Periodontal

Prognosis

What we DON'T know is more significant than what we DO know

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Objectives

By the end of this lecture you will:

- know what the term prognosis means
- know the different prognoses that can be assigned
- know what clinical and radiographic measures are used to assign prognosis classically
- understand how **ABSOLUTELY USELESS** all of that is
- Have an idea of a better way to go about thinking about prognosis

Overview

1. Introduction
2. Measures used to assign prognosis
3. Different prognostication systems
4. Limitations of prognosis
5. Where to go from here

Overview

1. Introduction

Prognosis[1]

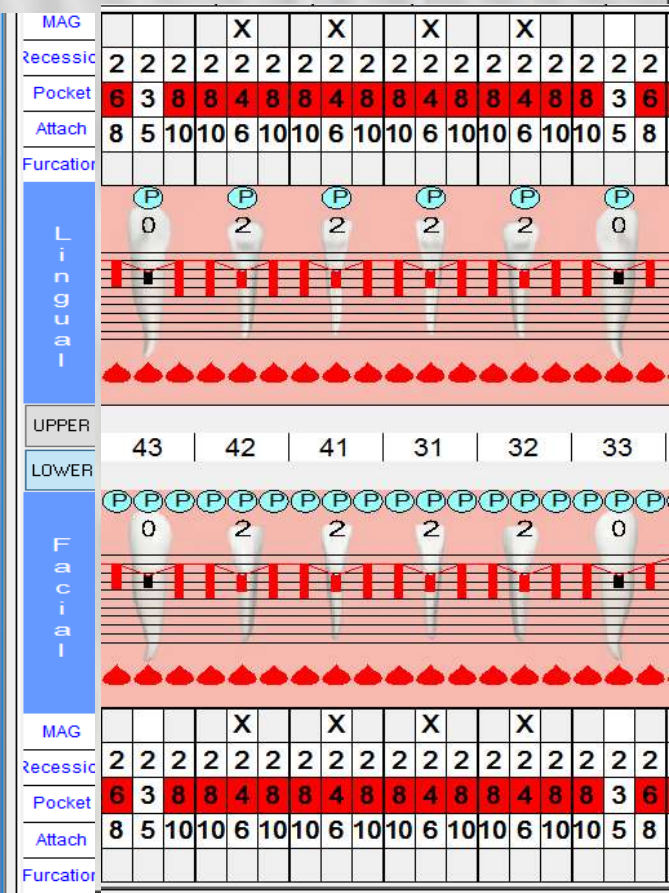
- ***noun*** \präg-ˈnō-səs\
  - : a doctor's opinion about how someone will recover from an illness or injury
  - : a judgment about what is going to happen in the future

Prognosis

- Because periodontitis is most often a chronic disease, and by definition needs time to sustain damage in the form of attachment/bone loss, some working knowledge of what is going to happen in the future is good

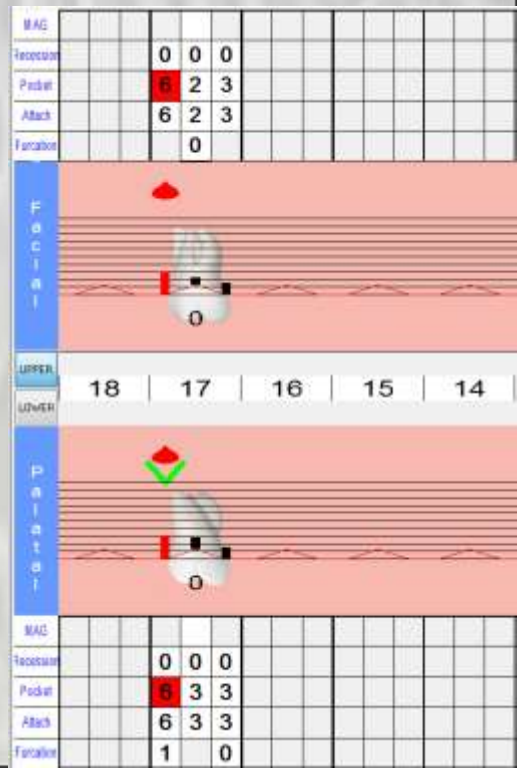
Case 1

- Some aspects of a treatment plan may call into question whether certain teeth are worth saving



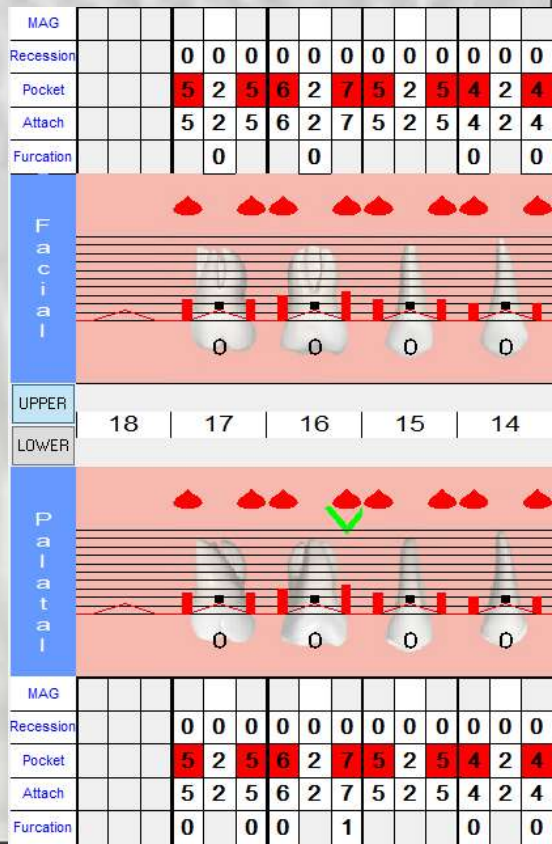
Case 2

- Other aspects of a treatment plan may depend on the outcome of periodontal treatment
- Should we use 17 as an abutment for an RPD?



Case 3

- A patient may choose to or not to pursue a particular treatment plan based on the predicted outcome of periodontal treatment
- 15 and 16 are non-vital. Should this patient agree to the planned endos and crowns on 15 and 16?



Overview

1. Introduction
2. Measures used to assign prognosis

VERY EASY

Why?

- Because most of the measures used to assign a prognosis come straight from the wonderful, thorough and complete clinical and radiographic periodontal examination that you normally do on your patients ☺

Clinical Measures

- Probing depth
- Attachment loss
- Mobility
- Furcation grade
- Plaque accumulation, BoP and visual inflammation (which may imply difficult to maintain areas)

Radiographic Measures

- Bone loss
- Crown:root ratio
- Root form (conical vs. divergent roots)
- Root proximity

Other Measures

- History of periodontitis
- Patient compliance

Why are these measures used?

Probing Depth

- Deeper probing depths lead to…
  - less cleansable areas[2], which allow for…
    - more pathogenic plaque formation[3], which allows for…
      - the inflammatory reaction to lead to attachment loss[3], which leads to…
- **deeper probing depths!**
- = vicious circle

Attachment Loss/Bone Loss/Crown:Root Ratio/Mobility

- The theory behind all of these measures affecting prognosis is that the less support a tooth has, the more susceptible it is to be affected by occlusal forces
- Recall that in the presence of inflammation, occlusal trauma can potentiate bone loss
- = another vicious circle

Furcation Grade

- The worse a furcation is, the harder it is to clean, both by the patient and the dentist/hygienist/periodontist
- = another vicious circle

Plaque, BoP, Visual Inflammation

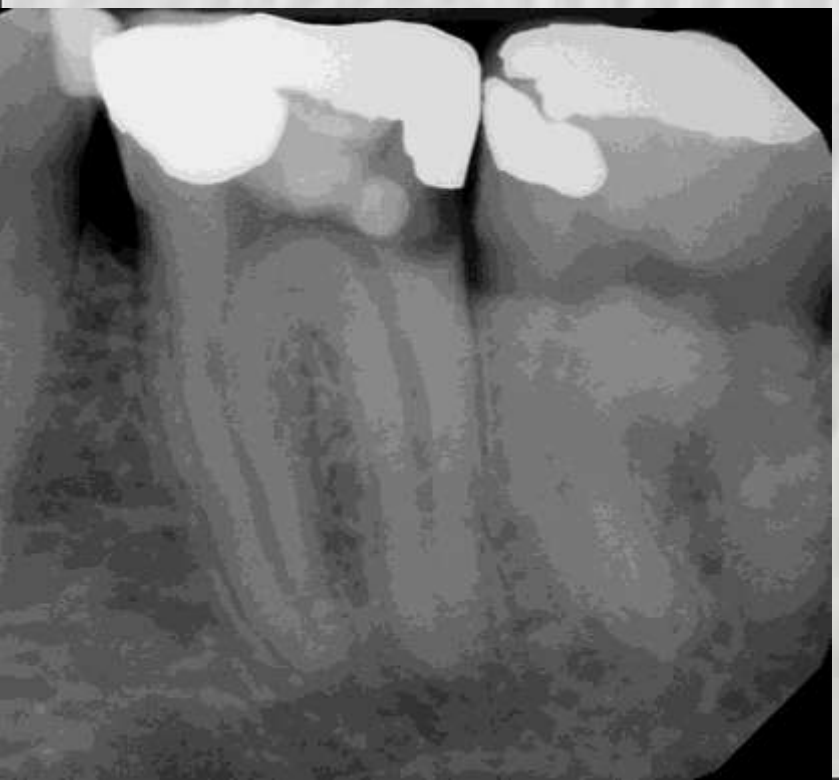
- These three measures are telling you where a patient is not performing adequate oral hygiene
- Sometimes, this inadequate oral hygiene is not their fault (think furcations, distal of the terminal tooth, crowded teeth, etc.)

Root Form

- The theory is that a tooth with conical roots will be less stable in bone than a tooth with roots which are cylindrical, or which, in the case of a multi-rooted tooth, diverge

Root Proximity

- Teeth which are too close together can't be instrumented adequately interproximally

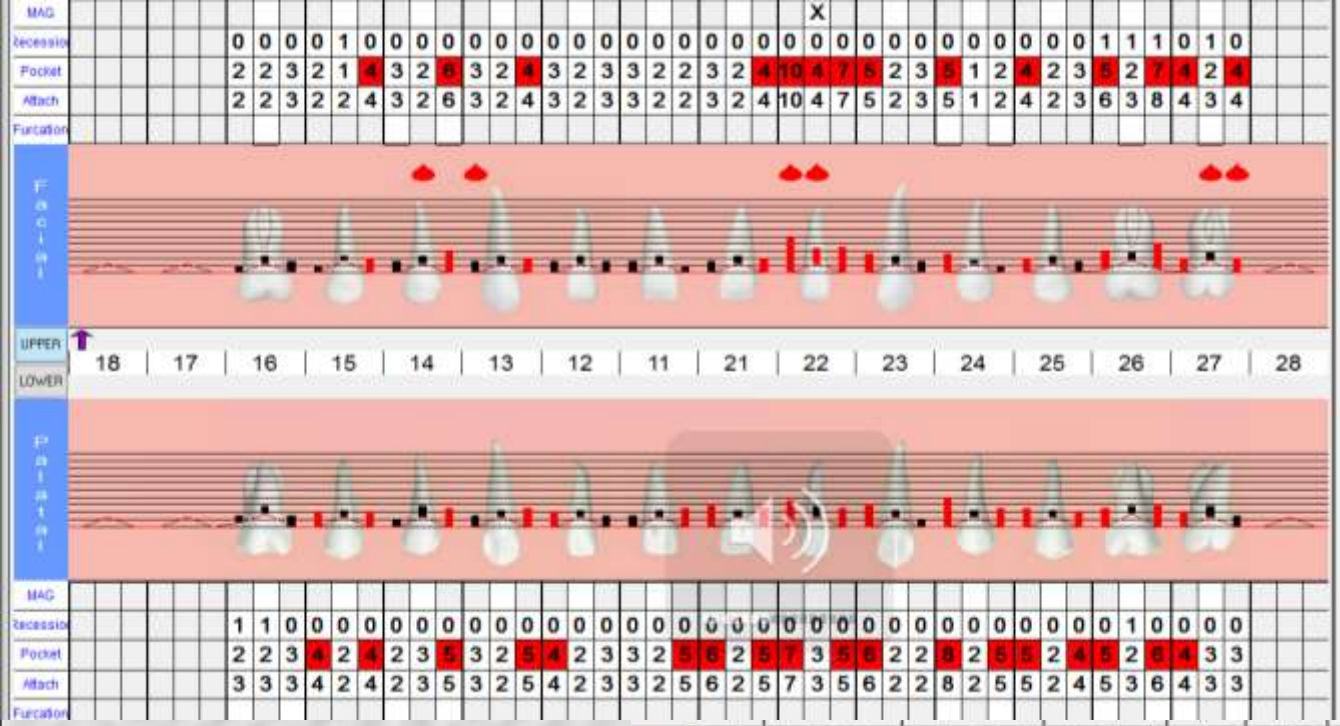


History of Periodontitis

- As with MANY diseases and disorders, having had the problem previously predisposes a person to having the problem again
- Nature (genetics) vs. nurture (habits/environment)?

Patient Compliance

- The most obvious vicious circle yet!
- Is often interpreted to refer to how well patients comply with oral hygiene practices and maintenance schedules
- Can also be interpreted as to how well a patient cares for their general health e.g. smoking cessation, diabetic control etc.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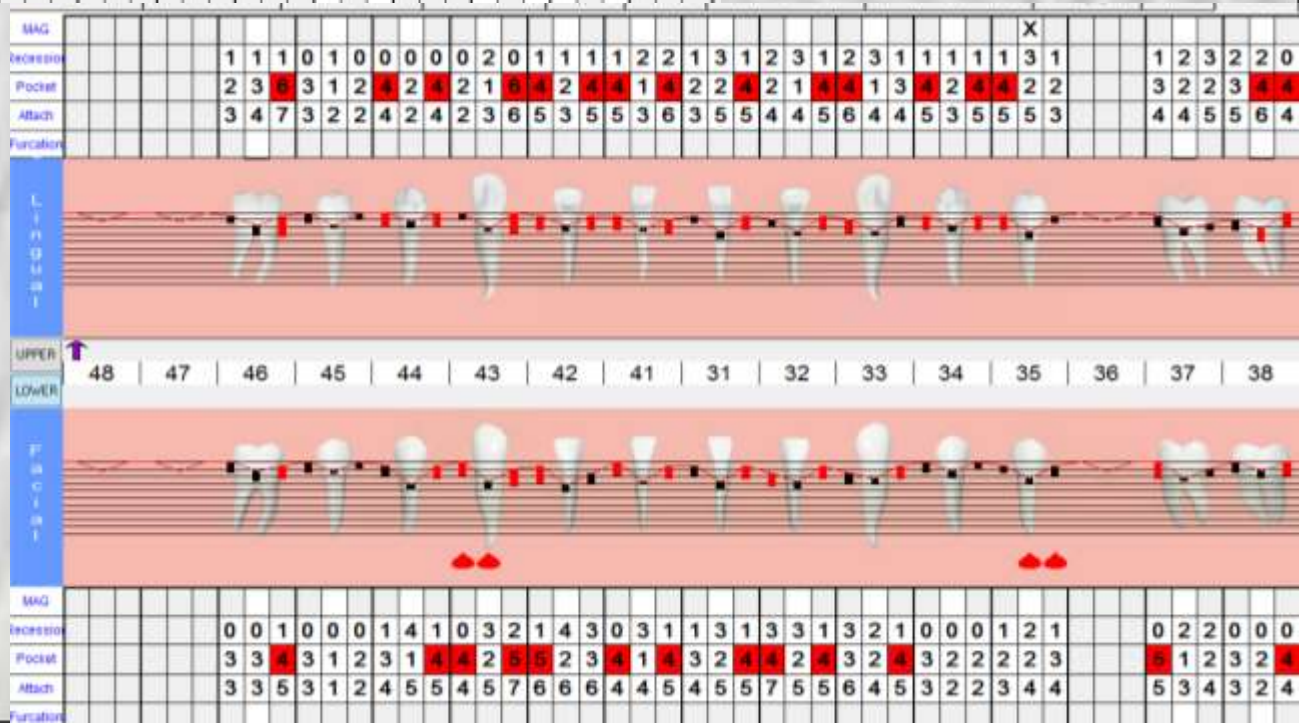
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Overview

1. Introduction
2. Measures used to assign prognosis
3. Different prognostication systems

Prognostication Systems

- Over the years, different people have attempted to weave the previously mentioned measures into cohesive prognostication systems, to aid in treatment planning
- Different systems use different combinations of measures

McGuire 1991[5]

- The most comprehensively studied system
- Tooth prognoses were either:
  - Good
  - Fair
  - Poor
  - Questionable
  - Hopeless

McGuire 1991

Good: teeth with

- adequate periodontal support
- control of etiologic factors
- proper maintenance assumed

Fair: teeth with

- attachment loss to the point where the tooth was no longer "good"
- class I furcation which was maintainable

McGuire 1991

Poor: teeth with

- moderate attachment loss with class 1 or class 2 furcations
- location and depth of furcation allows for maintenance, but with difficulty

Questionable: teeth with

- severe attachment loss resulting in poor crown:root ratio
- poor root form
- class 2 furcations NOT easily accessible to maintenance
- class 3 furcations
- class 2 mobility of more
- significant root proximity

McGuire 1991

Hopeless: teeth with

- inadequate attachment to maintain the tooth in health, comfort and function

Carranza 1999[6]

- From the most popular perio textbook, Carranza's Clinical Periodontology
- Same prognostic categories

Carranza 1999

Good: teeth with

- adequate remaining bone support
- adequate possibility to control etiologic factors and establish a maintainable dentition
- adequate patient cooperation

Fair: teeth with

- less than adequate remaining bone support
- some tooth mobility
- class I furcation
- adequate maintenance possible
- adequate patient cooperation

Carranza 1999

Poor: teeth with

- moderate to advanced bone loss
- tooth mobility
- class 1 or class 2 furcations
- difficult to maintain areas
- doubtful patient compliance

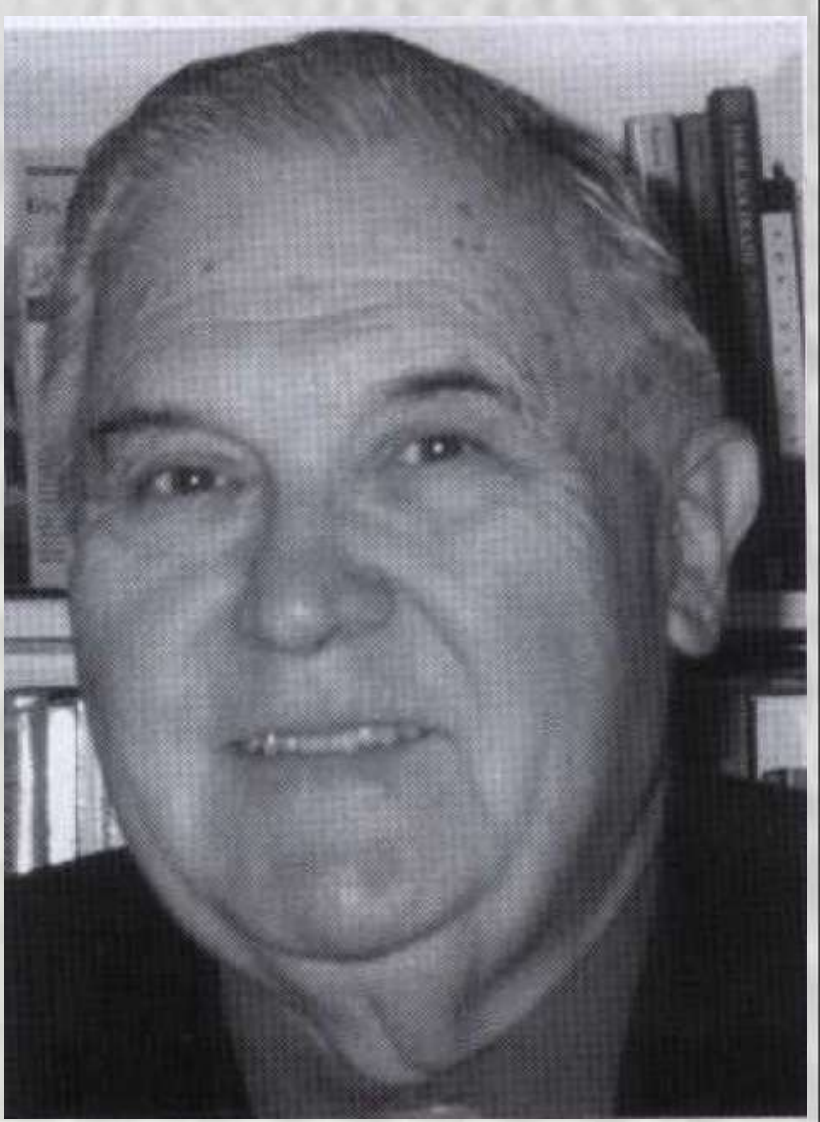
Questionable: teeth with

- advanced bone loss
- class 2 or class 3 furcations
- tooth mobility
- inaccessible areas
- presence of environmental or systemic factors

Carranza 1999

Hopeless: teeth with

- advanced bone loss
- non-maintainable areas



Becker 1984[7]

- An older system
- Only had two categories:
  - Questionable
  - Hopeless
  - (everything else was assumed to be "good" ☺)

Becker 1984

Questionable: teeth with

- bone loss close to 50% of the root length
- PD 6-8mm
- class 2 furcations with minimal inter-radicular space
- presence of a palatogingival groove on maxillary incisors
- mesial furcation involvement of a maxillary premolar

Hopeless: teeth with

- loss of 75% or more of supporting bone
- PD >8mm
- class 3 furcations
- class 3 mobility
- history of repeated periodontal abscesses

Hirschfield and Wasserman 1978[8]

- Only had one category:
  - Questionable
  - (everything else was assumed to be "favourable" ☺)

Questionable: teeth with

- a deep, non-eradicable pocket
- marked mobility of 2 or 2+
- extensive alveolar bone loss
- furcation involvement

Chace and Low 1993[9]

- Only had one category:
  - Poor
  - (everything else was assumed to be "good" ☺)

Poor: teeth with

- pocket depth ≥6mm
- mobility >0.5mm
- conical root form with poor crown:root ratio
- class 2 or 3 furcation involvement

Prognostication Systems

- As you can see, there are many similarities between the different systems
- Further, the lines between the different categories are somewhat arbitrary, and even overlapping

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Validity of Prognostication Systems

- Now that we have concluded our history lesson, the question remains:

DO ANY OF THESE PROGNOSTICATION SYSTEMS WORK?

Research

- How do you study prognosis?
- Almost all studies looking at prognosis have been longitudinal observational studies
- They look at teeth "before" and assign a prognosis, let life happen, then look at teeth "after"

Research Outcomes[10]

- There are two outcomes you can look at to assess the accuracy of periodontal prognosis:
  1. Tooth mortality
  2. Periodontal stability

Tooth Mortality

- Studies which use tooth mortality as an outcome look very simply at which/how many teeth have been extracted in the given time period
- Since this is very easy to measure, it is the most common method

The Lie of Tooth Mortality

- Tooth mortality ≠ mortality of AIDS patients
- Why?
- Because….

Teeth don't extract themselves!

The Lie of Tooth Mortality

- Teeth get extracted by dentists
- An individual dentist's decision about when it is time to extract a tooth renders any study about prognosis which uses this outcome **VERY BIASED**
- Further, teeth can be extracted for non-periodontal reasons unrelated to their prognosis (caries, fractures etc.)

Periodontal Stability

- Using the outcome of periodontal stability implies looking to see if our measures PD, CAL, BoP, bone loss etc. have stayed the same or gotten better or worse over time

Periodontal Stability

- Advantage: it gives a much clearer picture about prognostic accuracy to a clinician who understands these measures
- Disadvantages: it is much more
  1. time-consuming;
  2. labour-intensive;
  3. difficult to be reliably accurate;

and won't mean anything to patients (pssst! they don't care if their pocket is 3mm or 8mm. They just want you to stop probing them.)

McGuire's (and Carranza's) System[11,12,13]

After having extensively studied teeth in all 5 prognostic categories (and using both tooth mortality and periodontal stability as outcomes), they found that:

1. Prognosis was more accurate for single rooted teeth than it was for multi-rooted teeth

McGuire's (and Carranza's) System[11,12,13]

2. Prognoses of fair, poor, and questionable were so variable that after 8 years, of the remaining teeth initially placed in each category, only:
    - 33% which had been "fair" remained "fair"
    - 20% which had been "poor" remained "poor"
    - 0% which had been "questionable" remained "questionable"

McGuire's (and Carranza's) System[11,12,13]

3. In terms of accurately predicting tooth survival, combining fair, poor, questionable, and hopeless teeth resulted in an accuracy of 50% (might as well flip a coin)

In other words, the only good prognosis is an accurate prognosis, and the only accurate prognosis is a good prognosis

Becker's System[7]

- Becker's system was shown to be most accurate for patients who complied properly with maintenance:
  - 1.7% of "good" teeth ended up getting extracted
  - 25.8% of "poor" teeth ended up getting extracted
  - 80.4% of "questionable" teeth ended up getting extracted

Becker's System[7]

- Accuracy fell significantly for patients who were poorly maintained:
  - 3.0% of "good" teeth ended up getting extracted
  - 37.2% of "poor" teeth ended up getting extracted
  - 33.3% of "questionable" teeth ended up getting extracted

Becker's System[7]

- The increased proportion of "good" and "poor" teeth which got extracted in the poorly maintained group taught us the importance of maintenance in our treatment plans

Hirschfield and Wasserman's (and Chace and Low's) System[8]

- Longest study (average follow-up 22 years)
- The prognosis of "questionable" was most accurate among well-maintained patients, as opposed to downhill patients
- Patients who went downhill had higher proportions of teeth get extracted from the "good" category

Timing of Prognosis

- McGuire's and Becker's systems taught us another important thing about assigning a prognosis to a tooth:
  - A prognosis is most accurate until about 5 years into the future. After that…no guarantees
- This was confirmed by Hirschfield and Wasserman, as their prognoses become less accurate the longer time went on

One last thing…

What is the Meaning of "Hopeless"?

- Some of the previously mentioned systems have a category of "hopeless"
- What exactly is meant by calling a tooth "hopeless"?

Hopeless Teeth

- Untreated "hopeless" teeth can have a very negative effect on neighbouring teeth[14]
- Once extracted, periodontal issues on adjacent teeth will resolve[15]

However….

Hopeless Teeth, Hopeless Dentist

- Retained "hopeless" teeth which underwent scaling and root planing, surgery, and appropriate maintenance, while remaining with a "hopeless" prognosis, *did not negatively affect adjacent teeth at all* in terms of either periodontal stability or tooth mortality[16]

And Finally, Back to McGuire[5]

- Of the teeth initially classified as "hopeless", after 8 years 75% of them were still considered "hopeless"
- And what proportion of the teeth initially classified as "hopeless" were still around after 8 years to take part in the analysis, you ask?

38%!

Hopeless indeed!

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A Different Approach

- When making clinical decisions, rather than passively relying on someone else's prognostic religion to guide us, consider adopting the following approach

Value

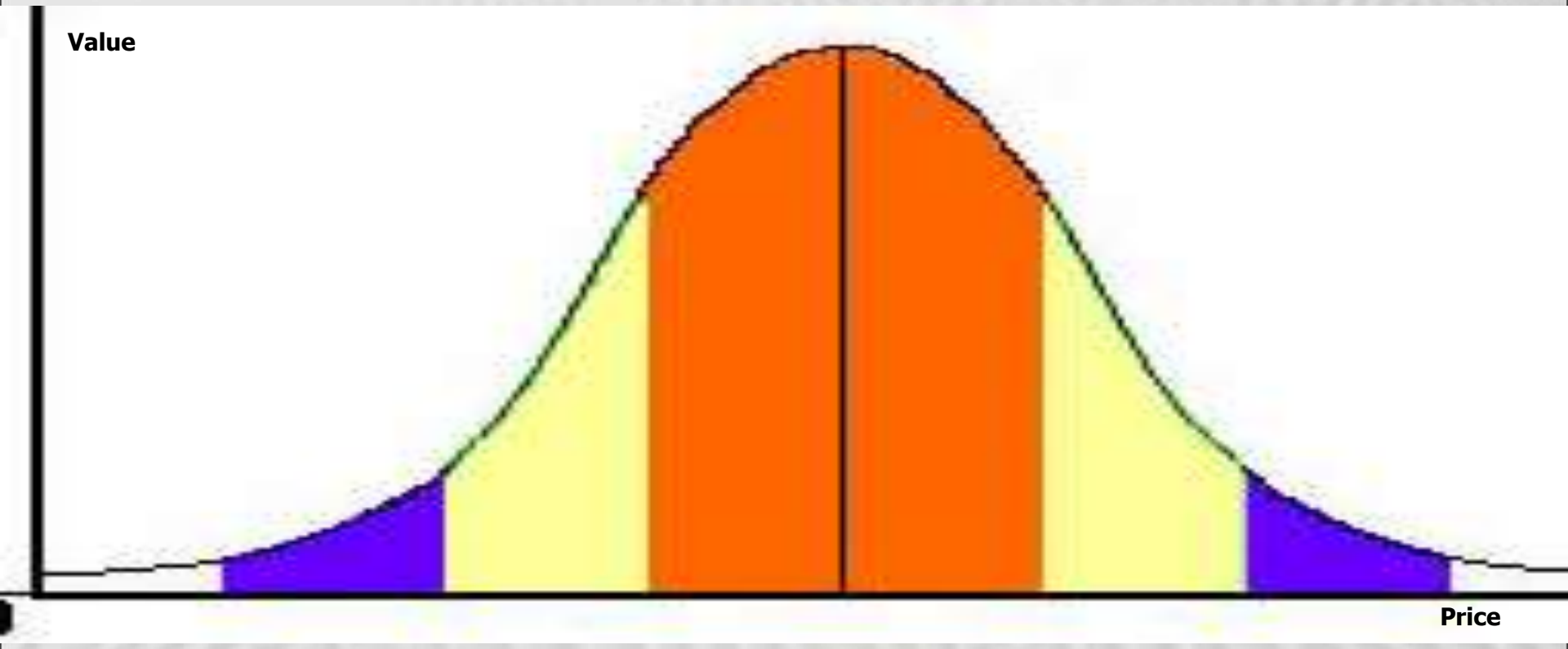
- Imagine you're a family of four, and you want to buy a house

Value

- You have three houses to choose from:

Value

- Just because the price goes up incrementally from left to right, does not necessarily mean the *value* increases as well


Value
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Value

- It is intuitive that very cheap things have poor value
- However, counter-intuitive as it may be, often very expensive things bring with them poor value as well – not because they are poor quality, but because the increase in price is **NOT** proportional to the increase in return on the investment

In other words, you don't
ALWAYS get what you pay for

Value in a Treatment Plan

- Deciding on the *value* of a treatment plan comprises asking, "For the money and effort, which treatment plan…
  - …is least likely to fail over the long-term, assuming a non-compliant, self-destructive patient?"
  - …will provide the best function?"
  - …will do the least harm to the patient?"
  - …will best meet the patient's expectations?"

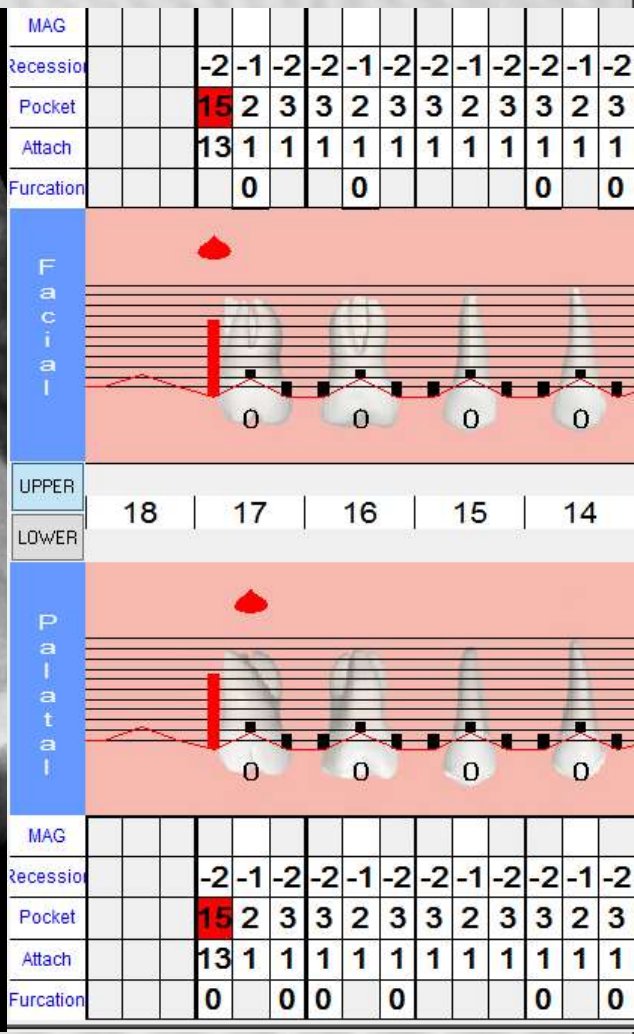
At the Tooth Level….

- Restorative dentists often ask periodontists, "Evaluate tooth X's periodontal prognosis. Tooth X is being planned for_____(insert tx plan here)."

At the Tooth Level….

- Instead, consider asking "What treatment plan for the position of tooth X has the best **value**?"

Case 4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Case 4

- Dx: localized severe chronic periodontitis 17; combined perio-endo lesion 17
- What is the best treatment plan for 17?

Case 5


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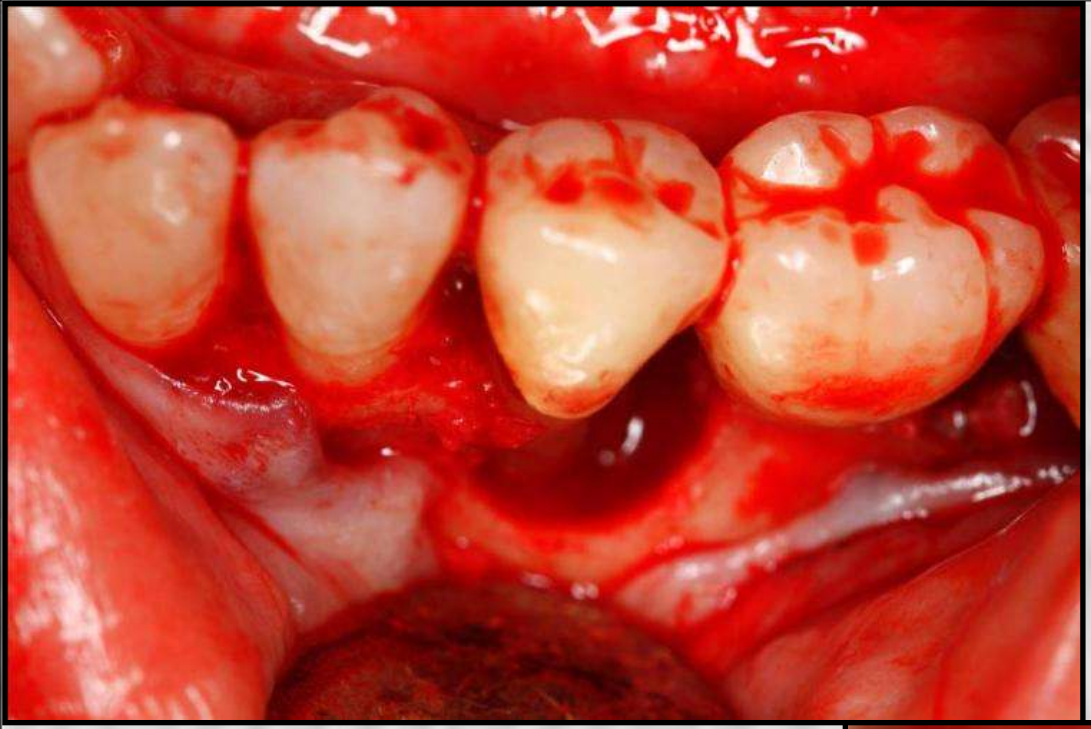
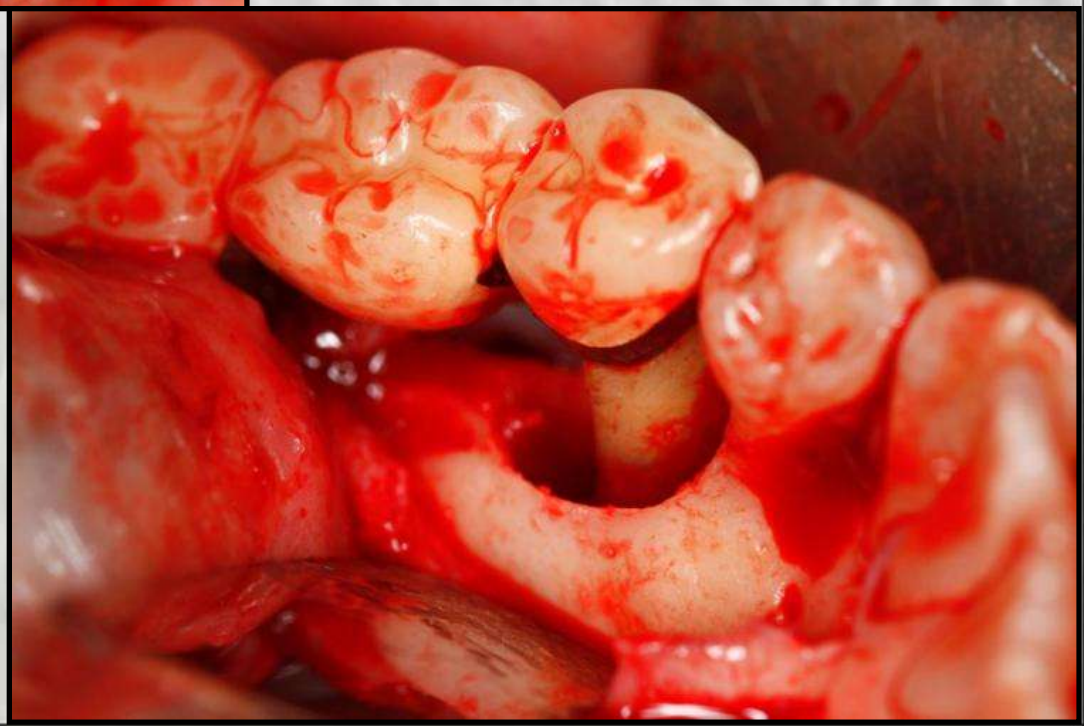




Case 5

- Dx: localized severe chronic periodontitis 35; combined perio-endo lesion 35?
- What is the best treatment plan for 35?

At the Arch Level….

- Restorative dentists often ask periodontists, "Evaluate the maxillary/mandibular arch's periodontal prognosis. Patient would like to have a _____(insert tx plan here) fabricated."

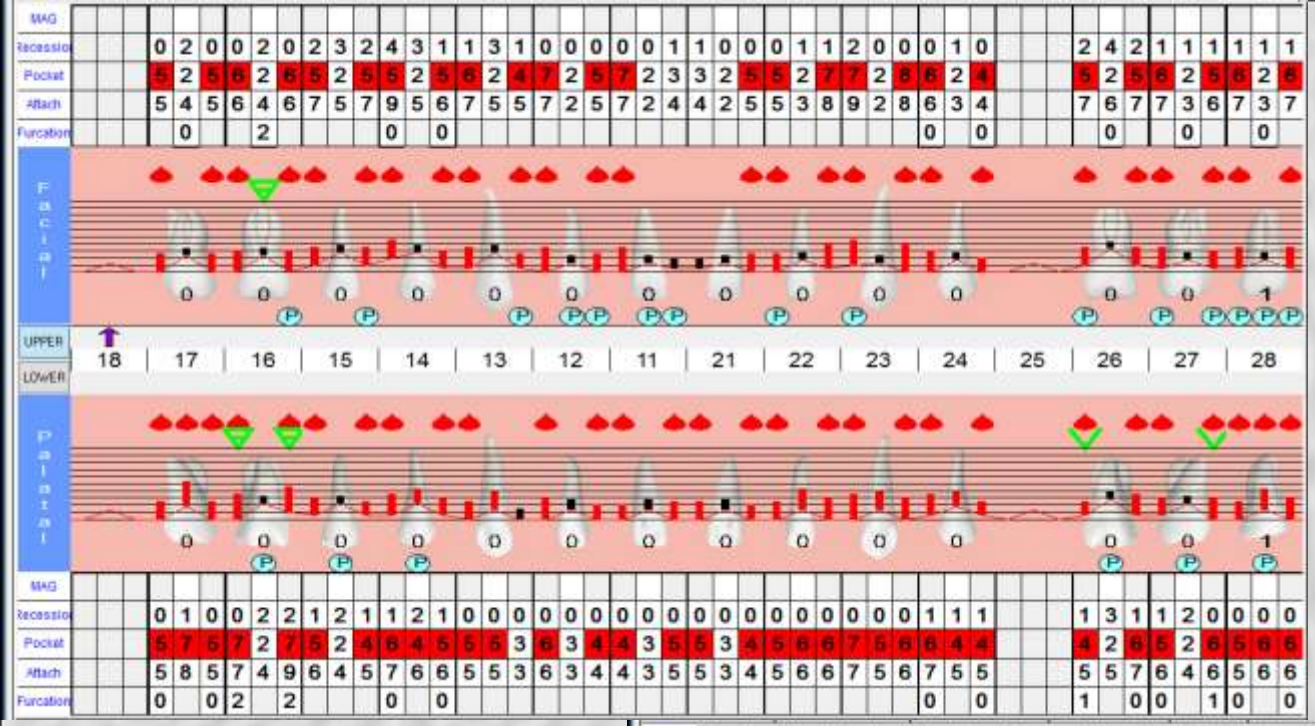
At the Arch Level….

- Instead, consider asking "What treatment plan for the maxillary/mandibular arch has the best value?"

Case 6

- 53 y.o. ♂ presents upon referral from GP for complete periodontal examination
- CC: "I know I have gum problems. What should I do about them?"
- HPI: Pt. has had sporadic dental care all his life. He admits to having been told about periodontal issues on many occasions.
- Pt. has been smoking a pack a day for the last 23 years; otherwise healthy

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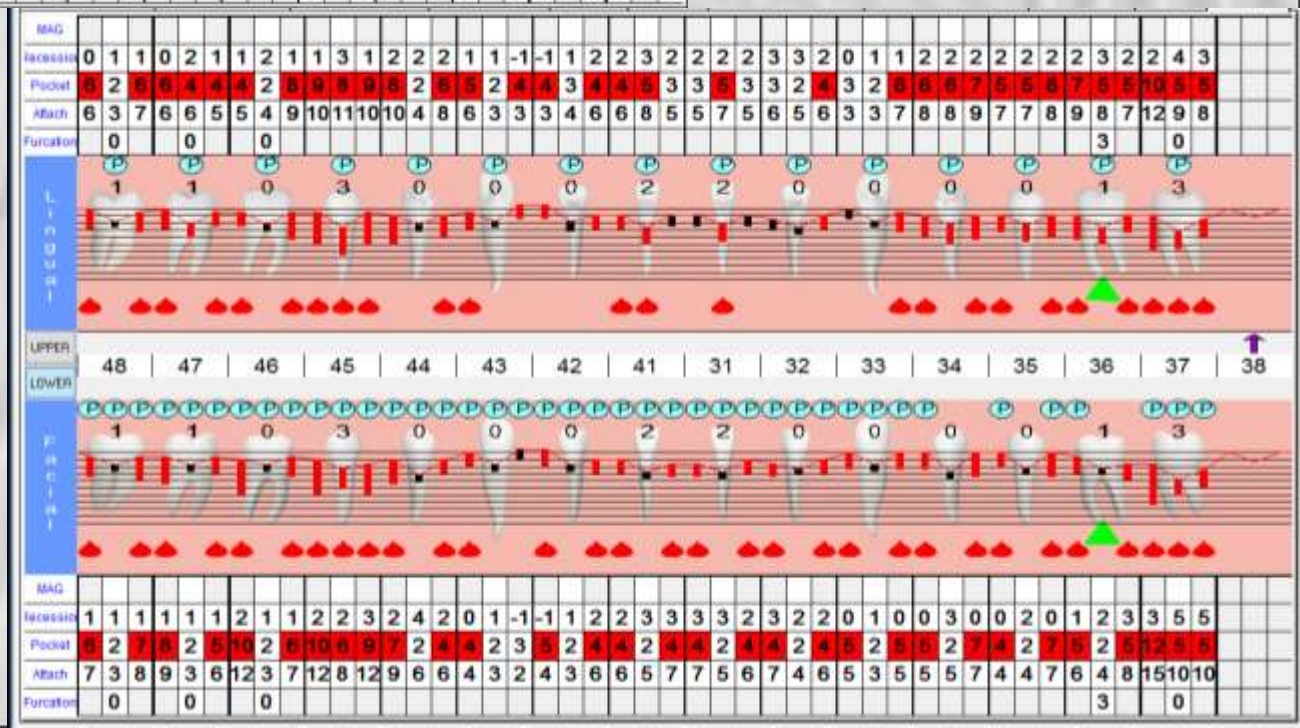
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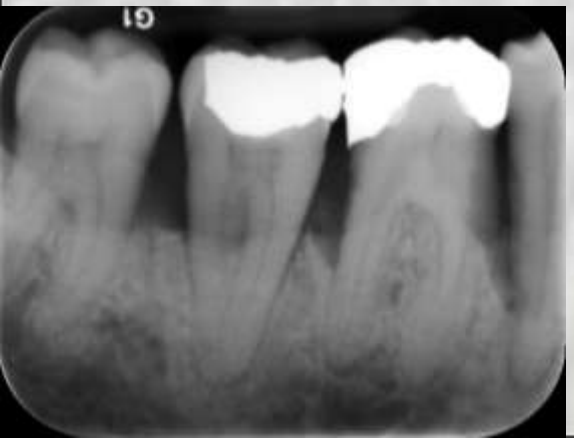
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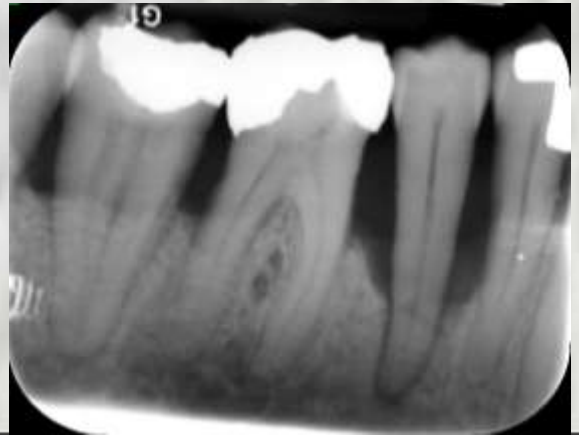
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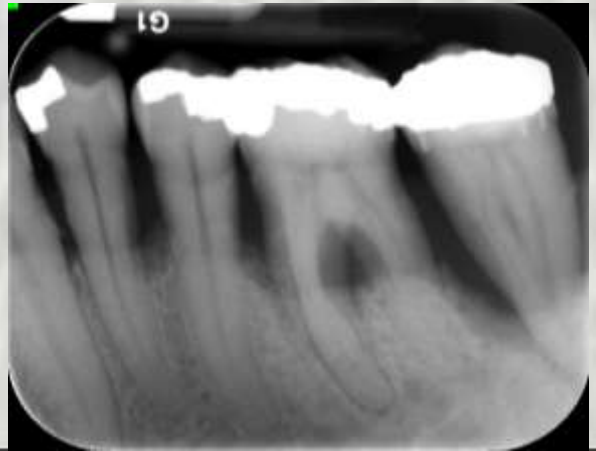
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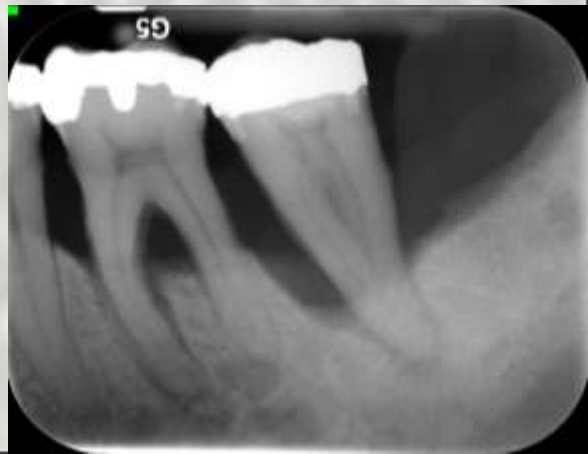
G5

Case 6

- Dx: generalized severe chronic periodontitis; secondary occlusal trauma 28, 37, 36, 31, 41, 45, 47, 48; (necrotic pulps, chronic apical abscesses 31, 41)
- Should we try to treat and retain as many teeth as possible?

Case 6

- Sure, if the patient doesn't mind looking like….

Any questions?

Thanks for listening!

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