

# *Delivery of Surveyed Crowns*

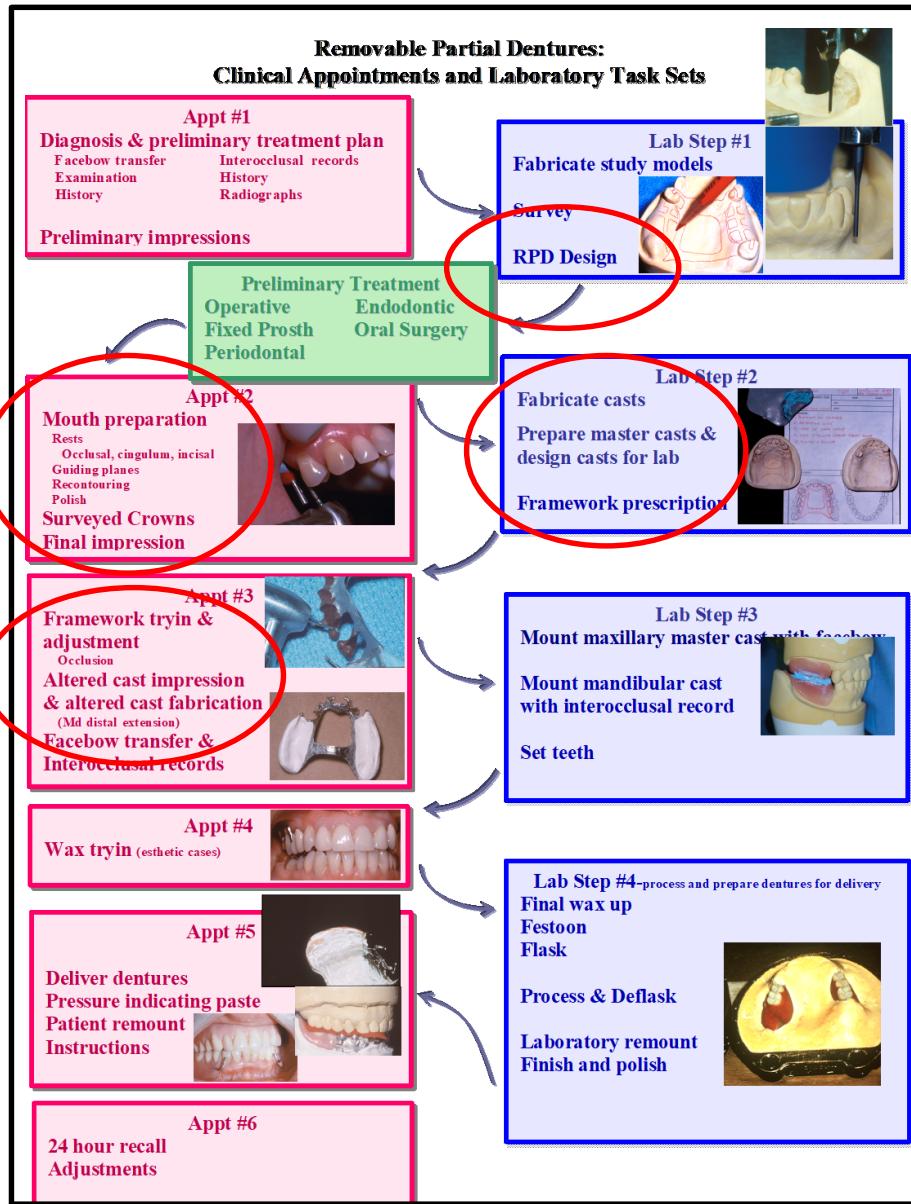
# *Fabrication of RPD Framework*

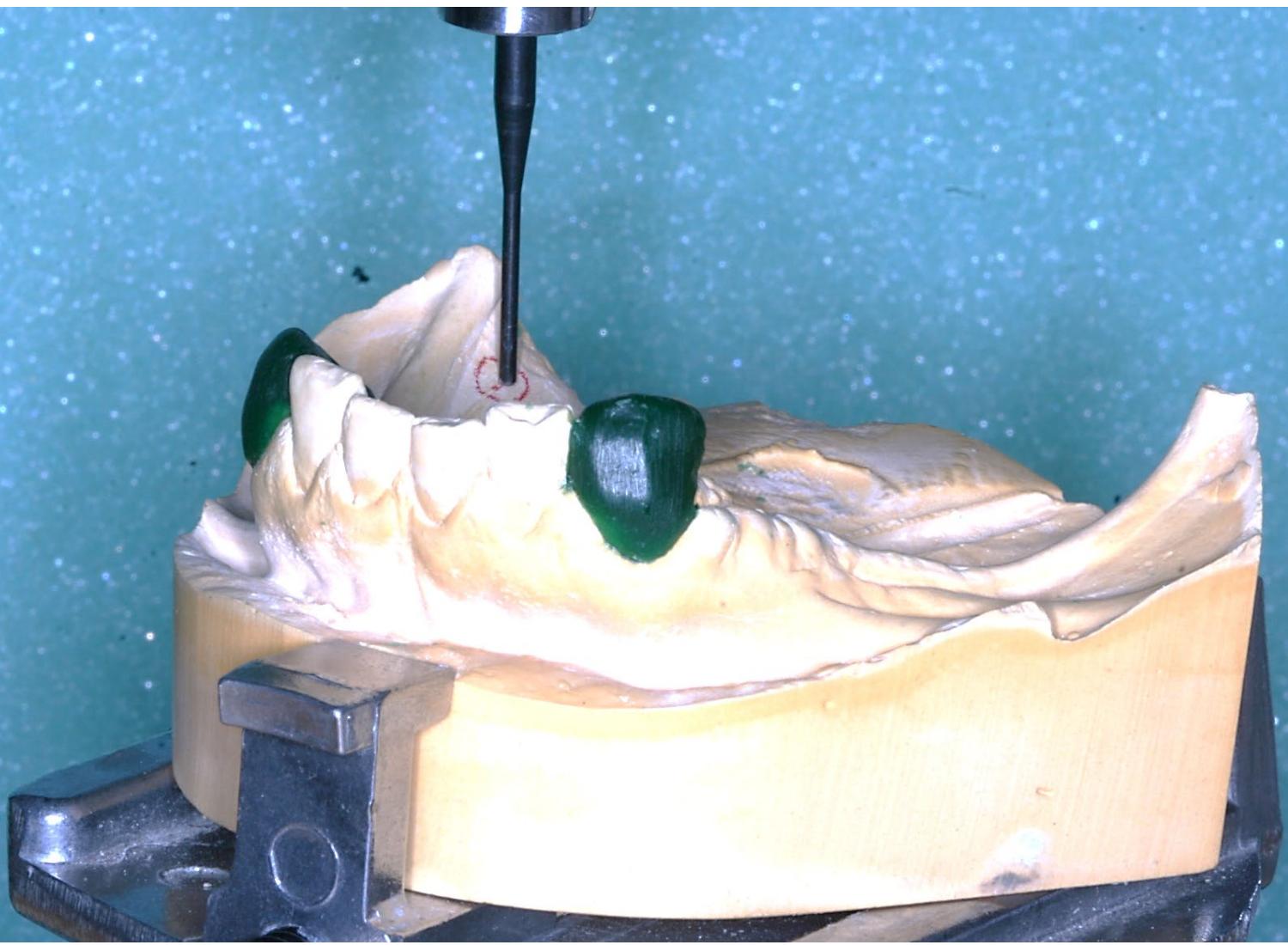
# *Fitting the Framework*

# *Altered Cast Impressions*

Today we're going to talk about several things listed here, finishing up survey crowns and then when the survey crowns are done, that's the last thing that we do before we start making the framework and then fitting the framework and a little something called altered cast impressions. So we've got several topics to go through today.

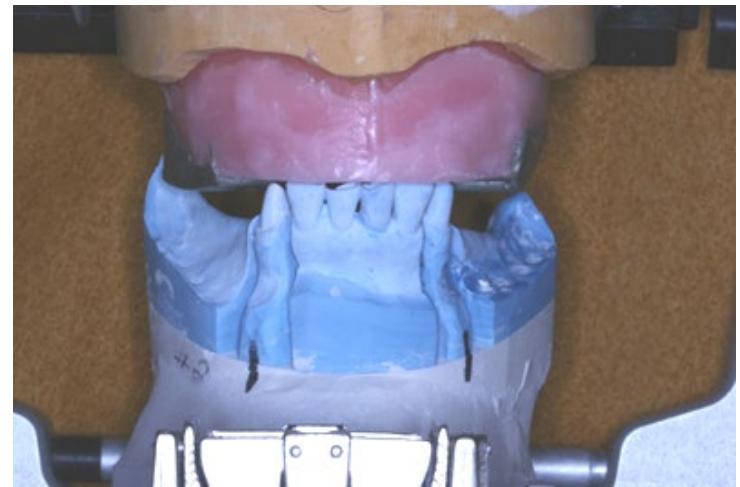
And if you look at our flow chart, here's our design, which we spent weeks on - trying to learn how to design the RPD, mouth preparations, doing our guide planes, survey line Adjustment, rest seats, survey crowns, and so now we're going on to the final impression, the framework for prescription, getting the framework back and what we do to finish up and finish the RPD. So you know again, there's many steps to get through this.





Now I showed you this case last week where we did some diagnostic wax ups of survey crowns before we actually prepped the teeth, before we actually sent the die cast in to have the survey crowns made. Before you do that, **you should do a diagnostic wax up. if you're going to have a survey crown request**, because it will keep you out of trouble if we find things that are going to cause us problems before we get the teeth prepped and before there's problems in the lab with our survey design and such. So it's always a good idea to do a diagnostic wax up.

# Clinical Case: Submission of Surveyed Crowns 22 & 27 to laboratory for fabrication

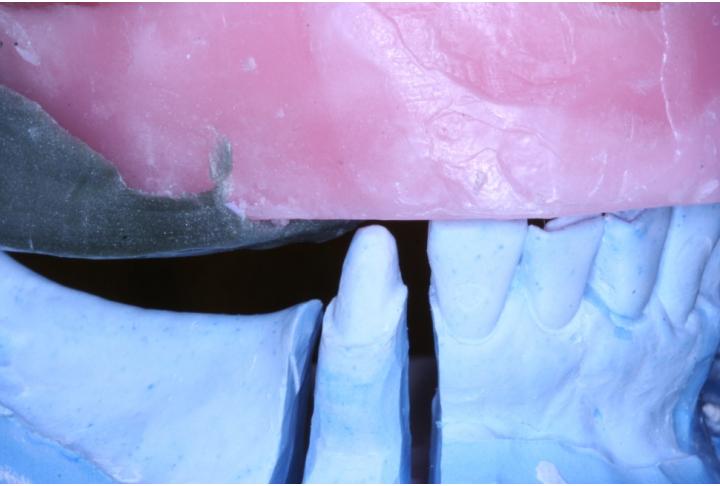
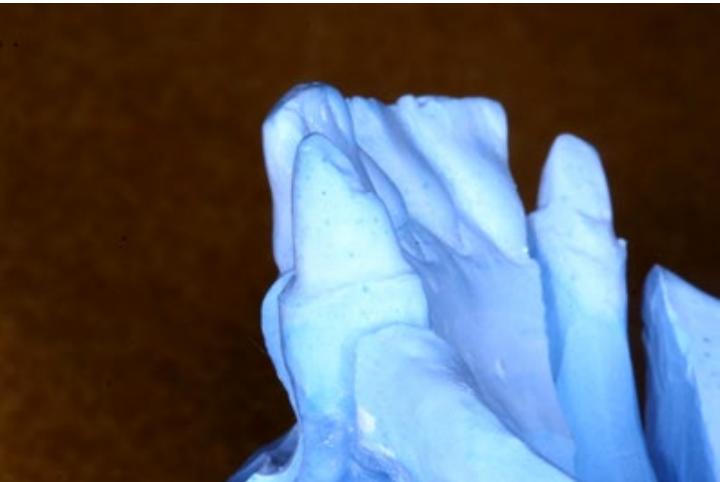
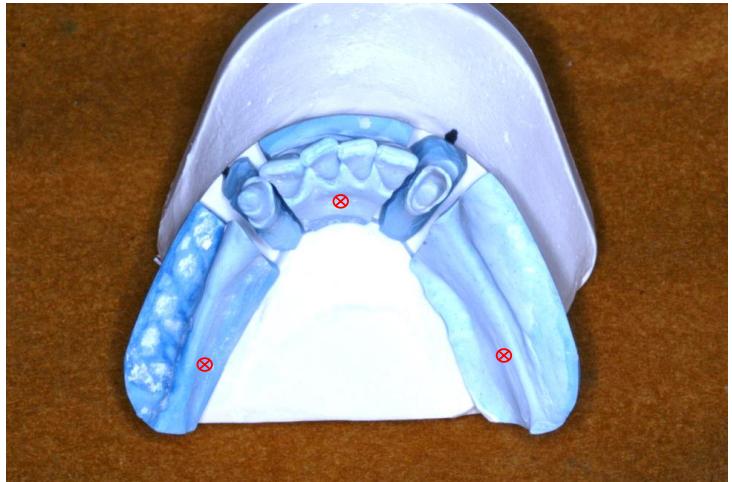


So remember on #22 and #27- this is not this exact case but it was close enough that we could almost pretend it was- Here's a clinical case that was seen a couple of years ago in the clinic where we had a 22 and 27 and we did the preps, and so now we're asking for the survey crowns on 22 and 27. I want you to look at this case. This is a maxillary complete venture opposing a mandibular RPD. I mentioned more than a few times before that this is the most common configuration of tooth loss that we see clinically. All maxillary teeth are lost and we're in a complete denture on the upper and a lot of times we just have the mandibular anterior teeth or we are missing teeth. It may not be a class one, maybe a class two, but we're missing teeth on the lower. And what happens is that the patient

comes in and they're kind of in a mess. We diagnose that they need an upper, we need to take out their teeth and do an interim complete denture, and let them heal for six months and then remake the upper denture, a conventional denture, and we do that first. So during that six months while the maxillary arch is healing up, we can work on the lower if we have periodontal issues to finalize, if we are having to do a fixed prosthodontics like survey crowns and we can work on this while the upper is healing.

**So a lot of times you're going to be working on a maxillary complete denture while you're working on a mandibular RPD, and this can get very challenging as far as the sequencing goes**, because what appointment do we do this, do this, do this, do this, etc. This is where you want to end up, where you've done border molding on the upper. You've got the upper record base, you've got an adjusted maxillary rim. And even though this is opposing a complete denture, it still needs to be mounted on an articulator with an accurate interocclusal relationship so we can make the crowns in harmony with what we're looking for as far as the occlusion goes. Now, you wouldn't think that would be so critical, but I've seen them where they don't do this and we end up with dracula things down here. You always want to put the work in on the beginning of something so that it turns out right with no surprises, it's predictable instead of waiting till you get bit from behind and now you're trying to fix things. It's a lot easier to put the work in at the beginning to make sure everything goes well. So this is a case and this is a die cast, the crowns have come back and we're seeing if we're going to proceed to what we think we're going to do today, which is cementation of our survey crowns.

So this is just a close up, it's a nice die cast. Here you can see the profile



**Because of precise requirements of RPD abutments,  
laboratory fabrication must have communication of  
what is expected.**

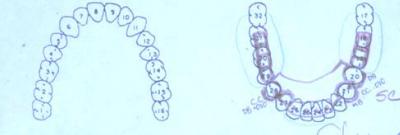
- **Master die cast**
  - Mounted on articulator
  - Tripoded
- **Additional design cast**
- **RPD design treatment plan design form.**
- **Fixed Prost prescription form**
  - Full written description of what you want in final crown
    - **Occlusal contact**
    - **Guiding planes**
    - **Survey lines**
    - **Retentive undercuts**

If you haven't caught on by now, when we're doing RPDs, the survey lines and undercuts need to be very precise. We're talking about 10 one thousandth of an undercut or 20 one thousands of an undercut. So things need to be very precise and it's always a challenge communicating with the lab. And here, because the requirements are so strenuous, it's even more challenging. So you want to use all the tools that we have to communicate what you want to the lab. Of course, you're going to have a master die cast, the one I just showed you, that needs to be mounted on an articulator.

When you do your diecast before you send it to the lab, let's say we had a class three mod one and we had a molar here and a molar here and we already cut our guide planes and such. You can put this whole thing, even though it's got a mounting on it, you can put this whole thing on your survey table and you can adjust it to these guide planes, to that orientation, and you're going to tripod it to make sure the lab makes the guiding planes and these crowns match these pretend ones that we have back here

Now, if this is the only abutments we have, we don't really have to match them up. But you still should oriented the way that you want and tripod it and you're instructing the lab how the parallel surface of your guide planes are going to be like.

So a master die cast mounted on the articulator, tripoded, and an additional design cast. That means a study model that's got the entire design crown on it, just like you have to have before you start cutting your ivorine preps. So that's two casts you're going to send. An RPD design treatment plan and design form are two dimensional treatment plan forms with the diagram and the tabular information and then a fixed pros prescription form that's going to be a written description of what you want in the final plan, what occlusal contact you want, distal or mesial guide plane, how you want the surveying line to be and where the retentive undercut and the magnitude of the retentive undercut. So that's a lot of stuff to get ready to send and that's a lot of stuff for the lab to decipher when they get it. So you want to make it as clear as possible.



## PROPOSED TOOTH PREPARATIONS:

Guide Plane locations	tooth	surfaces	tooth	surfaces
	30	2		
	29	2		
	27	M		

Survey line modifications	tooth	surfaces	tooth	surfaces
	20	1		
	21	1		
	22	1		

Rest preparation locations	tooth	surfaces	tooth	surfaces
	20	20		
	21	20		
	22	20		
	23	All D		

Opposing tooth modifications	tooth	surfaces	tooth	surfaces
	20	20		
	21	20		

Direct Retainers	tooth	surfaces	Type	unclear
	20	DB	Involute	6
	21	MB	Convolute	6
	22	DB	Direct	6

Planned Operative/Fixed Prost Procedures	tooth	restorations
	21	Surveyed crown

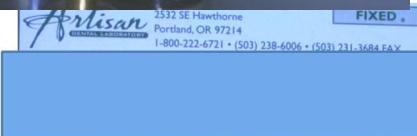
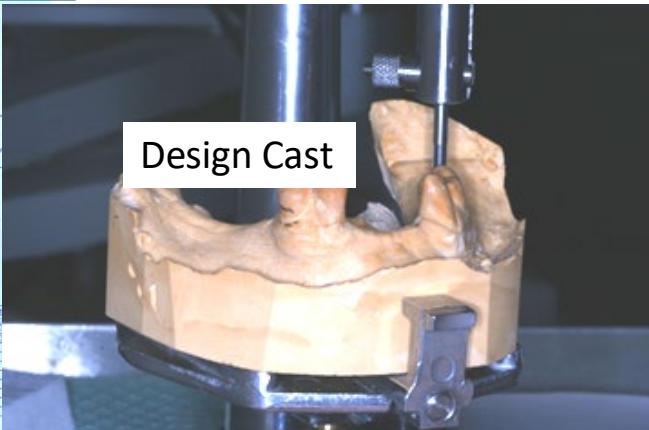
Kennedy classification	CL1, mid1
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Axis of rotation	20-28
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Major connector	1 Lingual plate
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Extra design concept	Faketooth (rotation path, metal-back, facing, etc)
	23-26

Design Cast



Die Cast



1. Designed study model, surveyed and tripoded.
2. Completed RPD treatment plan form.
3. Die model, tripoded and surveyed, mounted on articulator.
4. FPROS Lab prescription.
5. Diagnostic waxed crowns (not required but recommended).

So we've got a design cast, this is just kind of showing everything that we need.

Here's your design cast, It's designed survey model, completed RPD treatment plan form, and of course this is going to be in axium, so it's not going to be something that you fill out by the longhand. And I don't have it here but the diagnostic waxed crowns. So once you get a good diagnostic work up, you can actually send your wax patterns in with the powdered wax on it, and the survey lines on it, so you know we're doing everything we can to get the right ones back.

## **Receiving and delivering SC**

- **Examine on surveyor.**
- **Seat in mouth.**
- **Alginate pick up impression.**
- **Confirm on surveyor.**

When you receive your case back, don't put it on the shelf and don't even look at it until the patient's in the chair and pull it out of the box. You need to look at it before you anticipate the patient appointment. You need to examine it on the surveyer, when they come in you're going to seat it in the mouth and even then you're not going to cement it until we do an alginate pick up impression and confirm on the surveyer with that. So I'm going to go through that for you.

# Finished crowns arrive from lab:

## Put the case on surveyor and evaluate them!!!



Are guiding planes parallel with other GP? Are rest seats in proper location, are they positive? Are retentive undercuts provided? Are survey lines properly placed for lingual reciprocation and suprabulge shoulders?

The finished crowns have arrived from the lab, put the case on the surveyor and evaluate them, don't eyeball it! Put them on the surveyor and you're going to ask all these questions. Are the guiding planes parallel with other guiding planes? Are they parallel with each other? Are the rest seats in the proper location? Are they positive? In that case I was talking about that I can't believe I didn't take pictures of it. We had a DO rest seat o #28 and an MO on #31, and neither one of them were positive. If you're dealing with the big lab and you know, sometimes the quality varies, from case to case, it's still up to you to make sure that that's true. Are the retentive undercuts provided where you asked for them, and are the surveying lines properly paced for lingual reciprocation and supra bulge shoulders. So you should be familiar with all of these things by now, and when I say them it shouldn't be stumping you, you should know what we're talking about.

# Crowns seated on prepared teeth:



So this case, we looked at it on the surveyer, it appears to have all of the elements that we requested. Then you go on to the clinical appointment and you have to seat the crowns on the prepared teeth and you have to go through all the things you normally do for Crown and Bridge to seat a crown, to make sure the margins are right and such. But not only that, if their survey crowns the patients paying extra for survey crowns, we're paying the lab extra to go through this extra trouble with the survey lines and the rest seats and such. So things that you request should be there.

# **BEFORE CEMENTATION:**

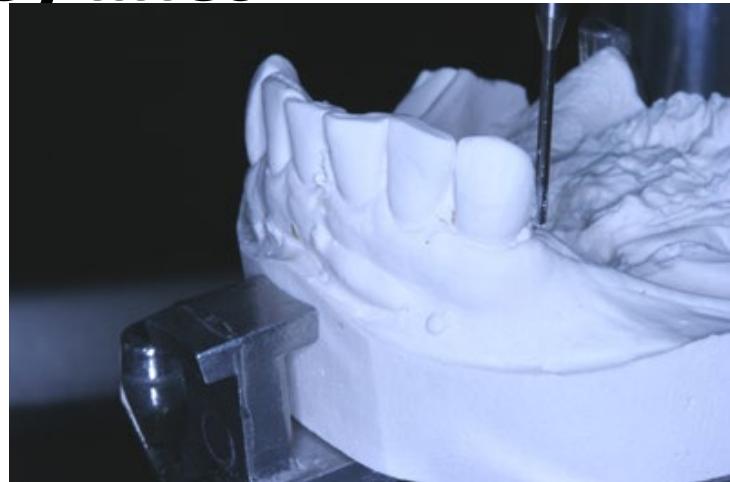
**verify contours, undercuts, ALL crucial aspects of SC**



**Pick up alginate impression, remove crowns, pour up  
in quick set stone, verify crowns on surveyor.**

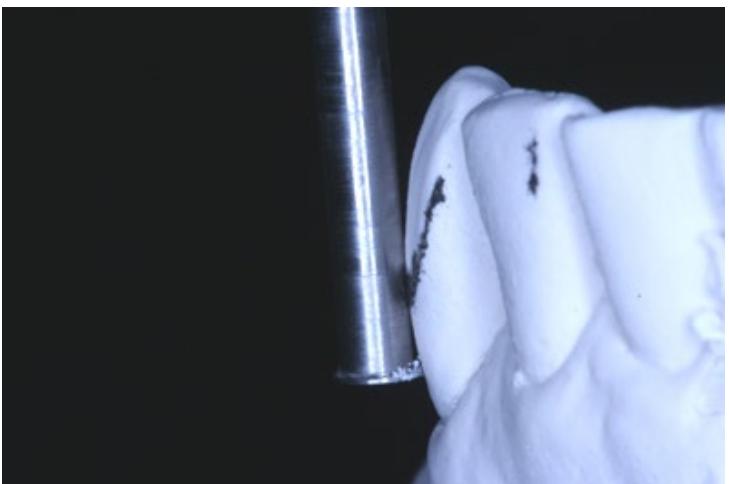
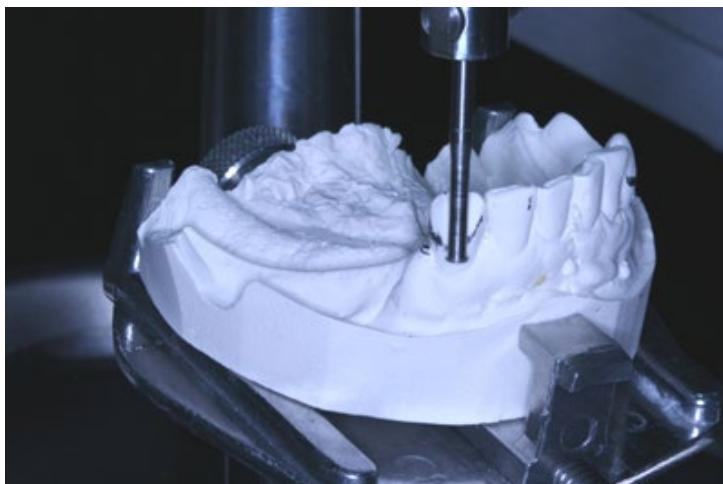
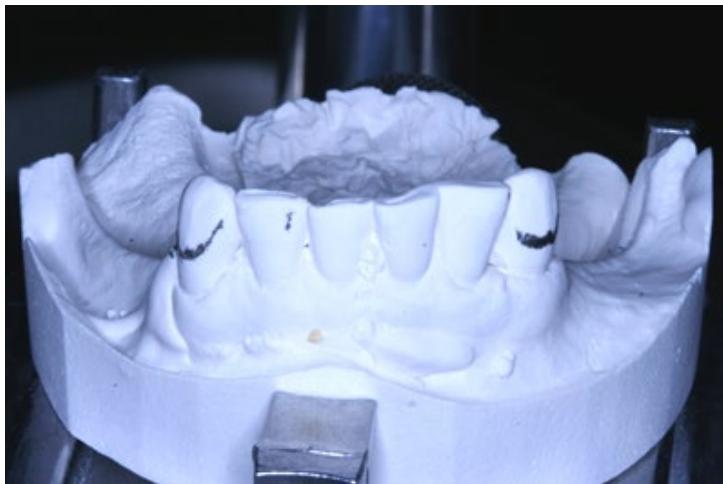
Here we've got the crown seated on the teeth, the margins are closed, everything's looking good and we can go ahead and cement right? **No! Before cementation, after the crowns are seated, after it looks like it's ready to go, we have to do one more step. We do an alginate pick up, the crowns are on the teeth** and we just put an alginate stock tray over it and we do an alginate impression and the crowns are going to come off in the alginate. You take the crowns out of the alginate and pour this up and you're going to end up with a stone model of the crowns seated in the mouth. This does not have to be neat, It does not have to look nice because you're just going to pour this up in snap stone real quick and put it on the surveyer. And again, check you've got positive rest seats, guiding plans, and the right survey lines. So we checked it on the die cast, but we're also going to check it as it's oriented in the mouth.

# On surveyor, check guiding planes and survey lines



On the surveyor, you check your guiding planes, we've got graphite and this is what a guide plane looks like. It has been surveyed, we've got a low survey line here and then we just kind of got a smudge next to it, that's what the guiding plane looks like. At the same orientation, we've got a nice guiding plane.

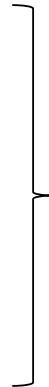
# Check undercuts



Here is our survey line. In this particular case, we were doing an I bar, we've got our retentive undercut and things are looking good.

# Receiving and delivering surveyed crowns

- Survey crown on master cast to confirm proper contours
- Seat crown
- Pick up alginate impression
  - Remove crown
  - Pour in mounting stone
  - Survey to confirm crown contours in mouth
- Cement



Here's another case where we're doing a molar. So this is the alginate pick up. Remove the crown, pour in snap stone....

# Verifying SC

- Guiding plane
- Low MB SL
- DB undercut



If crown does not have the required elements, DO NOT PROCEED TO CEMENTATION!!

It is much easier to correct deficiencies outside of the mouth rather than deal with them after crown is in the mouth.

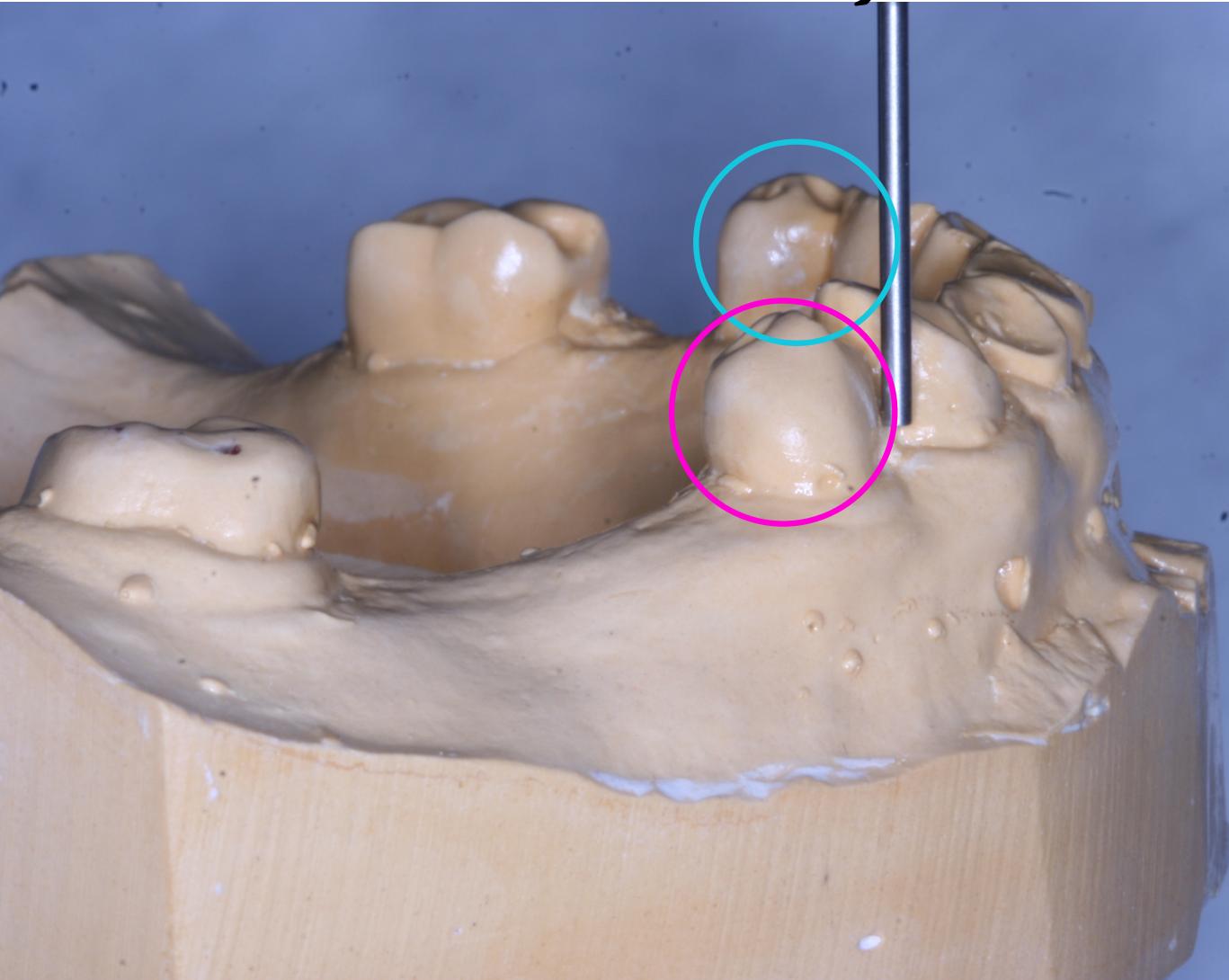


And here we've got all of these other guides where we have confirmed that our guide plane is good. And if this is our circlet clasp, this needs to be low here, which whoever did this didn't do a very good job at the survey line. But you can see that it's low here and then it's high here. And there's an undercut.

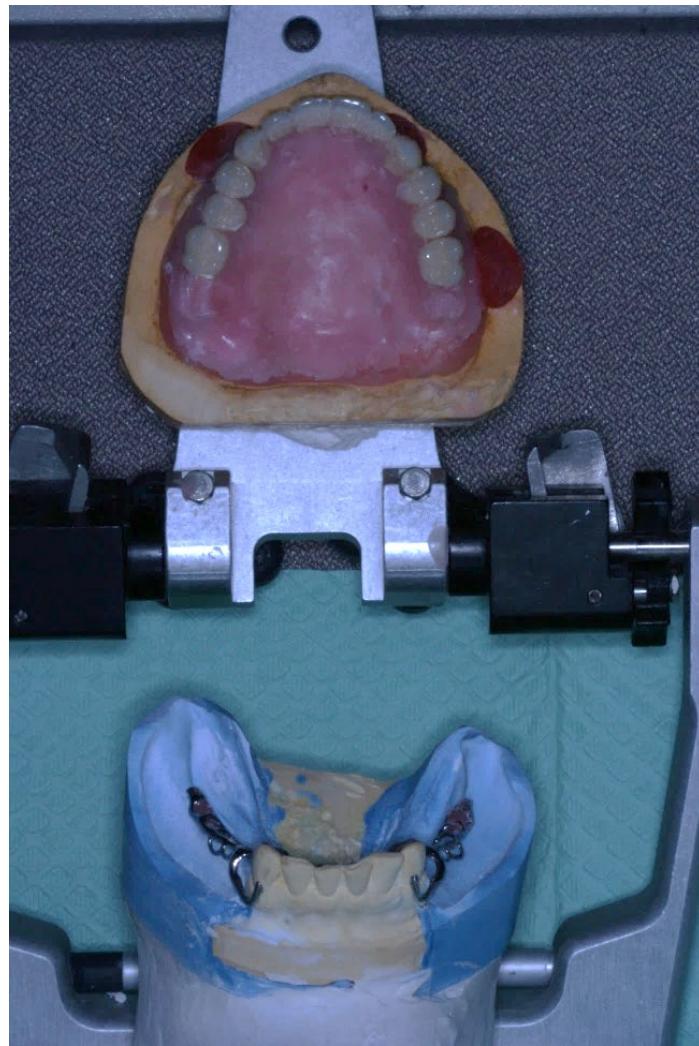
## *Why is PRE-CEMENTATION verification step so important?*

Why am I emphasizing this so much?

*This is why!* ☹



Because on more than one occasion this is what I've seen and other people have seen. **This** is a survey crown and **this** is a survey crown. This I wasn't there in the cementation and I hadn't actually seen the case, so they finished the survey crowns, they had the patient come in on this appointment to make a final impression, to send off for the framework fabrication. And when we put the cast on the surveyer, the student was surprised where's the undercut? There is no undercut at the distal buccal, there's no undercut at the mesial buccal and there's no undercut at the mid buccal on either survey crown. This is a mistake/a lapse. This is why you always check, check, check before you cement the survey crown. But when these crowns came back from the lab, they should have immediately been sent back and the patient not even appointed to cement these. **What I'm trying to say is the importance of you as the last stage quality check for these crowns.** You shouldn't just send the case to the lab and say, I need to survey crown here you figure out what I need. You need to have in your mind exactly what is required so that you can ask for it and that you can make sure that it's there when it comes back. If you are relying on the lab to design the crowns and to in fact even do the RPD designs, it's very foolhardy and you're not practicing dentistry at the level you should be. So yes, the lab should have known better, but I don't know what they knew to begin with. I don't know what they were told, but it was just so shocking to have this at that appointment, so can you see how if it's tipped over, we can't even put a dimple there because that wouldn't work. So take both the crowns off and do it over again, which of course is a lot of wear and tear on the patient as well.



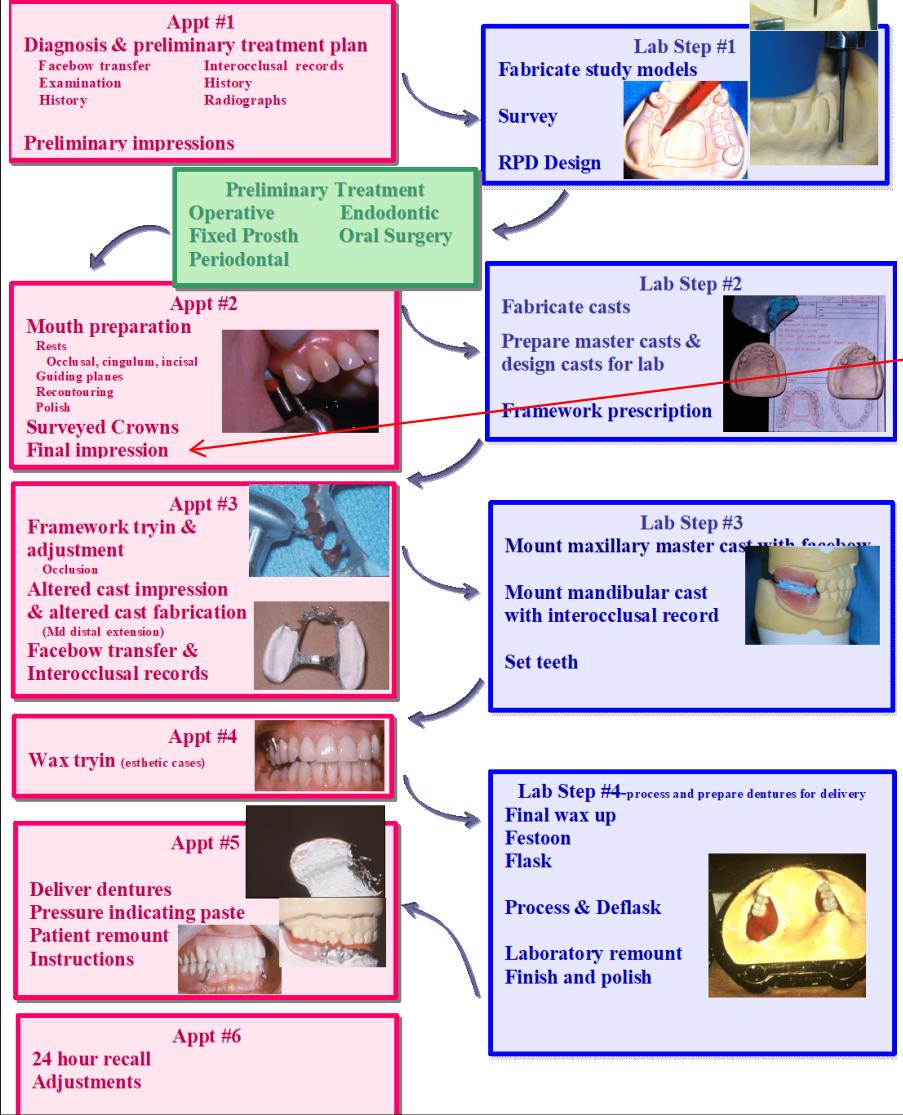
Skipped

A painting of a bridge over water at night with yellow lights reflecting on the water.

## *Fabrication of RPD Framework*

So that's the topic of Survey Crowns.

## Removable Partial Dentures: Clinical Appointments and Laboratory Task Sets



- **RPD Design**  
• The tail that wags the dog

## • Mouth Preparation

## • Surveyed Crown

## • Final Impressions

- Framework Fabrication

- Framework Try In

- Altered Cast Impression

- Interocclusal Records

- Denture teeth and base waxing

- Process Denture Base

- Deliver RPD

Now let's talk about final impressions  
to get your framework

# *Goals of Final Impression for Fabrication of RPD Framework*

- Record all tooth and alveolar surfaces
- Especially, surfaces that will contact the RPD framework
  - Rest seats
  - Guiding planes
- Occluding tooth surfaces
- Critical anatomical landmarks: retromolar pads, hamular notch, vestibular depths and edentulous regions



So when you're making final impressions for dentures, you're doing border molding and a wash impression. The important things are the denture extensions and the intaglio surface. When you're doing four crowns, you need to get a very accurate impression at the margin and of course the whole surface of the prep. So what's important for an impression for an RPD? Well, you've got to have everything. You've got to have all the surfaces of the teeth, especially if there's a rest seat and you have a bubble on where the rest seat is. And you want to make sure that you get your guiding planes, your inter proximal surfaces all the way down to the gingiva, and for the maxillary, it's very important that you capture the pallet absolutely perfectly. So in other words everything. You also have to get the retromolar pads, the hamular notch and so it can be kind of challenging to do that.

# *Preparation for Impressions*

- All other treatment finished, RPD mouth preparations completed and polished, surveyed crowns cemented.



So all of the mouth preps are done, RPD mouth preparations, all the survey crowns, everything's finished, everything's polished, all the RPD guiding planes, the rest seats, the survey line modifications. We're not having you polish them here because ivorine doesn't polished very well, but the enamel does. So after you do your mouth preps, you also need to polish the surfaces because we don't want any roughness. We want the RPD to slide on and off without any problems, so you're going to finish them with the abrasive tips that you use brownie and greenie.

# *“Making” an Impression*

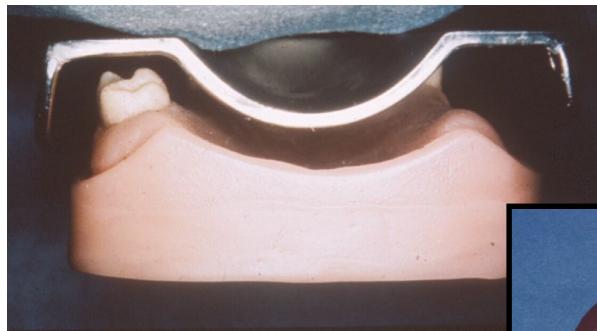
- Type of impression material should be already selected
  - Alginate
    - Most commonly used.
    - Inexpensive, accurate, easy to use, but must be poured quickly.
    - Stock tray modified with compound, select and modify ahead of time.
    - Even thickness of impression
    - Use adhesive
  - PVS
    - Custom tray
    - Expensive
    - Larger impression surface than crown impressions
    - Rigid material may tear in interproximal areas.



So making an impression. Now it needs to be very accurate, so you may think that PVS would be the best material. Some people do use PVS, you have to have a custom tray and of course it's a lot more expensive than alginate. But there are reasons that alginate is considered to be the material of choice and it's always been the one that I use. Alginate is very accurate. Even though that's what we make our study models out of, that doesn't mean that it's not accurate. It's just easier to use. You can use a stock tray and it's when we have dentition that a lot of times we've got a lot of inner proximal spaces and a lot of mutilated dentition, sometimes, if you try to use PVS and you take it out of the mouth, because when PVS sets up, it gets so rigid, a lot of times it will tear the PVS and distort it because we have a lot of irregular spaces in between the teeth. **So I recommend using alginate.**

# *Verify the adequacy of stock tray*

- Properly adapted to the arch (cover anatomic landmarks).
- Not over-extended posteriorly beyond the vibrating line.
- Sufficient space for impression material.
- Modify with red compound.
  - Especially in maxillary palate area to prevent slumping of alginate.
  - Fit of framework in this area is very important.



Of course, you have to pour it up right away. You have to make sure that you don't have a huge space. This can be a problem if if your alginate slumps in the pallet and you don't compensate for that, sometimes you need to put some spacer there, either wax or compound so you don't have a huge thickness in the pallet because if it distorts in the pallet, it's not going to fit in the palate when you get it back, and that is very, very sensitive to patients and it makes them gag.

# *Making the Final Impression for RPD Framework*

- “Paint” alginate into critical areas with your finger
  - Rest seats
  - Guiding planes
  - Palate
- Seat the tray slowly into position
- Hold until ready for removal
- Remove impression in a “snap” movement



So when you go to use the alginate, of course you don't do this with the PVS, but you do a lot more painting with your finger before you put the alginate in the tray in the mouth. So you're going to take enough alginate, you're going to paint it with your finger, mash it if you will, all around the abutment to paint it onto the rest seats, paint it onto the guiding planes and for a maxillary, you're darn sure going a paint in the palette with a big old glob of it, because if you have a hole or a big bubble here on your palate that's a no go. We used to have special alginate mixer's for this, but I haven't seen them in a long time. We just mix it chair side just like you normally do, and usually when you paint it on that's going to take care of any bubbles that you have. So you're going to paint around the abutments, you're going to paint in on the occluding surfaces and you're just going to do it. If you don't paint it right, you may end up with a bubble. If you have a bubble on your rest seat, you're going to have to do it over again. If you have a big bubble where your guiding plane is, you're going to have to do it over again. So you're going to paint it at all these places. **Hold the tray in place, don't walk away, and remove it with a snap instead of slowly so that it doesn't distort.** It may seem to you that there's low tech and high tech, the alginate is low tech and PVS is high tech. I don't think that's really fair. I recommend this, this is what most people use and it's a reliable way to do it.

# *Final Impression for RPD Framework*

- Examine closely
  - Rest seats
  - Guide planes
  - Gingival margins
  - All proximal tooth surfaces.
- All other areas that framework contacts
  - Palate
  - Buccal/facial contours



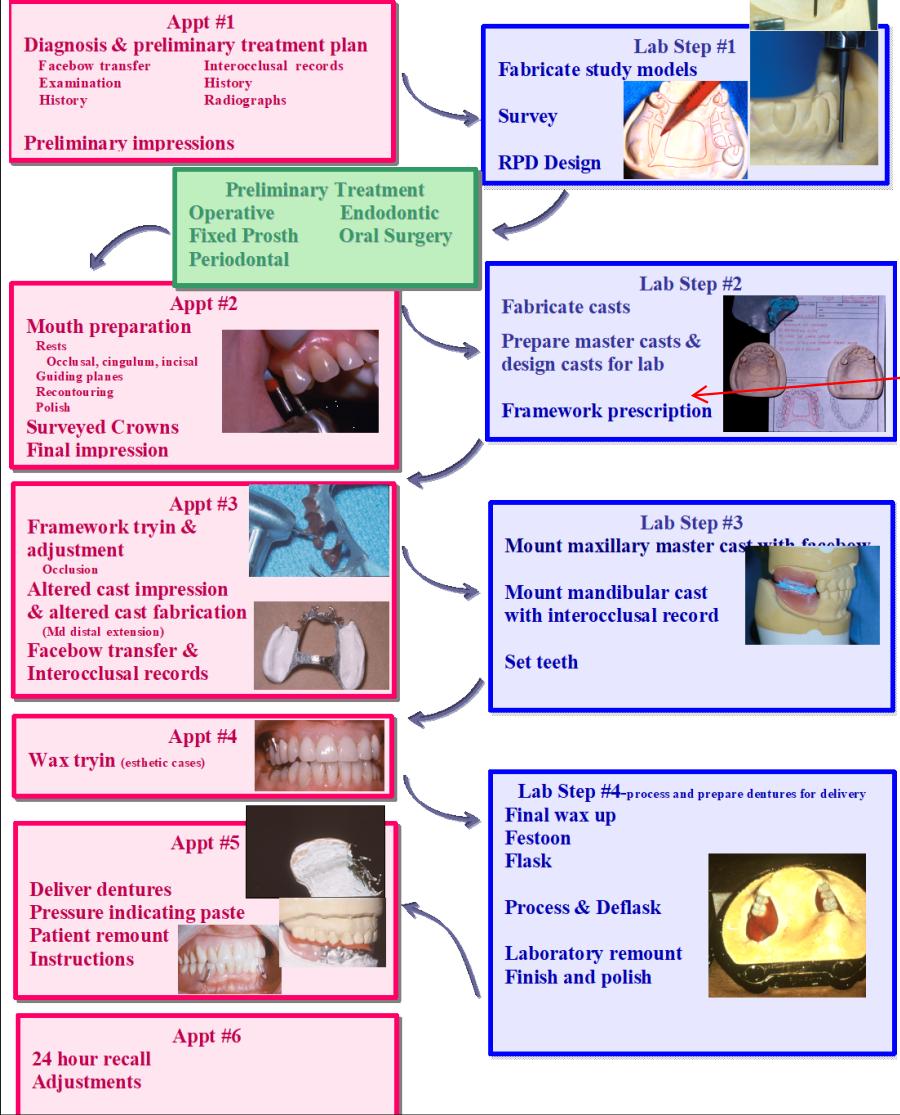
I think I've already talked about that.

# **Framework Final Impression--**

- **Usually alginate**
  - Stock tray or custom tray
- **Make two impressions**
- **Pour in microstone\*\* (improved stone not compatible with alginate)**
- **Select best cast for master**
  - Align on surveyor to proper orientation
  - Tripod but don't place survey lines (leave surfaces in pristine, untouched condition)
  - Mark undercut location with red pencil mark
- **Second best for design cast**

I recommend that you **make two impressions**, and that's so that you can pour them both up and then you have your option of taking the best of the two, and then you have a fresh new cast with all of the new rest preps on it and all of the new survey lines from survey crowns and such, and **you can use one of them for the design cast and one of them for the master cast so that your design cast is just like your new master cast**. Obviously pour it in microstone, improved stone is not compatible with alginate. Select the best cast. You're going to align the design cast, put on the surveyer, tripod the survey lines, draw your design on the second cast and tripod it. Your master cast you're also going to put on the survey table and using your analyzing rod and your gauges, you're going to orient it so it has all the right orientation and features. Then you're going to tripod it and that's it. So your master cast is just going to be tripoded. It's not going to be surveyed with graphite lines. It's just going to be at the right orientation when you send it to the lab.

## Removable Partial Dentures: Clinical Appointments and Laboratory Task Sets



### • RPD Design

- The tail that wags the dog

### • Mouth Preparation

### • Surveyed Crown

### • Final Impressions

### • Framework Fabrication

### • Framework Try In

### • Altered Cast Impression

### • Interocclusal Records

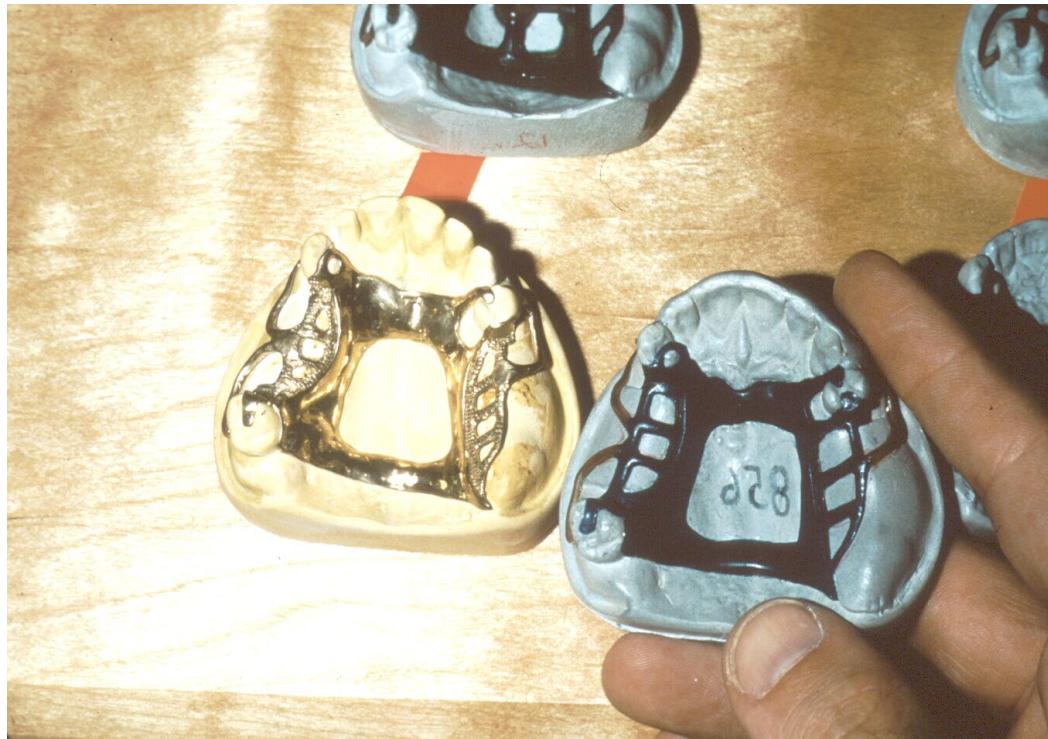
### • Denture teeth and base waxing

### • Process Denture Base

### • Deliver RPD

Framework fabrication is really a labor intensive lab procedure that I'm going to go through a little bit, so you'll have some idea.

# *Laboratory steps for Framework Fabrication*

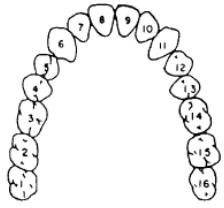


This is our wax up and then this is our final framework. How do we get from here to here?

# *Submission to Laboratory*

REMOVABLE PARTIAL DENTURE  
TREATMENT PLAN FORM

Patient \_\_\_\_\_  
Student \_\_\_\_\_



DIAGNOSTIC CASTS AND 2-DIMENSIONAL DESIGN - Faculty approval \_\_\_\_\_

PROPOSED TOOTH PREPARATIONS:

Guide plane locations	
tooth	surfaces

Survey line modifications	
tooth	surfaces

Rest preparation locations	
tooth	surfaces

Opposing tooth modifications	
tooth	surfaces

COMMENTS:

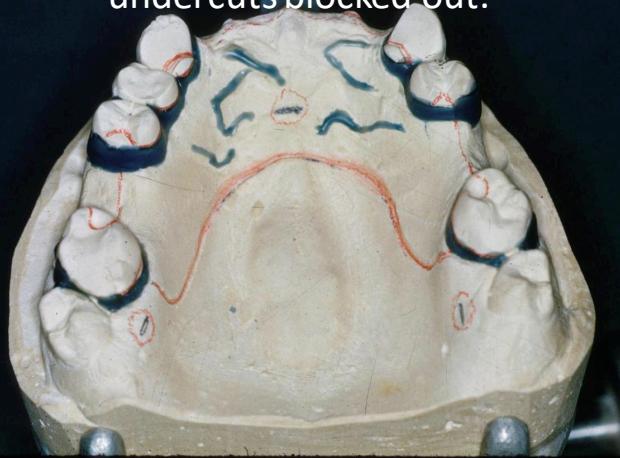
Direct Retainers	
tooth	type

- **Two casts**
  - Design cast
  - Master cast
- **Both tripoded clearly**
- **No other markings on master cast**
- **Treatment Plan Form**
  - Diagram of design
  - Details of design in tabular form
    - Rests, proximal plates lingual plate, major connector.
- **Axium information**
  - Written instructions

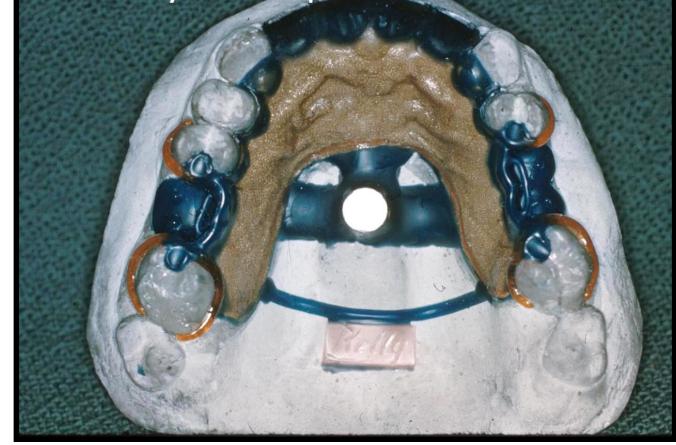
So submission to the laboratory, you're going to have a design cast and a master cast, both tripoded and no other markings on the Master cast. So you're going to have a treatment plan form and then on axium, of course, you've got written instructions.

# RPD framework

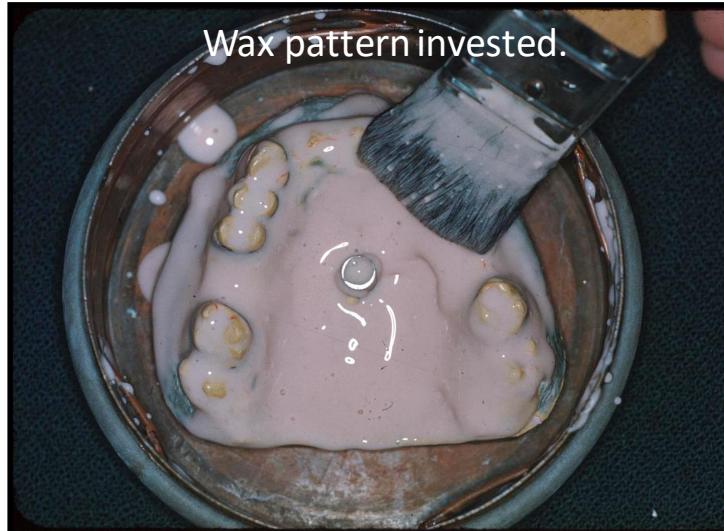
Master cast with undercuts blocked out.



Wax pattern of framework on refractory cast duped from master cast.

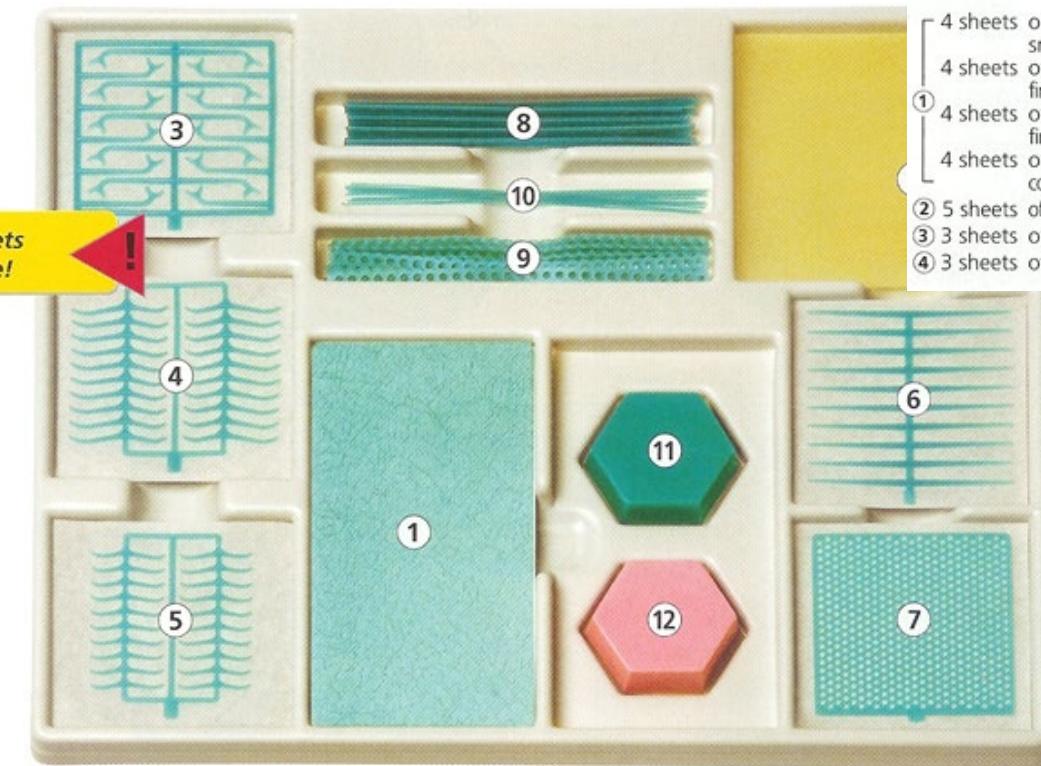


Wax pattern invested.



So let's say this is our master cast and it's gone to the lab. I'm just going to give you kind of a background here, so this is block out (upper left cast), this is where the survey line is and everything below the survey line we're going to block out except for the retentive tip, which there's one here and one here. But then this is duplicated and poured up in stone that is actually invested. So now this is investment stone (upper right cast) is going to be put in the oven and heated. This blocked out and duped cast is going to have the wax pattern of the framework waxed on to it. This is the sprue (in the middle of the cast) and it's the same theory as a crown, except it's a heck of a lot more. Once we get the wax pattern waxed up, the investment is put on top of it as well.

# Framework components come as prewaxed forms for uniformity

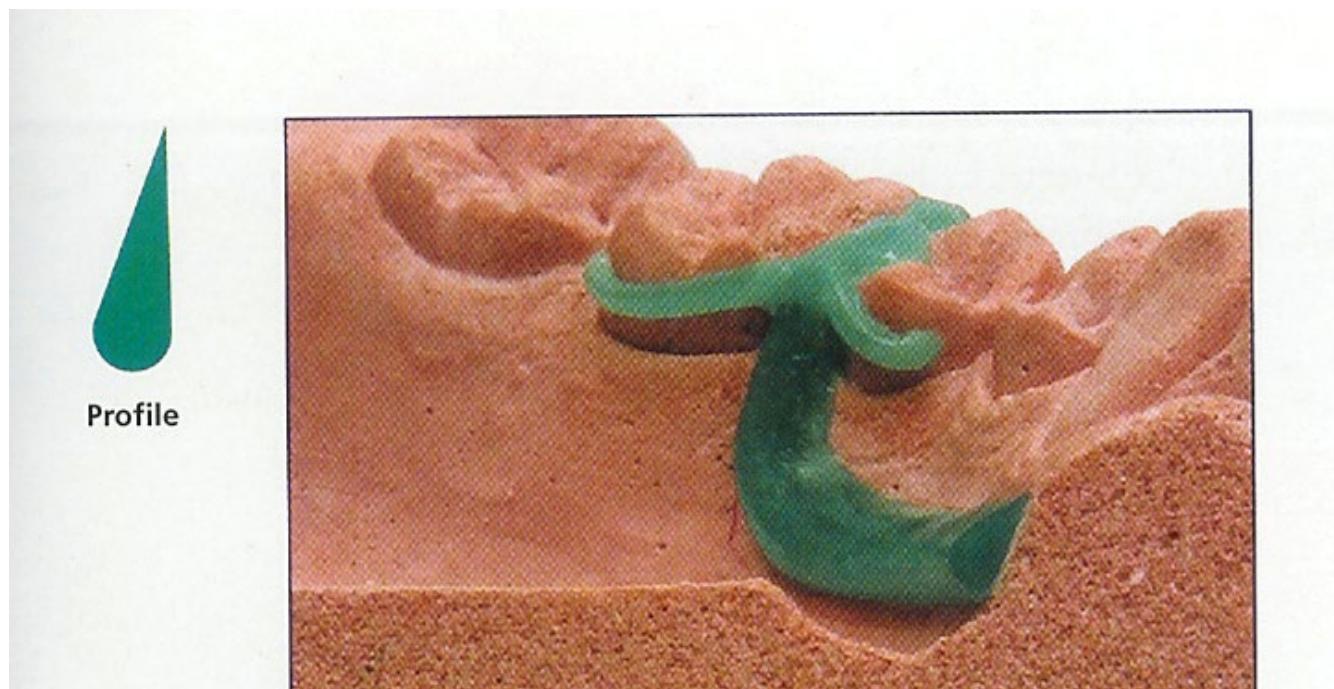


## Contents:

- ① 4 sheets of casting wax smooth, 0.3 mm
- ② 4 sheets of casting wax, fine stippled, 0.35 mm
- ③ 4 sheets of casting wax, fine stippled, 0.5 mm
- ④ 4 sheets of casting wax, coarse stippled, 0.5 mm
- ⑤ 5 sheets of casting-wax, 0.6 mm
- ⑥ 3 sheets of Bonyhard clasps
- ⑦ 3 sheets of molar clasps
- ⑧ 3 sheets of ring clasps
- ⑨ 10 pcs. of grid meshes
- ⑩ 10 pcs. of lingual jars
- ⑪ 10 pcs. of perforated retainers
- ⑫ 30 g of wax rods, 0.8 mm
- ⑬ 30 g of sculpturing wax for model casting
- ⑭ 30 g of undercut wax

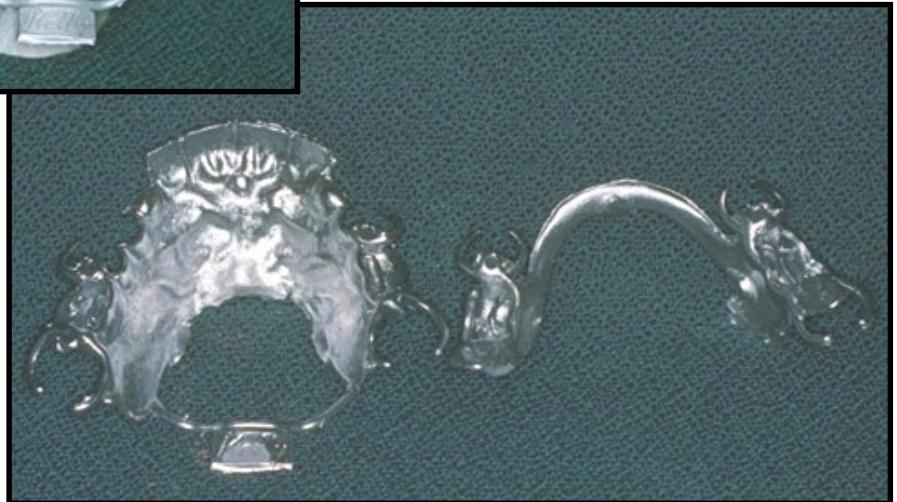
It's burned out and molten metal is swung into there, and it's just like the lost wax technique for crowns. When they're doing the wax up, these are circlet casts. These are wax patterns that have adhesive on them and these are just placed on the teeth where they need to be according to the survey lines and such. This is a T-bar, this is a Mesh denture base retention, so I'm just kind of showing you how thank god we don't have to wax them up.

## Lingual Bar wax pattern: teardrop shape for comfort and strength



This is a wax pattern for a lingual bar. You can see it's got that teardrop shape. Here's our lingual clasps, and these are just placed on there, so it's not all done by hand because these need to have a specific cross section geometry, size and length so that they do what they're supposed to do, the retentive ones.

# RPD framework is cast and finished



This shows two frameworks that just had the metal fabricated, and then this all has to be finished. And this is really hard metal.

# RPD Metal Alloys

- Known allergen that affects approximately 6% of population
- May cause dermatitis (contact or systemic)

- Gold Alloys
- Base Metals
  - Cobalt-chromium\*
  - Nickel-chromium
- Requirements:
  - Biocompatibility
  - Physical properties
  - Dimensional accuracy
  - Reproduction of surface detail
  - Easily repaired (soldering)
  - WW attachment

Let's talk about the metal a little bit. You know, — Cost

I mentioned when we were talking about major connectors that early RPDs were made out of gold—that was a long, long, long time ago. And when we had gold, gold wasn't as strong as what we have now. So we had bars going across the pallet so that they were thick enough so that they would be strong and one of the reasons we can have straps now, which are much more comfortable, is because we're using, you know more high tech metal. There was nickel chromium. I don't think anybody uses this anymore because nickel can be an allergen. And so most of them

are made out of chromium cobalt. And they, of course, have to be very biocompatible, dimensionally accurate, easily repaired. We can attach wrought wires to them and cost, which of course, the gold is no longer a possibility.

## Base alloy physical properties make them better choice than Gold for RPD frameworks

- **Base Metal Alloys approximately  $\frac{1}{2}$  weight of Gold Alloys**
  - lighter with comparable properties
- **Base Metal Alloys E (modulus of elasticity) 2x that of Gold Alloys (rigidity\*\*\*)**
  - Less thickness required for rigidity and strength
- **Results in brittle nature of material, fracture of clasps is a drawback.**

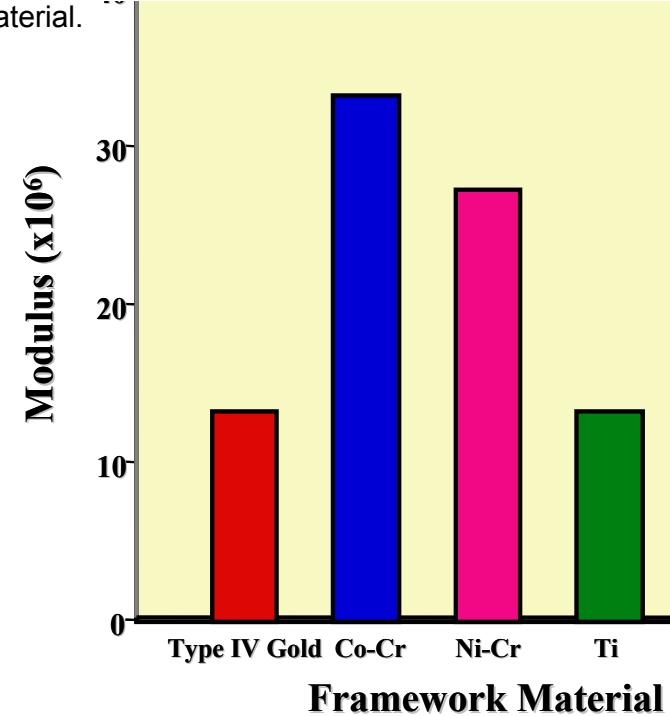
And the base metal alloys are lighter than gold, which is a good thing, but they're much much stronger than gold. So it has **two advantages**. It's lighter and it's a lot stronger. The bad thing about them is they have a **very brittle nature**. And when we talk about adjusting clasps with pliers, I've been there, done that, and I've witnessed other people do it when they're adjusting clasps and they just snap off. So that is a bad thing and we'll be talking adjusting

clasps later, but by and large the chromium is a very good material.

# ALLOY MECHANICAL PROPERTIES:

## Elastic modulus important indicator of rigidity

Here you can see the modulus, I hope you remember what a modulus is. Chromium is much higher than type four gold and it's very good for our purpose.

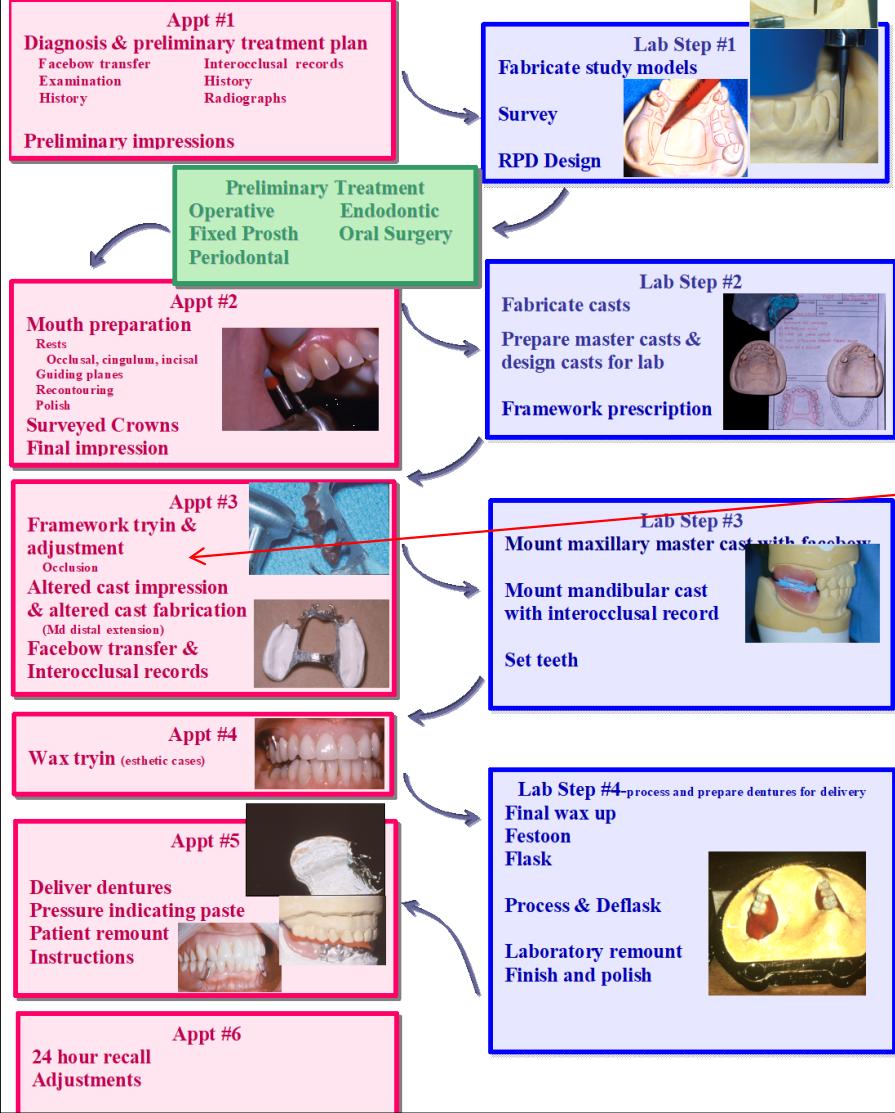


	Modulus (x10 <sup>6</sup> psi)	Yield Strength (x10 <sup>3</sup> psi)	Tensile Strength (x10 <sup>3</sup> psi)	Elongation (%)	Hardness (VHN)
Type IV gold	13	72	112	6	235
CO-Cr	33	72	93	2	380
Ni-Cr	27	100	116	2	340

A reproduction of Vincent van Gogh's painting "The Starry Night". The scene depicts a dark, swirling night sky filled with numerous small, yellow and white stars. A large, bright crescent moon is visible on the right side. In the foreground, a small town with houses and a church steeple is nestled at the base of a dark, craggy mountain. To the left, a tall, dark, and textured cypress tree stands prominently. The overall style is characterized by expressive, swirling brushstrokes.

*Fitting  
the R&D  
Framework*

## Removable Partial Dentures: Clinical Appointments and Laboratory Task Sets



- **RPD Design**  
• The tail that wags the dog

## • Mouth Preparation

## • Surveyed Crown

## • Final Impressions

## • Framework Fabrication

## • Framework Try In

## • Altered Cast Impression

## • Interocclusal Records

## • Denture teeth and base waxing

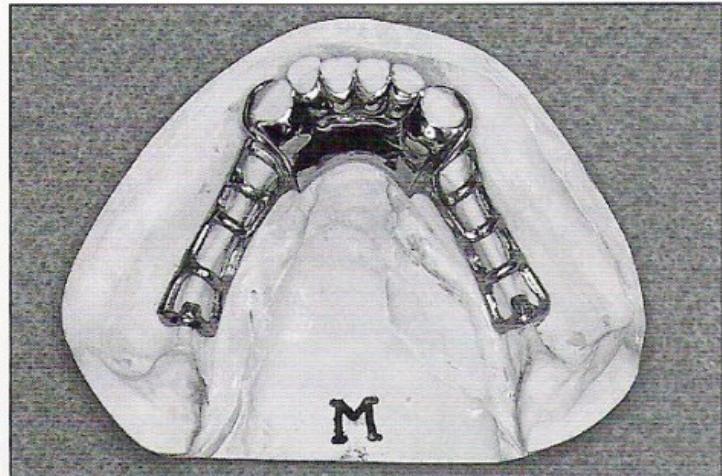
## • Process Denture Base

## • Deliver RPD

So let's talk about fitting the framework, which was Chapter 12. I have a lot of pictures from the chapter.

# Inspection of Framework

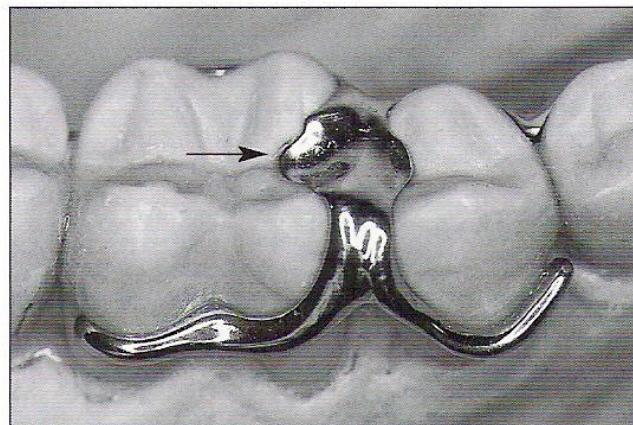
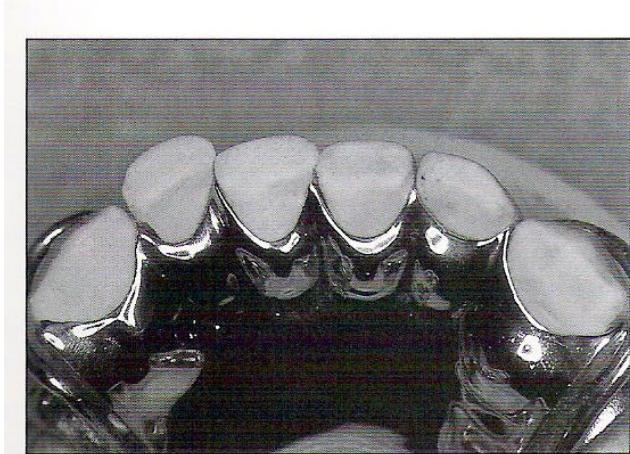
- **Inspect returned framework design:**
  - Major connector
  - Finish lines
  - Correct rests
  - Correct clasps
  - Soft tissue undercuts avoided
  - Finished intaglio (matte) and cameo (polished) surfaces



I showed you an example of a design where it came back from the lab and the design was different than what we asked for. It added the distal extension. So, you know, that's the first thing you look at- did you get what you ask for? And you always want to look at the finished product, it will come back on a master cast. It will always come back on a master cast. You want to make sure that it fits the cast well, that if it has a lingual plate, that it's adapting to the teeth well, and the finished intaglio surface will be matte but the cameo surface should be highly polished.

# Inspection of Framework

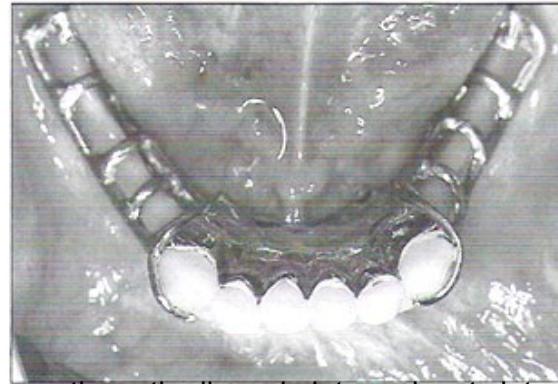
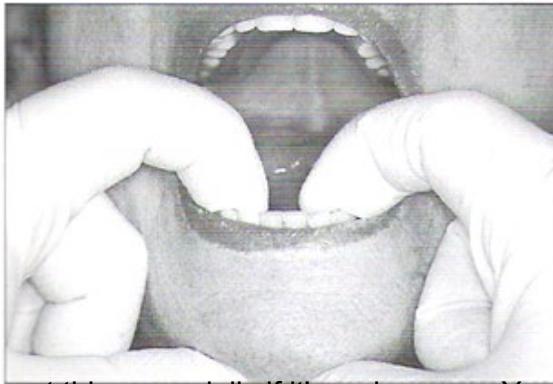
- On master cast:
  - Rest seats
  - Plating, clasps contact tooth
  - Any positive nodules to prevent seating
  - Major connector rigid
  - Clasps intact and smooth
    - Retentive tapered
    - Reciprocal consistent thickness



You want the correct clasp, soft tissue undercuts avoided, and you've got everything that you wanted.

# Framework Try In

- **Insertion should not be guided by pressure on distal extension.**
- **Seat framework by applying gentle pressure to rests and lingual plate.**



When you go to insert this, especially if it's a class one. You push gently on the lingual plate and rests into the rests seat, you don't want to put your fingers back here. That is where the key framework part fits the teeth, it is the rests, are the rests going to fit the teeth? And if it's not going to place, you don't want to force it because you don't want to get this locked in and not be able to get it out. That's really a bad day. So you push gently, you put your fingers over

where the rests are and keep in mind that it's got a path of insertion and make sure you don't put any eccentric pressure on it.

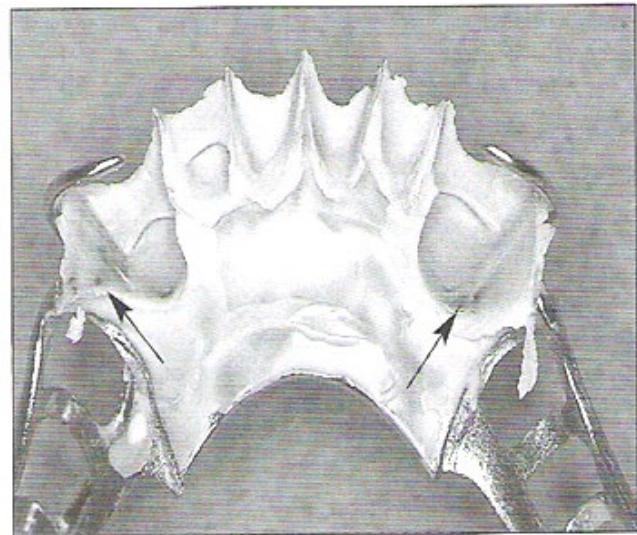
# Refining fit of framework: Use disclosing medium

- **Disclosing wax**
  - Need flame and wax spatula
  - May be reheated and smoothed (if uncontaminated by metal debris)
  - Placement can be controlled
  - Easy to remove from metal
- **Occlude**
  - No need for flame
  - Spray amount or placement uncertain
  - Must reapply for each insertion
  - Material builds up, thick layer
  - Messy
  - Hard to remove

Just like when you're trying to seat the crown and it doesn't go precisely to place and you have to look for some interferences or some high spots- what do you use in Crown Bridge on the inside of a crown to see where it's hanging up? Fit checker. All of these things are disclosing mediums, whether it's a fit checker, occlude or tip when you're delivering dentures, all these things are trying to tell you what's going on between the surface of your prosthesis and the tooth or soft tissue you're trying to fit it to. **I really recommend disclosing wax**, as the book does, the problem is it's wax- so you're going to need a flame and you're going to need a wax spatula to apply it with. But believe me, it's worth getting out those two extra things, rather than using occlude. Occlude is a spray (an aerosol), and so you spray it and it puts down a green layer of material and if there's a high spot, it shows through. **But with the disclosing wax, you can reheat it, the placement can be controlled, it has a thickness to it so you can actually see how far away the framework is from the teeth if it's not adapting because theirs thickness to it, and when you're ready to remove it, all you've got to do is pass the framework through a flame and take your air-water syringe and just blow with a blast of air to blow the melted wax off.** That's a big deal. With Occlude, people think it's easier because you just spray it on. But unfortunately, it builds up and kind of prevents seating after a while, it's kind of messy because it goes where you don't want it. Here you have precise placement with your hot wax spatula and when it comes time to take it off, it is a big hassle to get it off because you can't just heat it up and blow it off. **So disclosing wax really is the best.**

# Reading disclosing wax

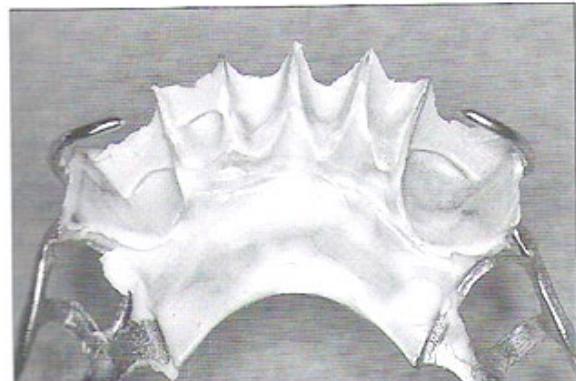
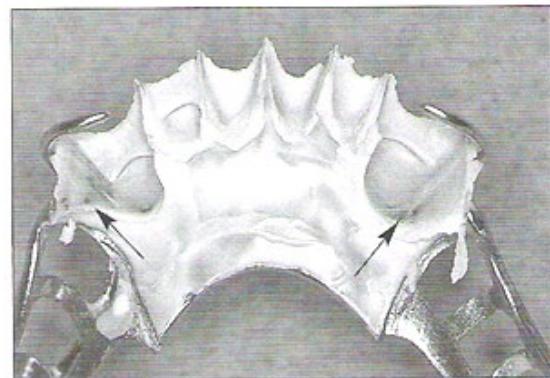
- Can gauge thickness
- Detect areas of incomplete fit



Here's disclosing wax that's white, and we've disclosed it on all the surfaces. Now I have been in the clinic and come in and they have painted everything, including the denture base retention, obviously you don't need to do that. **You only need to put it on the metal where it touches the teeth.** So we didn't even really need to do this as shown in the pic. So you put it and you try to seat it and you look for places where we've got prematurity.

# Framework Adjustment

- Identify areas of premature contact
- Adjust with hi speed fluted carbide bur
- Guiding planes & retententiv tips will show contact



We're going to use a multi fluted carbide bur, look at the guiding planes and the retentive tips. They're going to show contact. Because the guiding planes are built to glide up and down, so you shouldn't see an area where it's a really

stark, sharp, marking, but you will see where it's guiding up and down on the guiding planes.

# RPD framework - patient try-in

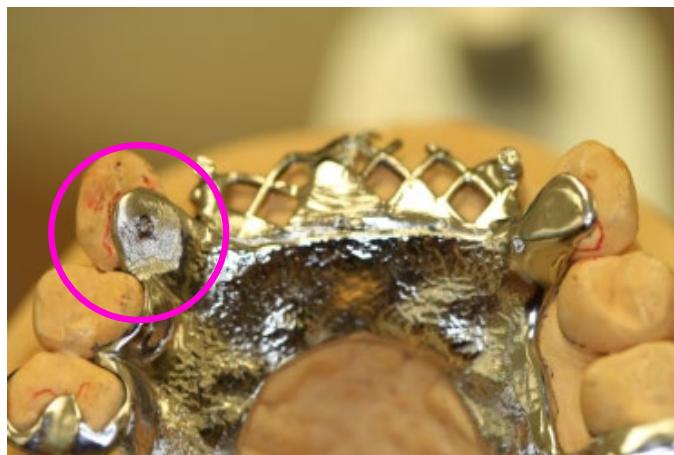


## Occlude as disclosing medium

This is Occlude. So you can see it shows through as well. But how do you get it off?

**Once framework is completely seated, occlusion must be adjusted.**

**All natural teeth should contact completely with framework in place just as they do without framework in place.**



Now a couple of slides and the framework is fitted. It doesn't go that simply. Sometimes you'll get a framework back and it'll just go right to place. The rests are in the rest seats, and some patients have some tactile sense of when a framework goes in and they can feel when it seats and can kind of help tell you if it's seated or not, and then sometimes it's not seating and you start with the adjustment and looking for places. They told you in the book where to look for places that you might have hang ups, prematurities, frameworks not fitting in the mouth. If you work on it, I say for forty five minutes, and it's not going to place, then you should just stop and assume that there was a distortion and make another impression and go for another framework. I've seen people labor over them for hours and you never get them to fit. So I think forty five minutes is a good amount of time and if it's not working, you have to be re-impress. What do we do after the framework fits? So Hallelujah that's a great thing, but now we've got to worry about the opposing occlusion and of course, worrying about the opposing occlusions started with the mouth preps when we get our pass through to the buccal for our clasp and where we did our rest seats to make sure that we had enough room for the framework metal to the opposing occlusion.

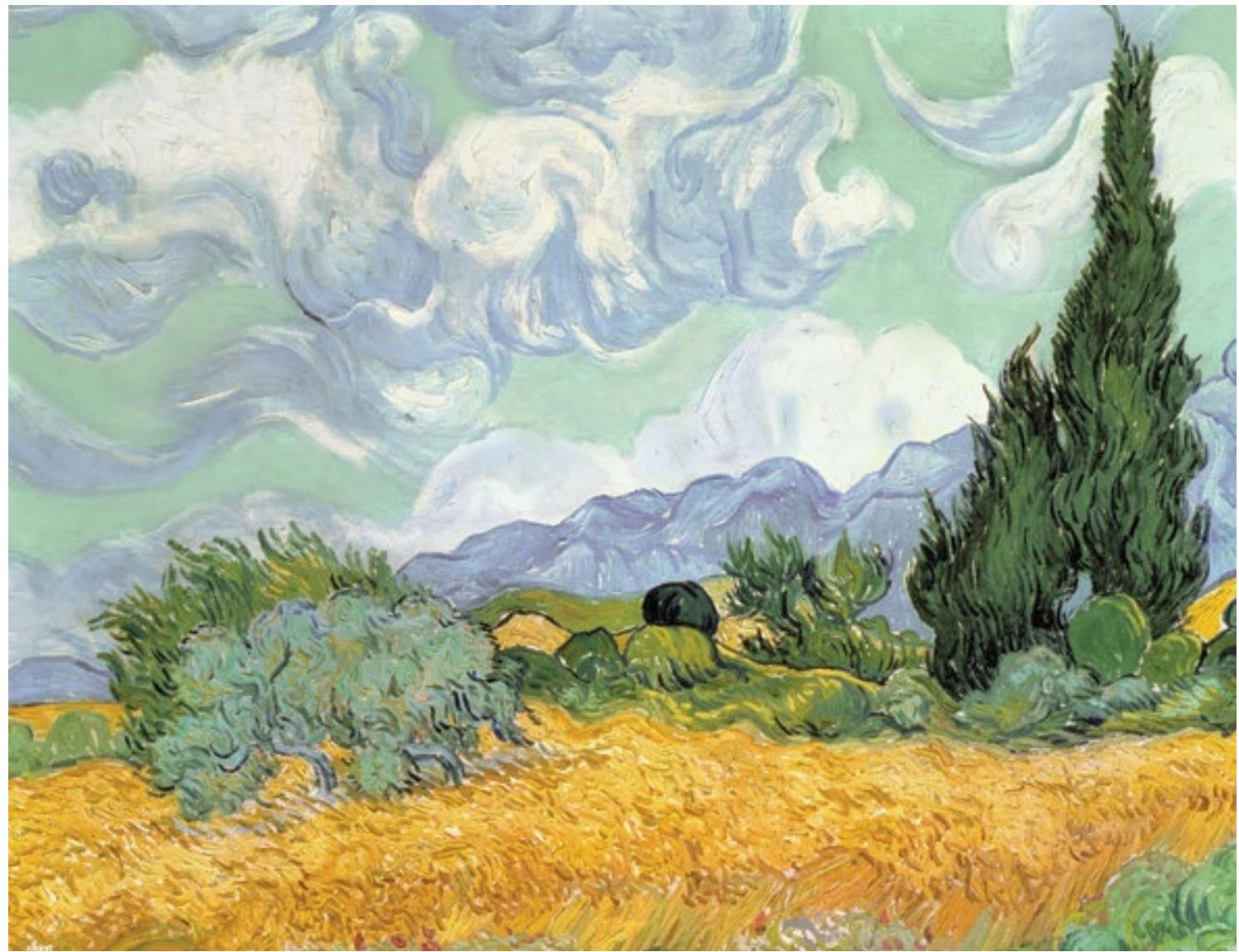
But a lot of times we see something like this. So here is the maxillary, we've got a reverse circlet here and so we have to do a pass through, but that is a really, really heavy occlusal contact there because it's like bull's eye. You guys have talked about bull's eye, right? If it's got a circle and it's kind of clear in the middle, that's a really heavy contact. So this pass through wasn't prepped enough for this to come through, And so now you should not just assume that if you've got a problem with occlusion, that you can just adjust the opposing dentition, that's not the right way to approach it. We need to make our mouth preps so we're not going to have this problem. So you should look at your centric contacts without the RPD framework in the mouth. Use artifoil so that you visualize where those contacts are and use shim stock to feel those opposing contacts, those contacts should be there the same weight, the same pressure, with the framework in. The framework shouldn't change the occlusion. So here, we're going to have to do something with this. Look at [this](#). It comes all the way to the lingual plate on this canine, but look at that, that's where the central conclusion is. And I warn you again and again and again, if you're going to put a rest seat like we do all the time on a canine, you need to have mounted casts and turn it around and look so you can visualize where the centric occlusion is on your canine before you do your RPD mouth preps, **make sure you do your cingulate rest below where your central occlusion is.**

# Fractured reverse circlet clasp

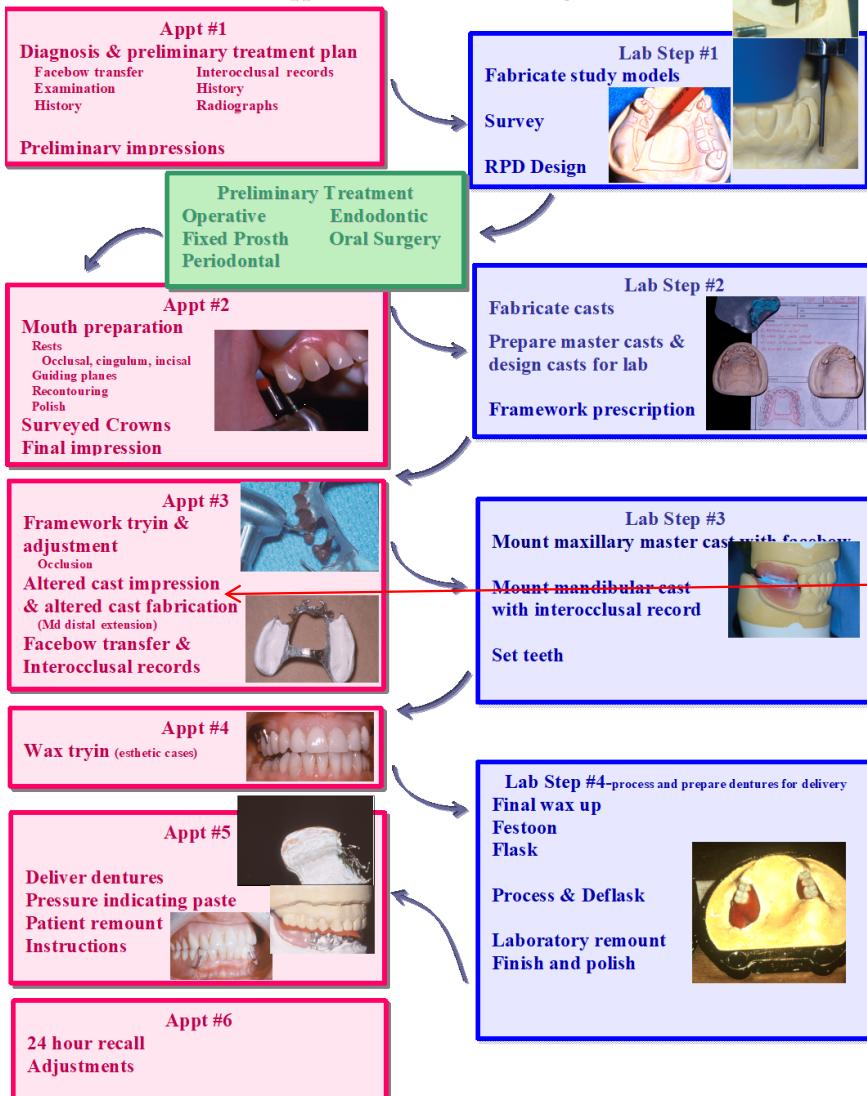


Here's where we had a reverse circlet here and we adjusted it so much that it got thin and it broke. And of course, reverse circlet- that's one of the problems that we talked about in the charge, one of the contraindications is if you've got very heavy occlusion there, you have to be careful with your reverse circlet





## Removable Partial Dentures: Clinical Appointments and Laboratory Task Sets



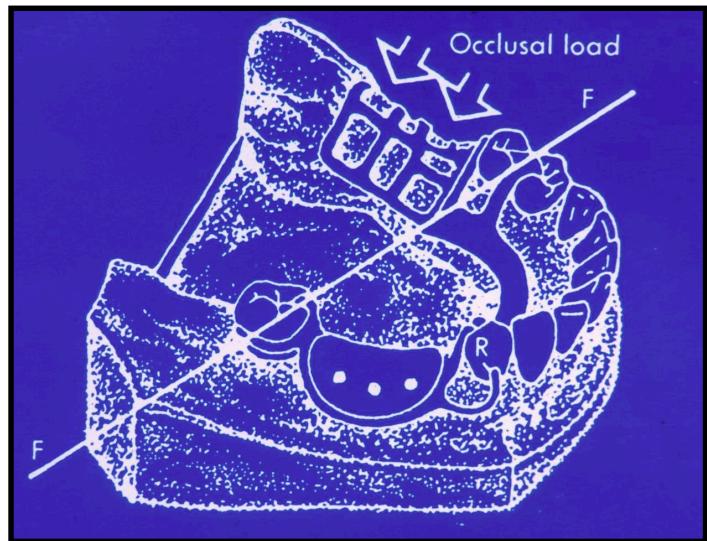
- **RPD Design**
  - The tail that wags the dog
- **Mouth Preparation**
- **Surveyed Crown**
- **Final Impressions**
- **Framework Fabrication**
- **Framework Try In**
- **Altered Cast Impression**
- Interocclusal Records
- Denture teeth and base waxing
- Process Denture Base
- Deliver RPD

# Altered cast impressions

- Improves support for the free end saddle or extension base
- Reduces tissueward movement from the fulcrum line
- Best relationship between supporting teeth and the residual ridges

However:

- (1) More treatment time.
- (2) Technically challenging.



Altered cast impression- I didn't have you read that whole chapter because the authors address so many different impression types and such that it's a lot of extraneous reading. So I think I can cover it here well enough that you get what you need to know out of it. **An altered cast impression is an extra step that we take with Mandibular distal**

extension RPDs because of the special attention we need to give to the mandibular ridge, remember if we don't have a tooth back here, we're wanting to get all of this tissue support from the soft tissue.

# Distal extension RPDs

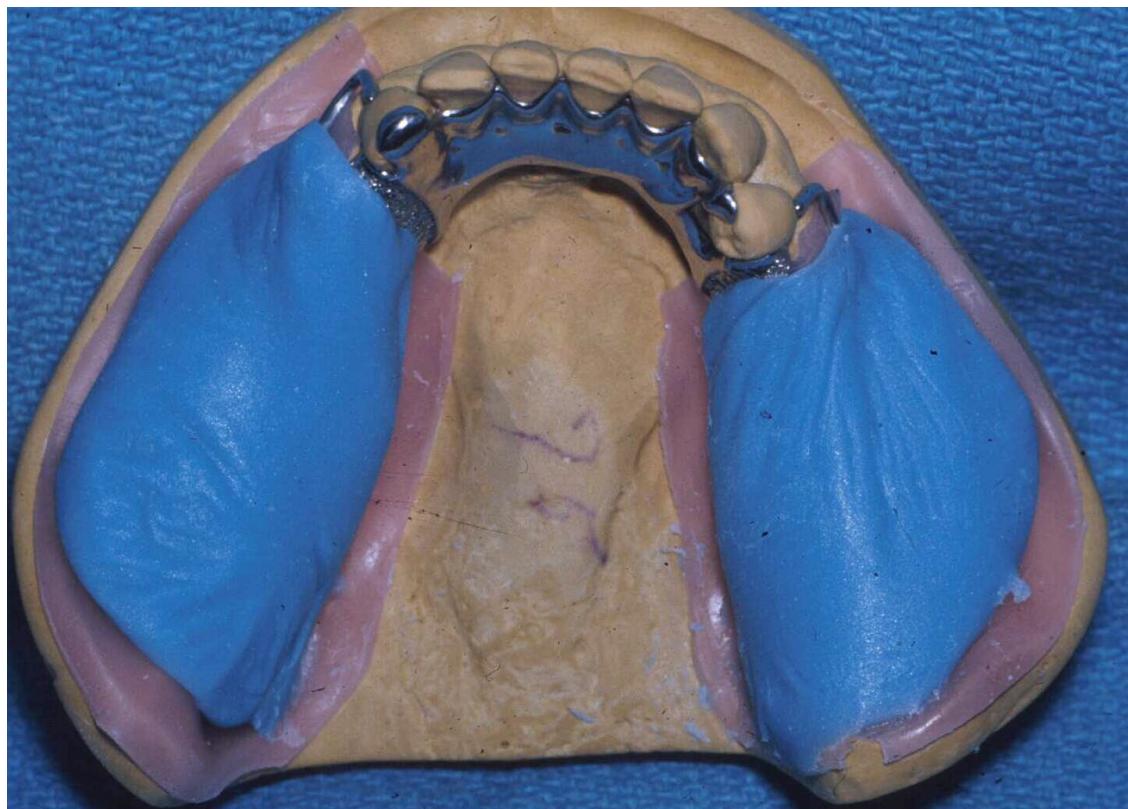
- Almost always, MD distal extensions need altered cast impression.
  - Borders harder to establish.
  - Need to capture buccal shelf and retromolar pad.
  - Md residual ridge more vulnerable.
- Almost never do MX distal extension RPDs require altered cast impressions.
  - Ridges easier to impress.
  - Have support of MC on palate.
- However, a long anterior segment may also need altered cast impression.
  - Labial flange important to esthetics
  - Acts as distal extension

This is my take on altered cast impressions, which **some people call corrected, corrected cast, altered cast**, they are all the same thing. **Almost always, mandibular distal extension, whether it's a class I or a class II, need to have this extra step** of an altered cast impression because we need to establish the borders. We've got that retro mylohyoid space and we need the buccal shelf for support, we need the retromolar pad for support, and even though those anatomical features, the retro molar pad and such are there on your master cast, we need a new relationship of the framework to how it fits the soft tissue. **We almost never do maxillary distal extension RPDs because the ridges are easier to impress and we have that added on most RPDs you're going to have some support from the palate** either a palatal strap or an AP strap and the maxillary just doesn't require it like the mandible does. However, if you have a really long anterior segment, you might want to do border molding, so that you get proper relationship for lip support and such.

With the mandible, it's harder to make sure that your extensions are right without getting them overextended or under extended, and the flanges, especially on the lower it seems, can be very sensitive for some people. If the flange is too short and food gets up underneath it, they complain about that a lot with mandibular RPDs. And usually it's because it's too short or they complain about getting food underneath the distal extension of a mandibular RPD and I look at it and the flanges are convex. So food is manipulated and it gets pushed against these bulges and it gets down below the bulge and then it can't come back up because they're not concave, they're convex, they get below that bulge and then the food is kept there and gets underneath the denture. That happens a lot. I don't know how it got into that.

## **Impression tray:**

**The purpose of the tray is to carry a uniform thickness of the final impression material to the mouth without exerting pressure on the mucosa.**



So this is your framework. It's already been fitted to the mouth, it works, we've done the occlusal adjustment if there was any, and now we are going to add an old fashioned tray material that we mixed up and put on. You would just use your triad material. These are added.

# Altered cast impression

- Add resin custom tray segments to denture base retention component of fitted framework.
- Border mold
  - Check tray for extension 2-3 mm from tissue reflection during border movements
- Same as for complete dentures
- BUT MUST completely seat framework each time.
- ALSO MUST seat holding framework ONLY AT RESTS. Do not press down on extensions.



And now we're back in the realm of complete dentures because we're going to border mold and do a wash impression of these distal extensions. And so all the same things, we've got to make sure you've got room for the border molding. But, you know, it's a little bit more complicated than with complete dentures because you've got to seat the framework, you're going to put your border molding on it and then you've got to manipulate it in the mouth. You have to hold your framework, in this case on the lingual plate and by the rests, make sure it goes to place and hold it by the rest, not push it down on the distal extension. You never put pressure on the distal extension! And then you border mold on all of these areas, the retro mylohyoid area, just like we did for complete dentures.

**Border Molding:**

**Use green stick compound to border mold.**

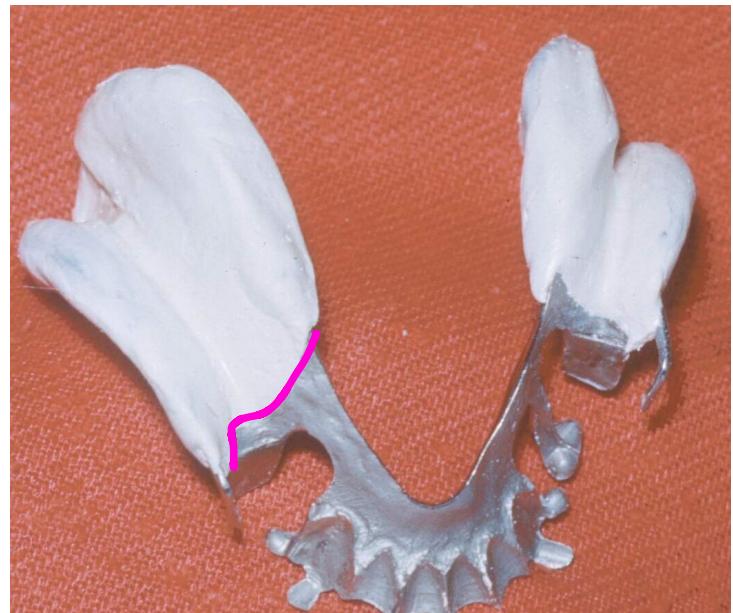


So this is a beautiful and this material looks great, but it should be greenstick just like we do for complete dentures. And here you can see we've got your retromolar pads covered, we've got your retromylohyoid area and you just can't do this to get the proper extensions and such without doing the border molding.

# Altered cast impression

## Wash impression

- Same as CD, selective pressure technique.
- All impression material trimmed from framework at internal finish line



Then you do a wash and you cut back. What is that area right there? What is that framework component? **Internal finish line**. So you cut back your PVS or polyether to the internal finish line. So we've got this beautifully border molded and new intaglio for how we want the denture base to be. What are we going to do with it?

# Making the altered cast:

- **Distal ridges removed from framework's master cast**
- **Seat framework, bead and box around impressed extensions**

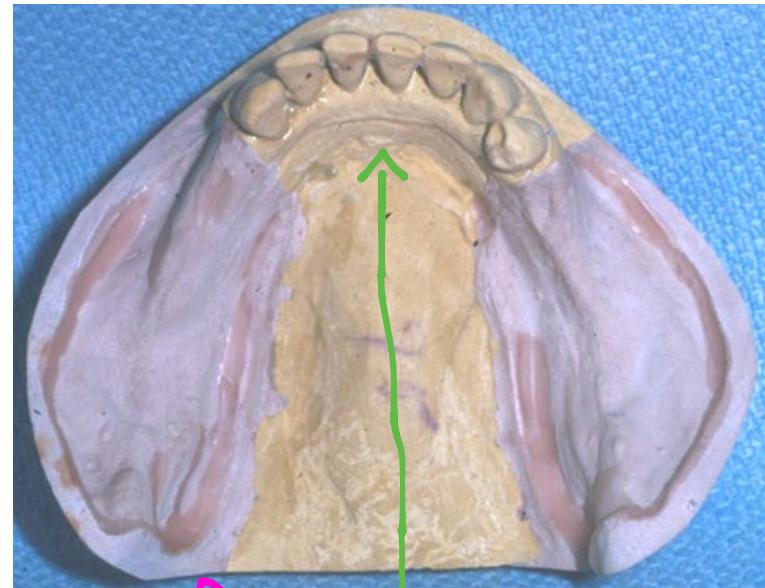
Master cast that has been sectioned.



This is your cast that came back with it. We used to make you guys do this, we don't do it anymore. So you're going to send your master cast and your altered cast impression to the lab and they are going to fabricate an altered cast for you. We're not going to ask you to do that anymore. So the frameworks on the teeth here on the other side and they cut away the soft tissue ridge part on the master cast...

# Altered Cast with the Edentulous Areas Repoured.

- Cast ready with borders and land area for eventual denture base processing
- Have obtained best possible soft tissue support for RPD.
- Have obtained best possible orientation of the metal framework to soft tissues.
- This is an effective preventive measure to protect abutment teeth by providing mucosal support and minimizing denture movement.



... and they're going to pour it up, and so now you have an altered cast. So this is the original and then this is that new tissue representation that we just went through for the wash impression. So now we have a new relationship of the framework to this soft tissue and of course, with this much distal extension this step is really important.



Fig 13-29 The master cast must be modified in preparation for corrected cast procedures. The broken line indicates the proposed cast modifications for a unilateral corrected cast process.

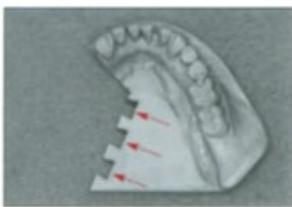


Fig 13-30 The master cast following modification. Dovetail notches have been prepared to permit mechanical interlocking of cast segments.

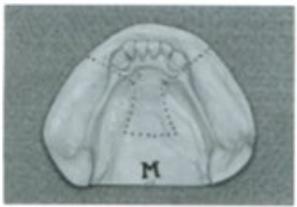


Fig 13-31 The broken line indicates the proposed cast modifications for a bilateral corrected cast process.



Fig 13-32 The master cast following modification.



Fig 13-33 Properly border-molded impression tray.



Fig 13-34 Completed rubber base impression.



Fig 13-35 Framework-impression assembly is properly seated on modified master cast. At this stage, the framework should be affixed to the modified master cast using modeling plastic. This minimizes the likelihood of displacement and distortion.



Fig 13-36 The assembly is inverted in preparation for rimming and boxing procedures.



Fig 13-37 Utility wax is used to rim the impression. The utility wax should be located 2 to 3 mm from impression borders and should extend peripherally 3 to 4 mm. Boxing wax is added to form a watertight vertical wall. When this has been accomplished, freshly mixed dental stone is introduced.



Fig 13-38 After the stone has gained sufficient strength, the corrected cast is recovered and trimmed.

But look in your book, this is a nice representation. It shows unilateral distal extension and bilateral, and they're taking the master cast and sectioning it. Here we've got a Kennedy class 1 with the wash impression, here it is on

the cast, and then here it is poured up.



This shows border molding with regisel here, and when you're doing your border molding you're just holding it in this case on the lingual plate, make sure that it's seated all the way, and you're not pushing down on the posterior

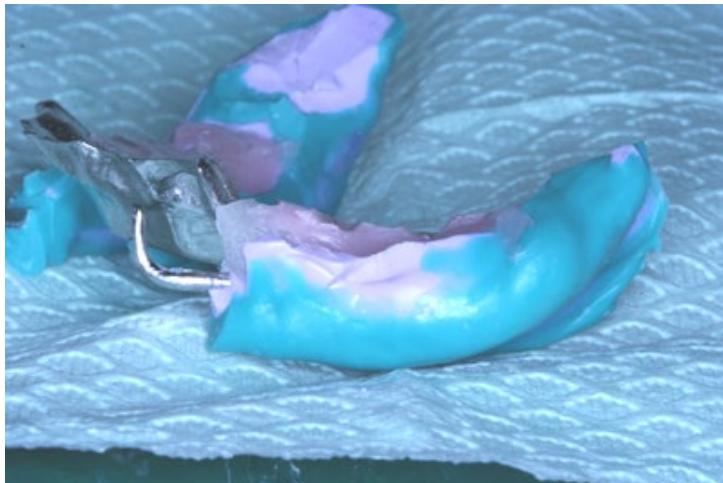
segments.

# Border Molding



This shows our border molding.

# Wash Impression



And this shows our wash.

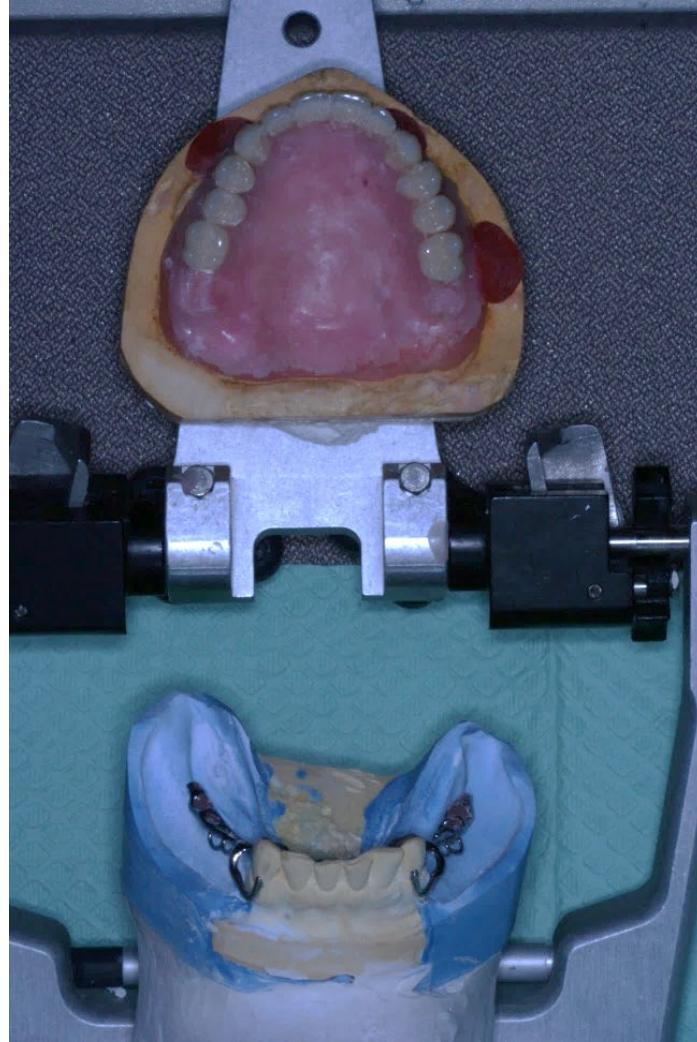


This shows it luded onto the cast, this is what it looks like underneath. And see we've got this land area all the way through. I'm using the same terms we do for complete dentures because we're in the land of complete dentures back here, the way we border mold and do a wash impression, and then this is going to be poured in with fresh stone.



And that's what it's going to look like. Now we're ready to go ahead and get our inter occlusal record between the

upper and lower MMR appointment.



This shows our case.



This just shows this RPD did not get an altered cast impression, it was made really short and it didn't cover the pad it just stopped right there and the patient under chewing stress, was very sore back here where it stopped. So we went back in and we border molded this whole thing and poured this up and used salt and pepper denture based repair material and extended it as it should have been initially and it fixed it.