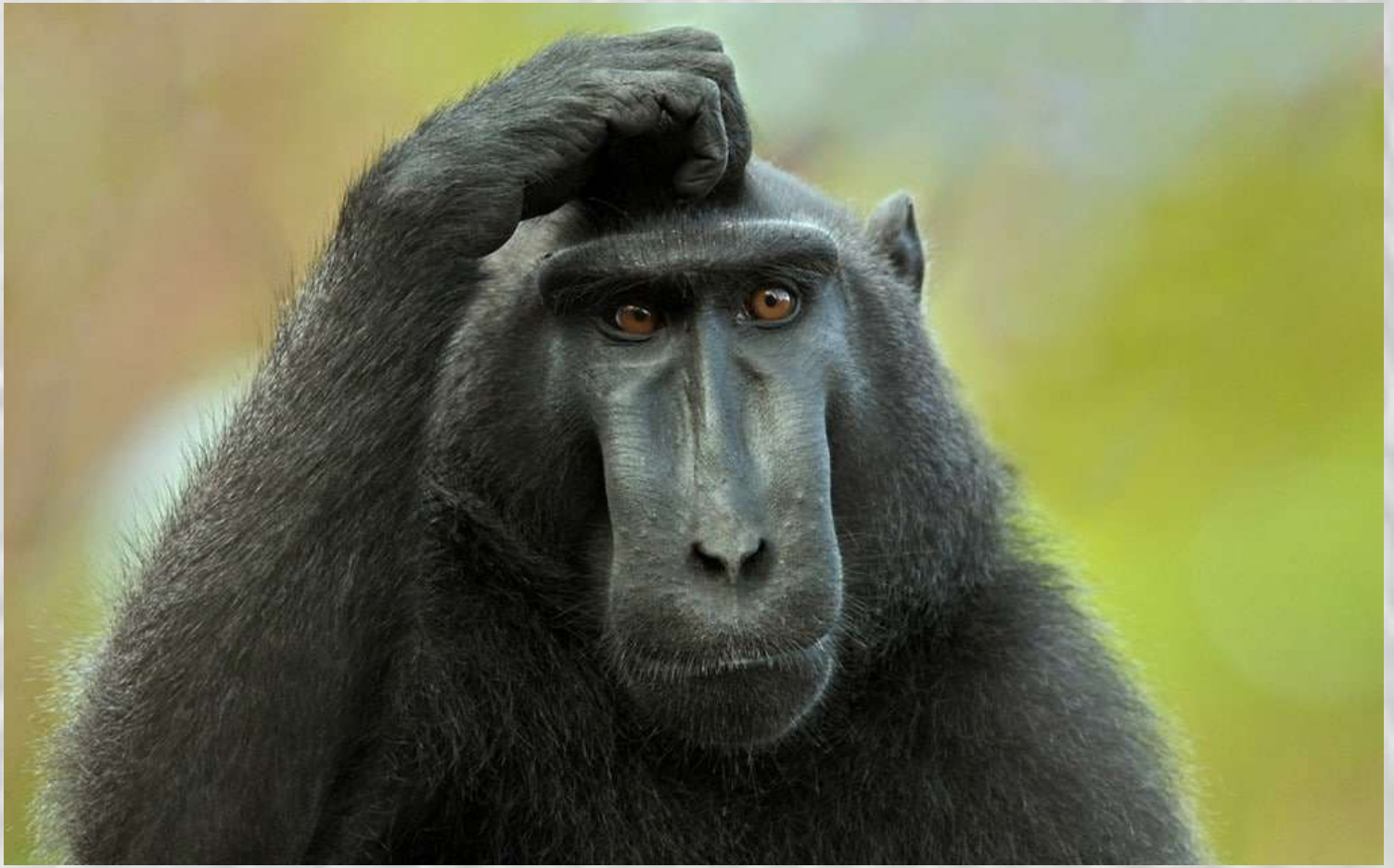
Overview

1. Introduction
2. What does "maintained" mean?
3. Evidence for maintaining deep pockets
4. Evidence against maintaining deep pockets
5. The verdict

Supervised Neglect?

- Every practitioner needs to decide for themselves what they are comfortable with
- The question of, 'Can this 5mm pocket, which isn't bleeding at this particular recall visit, be maintained?' is not to be confused with, "***SHOULD*** this 5mm pocket, which isn't bleeding at this particular recall visit, be maintained?'

Questions?



Thanks for being patient!

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Overview

1. Why don't all pockets resolve?
2. Can deep pockets be maintained indefinitely?
3. The classic – osseous resective surgery

Overview

1. Indications and contraindications
2. Pulling the trigger
3. Handling esthetic areas
4. How much is too much?
5. Does it work?

Overview

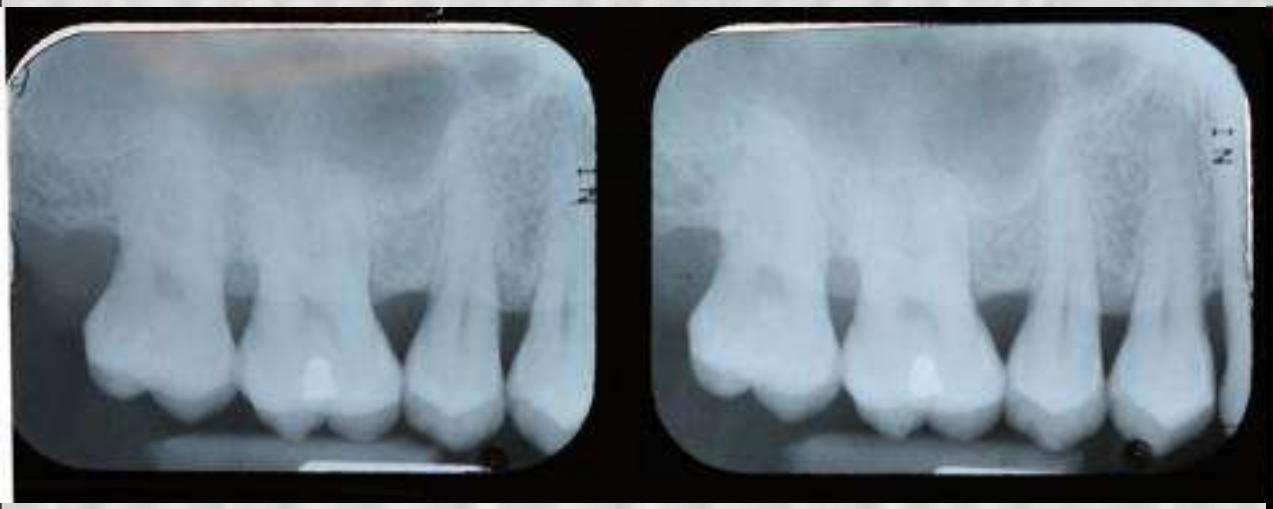
1. Indications and contraindications

Indications – Pocket Reduction

- ≥5mm pockets suspected of being associated with
  1. aberrant osseous structures such as ridges/exostoses
  2. certain osseous defects
  3. negative osseous architecture

Certain Osseous Defects?

- Craters and shallow, wide vertical defects are excellent indications for pocket reduction via osseous resection



Certain Osseous Defects?

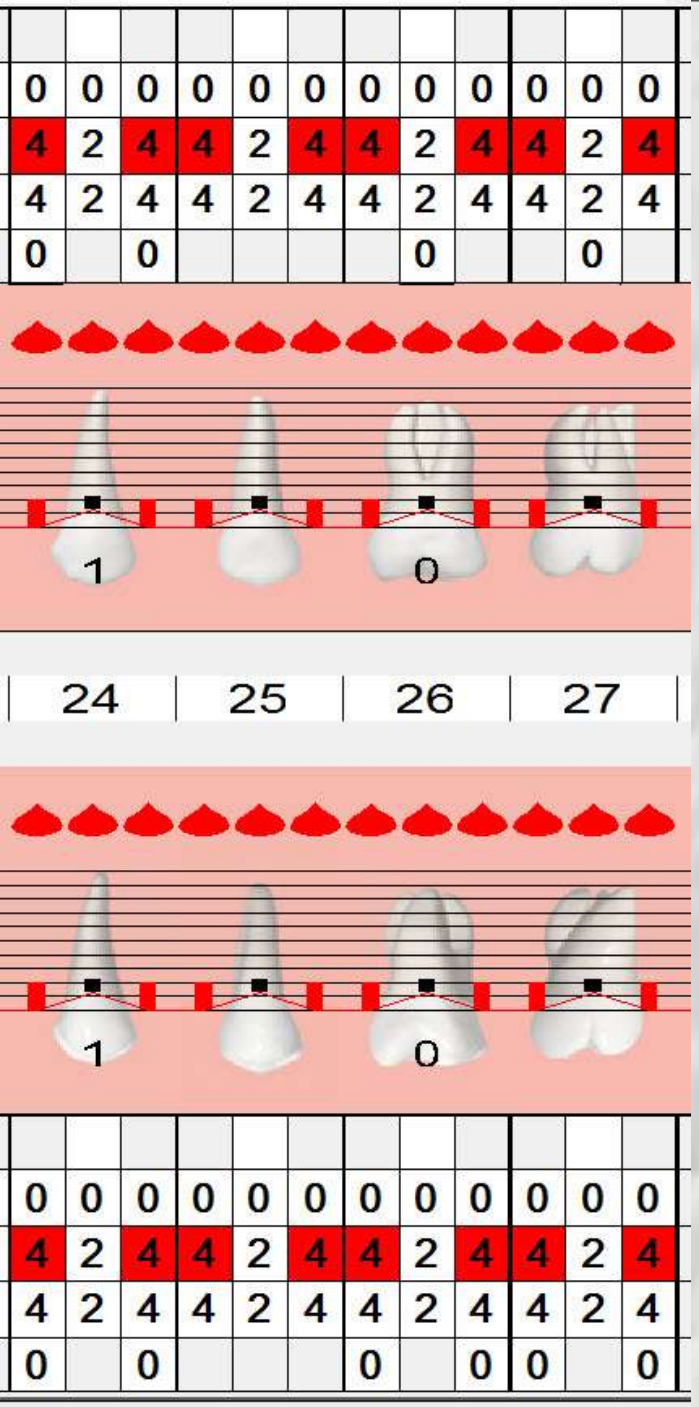
- Deep, narrow vertical defects and circumferential defects may be more amenable to **regeneration**

Indications - Exception #1

- **IF** you have a region of 4mm pockets, all of which are BoP, inflamed, and associated with radiographic evidence of osseous defects…

Exception #1

…then surgical correction is indicated

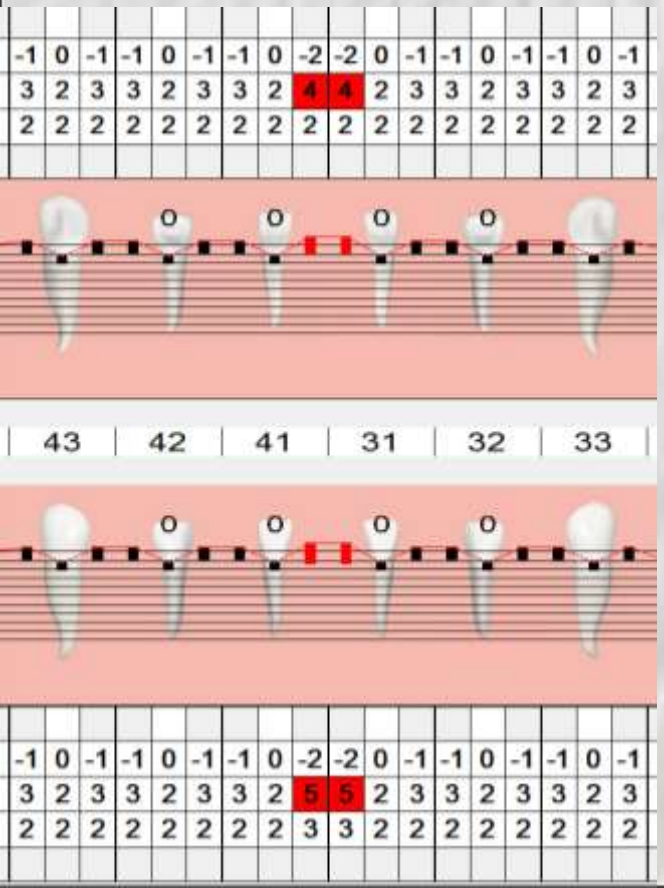


Contraindications - Exception #2

- **IF** you have an **<u>isolated</u>** pocket of 5mm which is
  - not bleeding and not inflamed,
  - not accumulating plaque or calculus,
  - not associated with an osseous defect,
  - in a healthy, non-smoking patient with excellent oral hygiene and maintenance compliance….

Exception #2

…then you may consider maintaining that area non-surgically



Contraindications - Exception #3

- **IF** you have an isolated pocket of 4-6mm which
  - has been Sc/RP,
  - **still has clinically detectable subgingival calculus,**
  - is not associated with an osseous defect,

then you may consider redoing the Sc/RP at that site

Anatomical Contraindications

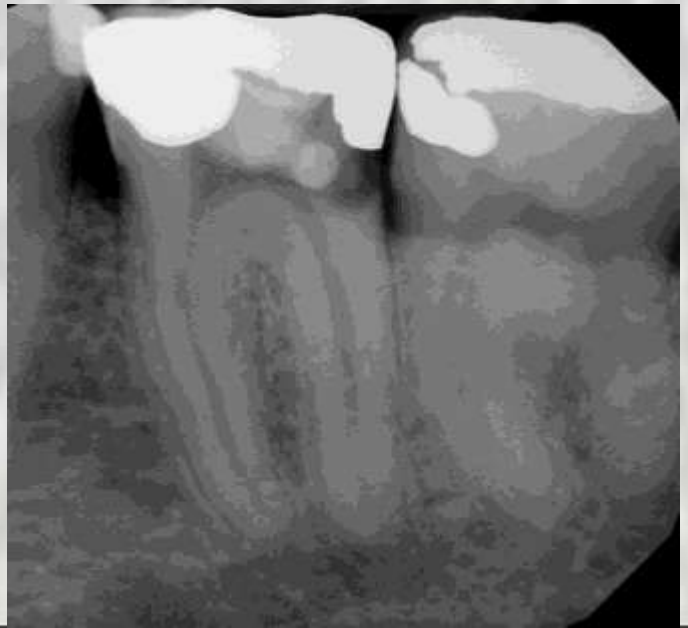
- *Expected crown:root ratio of affected teeth will be compromised*
- Roots of adjacent teeth are too close together to instrument between them
- Sinus is too close to osseous crest
- External oblique ridge projects horizontally in an aggressive fashion

Crown:Root Ratio

- Because osseous resection involves the removal of bone, it obviously doesn't make sense to compromise the C:R ratio to >1:1 via therapy

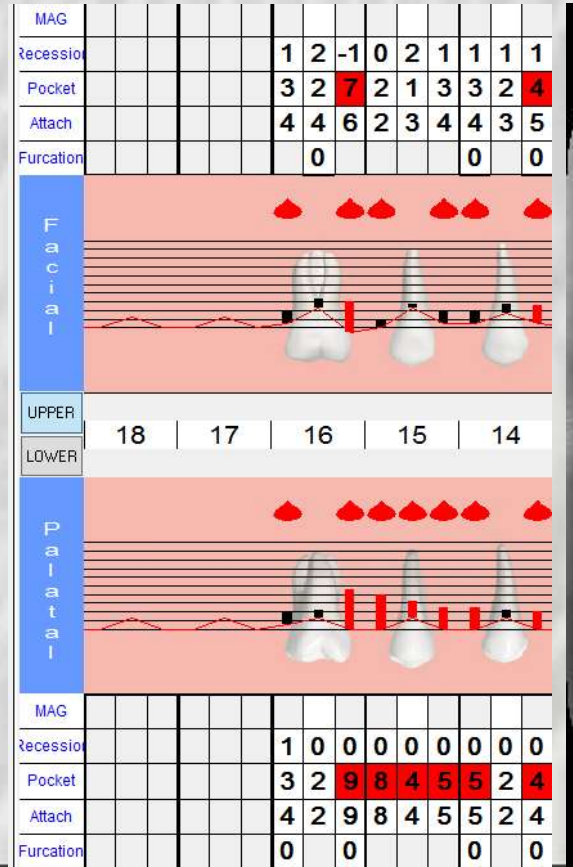
Root Proximity

- You need an adequate width of bone between roots for your instruments/burs
- Teeth that have narrow emergence profiles and teeth that have poorly angulated roots can sometimes have inadequate space interproximally



Maxillary Sinus

- Can you imagine performing a beautiful pocket reduction…only to have exposed the sinus?



External Oblique Ridge

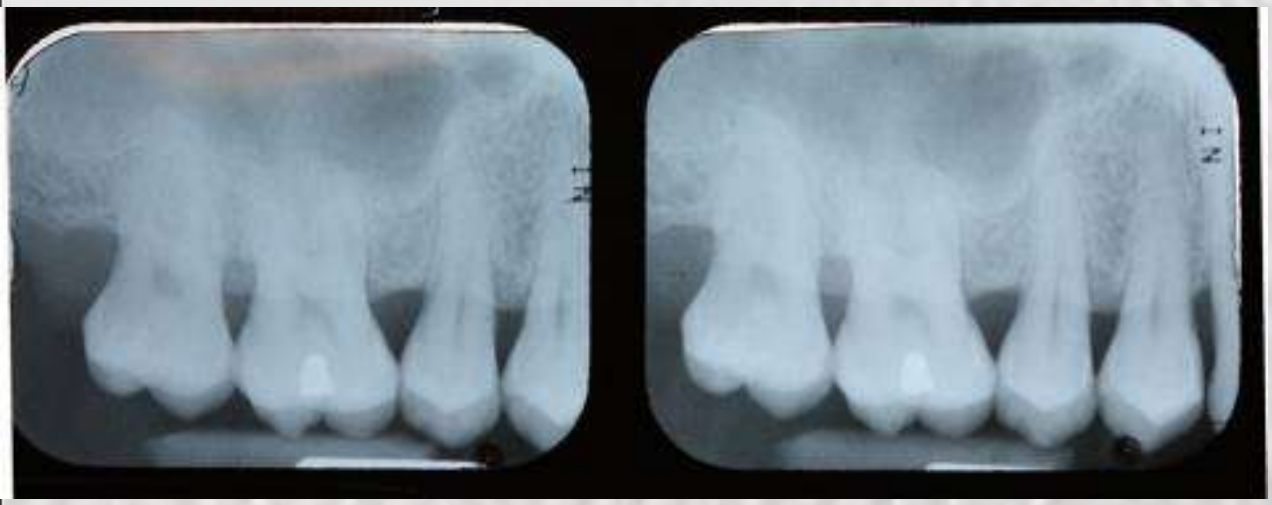
- As you will soon see, osseous surgery as done in pocket reductions involves thinning out Bu and Li/Pa bone
- If the external oblique ridge projects horizontally outward, this osseous resection would involve an unacceptable amount of bony removal

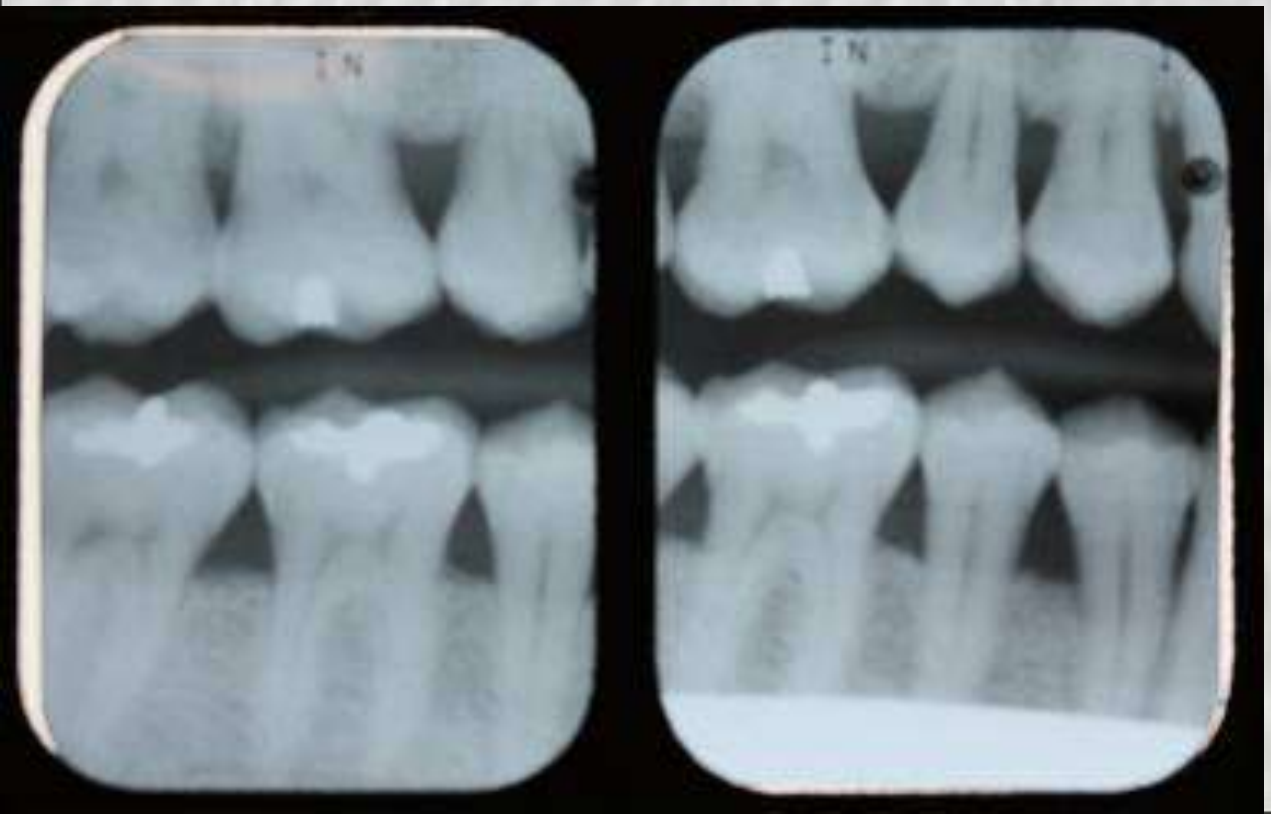
Overview

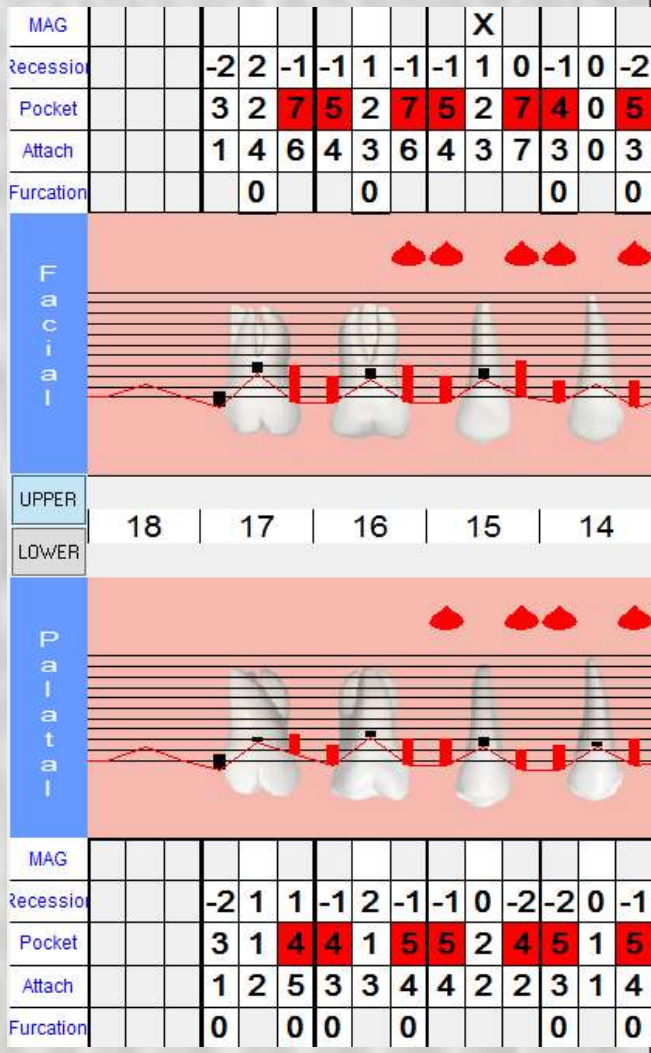
1. Indications and contraindications
2. Pulling the trigger

Case

- Let's go through a case together to see how it all goes down
- Introducing Mr. WC, one of my favourite patients from my residency in Virginia



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Palatal
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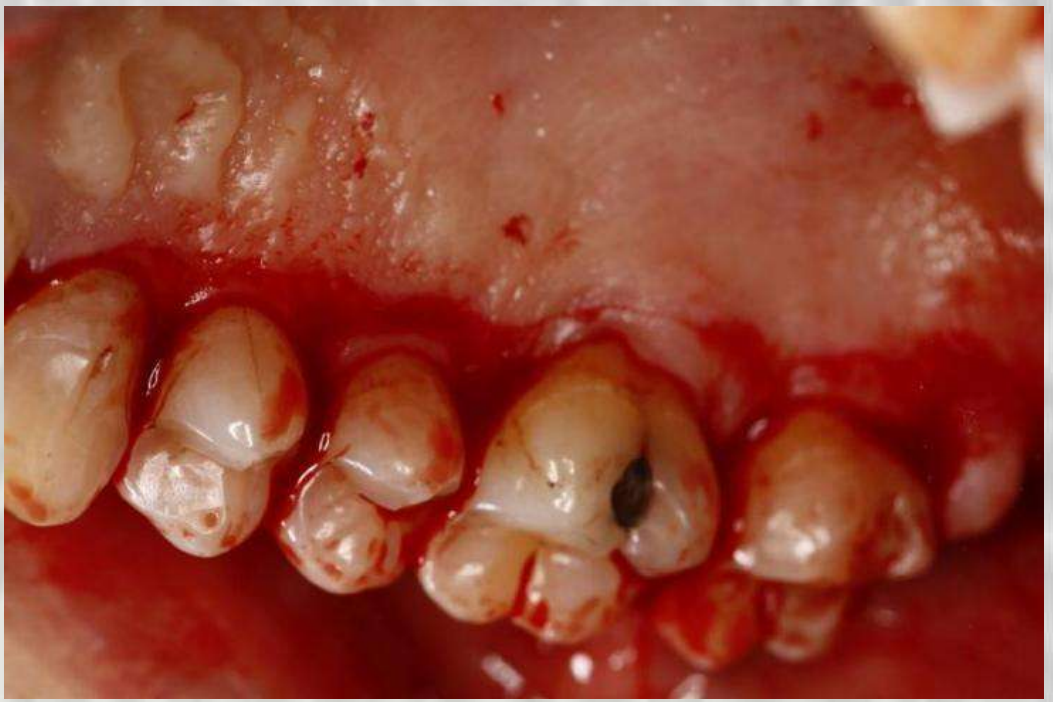
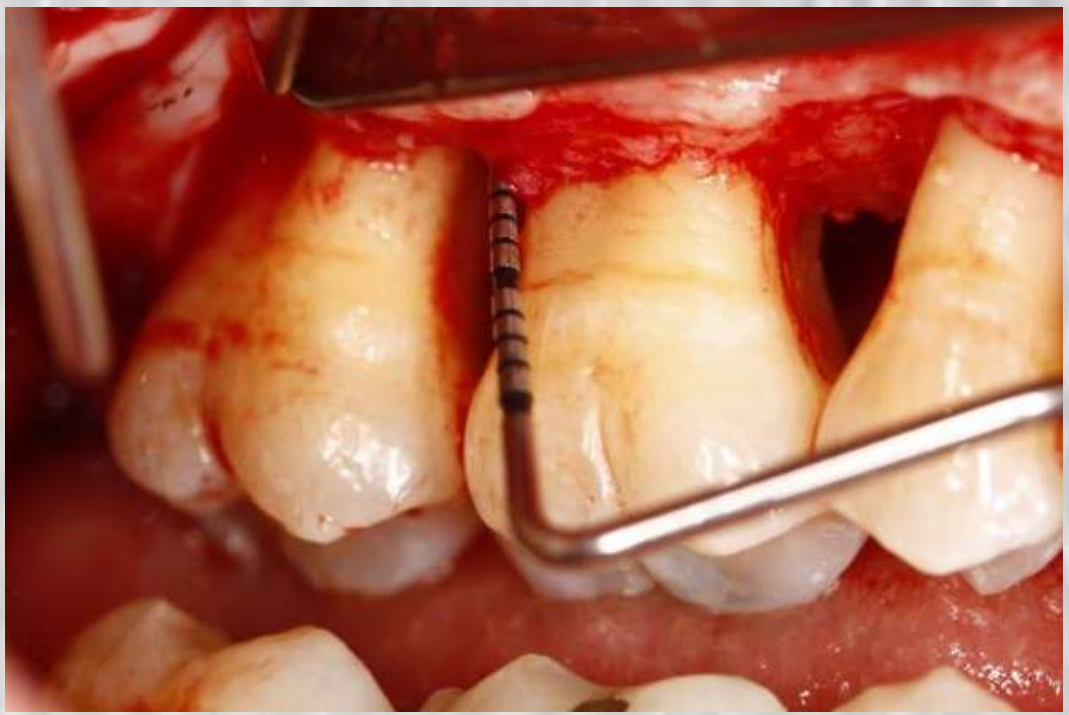
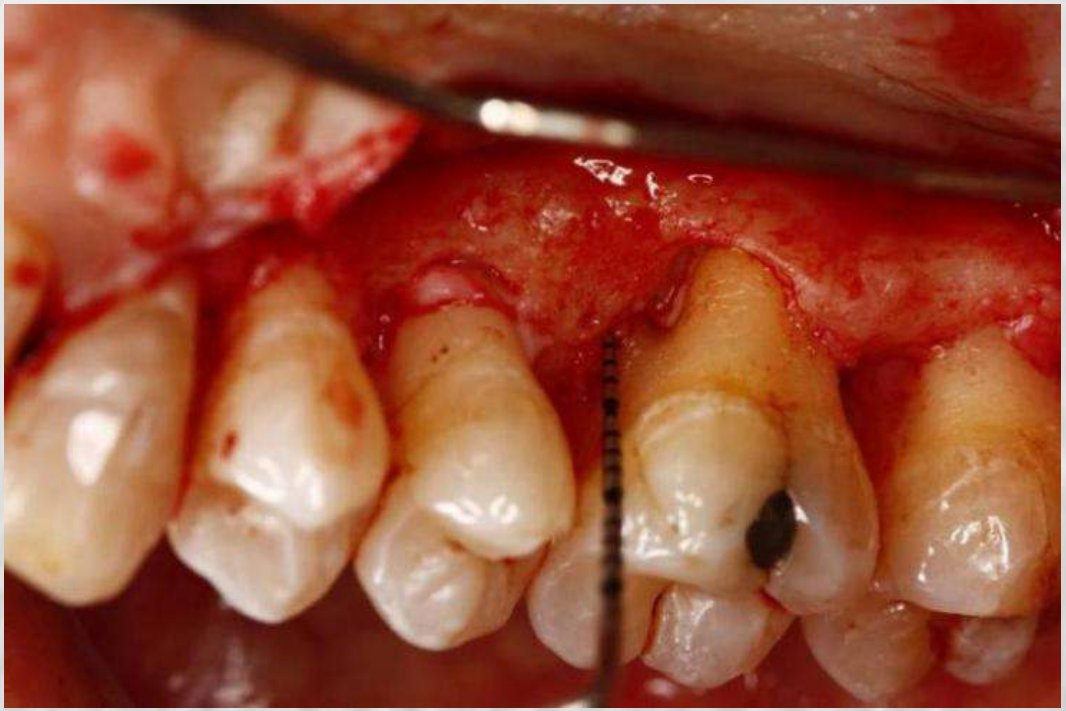
Incisions

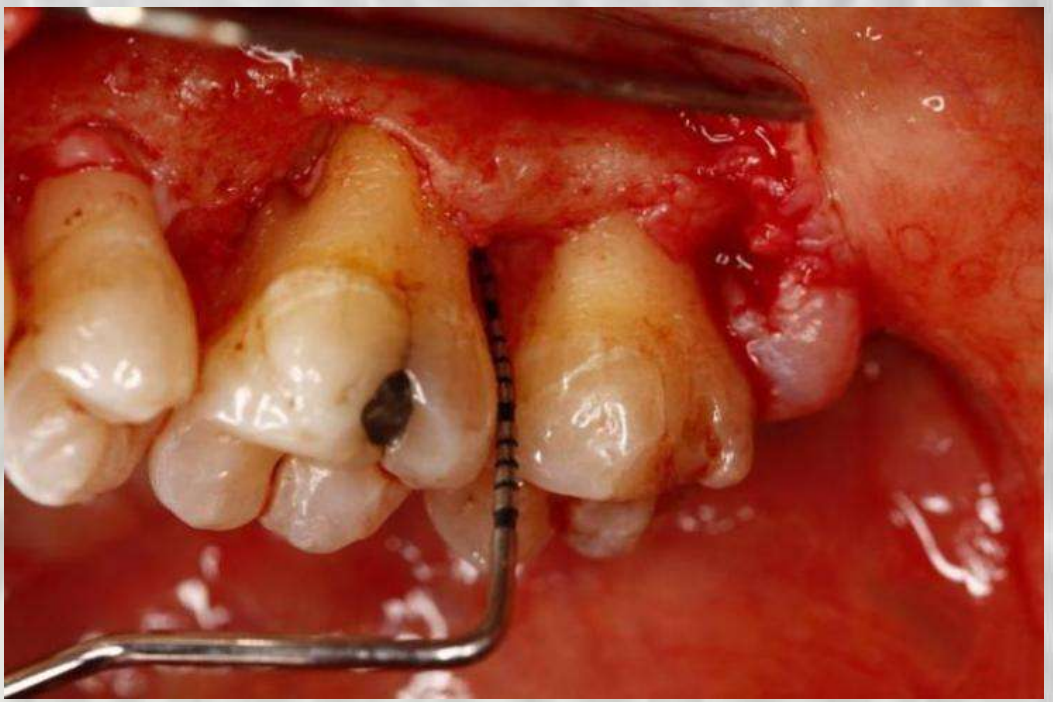


Buccal Osseous Etiology



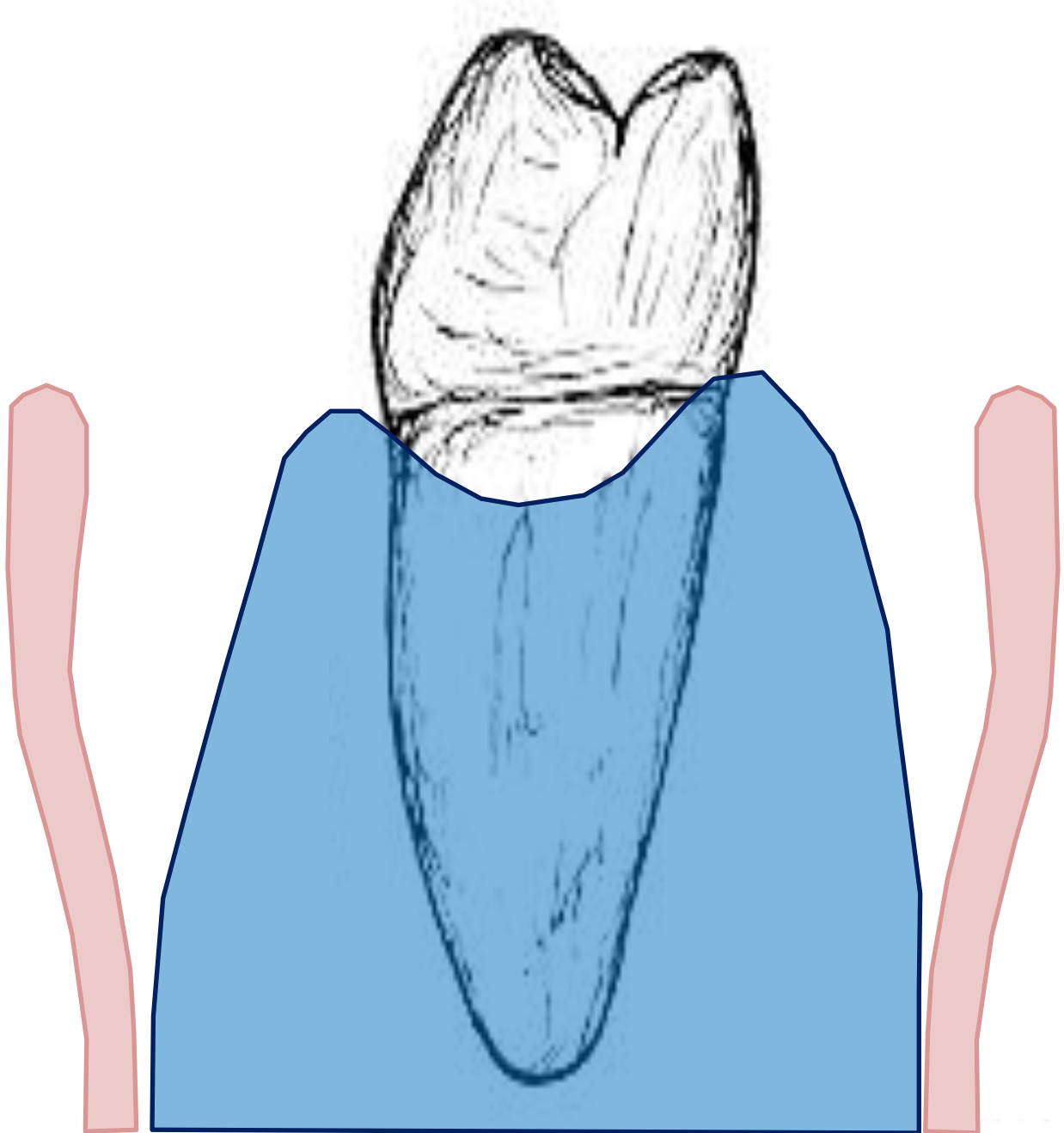


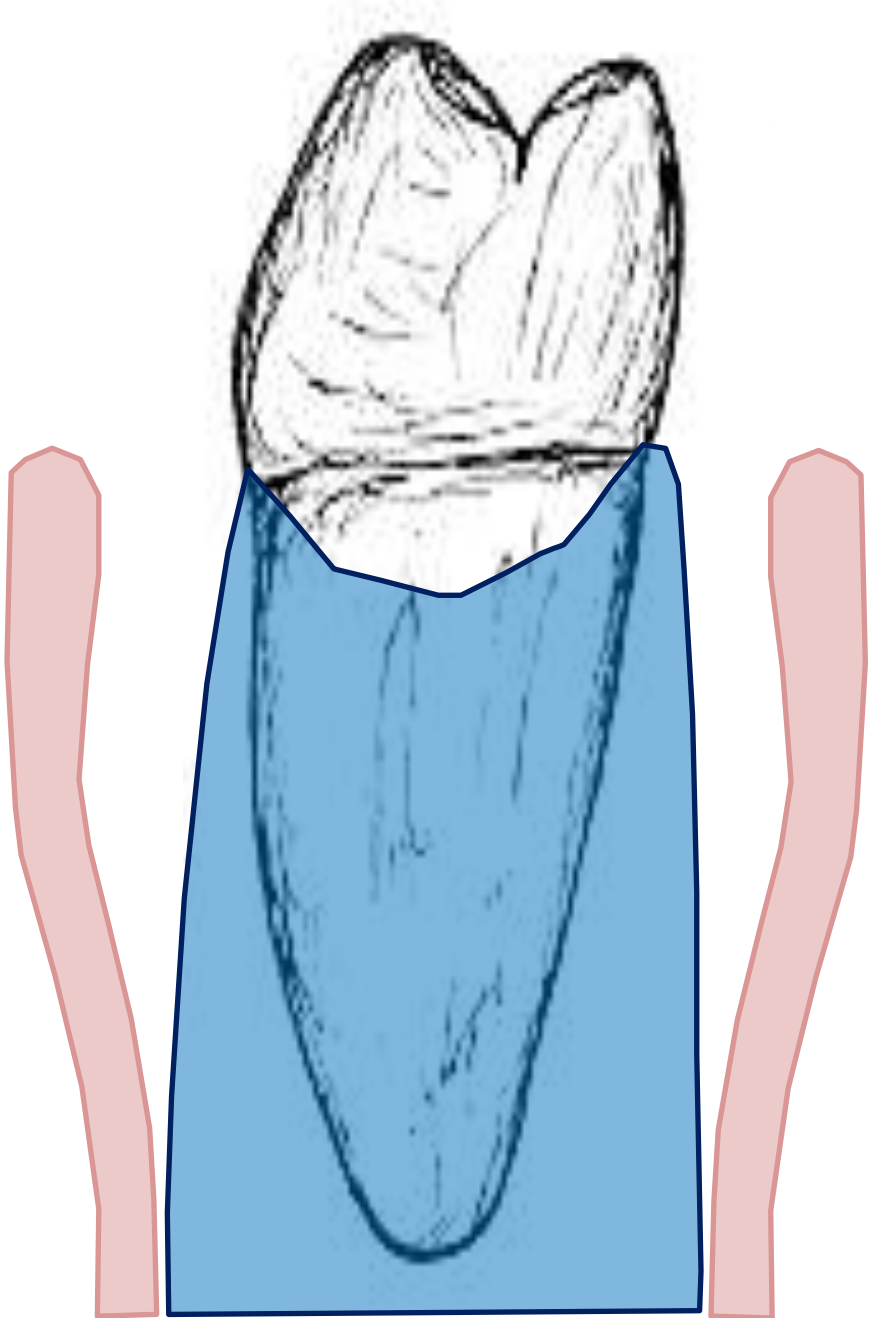
Palatal Osseous Etiology

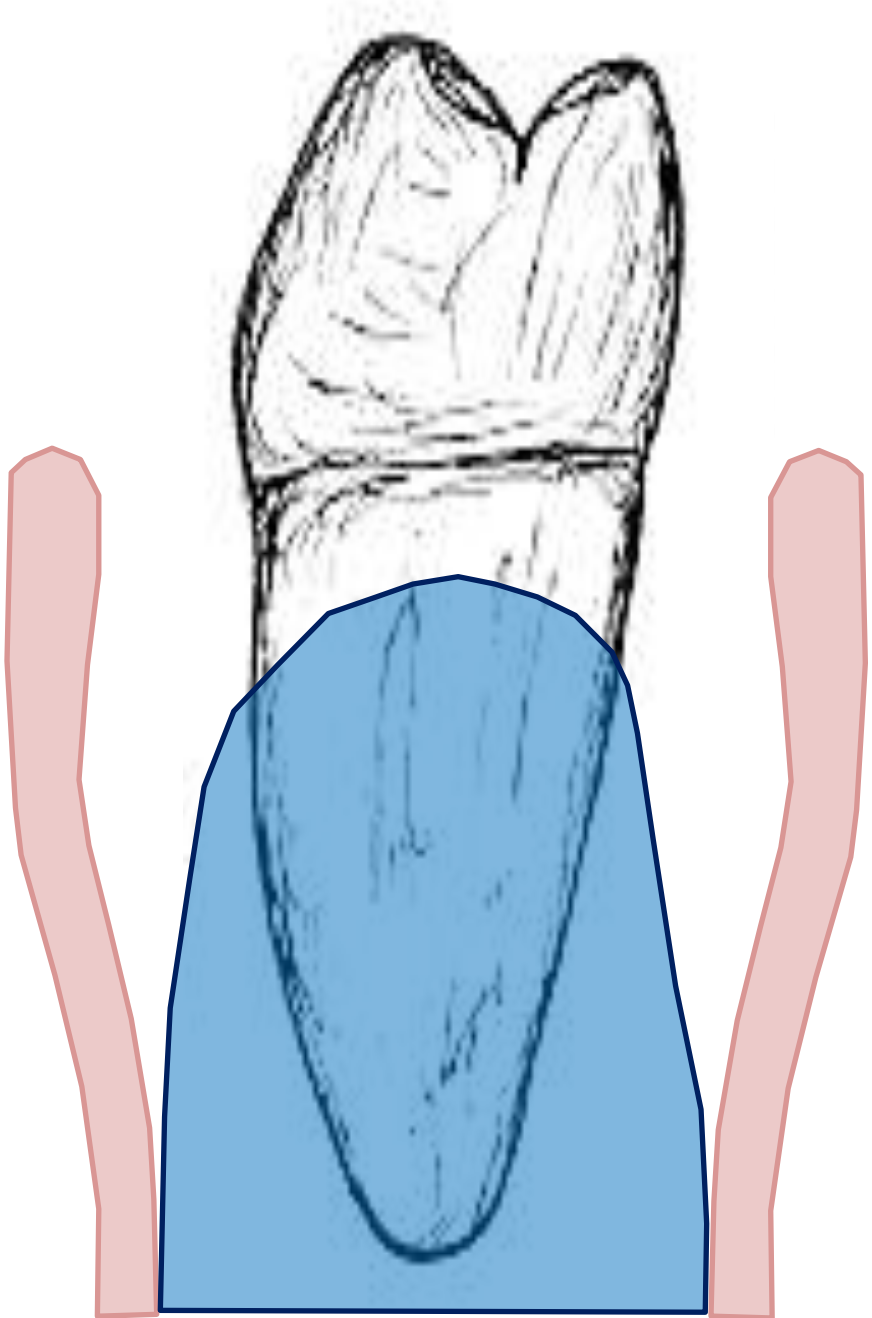


Sequence of Osseous Resection

1. **Osteoplasty** – removal of non-supporting alveolar bone
   a. Vertical grooving – removes ledges and exostoses interproximally
   b. Radicular blending – removes ledges and exostoses everywhere else
2. **Ostectomy** – removal of supporting alveolar bone
   c. Removal of the lips of the osseous defect
   d. Removal of buccal and lingual supporting bone to promote positive architecture

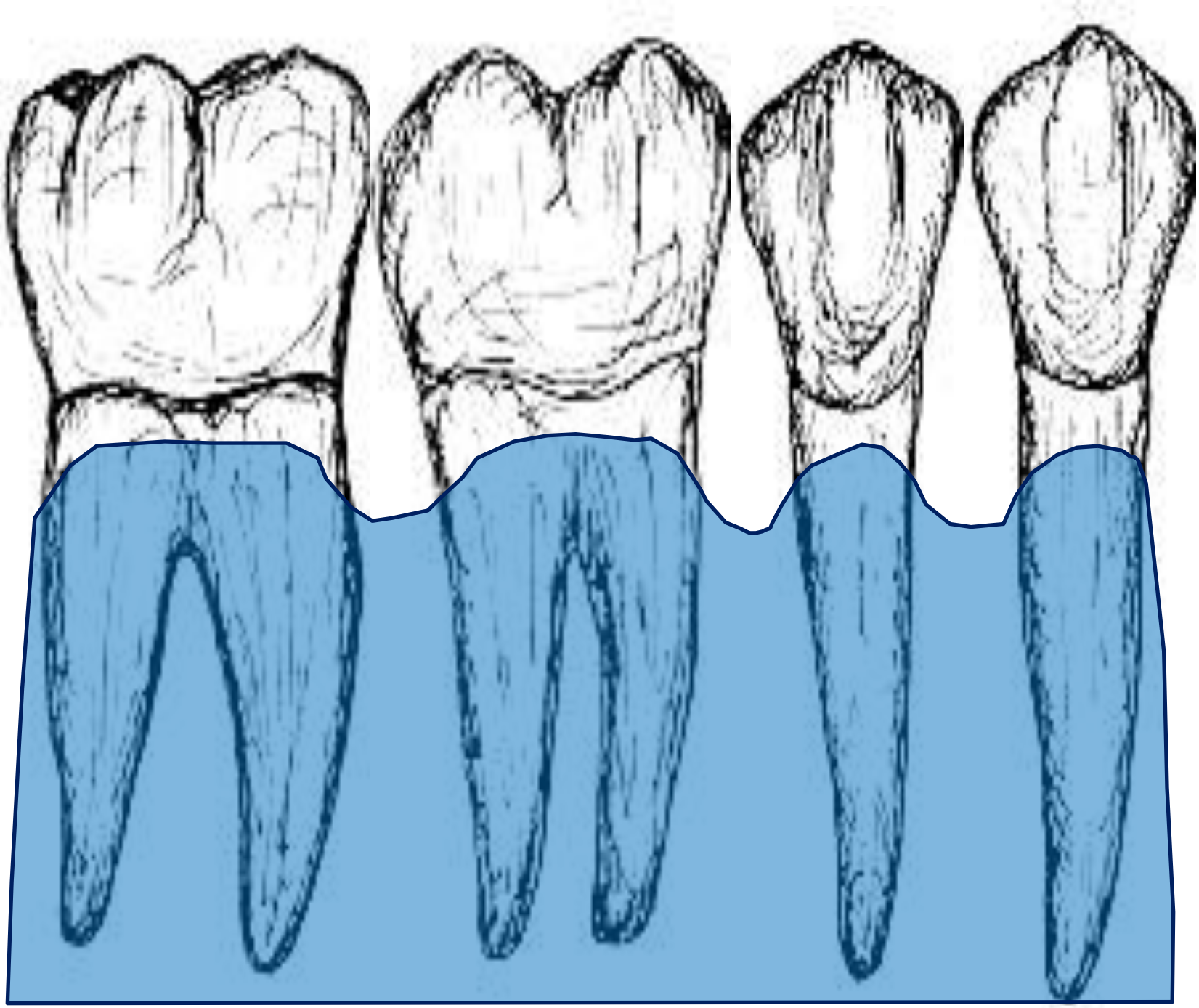






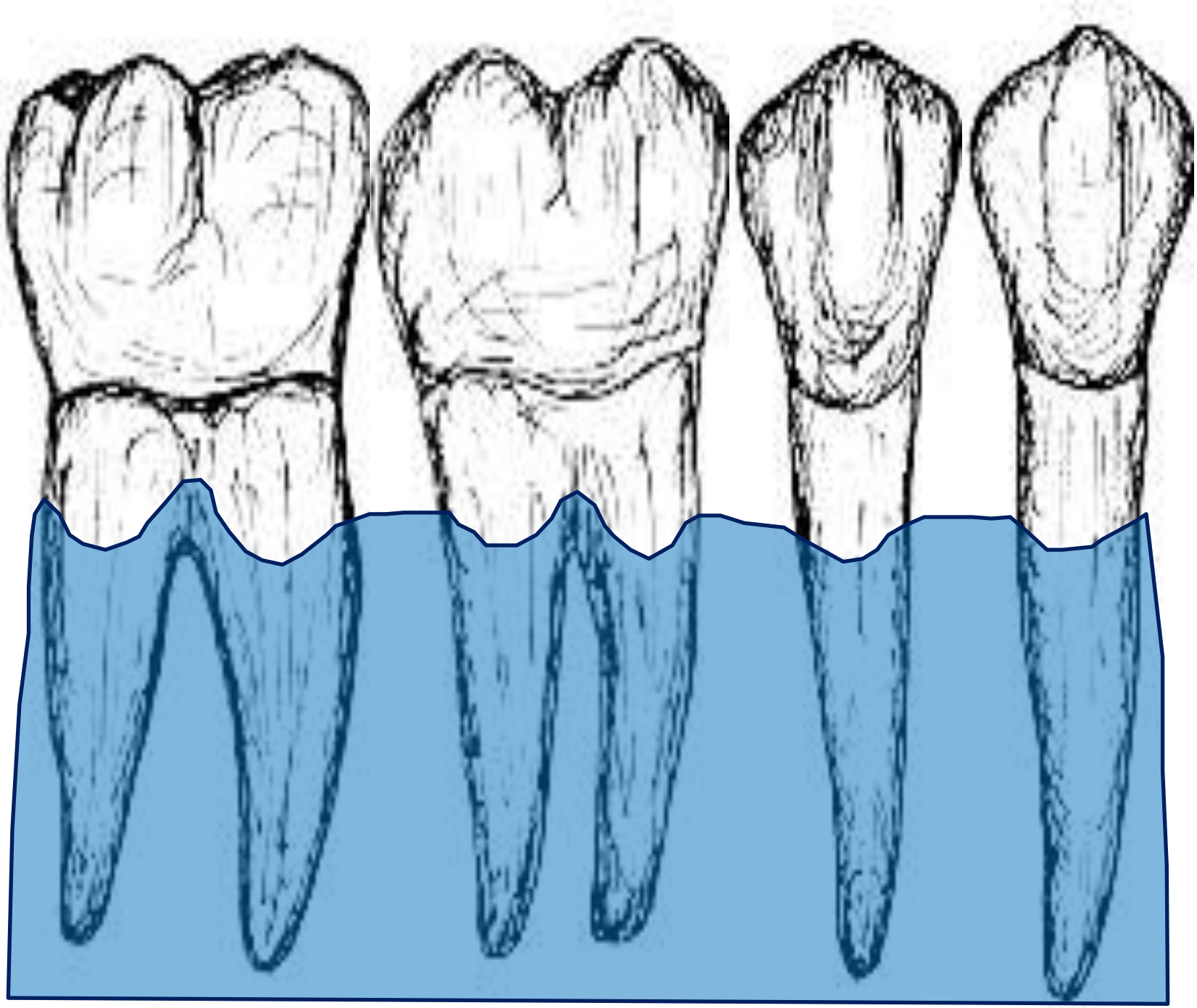
Where will this leave us in terms of architecture?

Negative!

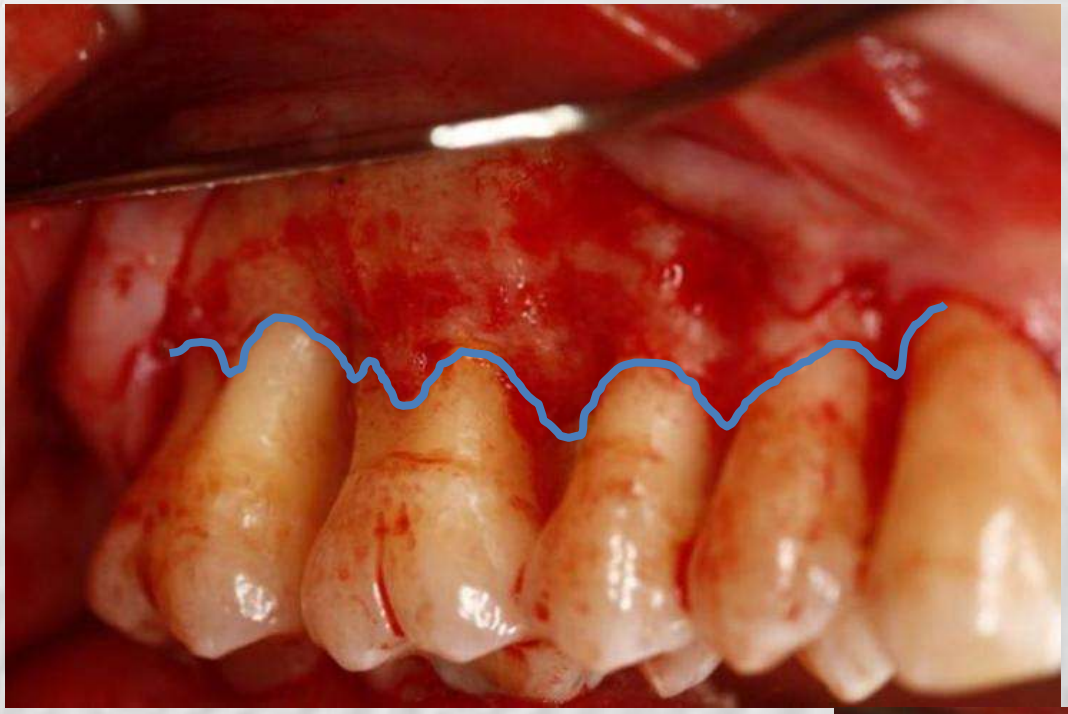


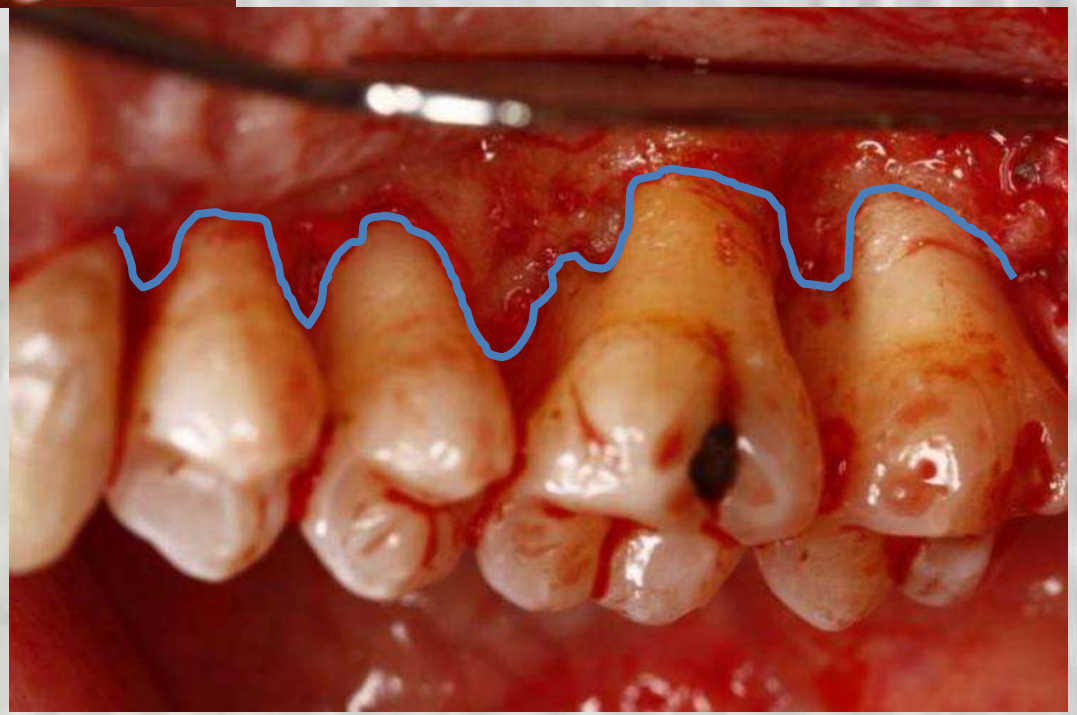
How do we handle furcation areas?

Premolarization!

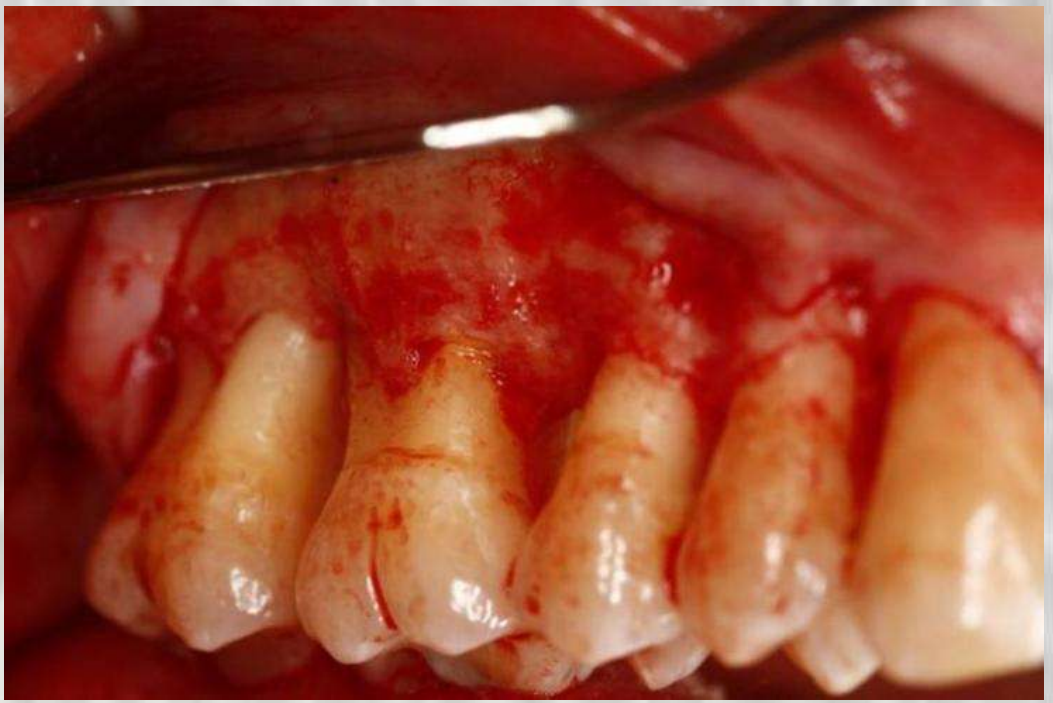


Post-Osseous Resection





Comparison



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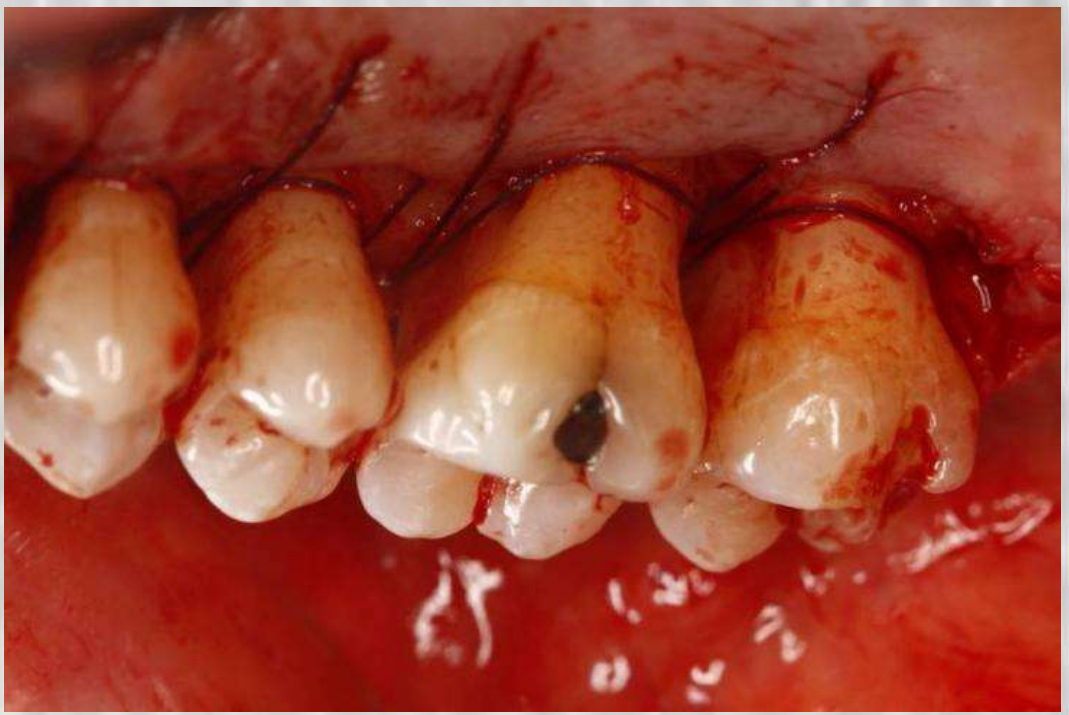


Post-Op

Comparison

Comparison

Overview

1. Indications and contraindications
2. Pulling the trigger
3. Handling esthetic areas

The Esthetic Zone

- The esthetic zone in a patient is ~~from #14 to #24~~ whatever you can see when a patient smiles/speaks/opens their mouth

The Esthetic Zone

- It is only reasonable that patients do not want to compromise their esthetic appearance too much
- Classical osseous resection in this area will lead to unaesthetic recession, as well as the formation of "black triangles" interproximally

Black Triangles

- The presence of an interproximal papilla is dependent on the **vertical distance between the contact point and the interproximal bone**[1]:
  - **5** mm distance – papilla present ~100% of the time
  - **6** mm distance – papilla present 56% of the time
  - **7** mm distance – papilla present ≤27% of the time

Good News!

- Fortunately, because the widths of the anterior teeth, and by extension their heights of contour, are smaller in the anterior region than in the posterior region, this means that the average interdental space is also smaller
- So?

So….

- Poorly regenerable defects such as craters are thus much less likely to form[2,3,4]
- Instead, the bone loss is generally flat horizontal, or in select cases (often aggressive perio) is vertical and amenable to regeneration

The Esthetic Zone

- A special technique is used to treat this area, as long as the remaining pockets are limited to the interproximal and palatal areas **(it is contraindicated if the pockets extend to the mid-buccal)**
- This procedure is called the Curtain Technique[5]

Curtain Technique

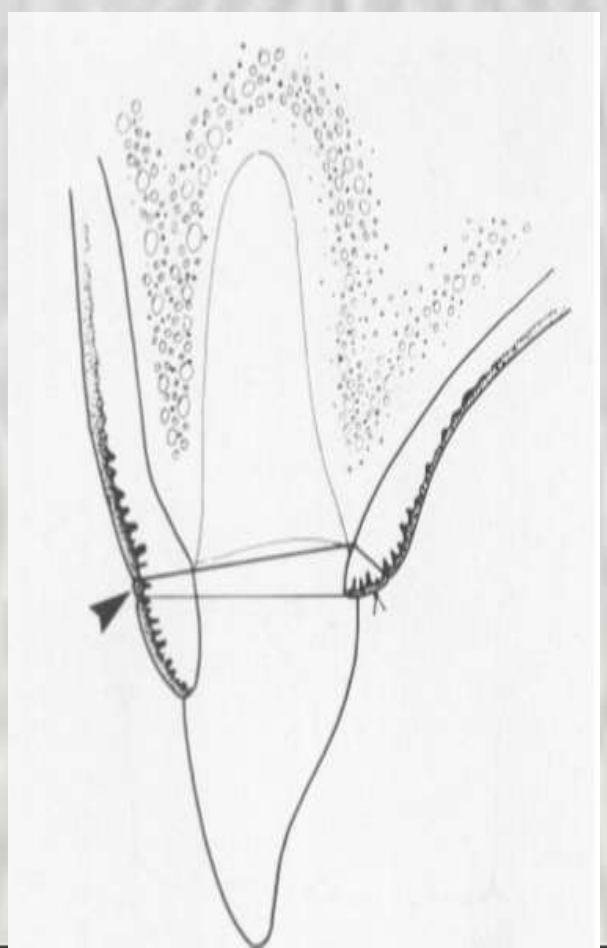
- The Curtain Technique involves submarginal palatal incisions to excise tissue on the anterior palate which is contributing to pocket depth
- Osteoplasty and ostectomy limited to the palate can be performed

Curtain Technique

- No buccal tissue is excised, nor is any buccal flap raised, thus minimal to no recession/black triangle formation is anticipated

Curtain Technique

- A special half-mattress suture is used to readapt the tissue



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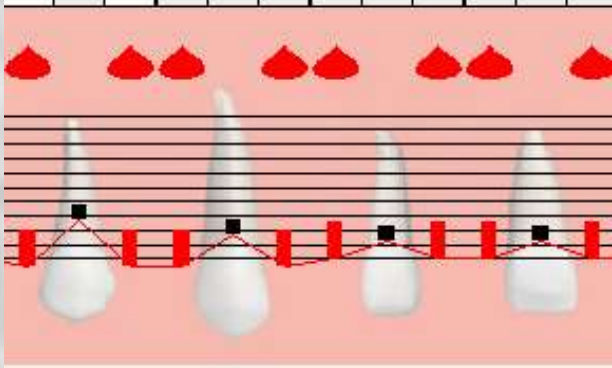

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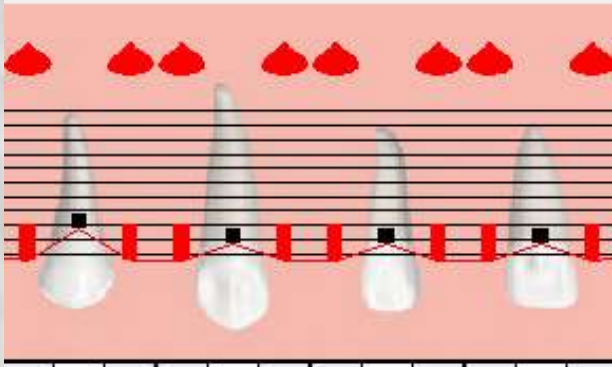

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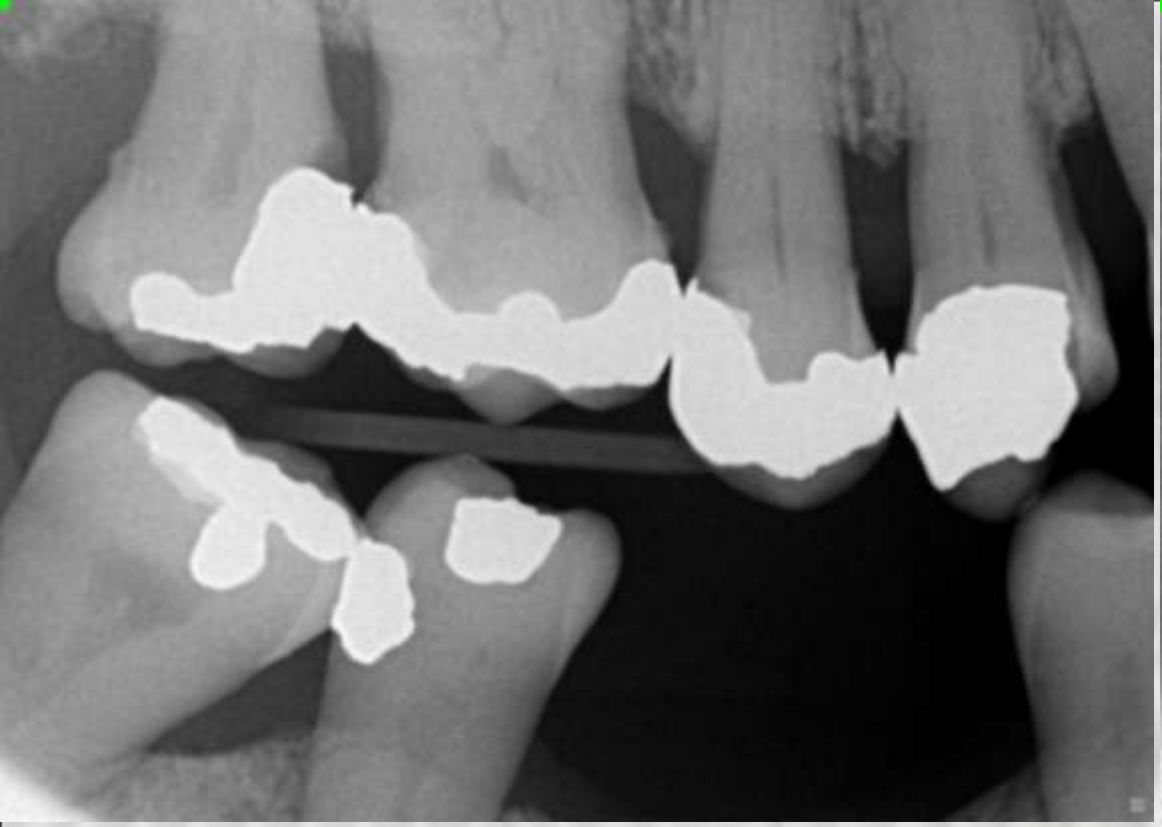
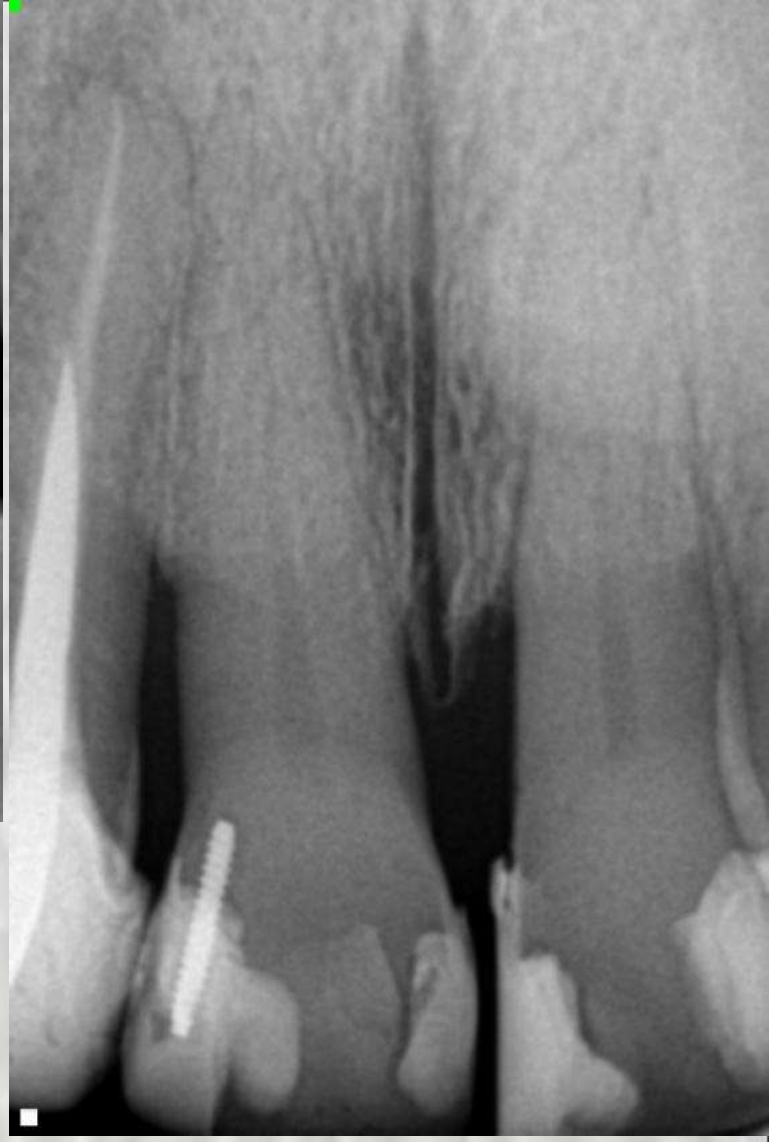
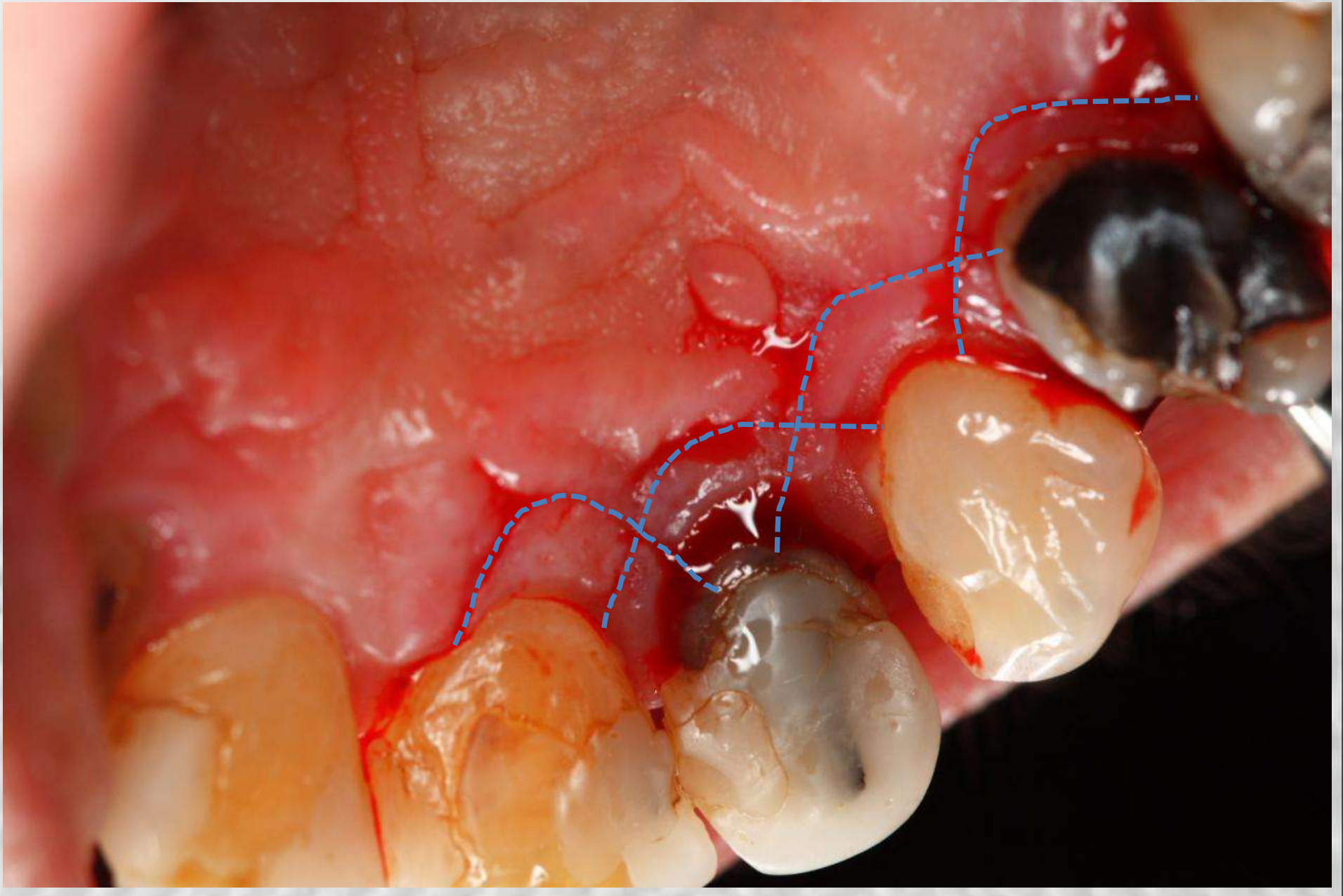






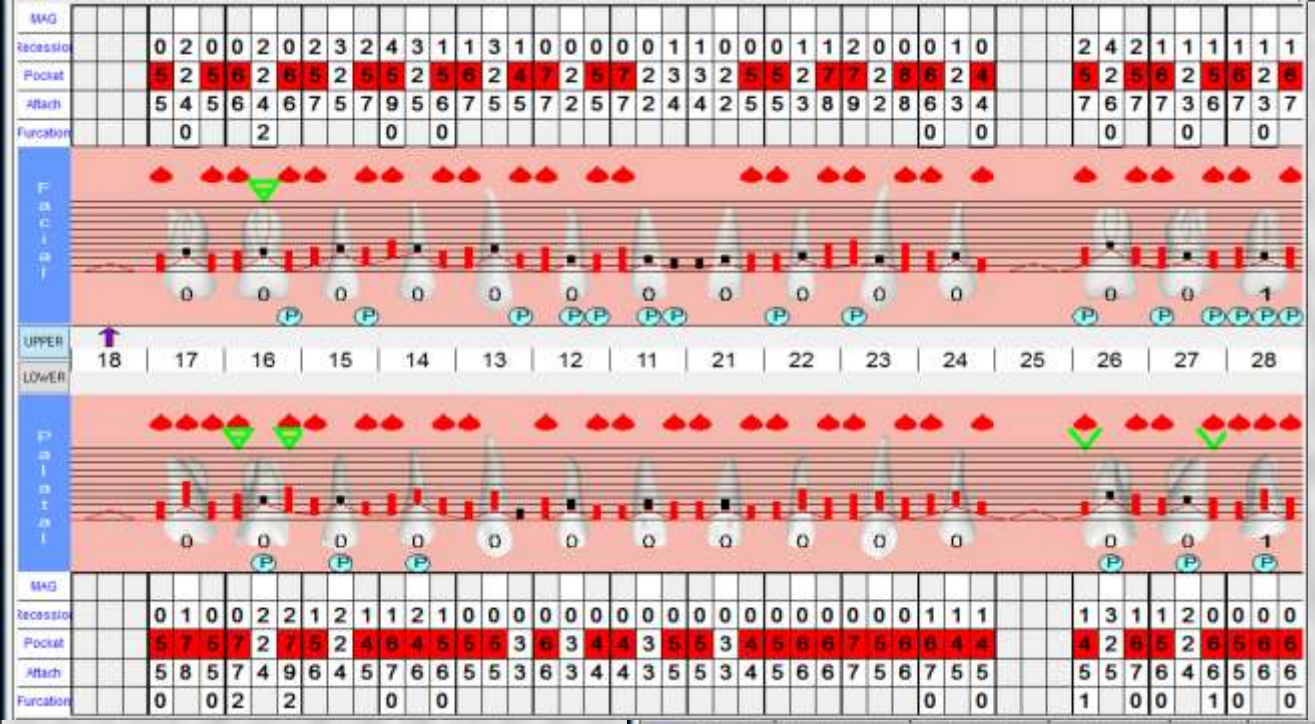
Post-op 3 years

Overview

1. Indications and contraindications
2. Pulling the trigger
3. Handling esthetic areas
4. How much is too much?

Let's look at Patient NK

(Case 6 from this morning's Periodontal Prognosis lecture)


MAG
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Pocket
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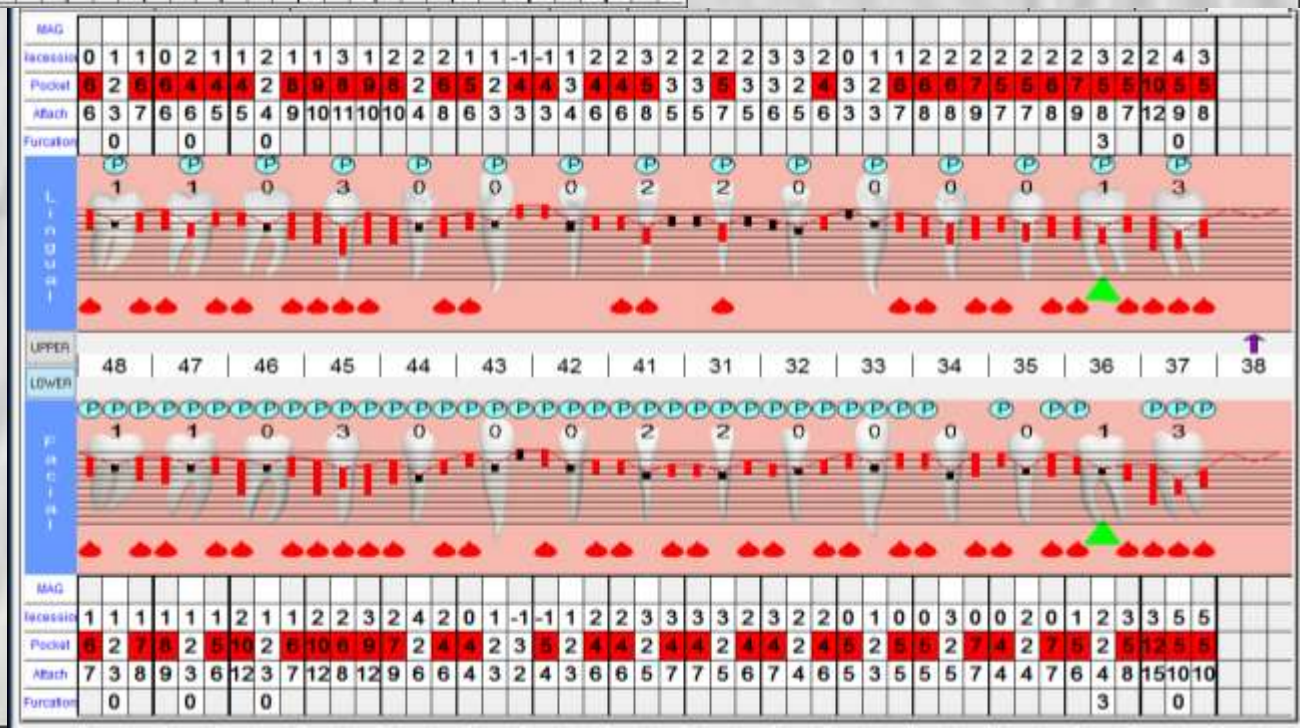
Palatal


MAG
Recession
Pocket
Attach
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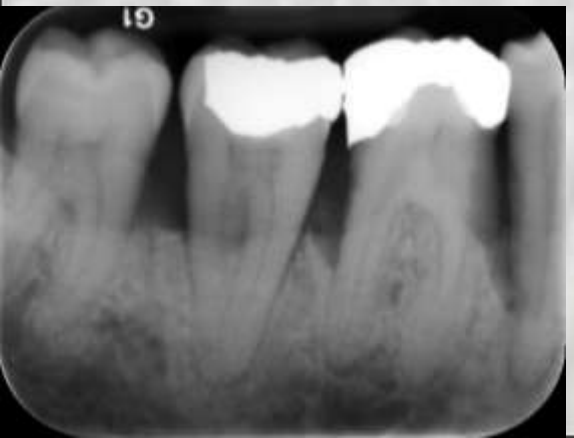
Facial


F5


F2


F2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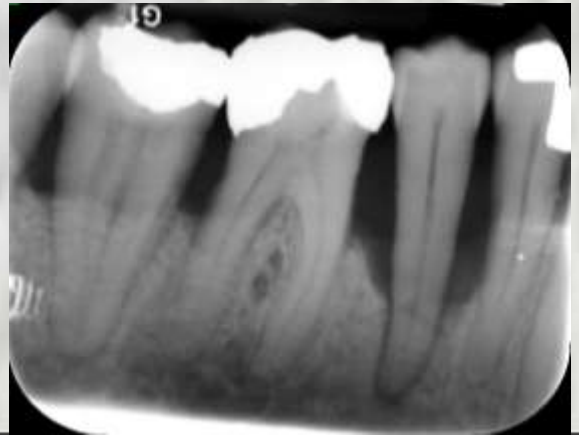

G1

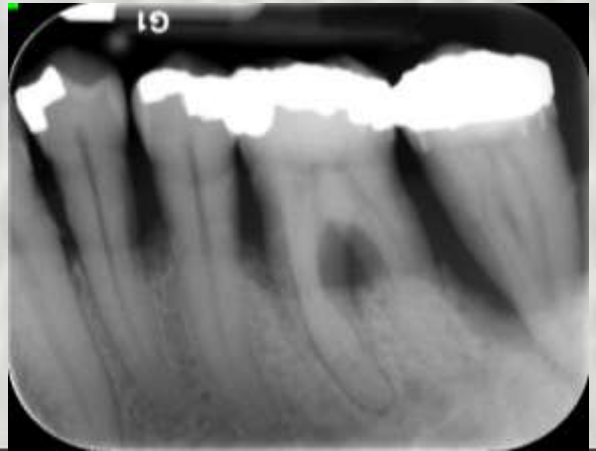
G6
H2
G5
G7
G7


F2


G5


G7


G2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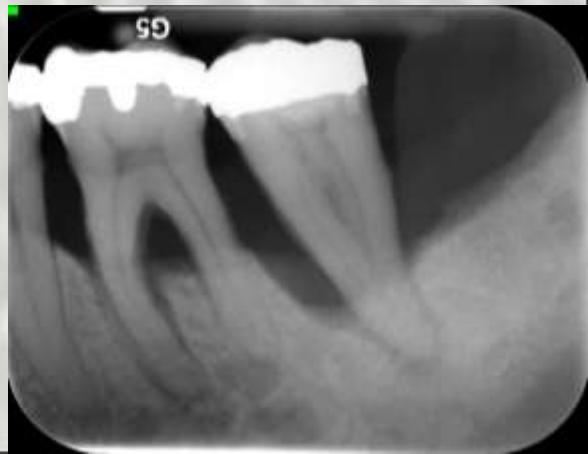

G5

Uh-oh….

- Patient NK has very deep posterior pockets, severe furcation involvements, and catastrophic crown:root ratios
- HOWEVER, his mobility is relatively localized, and he does not want to extract any more teeth than are absolutely necessary

Compromise

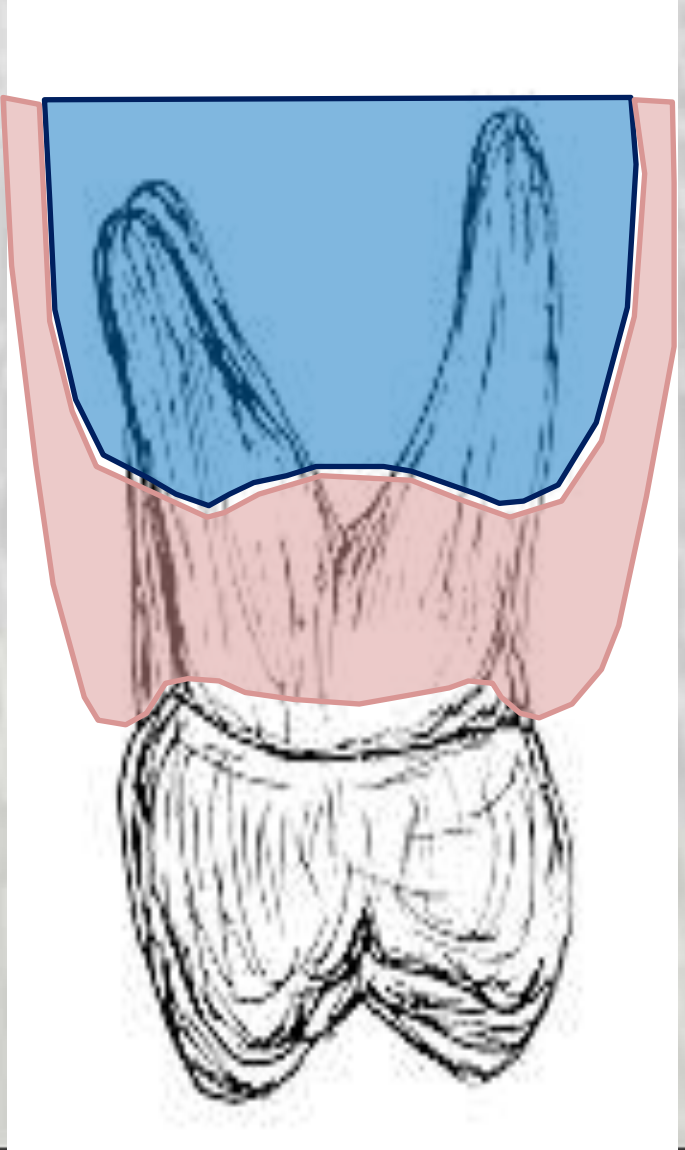
- Clearly, classical osseous resective therapy is contraindicated, as the crown:root ratio is already poor
- Just doing scaling and root planing will not address the obvious osseous defects
- What other options exist?

Compromise

- Resective therapy is really a continuum of therapies, rather than all or none
- In between Sc/RP and classical osseous resection are:
  1. Surgical debridement
  2. The palatal/lingual approaches

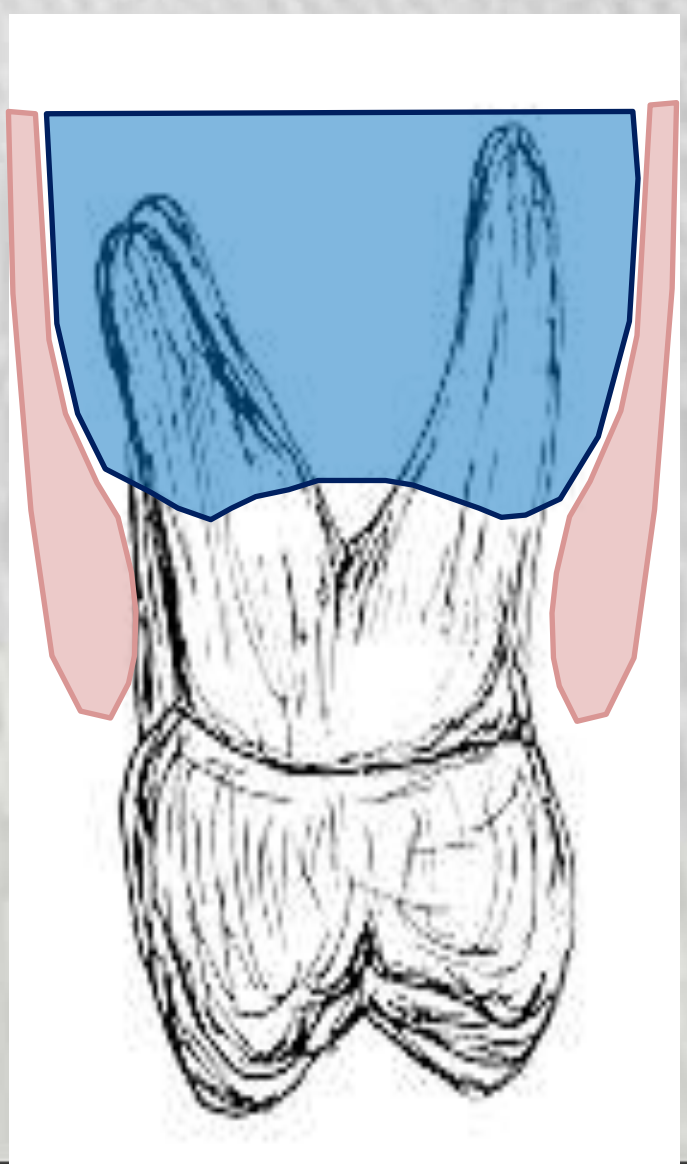
Surgical Debridement

- Imagine dealing with this situation:
- PD is deep, the crown:root ratio is already >1:1, and the furcation is involved



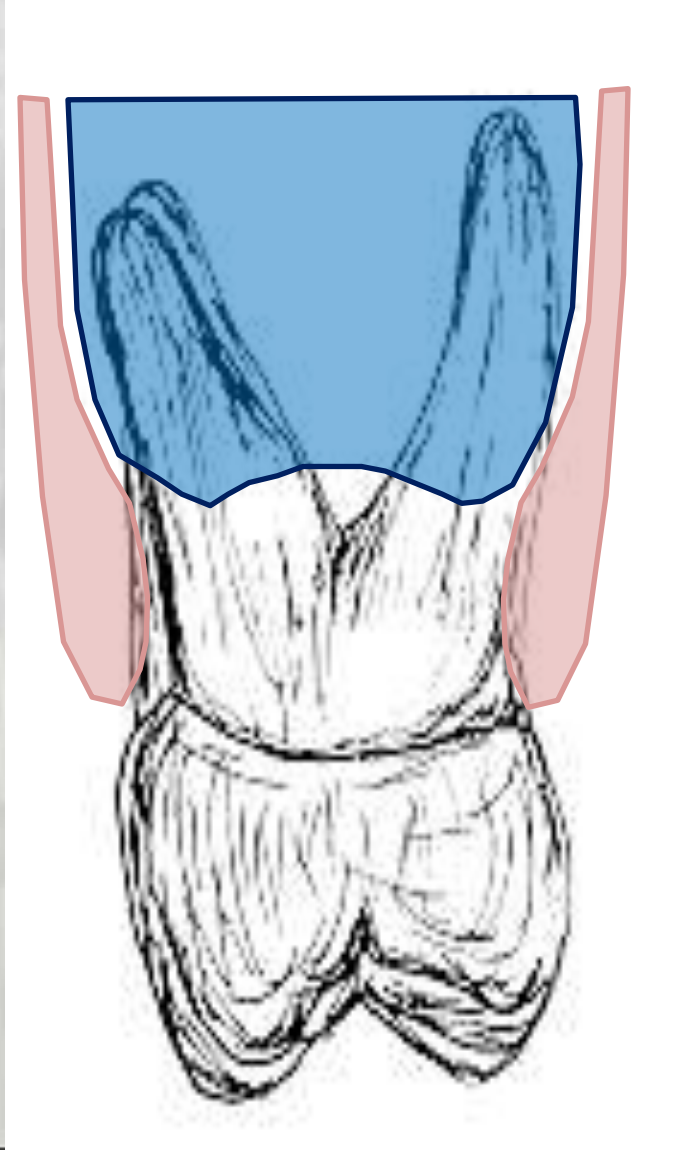
Surgical Debridement

- Performing classical osseous resection will only make the situation worse
- Instead, incisions can be made that remove the excess tissue:



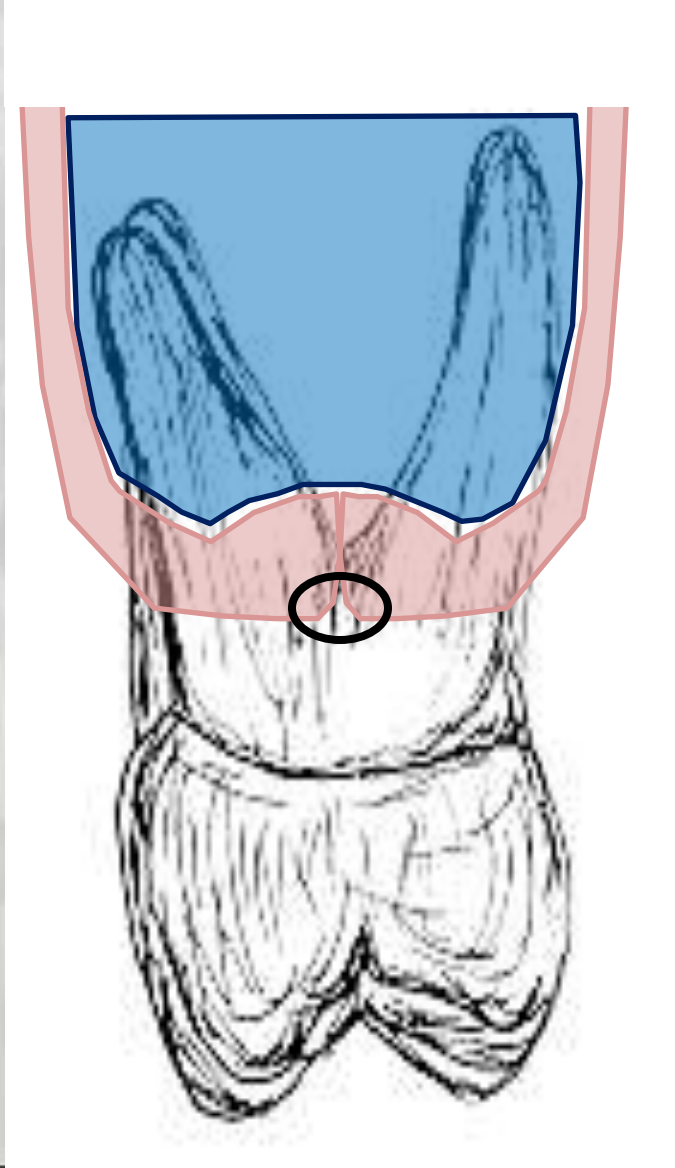
Surgical Debridement

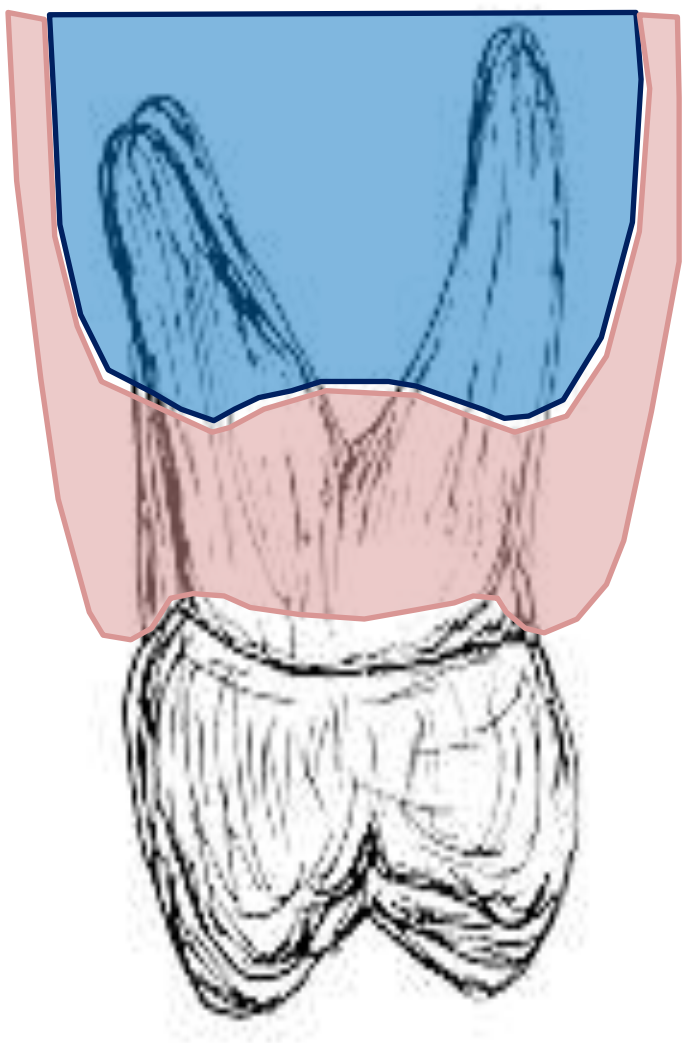
- A limited osteoplasty can be done:

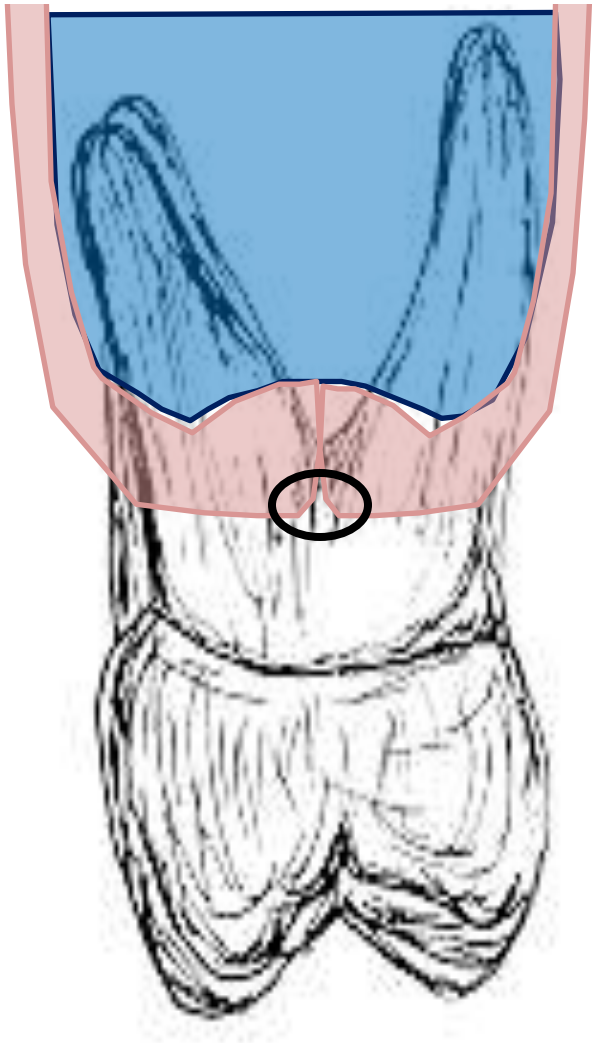


Surgical Debridement

- And when everything is sutured together, the pocket will be less than it was







Compromise

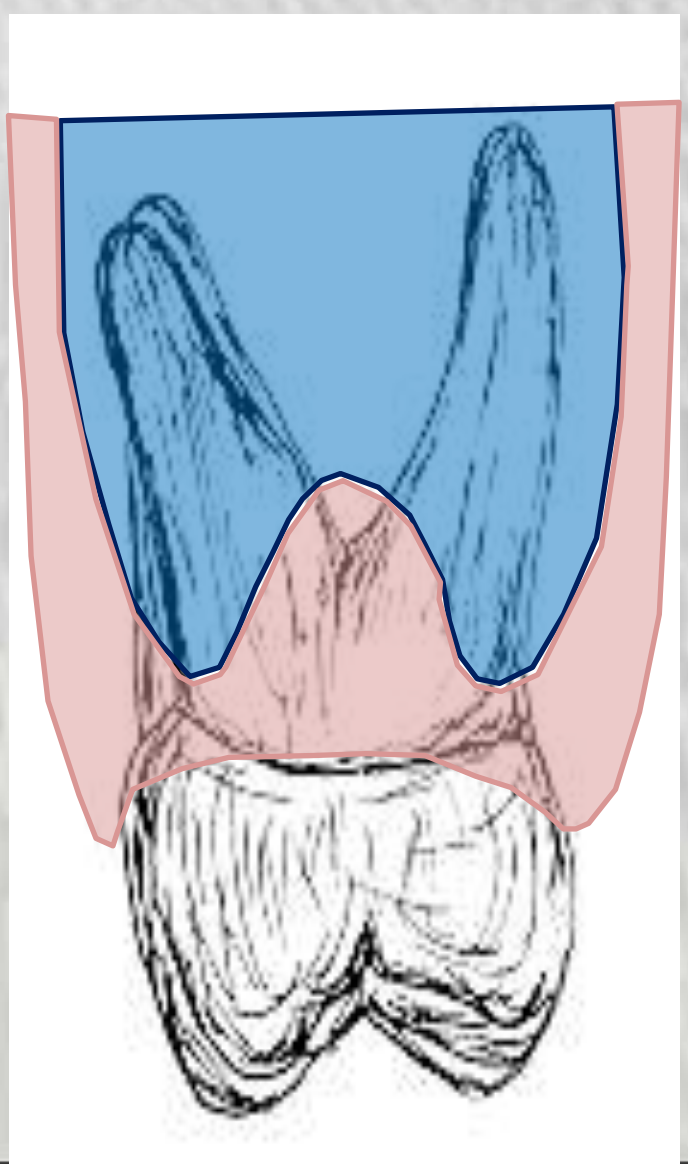
- Is this an ideal situation?
- Of course not, but rather it is the best compromise between not decreasing the prognosis by removing too much supporting bone, and not just leaving a pocket untreated

Wound Healing

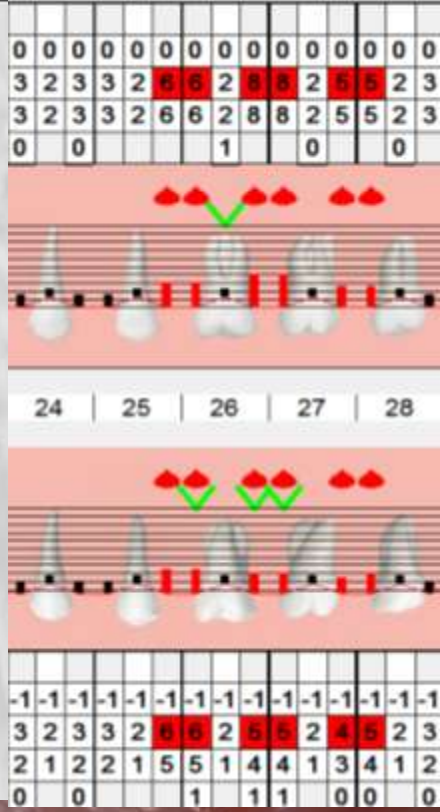
- What is the mechanism of pocket reduction following surgical debridement?
  1. Reduction in bulk of tissue
  2. Gain in clinical attachment via a long junctional epithelium[6]

Palatal/Lingual Approach

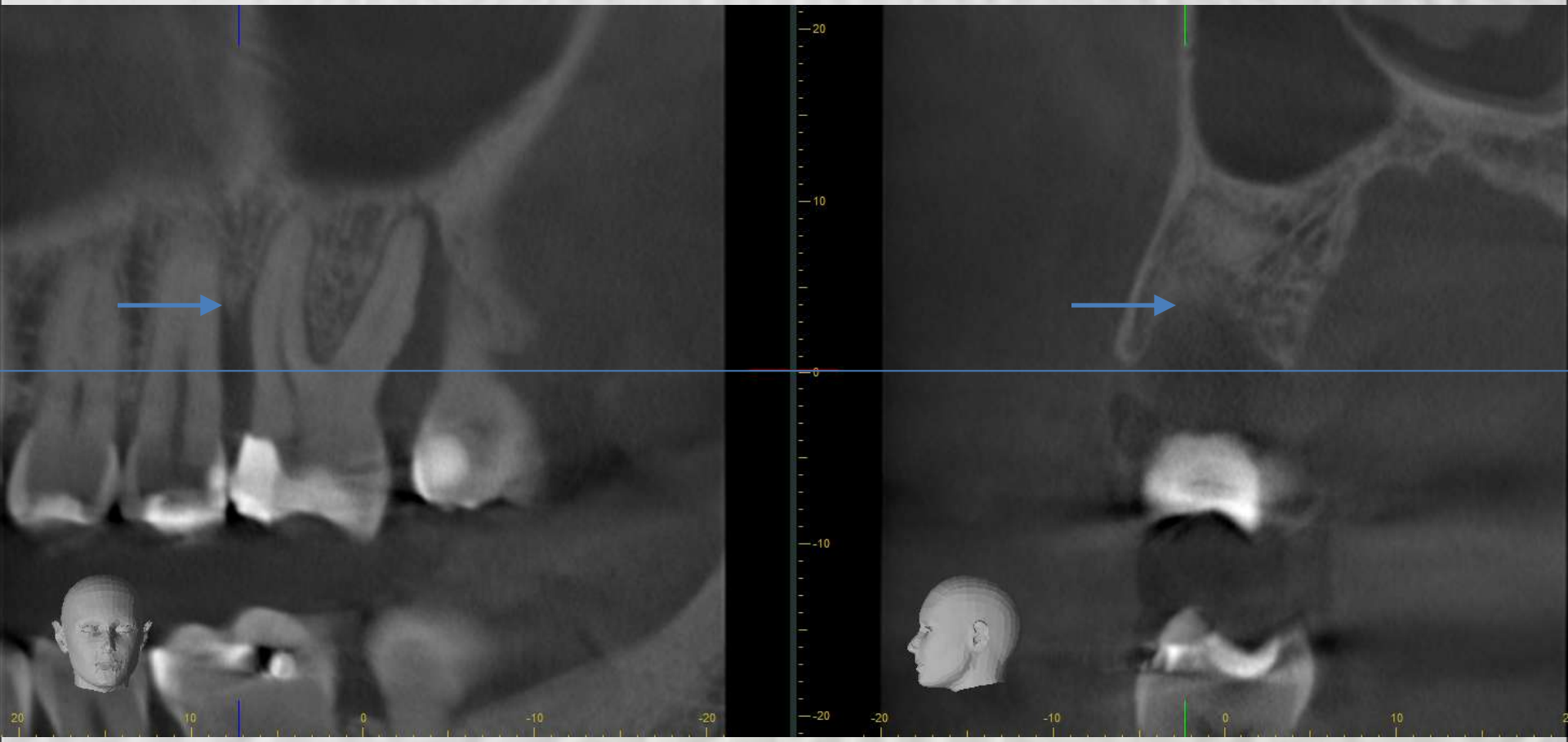
- Imagine this situation:
- Here we have a deep pocket, associated with a VERY deep crater and an involved furcation



Patient AL



Patient AL



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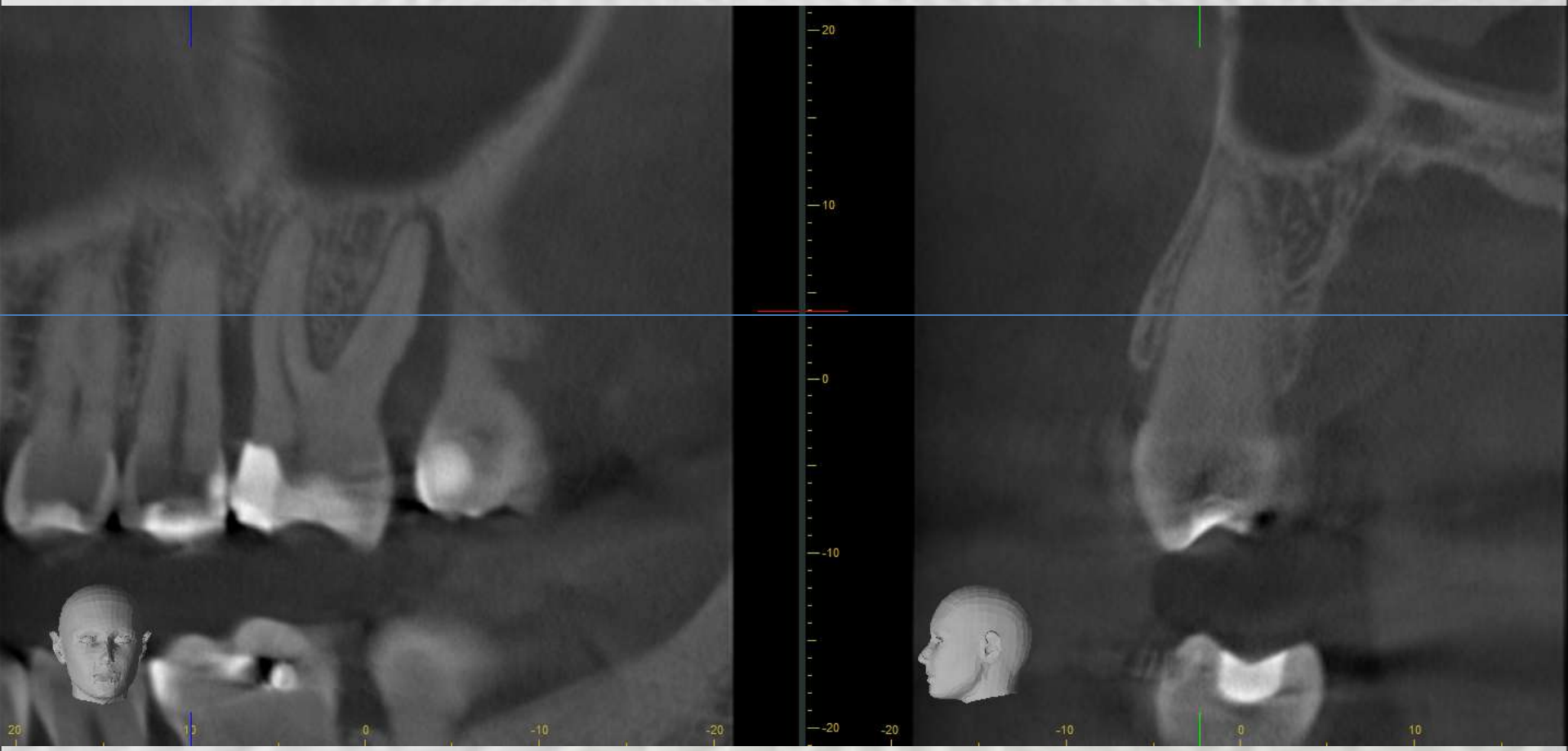
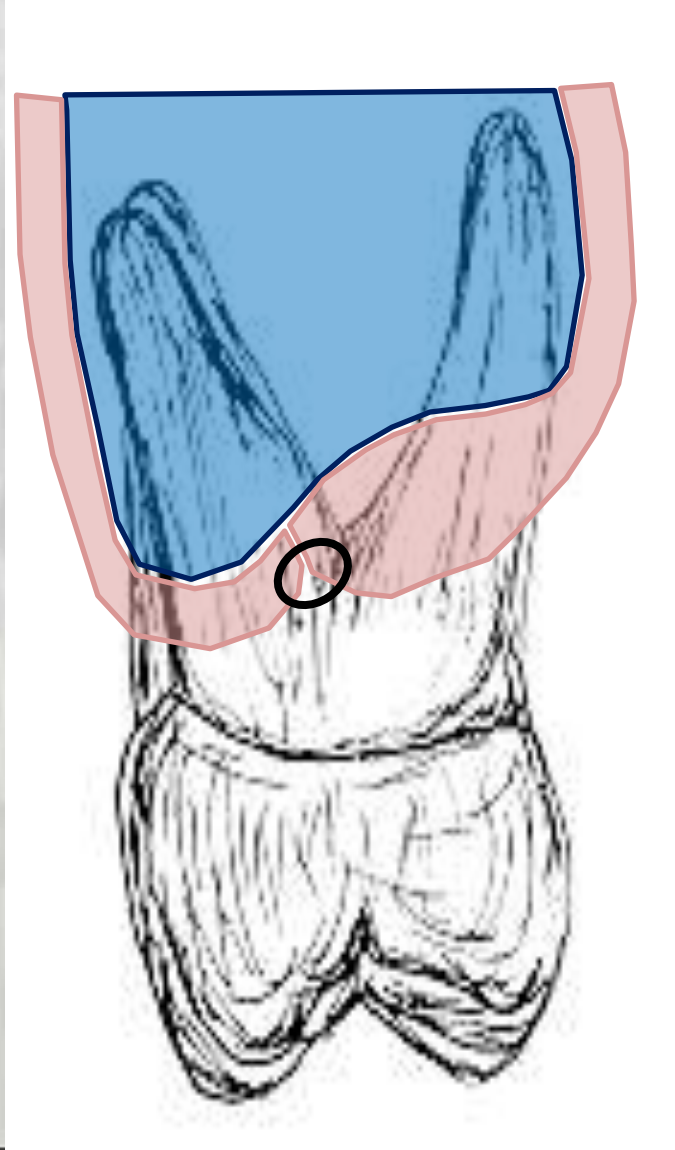
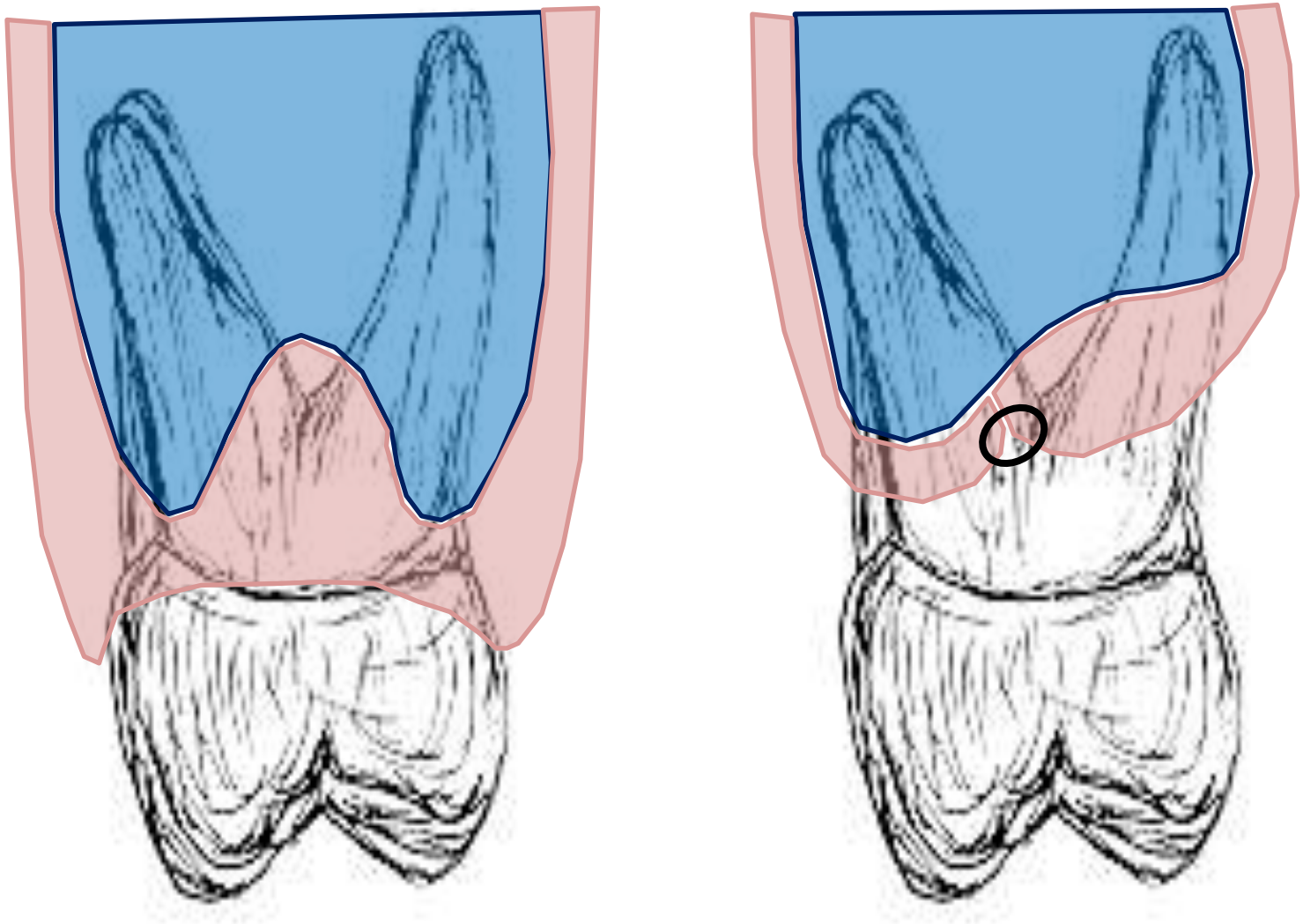


Palatal/Lingual Approach

- Let's perform only limited osseous resection on the buccal, but complete osseous resection on the palate:
- Adding the sutured tissue back in:

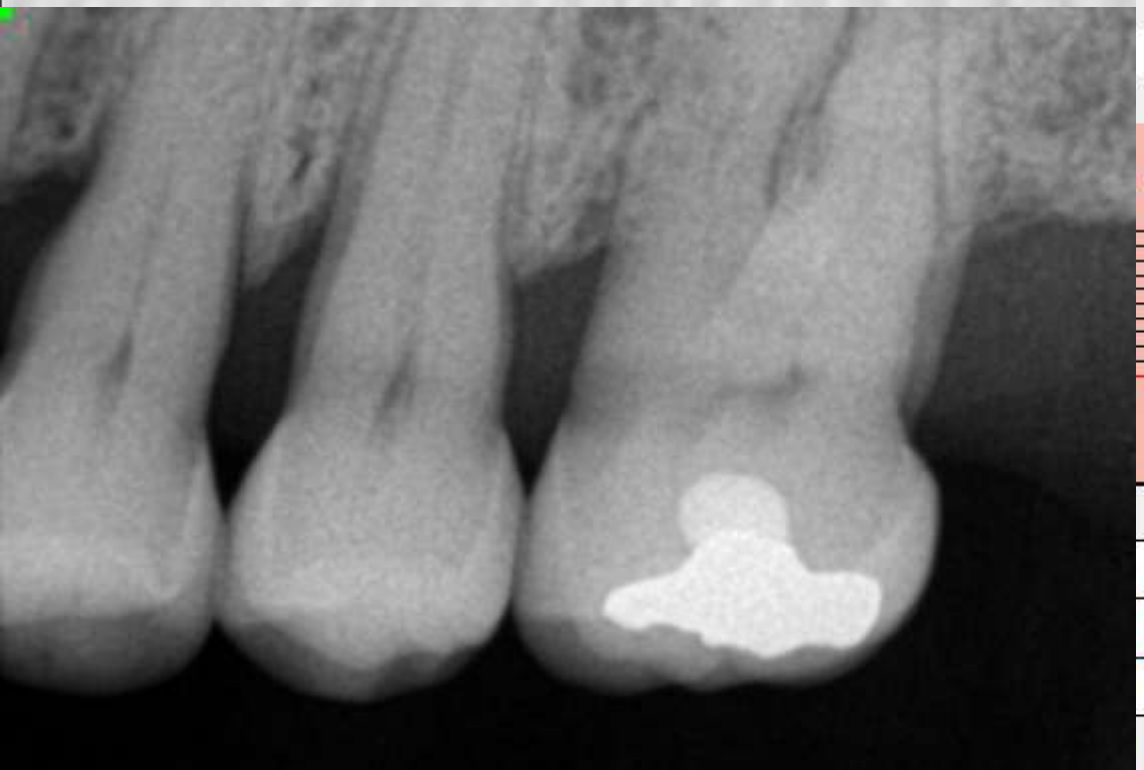


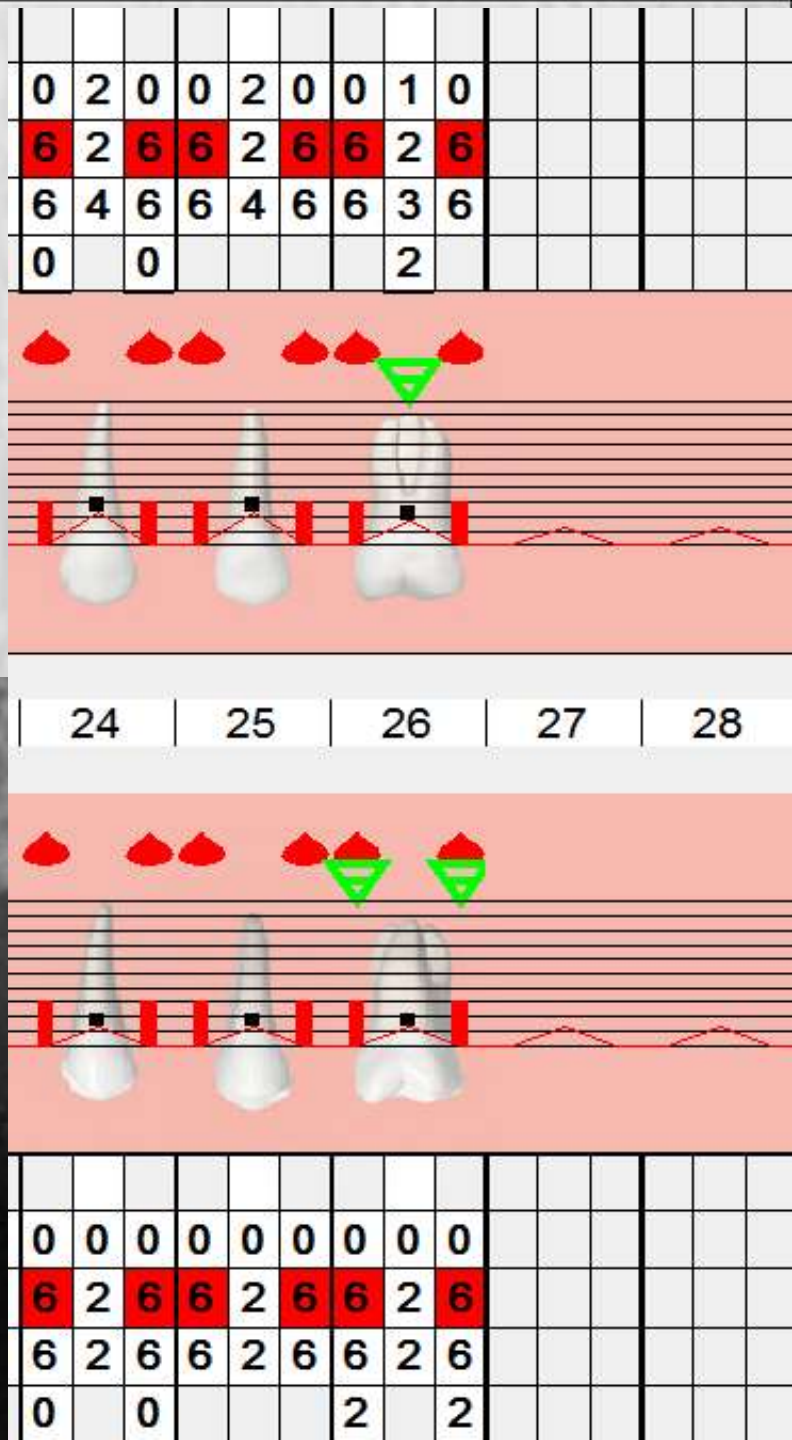


Compromise

- Is this an ideal situation?
- Of course not, but rather it is the best compromise between not decreasing the prognosis by removing too much supporting bone, and not just leaving a pocket untreated

Pre-op

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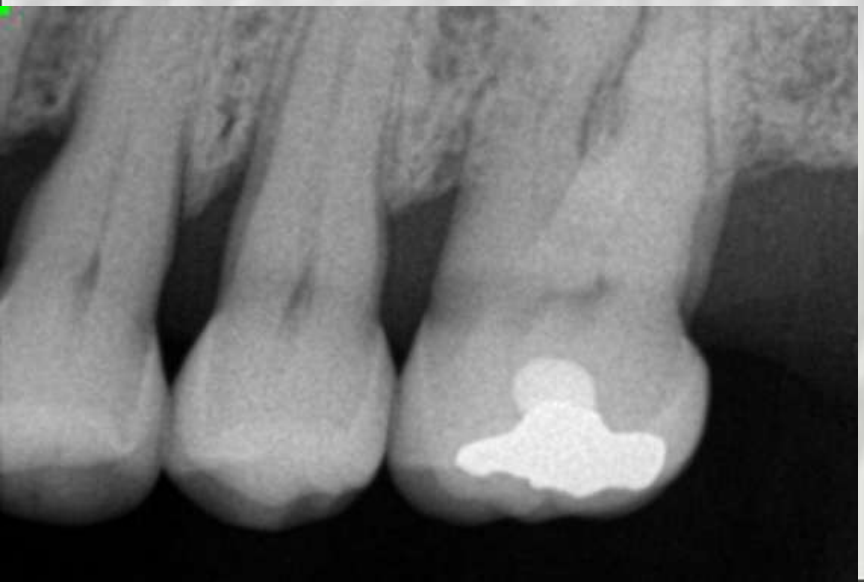
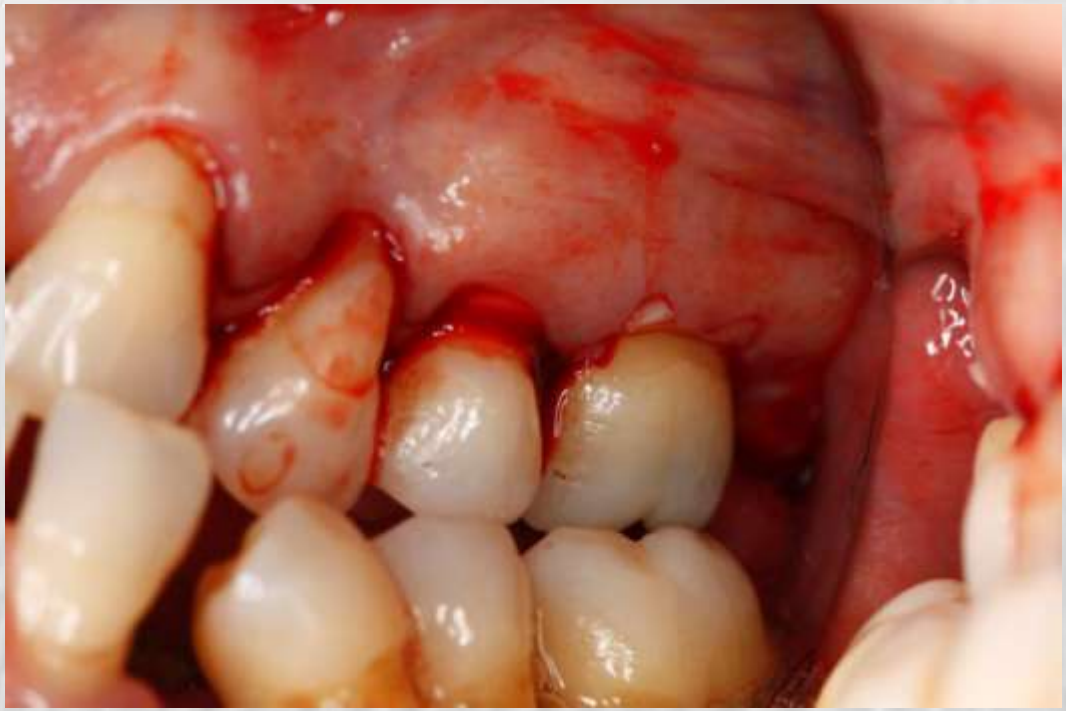
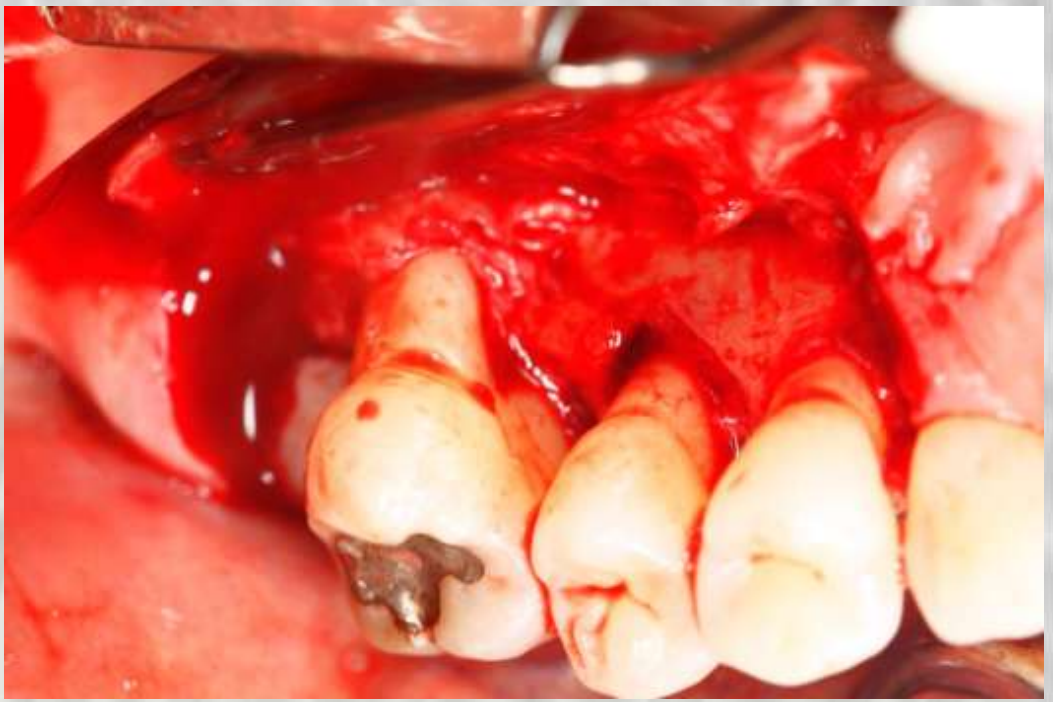
Pre-op

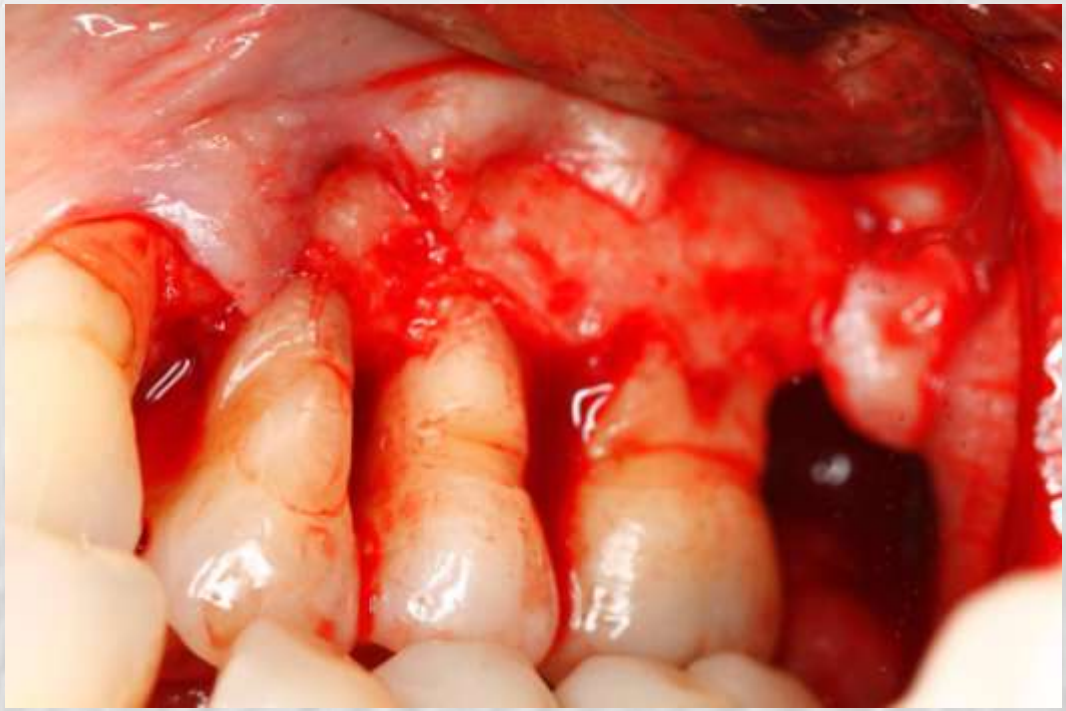


Incisions



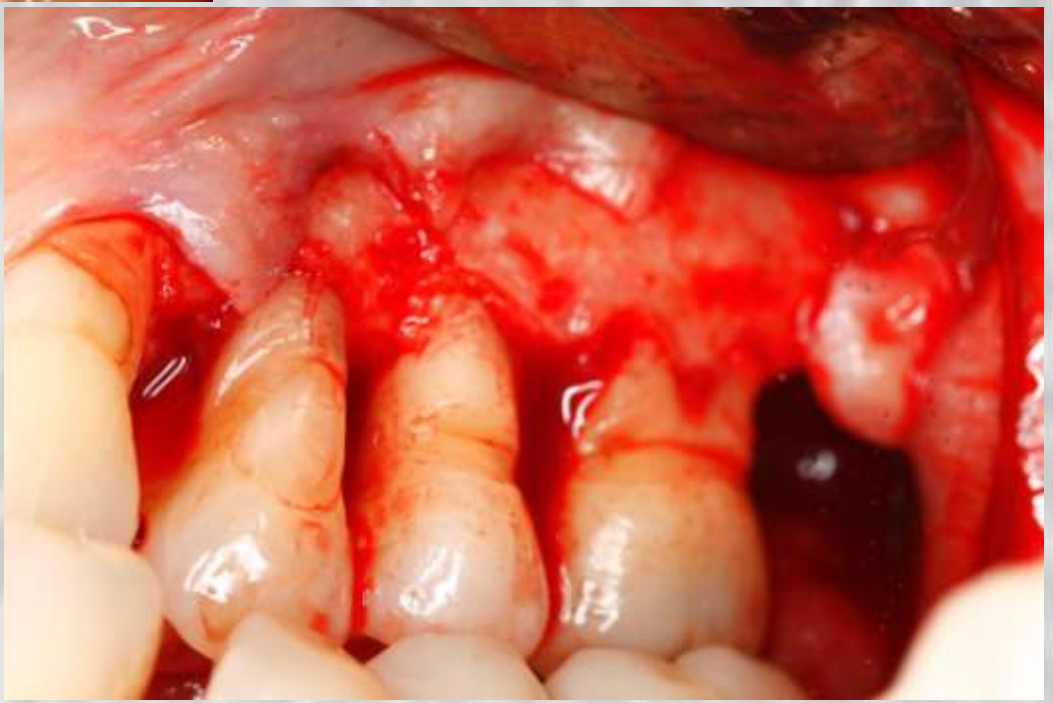
Osseous Etiology

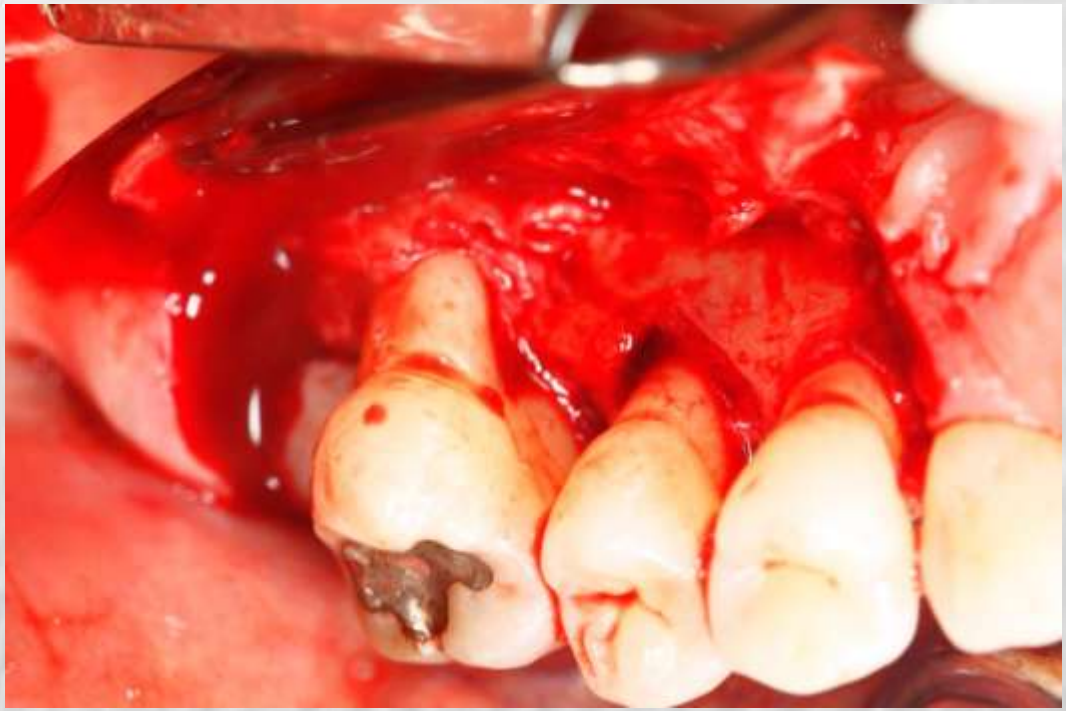




Post-Osseous Resection

Comparison - Buccal





Comparison - Palatal

Sutured

Comparison - Buccal

Comparison - Palatal

Post-op 3 years

Advantages of the Palatal Approach[7]

- Palatal bone is much thicker than buccal bone, so less resorption
- Palatal aspect is completely covered with keratinized tissue
- Wider palatal embrasure spaces allow for better access for operator and patient

Advantages of the Lingual Approach[8]

- Lingual bone is much thicker than buccal bone, so less resorption
- The vestibular depth on the buccal of the molars is often quite shallow, meaning that only a very limited amount of osteoplasty-ostectomy can be performed
- Interdental craters in the lower arch tend to occur beneath the contact areas of the teeth, which are much further to the lingual than in the maxilla
- The lingual embrasure spaces are usually wider than on the buccal, and with adequate reduction of the mylohyoid ridge, greater access for oral hygiene procedures is provided.

Take Home Message

- We have seen that when too much bone has been lost, in whatever form, the treatment takes on a compromised approach
- What does this mean?

Treat Early!

Don't be shy to tell your patients they need surgery after EIT if it is indicated (and NOT contraindicated, obviously)

Overview

1. Indications and contraindications
2. Pulling the trigger
3. Handling esthetic areas
4. How much is too much?
5. Does it work?

Success is….

…relative

At age 4 success is not peeing in your pants

At age 12 success is having friends

At age 16 success is having a driver's license

At age 20 success is having sex

At age 40 success is having money

At age 50 success is having money

At age 70 success is having sex

At age 74 success is having a driver's license

At age 78 success is having friends

At age 86 success is not peeing in your pants

Outcomes

- In periodontics (and in health-care in general) we speak of outcomes
- It isn't enough to do a treatment and forget about a patient
- We need to know the treatment has worked, and in the case of a chronic problem, that it has worked **long term**

Outcomes

- The most common outcomes we look for after osseous resective surgery are:
  1. Reduction in pocket depth (obviously)
  2. Long term maintenance of
     1. reduction in pocket depth
     2. absence of progression of attachment/bone loss
     3. absence of inflammation

The Nebraska Studies

- Subjects with generalized periodontitis had each quadrant in their mouths randomly assigned to get either:
  1. Supragingival scaling
  2. Scaling and root planing
  3. Modified Widman flap (basically a surgical debridement)
  4. Pocket reduction via osseous resection

The Nebraska Studies[9]

- Of the four treatments, pocket reduction via osseous resection reduced pocket depth the most, compared to the other three treatments

The Nebraska Studies[10]

- After 7 years of maintenance therapy, the sites that had pocket reduction via osseous resection still had a greater reduction in pocket depth than the other three modalities

The Nebraska Studies[11]

- After 7 years of maintenance therapy, the sites that had pocket reduction via osseous resection were the least likely to have experienced breakdown in the form of progressive attachment loss

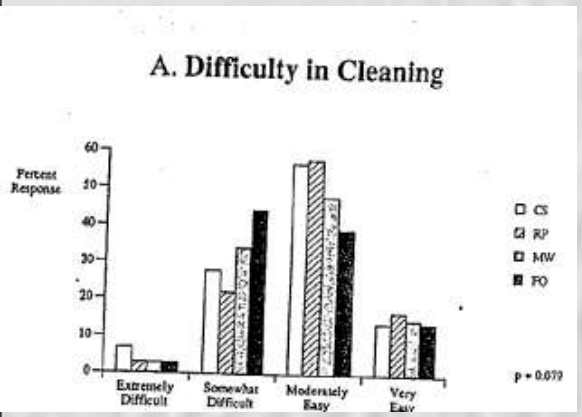
The Nebraska Studies[9-11]

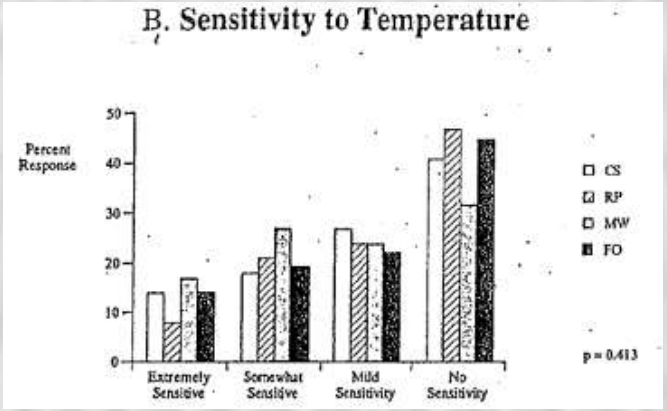
- All the Nebraska Studies noted that pocket reduction via osseous resection, by virtue of its subtractive approach, left the patient with the most attachment loss, in the form of recession (recall that PD + R = LOA, so for a given level of attachment, as pocket depth decreases, recession increases)

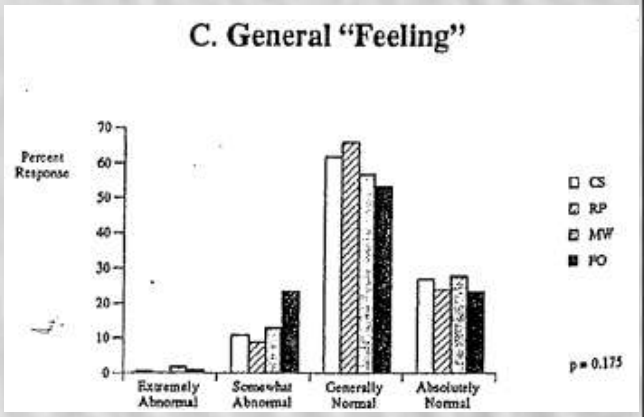
The Nebraska Studies[12]

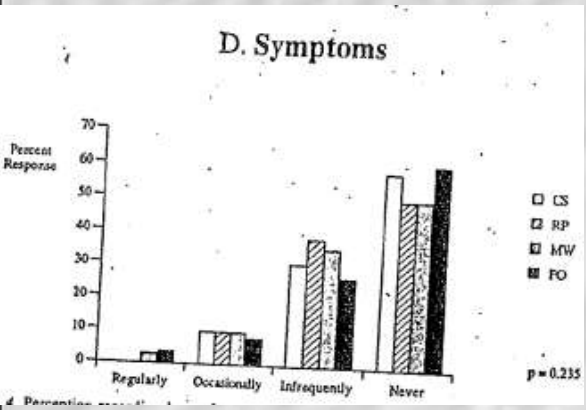
- When patients were asked via a survey about how they felt about the treatment modalities, there were **no differences** in their responses for the 4 different treatments

The Nebraska Studies[12]









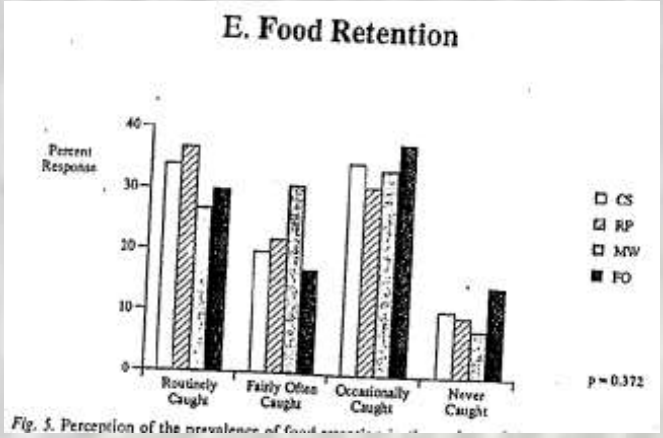
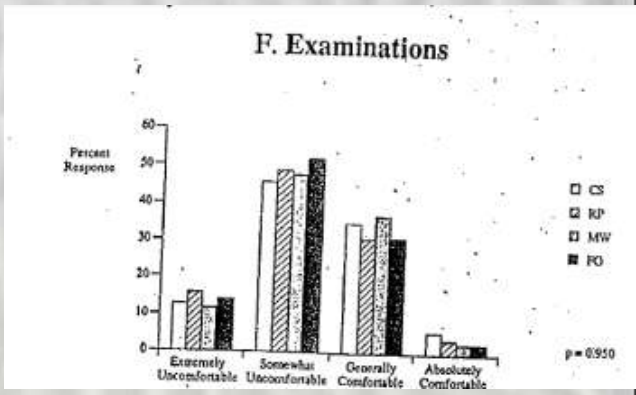
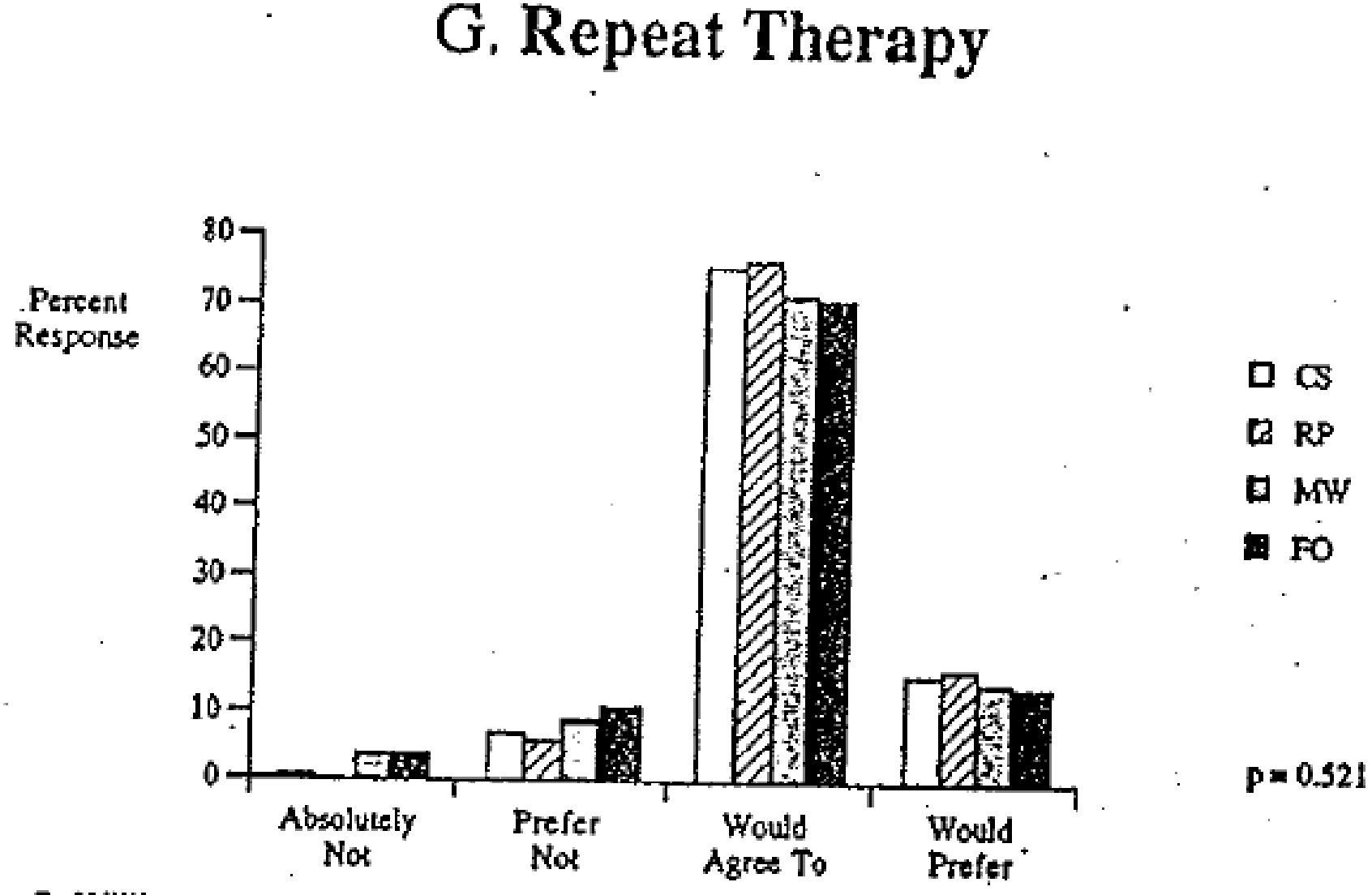


Fig. 5. Perception of the prevalence of food



The Nebraska Studies[12]



Any questions?

Thanks for listening!

References

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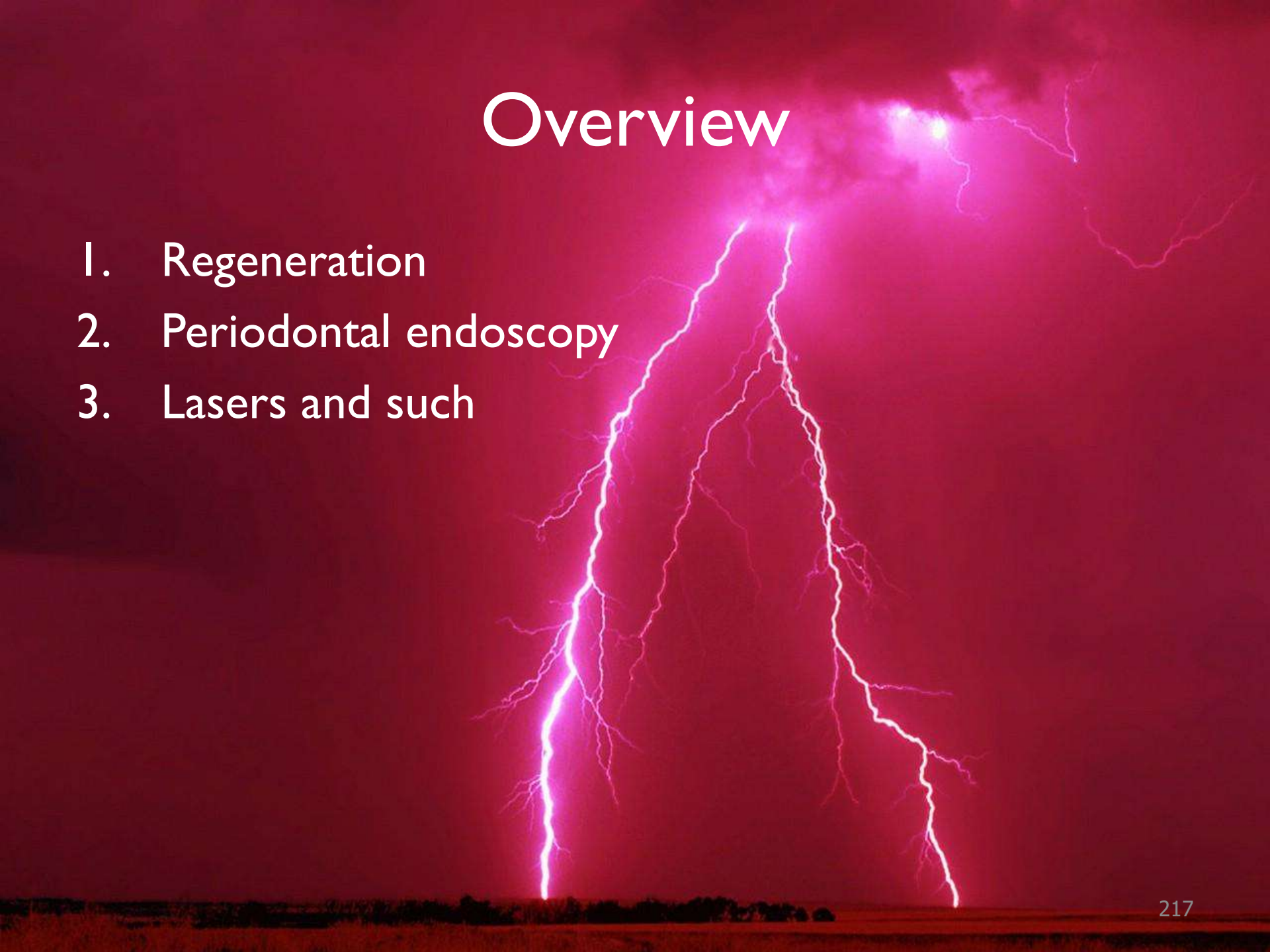
12. Kalkwarf KL, Kaldahl WB, Patil KD. Patient preference regarding 4 types of periodontal therapy following 3 years of maintenance follow-up. J Clin Periodontol. 1992 Nov;19(10):788-93.

Overview

1. Why don't all pockets resolve?
2. Can deep pockets be maintained indefinitely?
3. The classic – osseous resective surgery
4. Alternative pocket-reducing therapies

Overview

1. Regeneration
2. Periodontal endoscopy
3. Lasers and such



Overview

1. Regeneration

Definition

- **Regeneration** implies the ability to replace lost:
  - bone
  - pdl
  - cementum
- Any sort of healing short of that in the context of lost periodontal tissues is considered to be **repair**

Additive vs. Subtractive

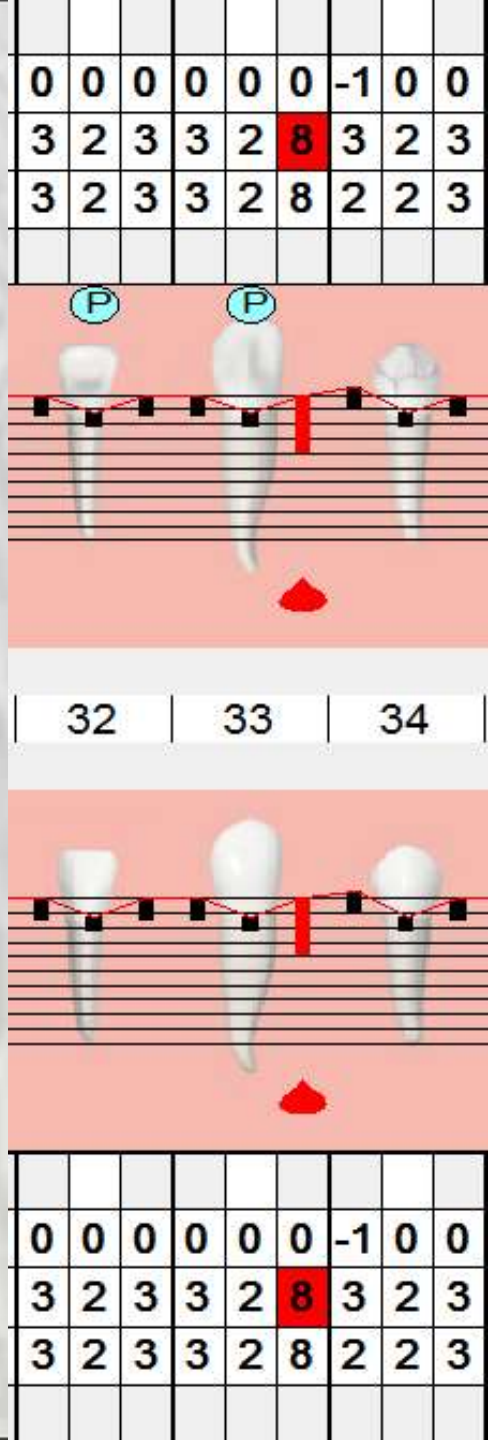
- Osseous resection, as has been presented to you, is fundamentally subtractive in nature
- If the outcome that you want is pocket reduction (and long-term maintenance of pocket reduction), then there is no more universally validated therapy than osseous resection
- However….

…There are consequences

Additive vs. Subtractive

- Now that we've been through the process of osseous resection, you can see that the technique leaves patients with more apical bone levels, and by extension, positive recession/dentinal sensitivity
- Obviously, if there were some way to reliably **ADD** to the existing bone to address osseous defects, that would be ideal

Patient FG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Patient FG

The Defect

Adding a Membrane

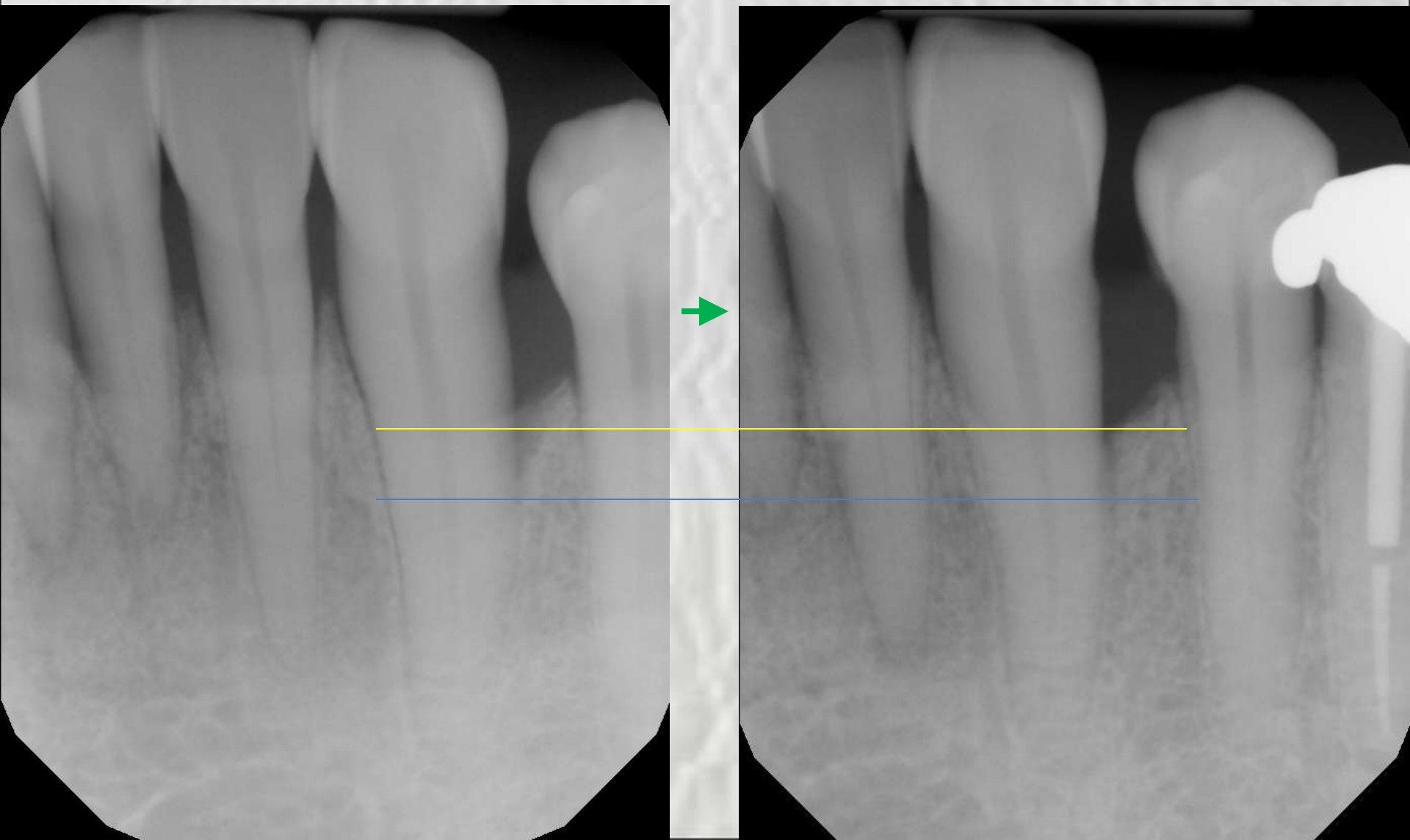
Packing in a Bone Graft

Covering the Bone Graft with the Membrane

Sutured

6-month Post-op Radiograph

Comparison



What can be learned about regeneration from this case?

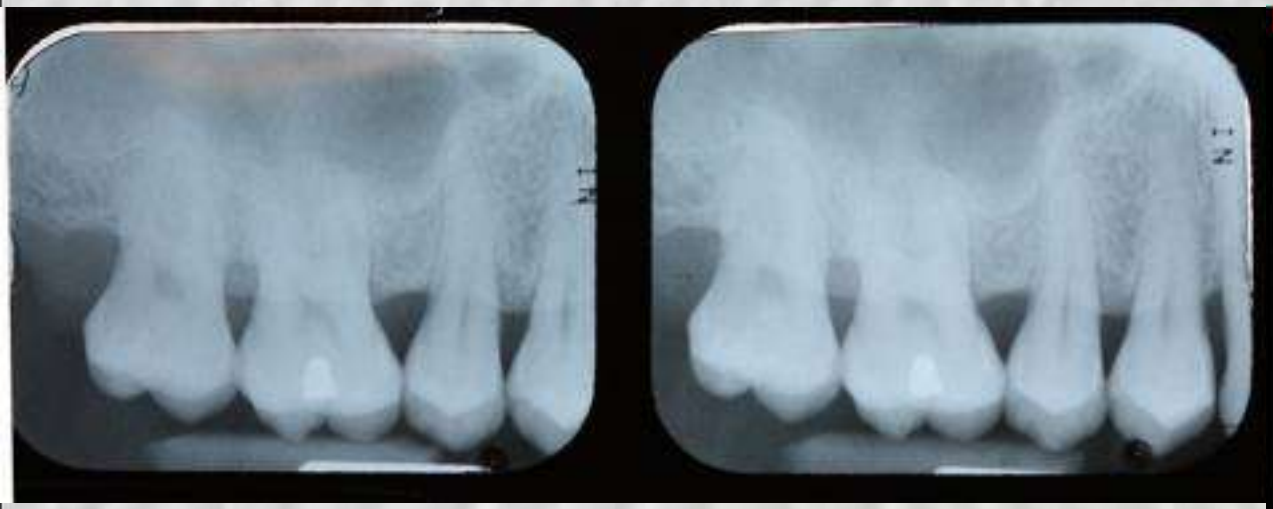
Can **ALL** residual pockets be managed by regenerative solutions?

Lesson #1

- Deep[1], narrow[2,3,4] vertical defects and circumferential defects may be more amenable to **regeneration**

Lesson #1

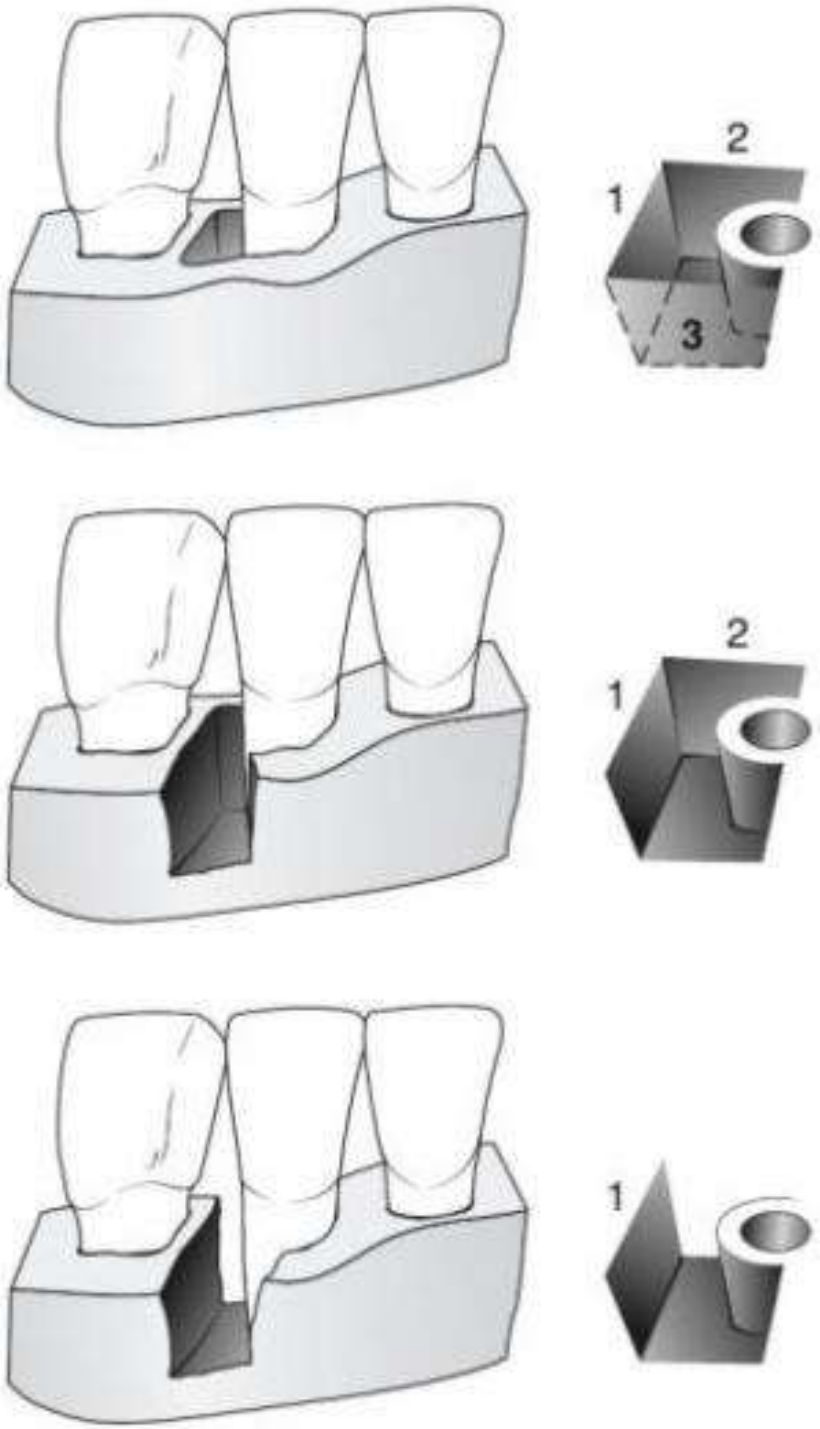
- Craters and shallow, wide vertical defects are excellent indications for pocket reduction via osseous resection



Are **ALL** deep, narrow vertical defects completely regenerable?

Lesson #2

- The amount of "regeneration" (more likely improvement in clinical and radiographic parameters) that you can get is related to the number of walls you have



Lesson #2

- 3 walls get regenerated better than 2 walls, which get regenerated better than 1 wall[5]
- In the case of combination defects, the part of the defect with the most walls will be the most reliably regenerated

Does it matter what materials are used for the regeneration?

Materials

- Regeneration can make use of different types of bone grafts:
  - Autografts
  - Allografts
    - Decalcified freeze-dried bone allograft
    - Freeze-dried bone allograft
  - Xenografts
  - Alloplasts

Materials

- Regeneration can make use of different types of occlusive membranes:
  - Resorbable membranes (usually collagen)
  - Non-resorbable membranes (usually some form of PTFE)

Materials

- Regeneration can make use of different types of biologics:
  - Autogenic biologics
    - Platelet-rich plasma
    - Platelet-rich fibrin
  - Allogenic biologics
    - Platelet-derived growth factor
  - Xenogenic biologics
    - Enamel matrix derivative

Lesson #3

- It doesn't make any difference which combination gets used, as long as it works in the surgeon's hands[6]

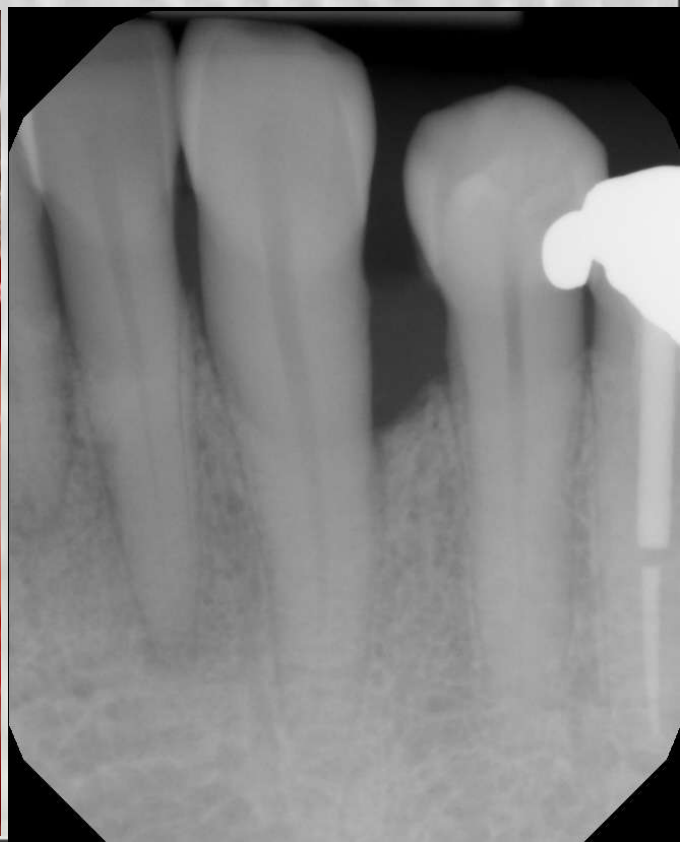
Does a successful regeneration mean that the pocket has completely resolved?

Lesson #4

- Look at FG' case again:

Lesson #4

- Note the obvious negative architecture, open contact, and residual vertical defect



Lesson #4

- You may still need to do osseous resection following regeneration to achieve an optimal outcome

Lesson #5

- Note the obvious post-op calculus accumulation on 33D and 34M

Lesson #5

- Regenerative outcomes are negatively affected by poor oral hygiene, smoking, and tooth mobility[6]

Regeneration – Take-Home Message

- Regeneration is an excellent treatment modality in terms of potential outcomes, HOWEVER:
  - There are few indications and many contraindications
  - It is highly case-sensitive
  - It is highly technique-sensitive

Exciting New Research

- There is some evidence that adding enamel matrix derivative to flap surgery to eliminate pockets, in the presence of bone loss but the absence of interproximal defects, can reduce pockets WITHOUT causing as much recession[7,8,9]
- This is NOT regeneration, but is an interesting idea for use of a regenerative material

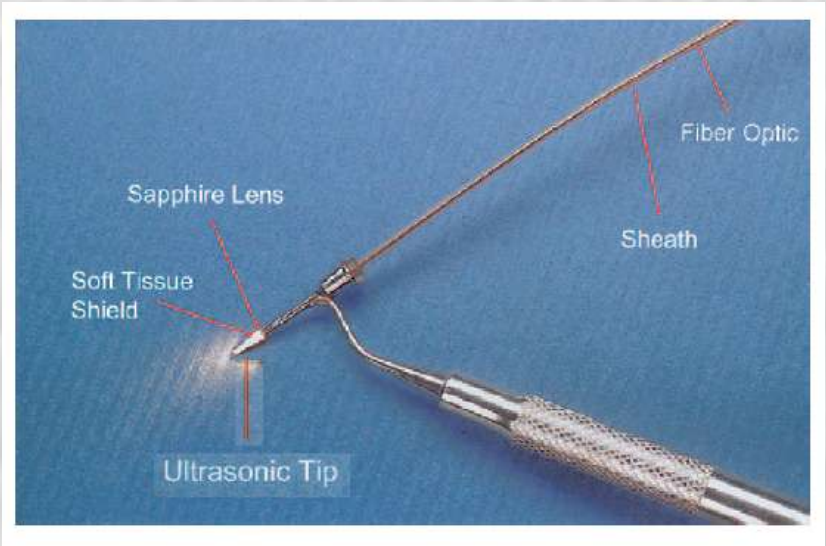
Overview

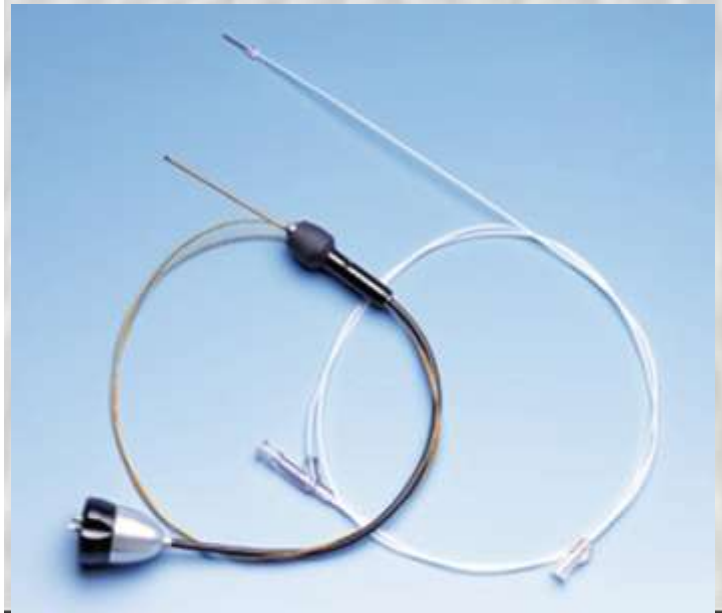
1. Regeneration
2. Periodontal endoscopy

Seeing is Believing….

- Recall that one never removes 100% of the calculus during scaling and root planing
- The traditional complaint about scaling and root planing is that calculus gets left behind BECAUSE the operator can't actually see what he/she is doing

Enter the Endoscope





Enter the Endoscope

Useful?

- This technology represents true innovation
- How would you go about assessing if the technology actually makes a difference?

Research

- A study assessing the effectiveness of a periodontal endoscope would have to prove 2 things:
  1. That using the periodontal endoscope leads to more calculus removal during scaling and root planing that does not using it
  2. That this increased calculus removal ALSO leads to improved clinical parameters (reduction in probing depth, bleeding on probing etc.
- Unfortunately….

Effects of periodontal endoscopy on the treatment of periodontitis

A systematic review and meta-analysis

Yunchun Kuang, BS; Bo Hu, MSc; Jin Chen, BS; Ge Feng, PhD; Jinlin Song, PhD

Periodontitis is a chronic infective disease of the tooth-supporting apparatus, including the gingivae, periodontal ligament, and alveolar bone. It affects a large percentage of the dentate population and is responsible for much of the tooth loss that occurs in later life.[1,2] Attachment loss and bone absorption are signs of periodontitis. The typical clinical manifestations of periodontitis are gingival inflammation (GI), bleeding on probing (BOP), formation of periodontal pockets, and tooth mobility.[3,4] Bacteria in plaque biofilms and their by-products play an initial and progressive role in periodontitis.[5] With a rough and polyporous surface, dental calculus provides optimal conditions for bacteria to colonize, metabolize, and cause disease.[6] The primary objective of periodontal therapy is to remove plaque biofilm, along with the calculus and bacterial by-products, thus maintaining a biologically harmonious root surface. Ultimately, clinicians who perform periodontal

ABSTRACT

Background. For this systematic review, the authors evaluated and synthesized the available scientific evidence related to the effects of periodontal endoscopy on the treatment of periodontitis.

Methods. The authors searched PubMed, Embase, Cochrane Library, Chinese Scientific Journals database, China National Knowledge Infrastructure, and Chinese Medicine Premier's Wanfang database for articles about periodontal endoscopy that were published through January 2017. The authors considered the percentage of residual calculus, average treatment time, bleeding on probing (BOP), gingival inflammation (GI), and probing depth (PD) as outcome measures. The authors extracted data and performed meta-analyses for groups of articles for which it was appropriate.

Results. The authors identified 8 articles as being suitable for this systematic review. The investigators of 3 studies reported results related to BOP and GI that revealed some advantages of periodontal endoscopy over traditional scaling and root planing (SRP). The investigators of 4 studies explored PD and found no difference between periodontal endoscopy and traditional SRP. The authors could not perform meta-analyses on the study results related to BOP, GI, or PD. The percentage of residual calculus after periodontal endoscope–aided debridement was significantly less than the percentage of residual calculus after traditional SRP (mean difference, −3.18; 95% confidence interval, −4.86 to −1.49; $P = .002$; heterogeneity $I^2 = 74\%$). The authors found that periodontal endoscopy took significantly more time than traditional SRP (mean difference, 6.01 minutes; 95% confidence interval, 4.23 to 7.8; $P < .00001$; heterogeneity $I^2 = 0\%$).

Conclusions and Practical Implications. Periodontal endoscopy may provide additional benefits for calculus removal compared with traditional SRP, although it could take more time to perform. With respect to BOP, GI, and PD, the authors found no sufficient evidence to support the difference between the use of periodontal endoscopy and traditional SRP. The authors concluded that additional scientific research is required to assess the effects of periodontal endoscopy on the treatment of periodontitis.

Key Words. Periodontitis; scaling and root planing; periodontal endoscope; systematic review; meta-analysis.

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Thanks for Playing, Try Again

- A recent meta-analysis found that the first condition about increased calculus removal was satisfied (no big surprise), but that the second condition regarding improved clinical parameters was NOT satisfied[10]
- Periodontal endoscopy remains an elective adjunct to treatment until proven to be a standard of care

Overview

1. Regeneration
2. Periodontal endoscopy
3. Lasers and such

Lasers….

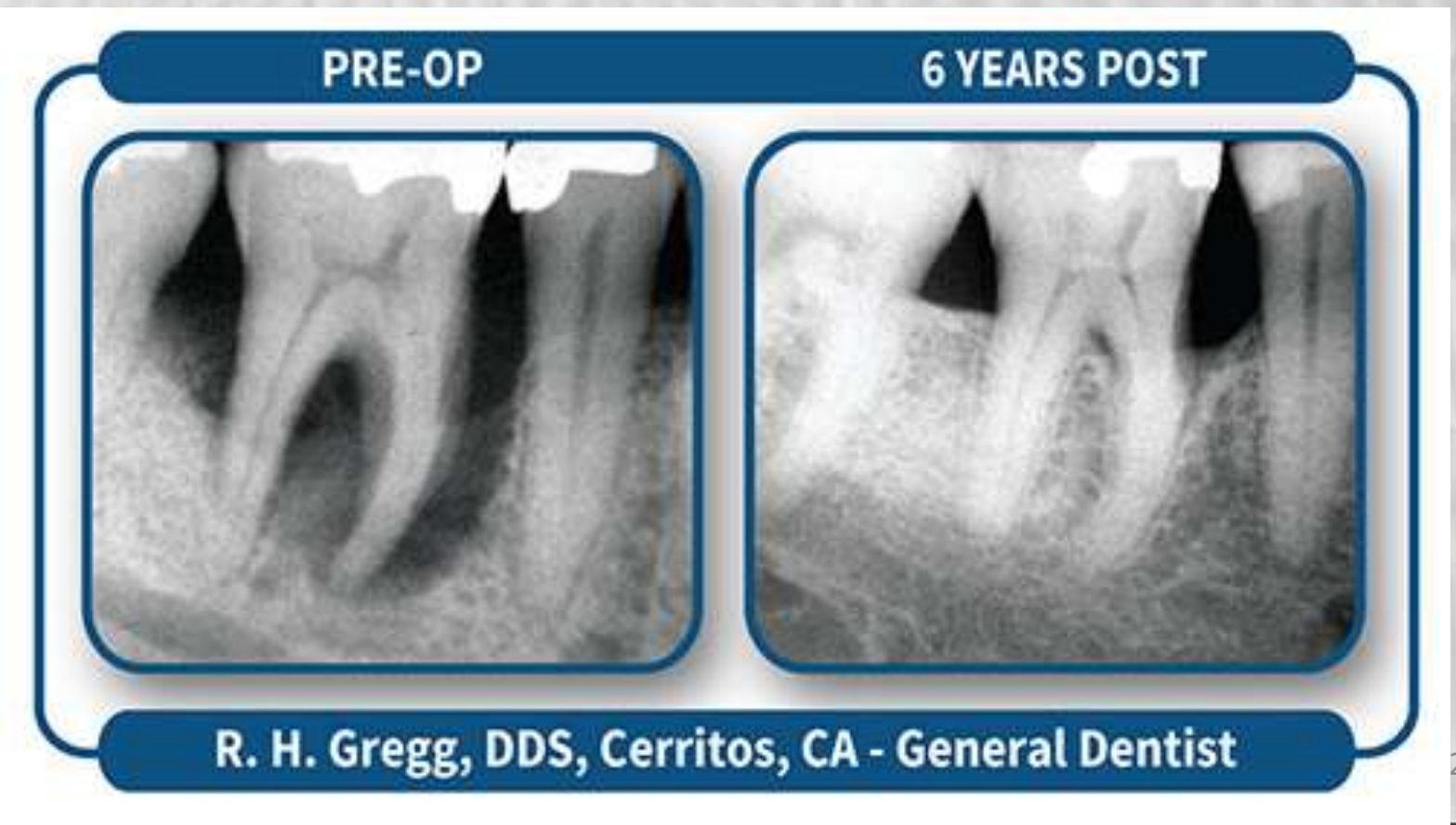
- Stands for **l**ight **a**mplification by **s**timulated **e**mission of **r**adiation
- = fancy way of saying a device that emits a VERY focused light source
- Many different types, which emit different waveforms (e.g. pulsed vs. continuous etc.) and wavelengths (488nm – 10.6μm)
- Purportedly "disinfect" pockets

…and Such?

- Related but distinct from lasers is photodynamic therapy, which relies on putting a medication (a photosensitizer) in the pocket, and then activating it with a specific wavelength of light, which then selectively kills certain bacteria

Are Excellent Outcomes Attainable?

- All lasers and photodynamic therapy protocols can show impressive results:



Are Excellent Outcomes the Norm?

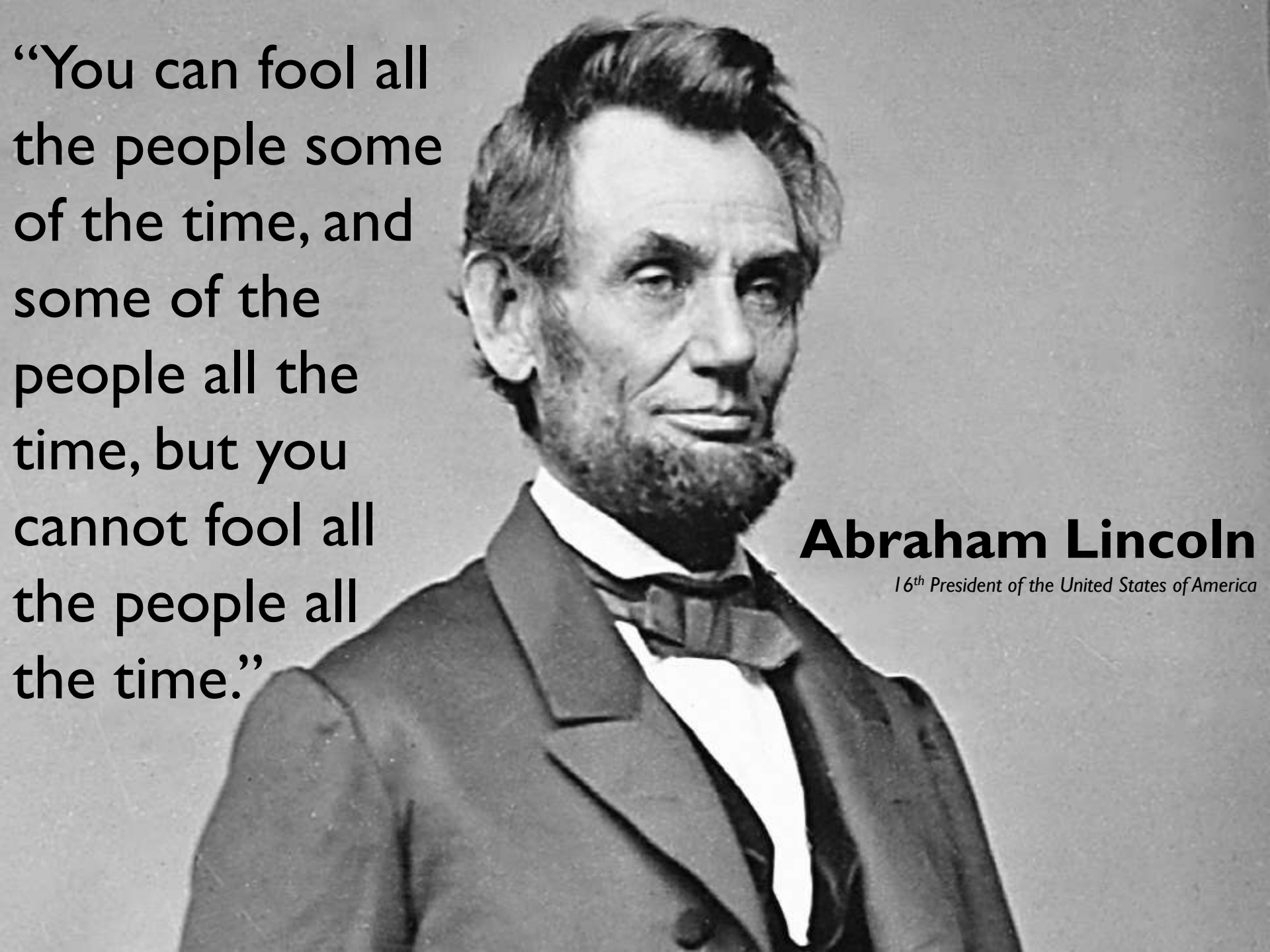
- However, the reason we have evidence-based dentistry is to see if what one operator can do on one site in one patient is generalizable to the entire population of operators, sites and patients
- So what does the literature say about lasers and such?

Are Excellent Outcomes the Norm?

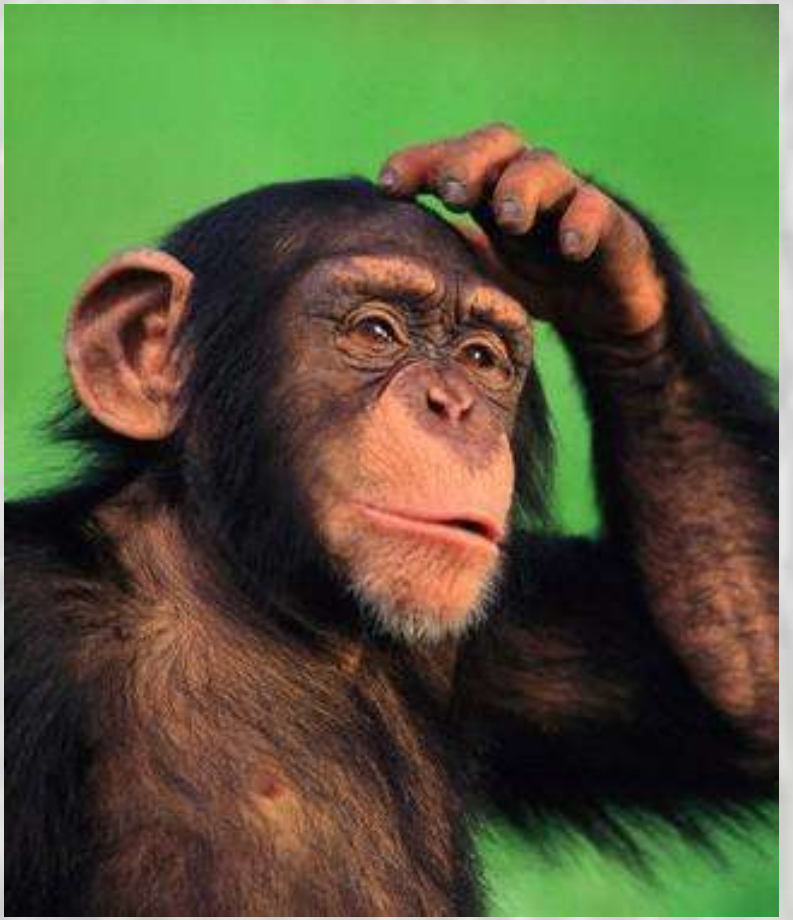
- As a stand-alone treatment, certain specific lasers (Er:YAG, Nd:YAG) may be equivalent to traditional scaling and root planing in terms of reducing pocket depth[11]
- As a stand-alone treatment, photodynamic therapy alone was not as successful at reducing pocket depth as traditional scaling and root planing[12]

Are Excellent Outcomes the Norm?

- As an adjunctive treatment, coupled with traditional scaling and root planing, lasers may provide additional clinical benefits in terms of pocket depth reduction[11]
- As an adjunctive treatment, coupled with traditional scaling and root planing, photodynamic therapy provides an average additional reduction in probing depth of **0.25mm**, compared traditional scaling and root planing alone[12]


"You can fool all the people some of the time, and some of the people all the time, but you cannot fool all the people all the time."
Abraham Lincoln
16th President of the United States of America

Questions?



Thanks for being a wonderful audience!

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