

Treatment Planning

5. PHASE 3
REHABILITATION,
MAINTENANCE PHASE

Get started!

28 slides, about 1-1.5 hour

Learning Objectives

Phase
3
Rehab

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1. Be able to recognize, explain, and determine the restorative implications of **stressed pulp syndrome**
2. Know the meaning of the following terms and be able to explain their clinical implications: **Perio plastic surgery, Restorative crown lengthening, Esthetic crown lengthening, biologic width, altered passive eruption, mucogingival defects**
3. Be able to name and explain the options for single tooth replacement and multiple tooth replacement.
4. Explain the difference between a **bound vs unbound space** and the restorative implications.
5. Explain to a patient where implants are best used with an RPD
6. Know the schedules and what to do in **recalling** for endo, perio, caries, and removable prosthodontics.

Data Collection → Tx Plan

Here's where we are in the process now...



Phase 3 Goals

Phase
3
Rehab

3

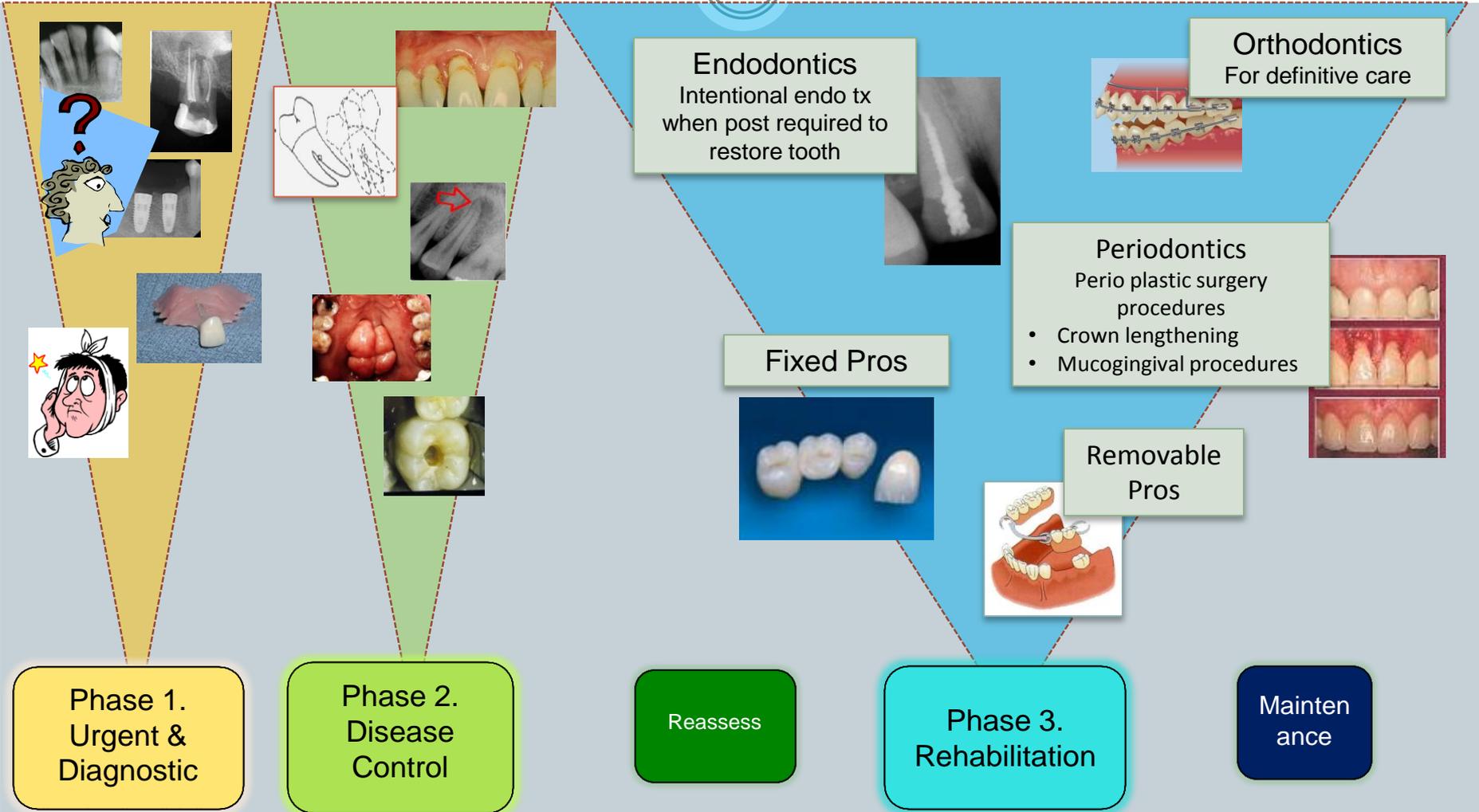
“Begin with the end in mind”

- Up to now, we have been talking about treatment that you would be doing no matter what...Now we are getting to the point where the real options come in to play.
- Our goal is easy to state: **Restore form, function, and esthetics**. There are just so many ways to get there! And so many pitfalls in getting it right! And it is hard to explain at this point because you have not been exposed to many of these treatments.
- So just try to get an idea of some of the options. As you learn more about these in your advanced classes, you can see how your choices here affect your Phase 2 choices as well.

Let's focus on Phase 3 Treatments

Phase 3
Rehab

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Endodontics
Intentional endo tx
when post required to
restore tooth

Orthodontics
For definitive care

Periodontics
Perio plastic surgery
procedures

- Crown lengthening
- Mucogingival procedures

Fixed Pros

**Removable
Pros**

Phase 1.
Urgent &
Diagnostic

Phase 2.
Disease
Control

Reassess

Phase 3.
Rehabilitation

**Mainten
ance**

Phase 3 Treatment



**ORTHODONTICS
ENDODONTICS
PERIODONTICS
FIXED PROSTHODONTICS
REMOVABLE PROSTHODONTICS**

Overview: Phase 3

Phase
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Generally, **treatments in Phase 3 must be carefully sequenced**. It is crucial that you get this right or you will end up giving folks care for free when you make a mistake. Orthodontics done in this phase is a stand-alone treatment. Otherwise, it would be in Phase 2.

1. **Consider *any* potential Endodontic treatment before Prosthodontics.** Teeth that have been treated with multiple restorations and are planned for fixed prosthodontics should be at least considered for endodontic treatment first.
2. **Periodontal adjunctive care can be quite complex.** More later, but there are times when you will need to start the crown preparation so you know exactly where the margins will end before you do the periodontal surgery.
3. **Generally, Fixed Prosthetics comes before Removable Prosthetics.**

Orthodontics

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- There is so much that Orthodontics can do for your patients-both for esthetics and function- that do not involve preparing teeth!
- Any time there is an Orthodontic as well as a Prosthodontic option, you owe it to your patient to offer it and explain the advantages/ disadvantages.
- Never assume they would not be interested because of age, finances, or any other reason if they are otherwise a good candidate (Perio and Caries well controlled).

Endodontics

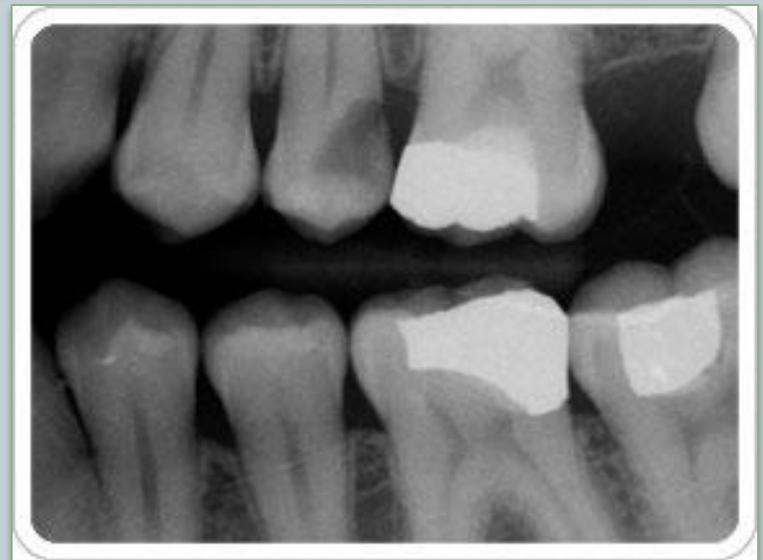
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- **Stressed pulp syndrome** describes a tooth that has been repeatedly **insulted with caries, restoration, or trauma**.
- Even if still vital, preparing a stressed pulp **may be the final straw**. Note the size and shape of the pulp chamber compared to adjacent/contralateral tooth as one consideration.
- Look at it carefully and think: Would it be better to do endo before Pros is done? Or is the risk and quality outcome if done before or after?

Abou-Ross M, J Pros Dent '82

Notice how much the size of the pulp on #13 is reduced compared to #12? Considering this history of deep decay, even if the pulp tests vital, at least *consider* an endodontic evaluation if you were going to, say, use it as a FPD or RPD abutment.



Back to
Review

Phase 3 Periodontal Surgery

Phase
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Rehab

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- Our Phase 2 Perio treatment was focused on treating disease, which included:
 1. Initial Therapy (scaling and root planing to remove calculus)
 2. Re-evaluation
 3. If necessary, surgery for access to the calculus you couldn't reach or to reshape damaged bone or graft for repair.
- In Phase 3, Periodontal surgery falls in the category called Periodontal Plastic Surgery, which can include:
 - **Reshape the periodontal architecture for esthetic reasons**
 - **Reshape supporting bone as an adjunct to Prosthodontic care**
 - **Reshaping or repairing mucogingival defects**

Usually, your disease control goals are met in Phase 2 before you commit to this care in Phase 3, but to avoid duplicate surgery, you may choose to do both Phase 2 and Phase 3 surgery at the same time.

Periodontal Plastic Surgery

Phase
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Restorative Crown Lengthening



Before

After



- There are two general types of crown lengthening procedures:

1. Restorative Crown Lengthening

- Generally, the body rejects restorative material placed too close to bone- you need about **2-3 mm between restoration and the crest of bone**.
- This is called the **Biologic Width**. Putting a margin too close is a “biologic width violation”- it leads to chronic inflammation (redness, swelling, bleeds easily)
- These procedures **reduce bone height** so a restoration can be placed without violating the biologic width.

2. Esthetic Crown Lengthening

- Reshapes tissue for esthetics- to get a nice, even gingival architecture
- Can be done with Prosthodontic treatment or by itself.

Periodontal Plastic Surgery

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- One common reason for Periodontal Plastic Surgery is “short teeth” or a “gummy smile” and **one** cause of that situation is **Altered Passive Eruption**. This happens when the teeth erupt, but the bone doesn't resorb correctly and the gingiva doesn't roll back, leaving the apparently “short teeth.” Really, the teeth are the right size.
 - Teeth are amazingly consistent in size. **Central incisors are nearly always at least 10 mm in height**. If they are shorter than 10 mm, it's:
 - ✦ **Worn down teeth- you can see the dentin**
 - ✦ **Excess gingiva -you'd have deep probing measurements**
 - ✦ **Excess bone over the tooth.**
 - You should be able to feel the CEJ with an explorer (gently!!! Get someone to show you how!) .If not, then they haven't erupted correctly
- Doing prosthetics would be the **WRONG** treatment plan here!!! If you made the teeth longer, they would look like horse teeth, and the smile would still be “gummy”- the smile “frame” of lips is still in the same place, so you just can't make the teeth longer!



This patient had an Esthetic Crown Lengthening procedure done to remove excess tissue left covering her normal sized teeth when altered passive eruption failed to expose them correctly.



Case 1: Altered Passive Eruption

Phase
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Rehab

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Diagnosis

1. Short clinical teeth
< 10 mm central incisor
2. Can't feel CEJ with explorer clinically

Esthetic Crown Lengthening: Surgical Exposure

Phase
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- Tissue reflected back to show location of bone.
- There needs to be 3 mm of space between the crest of bone and where you want the gingival crest to end up, and exactly the same shape.



Esthetic Crown Lengthening: Bone Recontouring

Phase
3
Rehab

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- Reshaping bone with chisels at the line angles.

Esthetic Crown Lengthening: Bone Recontouring

Phase
3
Rehab

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- Final position should be 2 mm apical to CEJ
- Notice how it's nicely shaped all the way to the line angles now



Esthetic Crown Lengthening: Tissue Placement

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- Tissue is replaced so that it is 3.0 mm from alveolar bone crest. This leaves 1 mm of tissue over enamel
- Without any further treatment, this is now a really nice esthetic result.
- Know when your patients might benefit from this so you can refer them to a Periodontist! (*Don't try this at home, folks...*)



Restorative Crown Lengthening

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Restorative Crown Lengthening



Before

After

I know what you're thinking- why not do the surgery first? Experience has taught us that only after you actually prepare the tooth do you know where the final margin needs to be. It's a real bummer to do the surgery, prep the tooth, and then have to re-do the surgery because you guessed wrong!

- In this case, the cusp has broken below the gingiva, so your margin needs to be that deep. But the bone is so close your margin would be impinging on the **biologic width**...what now?
- Go ahead and prepare your crown and place a provisional. That way, the surgeon knows **exactly** where you need your margin to be.
- The surgeon then removes enough bone to **leave the margin 3 mm from the height of bone.**

Periodontal Plastic Surgery

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The frenum attachment has pulled the tissue away, leaving the exposed root and no attached gingiva in that area.



- **Mucogingival defects** can:
 - Be unesthetic (on the maxillary)
 - Cause sensitivity
 - Predispose area to significant periodontal disease
- Periodontal grafts can restore the gingival tissue structure. This one was probably taken from the roof of the mouth and grafted into this area.
- Any time you are **planning dentistry (margins, FPD clasps) in an area of a mucogingival defect, consider consulting with a periodontist.**
- **These defects trigger a D0180.**

Raleigh Perodontics

Case 2: Dennis

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- Dennis is a 46 year old male who is concerned about the appearance of his teeth.

What is your first thought on the diagnosis?

- a Altered Passive Eruption
- b Worn Teeth
- c Congenitally Short Teeth

Prosthodontics



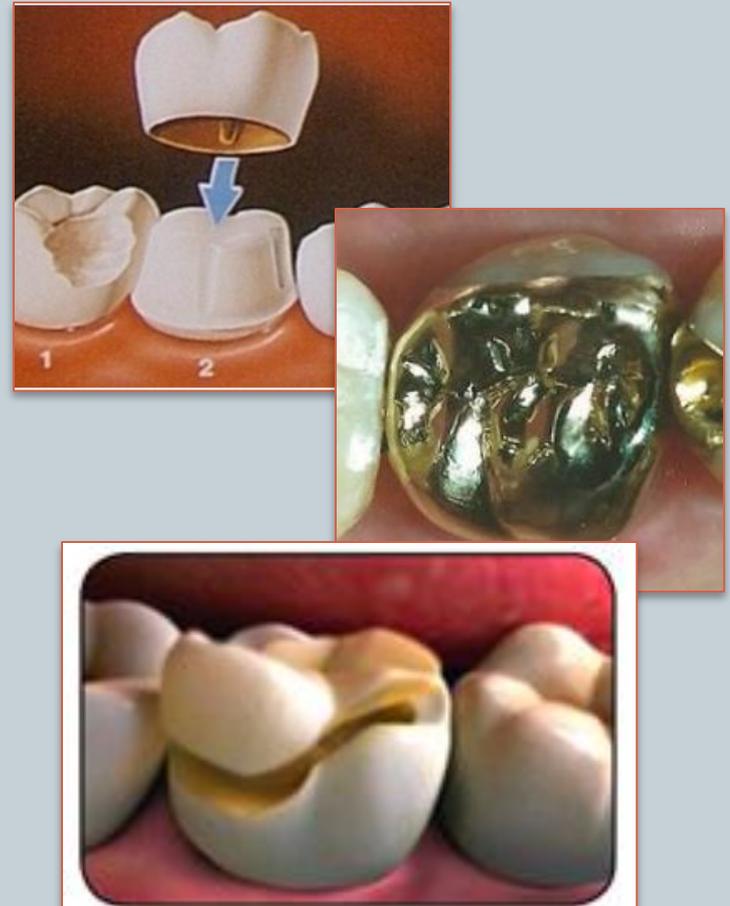
FULL COVERAGE RESTORATIONS
SINGLE TOOTH REPLACEMENTS
MULTIPLE TOOTH REPLACEMENTS
UNBOUNDED SPACE REPLACEMENTS

Full Coverage Restorations

Phase
3
Rehab

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- In dental school, these restorations are considered part of Phase 3 and taught in Prosthodontics, but generally they are considered Operative and done in Phase 2.
- Consider each individual situation and use the best material for the situation
- You'll learn more about it in Fixed Pros and Esthetics this year and next.



Single Tooth Replacement Options

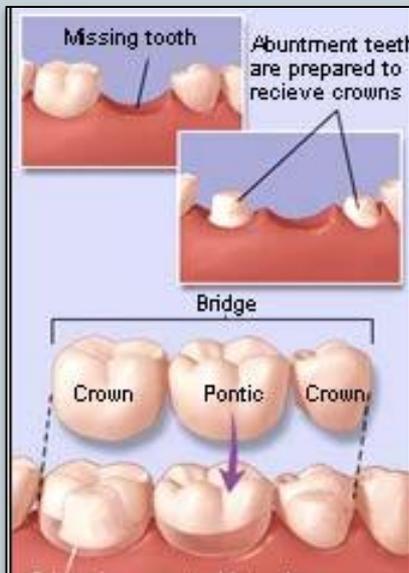
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Best two replacement options:

Implant



Fixed Partial Denture (FPD)

1. **Nothing.** Not all spaces have to be filled.
2. **Implant.** Preferred replacement selection-need enough bone, enough space, and pt health factors to be favorable.
3. **Fixed Partial Denture.** When implant not feasible, or adjacent teeth already need crowns.
4. **Removable Partial Denture.** *Usually* a distant third in the replacement options. **But** if there are many other missing teeth in this arch, or lots of bone and tissue are missing as well, this can be the best option.

Multiple Tooth Replacement Options

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1. **Nothing.** Again, not all spaces need to be restored.
2. **Implant FPD.** Same issues as single tooth, but added complexity.
 - **Max teeth-** One implant per tooth replaced
 - **Mand teeth-** Two implants can support a three unit FPD
- **Fixed Partial Denture.** You will learn later how many pontics two natural abutments can support, but usually it's no more than two posterior or up to four anterior.
- **Removable Partial Denture.** If replacing more than two teeth, either implants or RPD's become the options, and since RPD's are, by a factor of 10, less expensive, they are a popular and very useful option.

Implant FPD- planned for the mandible, we can fabricate a 3 unit FPD on 2 implants. On the maxilla, we would probably need 3 implants.



Conventional FPD- this is a classic posterior 4 unit restoration

RPD- This appliance replaces the 4 incisors and 4 premolars by attaching to the remaining canines and molars.



Back to
Review

Multiple Tooth Replacement Options: Unbounded Spaces

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Unbounded space

No tooth on the distal end of the space. Think it might be kind of loose and floppy?

Options?

Nothing, Implants, or RPD + implants



Bounded space

Functional tooth on either end of the space.

Options?

Nothing, Implants, FPD, or RPD

- An **“unbounded space”** is one that does not have a tooth at one end.
- This, of course, rules out a conventional FPD- that *used* to mean an RPD was the only option.
- Now, implants offer a lot of other options, if the patient can afford them. But if not, RPD’s can still work fine.
- BUT, **RPD’s work better on the maxilla than the mandible**. If the patient can only afford a few implants, put them in the mandible, either to eliminate or stabilize an RPD.

Multiple Tooth Replacement Options: Unbounded Spaces: **Add Implants**

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Unbounded space

No tooth on the distal end of the space.
Think it might be kind of loose and floppy?

Options?

Nothing, Implants, or RPD + implants



This RPD was retrofitted with 2 implants at the distal end. Now it won't pull up with sticky food or wiggle loose with every tongue movement.

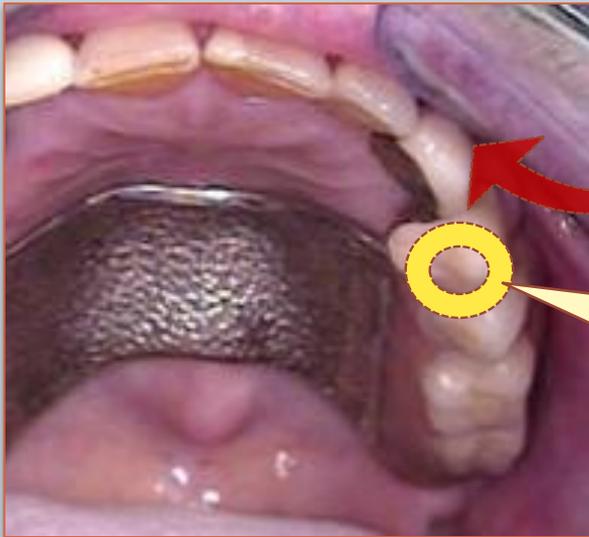
- An **“unbounded space”** is one that does not have a tooth at one end
- BUT, **RPD's work better on the maxilla than the mandible.** If the patient can only afford a few implants, put them in the mandible, either to eliminate or stabilize an RPD.

Multiple Tooth Replacement Options: Unbounded Spaces- **Add Implants**

Phase
3
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This **maxillary RPD** is also filling unbounded spaces, but on the maxilla, with all the bone for stability and support, the implants were placed so that a metal clasp did not have to be placed in an area where it would show.



Location
of
implant

- **Combinations** of implants and removable prosthetic appliances can meet a variety of needs and financial means.
- **Gross oversimplification.** Prioritize implants as follows:
 1. Place implants to avoid having to place an RPD or FPD if possible
 2. Add implants to stabilize unbounded mandibular RPD
 3. Add implants to eliminate visible clasps, or stabilize maxillary RPD

The Edentulous Arch

Phase
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Rehab

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And finally, there is the restoration of the **edentulous** arch.

1. Nothing is still an option. Not a great one...but it will surprise you how well some people do.
2. Implant supported FPD. Great, but expensive
3. Implant supported RPD. Good option, less expensive.
4. Conventional complete denture. Least expensive.

There are some other twists on these choices, but these are the general concepts.

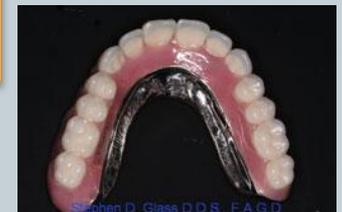


Maxillary Implant supported FPD



Maxillary Implant supported RPD.

With at least 4 implants, the denture can be “palateless”. Notice that the esthetics of the smile *may* be better with the RPD than the FPD because of the shape of the teeth and the gingiva.



Conventional complete dentures



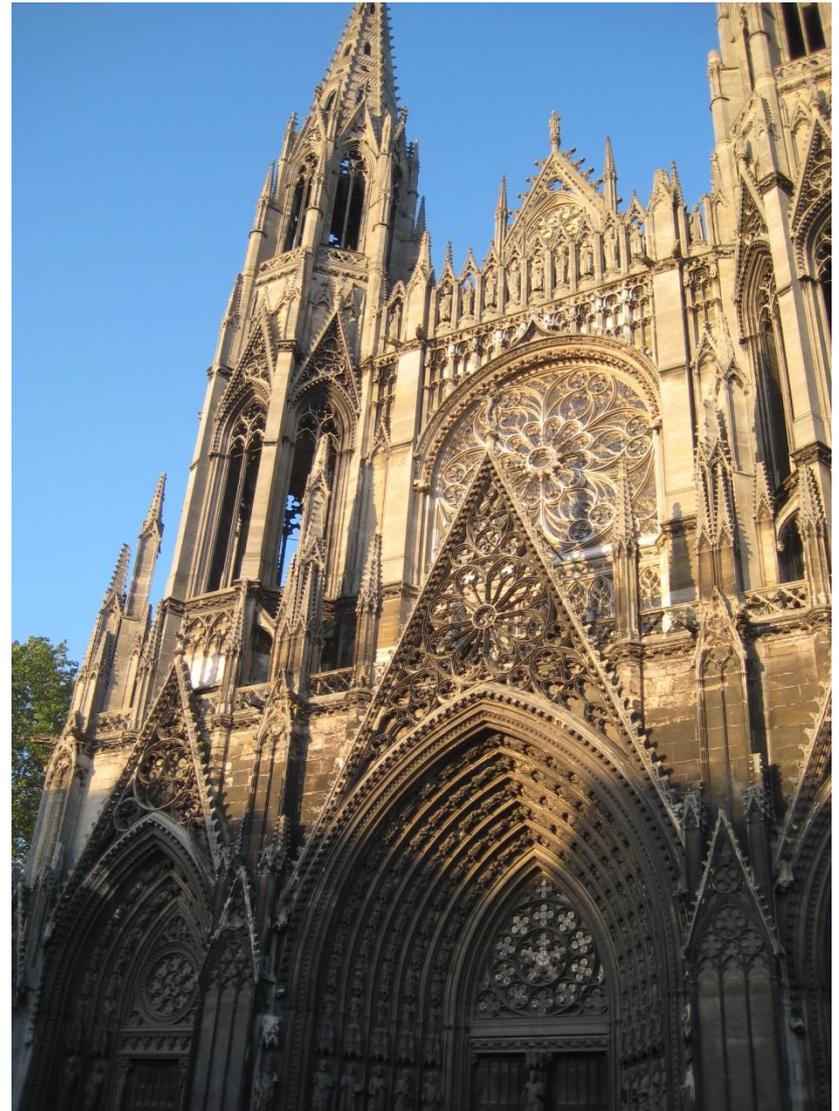
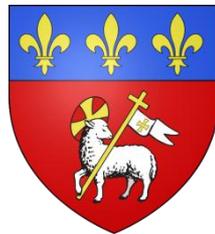
Rouen, France

A prosperous city under the Romans, Rotomagus was overrun by the Vikings in the 800's. To stop the Viking raids, the French king gave them this part of France, which became known as Normandy ("north men land") with Rouen as the capital.

Although there has been a church on this site since the 300's, the current building was started in 1100 and finished in the 1300's after a fire.

During the Middle Ages, wool from England was woven into textiles and sold at the Champagne fairs, so it was very wealthy. A number of houses still exist from these days.

Break time!





Street market for local produce



The Gros Horologe (Big Clock)
is from the late 1300's.



Street cafés are everywhere. Shops tempt you with pastry, or coffee, or chocolate shaped like a soccer ball...





The medieval center has been carefully preserved and rebuilt after WWII, including the Law Courts (above) and many of the wealthy merchant houses around the town square.





And Joan of Arc was burned in the square in Rouen during the Hundred Years War. The spot is marked and this statue is a few steps away.

Maintenance Phase



ORTHODONTICS
ENDODONTICS
PERIODONTICS
CARIES
REMOVABLE PROSTHODONTICS

Orthodontic Retention

Maintenance

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There are three basic types of orthodontic retention devices:

1. **Positioner**- Not only a retainer, this type can be used for final adjustments as the teeth fit completely into appliance. Especially important that patient wear it right after active appliances removed to hold teeth while bone and PDL final remodeling takes place
2. **Removable**- all elements are passive (no springs, etc) so it just holds the teeth in place.
3. **Fixed**- Usually placed only on the lower anterior teeth for long term retention. Frequently worn until final growth and development occurs in early 20's.



Positioner



Removable

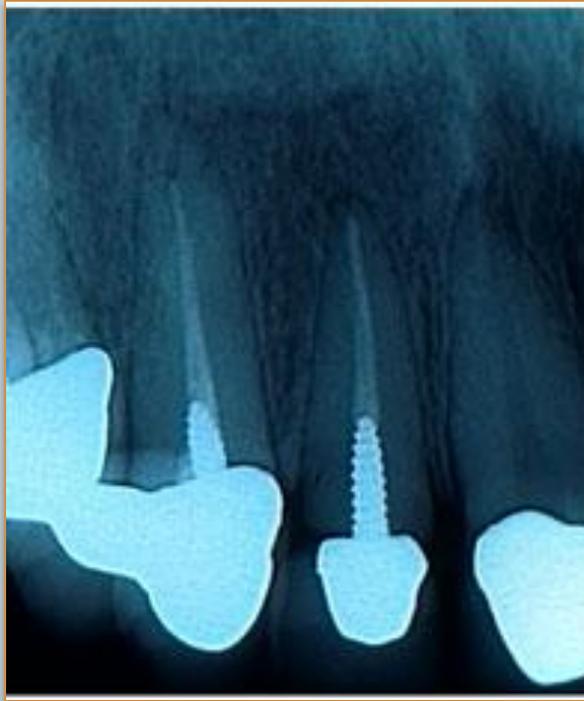


Fixed appliance

Endodontic Evaluation

Maintenance

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- Generally, re-eval an endodontically treated tooth at 6 months, 12 months, and 24 months.
- How? The usual way:
 - **Percussion**- should not be tender
 - **Palpation**- should not be tender
 - **Probing**- should not have probing depths out of “normal” for this patient
 - **Radiographs**- *tricky*. You’d like the see any lesion getting smaller and less radiolucent. But in the absence of other symptoms, it’s not a big concern.

Periodontal Maintenance

Mainten
ance

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- This is a complex topic, but to keep it simple, here are the basics:
- If you have *ever* treated the patient for periodontal disease, they are **always** scheduled for a **periodontal maintenance (D4910)** visit, **not a prophylaxis (D1110)**.
- Based on the severity and susceptibility of the patient, schedule the patient for recall every 3, 4, or 6 months.



Caries

Maintenance

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Caries recall for three reasons:

1. **Reinforce pt education** on diet, home care (use of F) and xylitol.
2. **Office F-** best is varnish
3. **Evaluate for new lesions** with exam and radiographs.

Interval can be different for different reasons:

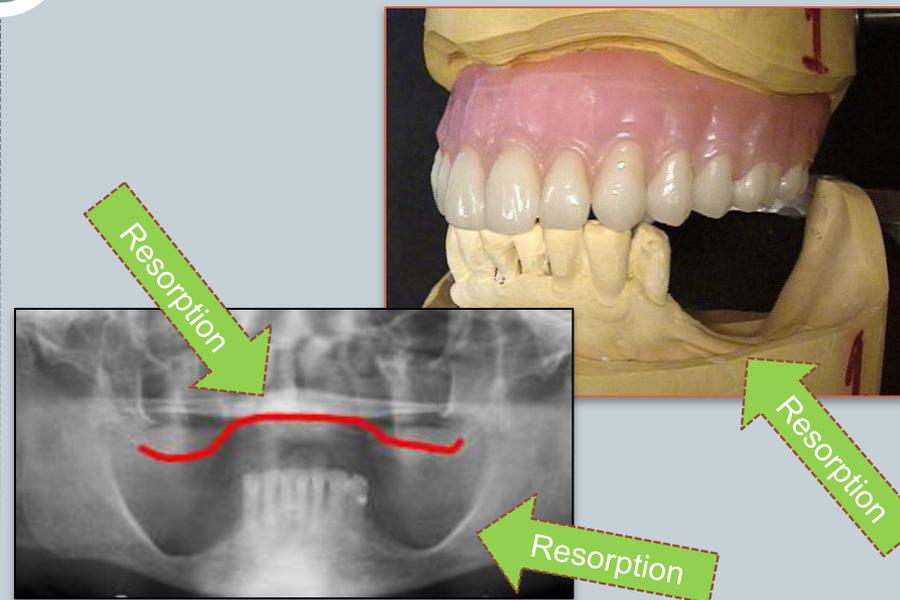
1. **Radiographs-** every 6, 12 (high risk) or 18 months (mod risk) depending on risk level
2. **F varnish and exam-** every 3 months (high risk) 6 months (mod risk).

Removable Prosthodontics

Maintenance

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- This is a complex topic, but here's the short version: once the teeth are gone, the **bone starts to resorb**, and dentures accelerate this process somewhat.
- As the bone resorbs, the **denture no longer fits**, so it is even looser and **even more damaging** to the bone.
- Fairly regularly (at annual exam), these need to be **evaluated for fit**, and if they are loose, be **relined** (have more acrylic processed onto the tissue side of the denture).



This is a fairly **severe case of bone resorption** on the mandibular lower and maxillary upper. **Why?** The remaining lower natural teeth push up against the front of the maxillary denture, causing resorption there. And the lower partial denture pivots downward, causing resorption there. This patient had not had these evaluated for over 20 years...she figured since the teeth were gone, she had no more worries!

Back to Review

Now that you've got the basics...



- Phase 3- Read textbook pages 200-211, not so much for the details, but for the overall concepts of when and why different choices are made.
- Maintenance- Read textbook pages 219-224. Be sure and read the “What’s the Evidence” and “In Clinical Practice” boxes.

In the Sophomore year, you are going to be learning how to make all these appliances- crowns, FPD’s, RPD’s, and complete dentures. There will be a lot of information on when and why as well as how, so knowing the framework of how this will fit into the patient’s treatment will help you absorb these details so they will be usable in clinic, not just your next test.

Review

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- 1 Recognize, explain, and determine the restorative implications of **stressed pulp syndrome**
- 2 Define the following terms and explain their clinical implications: **Perio plastic surgery, Restorative crown lengthening, Esthetic crown lengthening, biologic width, altered passive eruption, mucogingival defects**
- 3 List and explain, in terms a patient would understand, the options for single tooth replacement and multiple tooth replacement.
- 4 Explain the difference between a **bound vs unbound space** and explain how this affects your restorative options.
- 5 Explain to a patient where implants are best used with an RPD
- 6 List the schedules and what you will do at each recall appointment for endo, perio, caries, and removable prosthodontics.

Well done!

Honfleur Harbour,
Normandy, France

Stop

Dennis: You chose a

43



Altered Passive Eruption

Altered passive eruption is diagnosed by clinically short teeth that are NOT worn on the incisals. These teeth are visibly worn, so this is probably not the best diagnosis.

Try again!

Back

Dennis: You chose b

44



Worn Teeth

Correct! If you look at the incisal edges, you can see the facial and lingual edges of enamel with the dentin cupped out where it wears more quickly in between.

How do you fix it? *It's complicated....*



Back

Dennis: You chose c

45



Congenitally short teeth

No, teeth are generally quite consistent. There *are* congenitally short teeth, but they are rare, and usually overall misshapen.

Try again!

Back