

**What you think when the  
dentist says you need a bridge:**



# RPD Delivery and Post Insertion Denture Problems



Let's talk about delivery. I'm going to talk about replacement teeth and such later on, but I didn't

want to add that to today's lecture and make it long. Let's talk about RPD delivery.

# **RPD DELIVERY**

- **Denture base**
  - Check with PIP
- **Occlusion**
  - Check occlusal contacts in MI without prosthesis.
  - Articulating paper should be thin.
- **If framework is already adjusted (during fitting the framework), then any occlusal must be to discrepancy due to denture teeth.**

RPDs are kind of half and half. It depends if they're class two or class one, they've got a significant amount of denture base and denture teeth. It may be just a couple of teeth you're replacing if it's a Kennedy class three. But they really are kind of in two parts. (1) The **metal framework** that we've talked about a lot, the design of it, how we get it, the fabrication of it. And then (2) the second part, which is the **denture base retention, the denture base and the teeth**. So you've got to check everything. The denture base, you check with pressure indicating paste and we went through that quite a bit last term when we talked about delivering complete dentures. Occlusion, check occlusal contacts in MI without the prosthesis. So you're going to check what the patient's contacts are without the RPD in place. You should use thin articulating paper, don't use that thick horseshoe stuff that they've got down there because it's too thick and it will give you false positives. So use artafoil on a Miller forceps, and then check the framework occlusion. Once you fit the framework to the teeth and you should adjust the occlusion, and so once you've done that, the only thing that should be a problem is the occlusion of the denture teeth. But that's not always the way it is, unfortunately. A lot of times the framework is kind of different during the delivery appointment and we'll talk about that in a minute what could cause that.

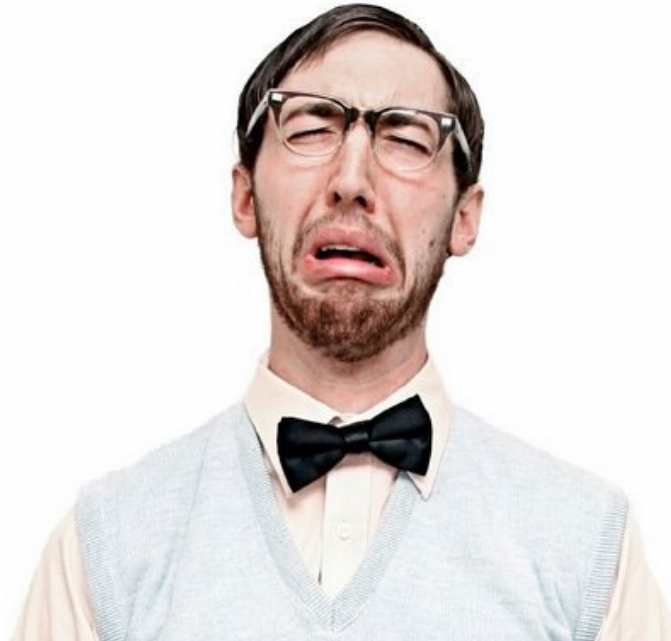
# **Should RPDs be fabricated in MI or CO?**

- **MI (maximal intercuspation):**
  - The complete intercuspation of opposing teeth independent of condylar position. Sometimes referred to as “the best fit of the teeth”.
- **CO (centric occlusion):**
  - The occlusion of opposing teeth when the mandible is in centric relation.

**If there are sufficient natural teeth remaining in an arch to reliably establish MI, and there are no significant discrepancies between MI and CO, the RPD should be fabricated in the patient’s existing MI.**

But you must have the same contacts of natural tooth to natural tooth with and without the RPD. What do we restore complete denture patients in? There is no such thing as MI, so we have the patient in CR and get a record. So they are restored in not exactly CO, but it's not MI either. **It's CR with denture teeth.** When we're doing an RPD and we're mounting it against opposing dentition, how are we going to go about that? So we know that maximum intercuspation, a complete intercuspation of the opposing teeth is the best fit of the teeth and central conclusion is the occlusion of the opposing teeth when the mandible is in centric relation. If there are sufficient natural teeth remaining in the arch to reliably establish MI and there's no significant discrepancy, so when you're doing your evaluation of your patient, the initial eval, you should be looking at the occlusion, checking CO and MI, and seeing if there's any big discrepancy between them. Then the RPD should be fabricated in the existing MI, you're not going to change the bite. So most RPDs are in MI.

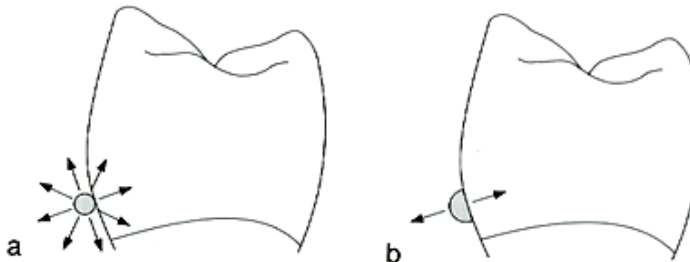
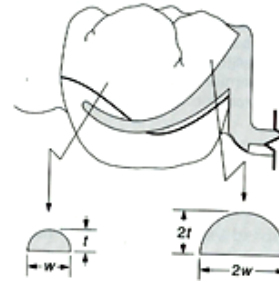
# Adjusting Retentive Clasps



Let's talk about adjusting clasps.

# Clasp properties that affect function

- Length
- Cross sectional area
- Material
- Cross sectional shape
  - Degrees of freedom
    - wrought wire is flexible in any direction
    - cast clasp flexible in one direction





Sometimes the clasp needs some adjustment. Occasionally they may be too retentive. Usually it's that they're not retentive enough and they need a bit of tweaking. There's a lot of back and forth between the lab. The framework goes on and off the stone cast a lot. Sometimes we don't have the retention that we want and we need to adjust it. We've talked before about the length, the cross-sectional area, the material meaning is it a cast clasp or a wrought wire clasp. The cross sectional area, if it's a cast clasp it's going to look semicircular like the example on the right (b). If it's a wrought wire, it's going to be completely round like the example on the left (a). With all of these things, you better know what you're dealing with. Think this is a wrought wire or this is a cast clasp.

# CLASP ADJUSTMENT

- **Types of material deformation:**
  - ***Elastic***- A temporary shape change that is self-reversing after the force is removed, so that the object returns to its original shape.
  - ***Plastic***- When the stress is sufficient to permanently deform the metal. Involves the breaking of a limited number of atomic bonds by the movement of dislocations.
  - The retentive tip of a clasp experiences ***elastic*** deformation as it flexes over the HOC.
  - When a clasp is adjusted, it undergoes ***plastic*** deformation.

You should remember this from a couple of years ago in dental materials, that we have elastic deformation material and we have plastic deformation. Elastic means that it deforms meaning it changes shape temporarily, but it goes back to its original configuration. That's what the retentive tip does when it moves over the height of the contour. We certainly don't want it to change permanently every time it goes into the mouth. Plastic deformation is when we apply enough force, enough stress to permanently deform the metal. And, you know, that's a lot bigger deal. **So the retentive tip of the clasp experiences elastic deformations as it flexes over the height of contour. But when it's adjusted, it undergoes plastic deformation.** We're actually moving some atomic bonds and such within it.

# **Strain or Work Hardening**

- **Cold working or work hardening refers to the plastic deformation of metals by bending forces at room temperature.**
- **Repeated bending of metal increases crystalline deformations structure which ultimately results in undesirable characteristics.**
- **Capacity for plastic deformation diminishes.**
- **Ductile materials become hard and brittle.**
- **Toughness reduced.**
- **Fracture of metal can be result.**

Cold working or work hardening refers to plastic deformation of metals by bending at room temperature. If this is done repeatedly, we get an increase in crystal deformation and it eventually gets so brittle that when you go to adjust it, it may fracture. This is not something we want to do a lot of.

# CLASP ADJUSTMENT

## Bird beak pliers

- **WW**
  - Apically and laterally
- **Cast circlet**
  - Laterally (perpendicular to flat inner surface of clasp)
- **Infrabulge**
  - Vertical projection arm
- **Position the round jaw of the pliers inside the clasp.**



## 3-prong pliers

- **T bar**
  - Small, horizontal retentive tip



So as we talked about in the quiz, we've got bird beak pliers that the authors tend to say you use it for just about everything and the three prong, they just use for the small horizontal part, they say that's the only time that you use the three prong pliers. I don't necessarily stick to these rules, use whatever works for you. But this is something that you need to do with an instructor the first time, because if you apply too much force or you do it too quickly mainly, you can break the clasp pretty easily. When you're doing a circlet clasp, you always put the round part on the inside of the clasp, if you didn't you'd have these two sharp edges of the box side of the pliers with applying stress concentrations to the inside of your clasp. So always put the round on the inside of the clasp.

# CLASP ADJUSTMENT

The most important thing to remember when adjusting clasps is that cast metal is very ***brittle***. Adjustment must be made very slowly or clasp will snap.

**THE RATE OF FORCE APPLICATION IS CRITICAL.**

The most important thing to remember when adjusting clasps is that **cast metal is very brittle**. You're not going to break a wrought wire unless it's old and it's got work hardening. But it's very easy to break a cast clasp. Adjustment must be made *very slowly* or it will snap, the rate that you apply the force is very critical. So you put your pliers on it and you very, very slowly start to try to bend just a little bit and you do just a little bit. If it takes you 10 times to effect any change, that's better than applying too much force and snapping it. This is not something you leave to the last



five minutes of the appointment and you've got to rush to get them out. Hold your breath while you do it.

# **Resin-Metal Denture Base**

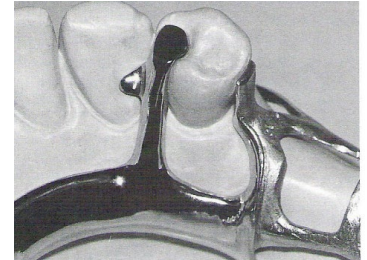
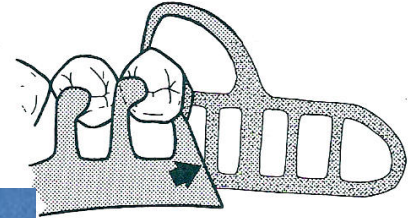
- **Structural Considerations**
- **Metal/resin interface**
- **Dissimilar material properties**
- **Finish lines**
- **SOMETIMES RESIN IS NOT TRIMMED TO INTERNAL FINISH LINE AND RPD DOES NOT SEAT EVEN THOUGH THE FRAMEWORK DID.**

Let's talk about some features of the RPD framework, particularly the resin metal denture base. It's an interface between unlike materials, you've got a relatively weak material, the denture base, and it's interfacing with a very, very strong material, the metal. We need to manage that very well or the resin will fail and you will have pieces chunk off of it and you'll have irregularities. So for dissimilar material properties, we need to have finish lines, we need to control where these things interface. And because we have these finish lines. It's very easy to see how the resin should be finished to the finish lines. The lab sometimes are not very particular about making sure they don't have any resin slopping over that finish line, and if you have any issues with the RPD not seating, it seated when we did the framework, but it doesn't seat when we are doing the RPD- Look at these finish lines and make sure you don't have any excess of resin that's over the finish line. If you do, you need to take your acrylic burn and cut it back.

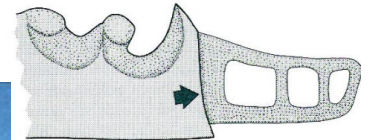
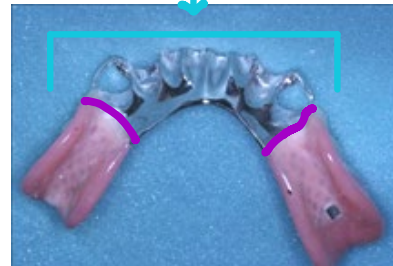
# External and Internal Finish Lines

- Make sure denture base material is finished to line.
- Excess acrylic is weak and will flake off.
- Excess acrylic on intaglio surface may keep RPD from seating.

Cameo surface

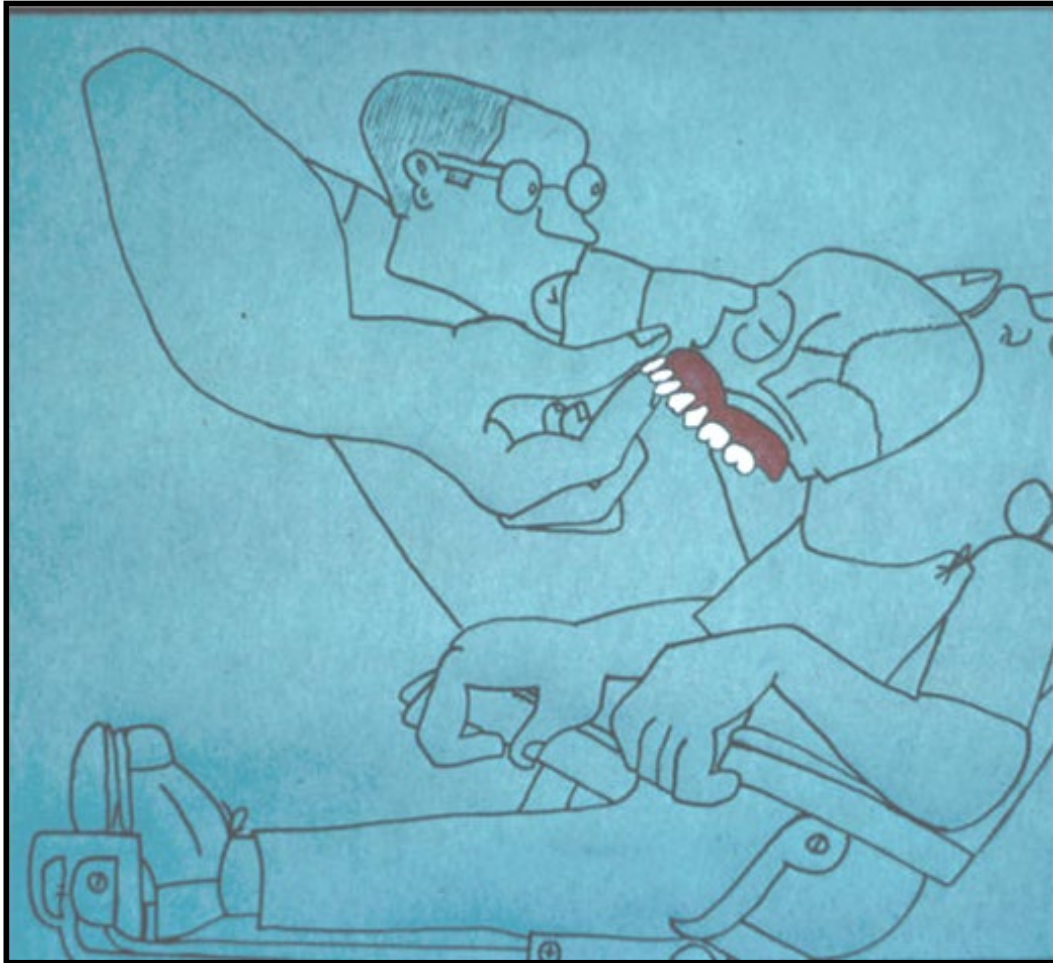


Intaglio surface



So this is the **external finish line**, this is the **cameo surface** and this is the **intaglio surface**. So this is the intaglio surface and there's an **internal finish line** right here. And I think you can see the guide plane and the proximal plate, if you have some excess of resin that slops over onto there, it may keep the RPD from seating. **So always look at the internal finish line and make sure that it's trimmed precisely, It's very crisp (that's what the finish line is for) so you can get this definite very easily discernible finish line here.** Here it is on a real framework.

# DENTURE TROUBLESHOOTING



So let's talk about the next chapter where it talked about general problems.

## **Discomfort may be secondary to;**

- **Open vertical dimension of occlusion**
- **Inaccurate centric relation record**
- **Lack of occlusal balance**
- **Poor denture base adaptation**
- **Inappropriate denture base extensions**

Discomfort may be secondary to open vertical dimension of occlusion, inaccurate centric relation record, lack of occlusal balance, poor denture base adaptation, inappropriate denture base extensions, usually they're overextended. Usually if there's a problem with vertical dimension, it's excessive and you get very **characteristic** things that happen after they put their dentures in. Whether it's complete dentures or RPDs if you've opened the bite and you shouldn't have, **their**

jaws hurt. They feel like there's no space to get food in their mouth so that they can chew. When they say they're S's, they're upper and lower teeth kind of clack against each other and they can feel like they're gagging as well.

## **Retention and stability may be compromised by:**

- **Occlusal discrepancies.**
- **Poor denture base adaptation.**
- **Underextension of denture borders.**
- **Overextension of denture borders.**

These factors are controlled by the dentist.

Retention and stability may be compromised by occlusal discrepancies, and I'm not going to go into it today, but we are going to go over one of the most important things if you're going to do

dentures at all, you should know how to do a **clinical remount**. I'm going to explain why and we'll do that probably the last day. But it's a very good thing to know how to do. Poor denture base adaptation, under extension or overextension. These are things that you're going to be in charge of.

## **Retention and stability may be compromised by:**

- **Moderate to severe resorption**
- **Unfavorable floor of mouth posture**
- **Retruded tongue position**
- **Reduced salivary flow**
- **Poor neuromuscular control**

Now there's other things that can cause problems if they've got really bad bridges, if they've got an unfavorable floor of the mouth position or retracted tongue, we talked about those things the

**These factors are beyond the control of the dentist.**

last term. If they've got a very dry mouth and what we just call poor neuromuscular control, which is just kind of a blanket term, how are they managing their dentures in their mouth? These are really beyond your control. It makes sense that we should really, really try to keep a good control on what we can have sway over, because there's a lot of things that can still cause a problem,



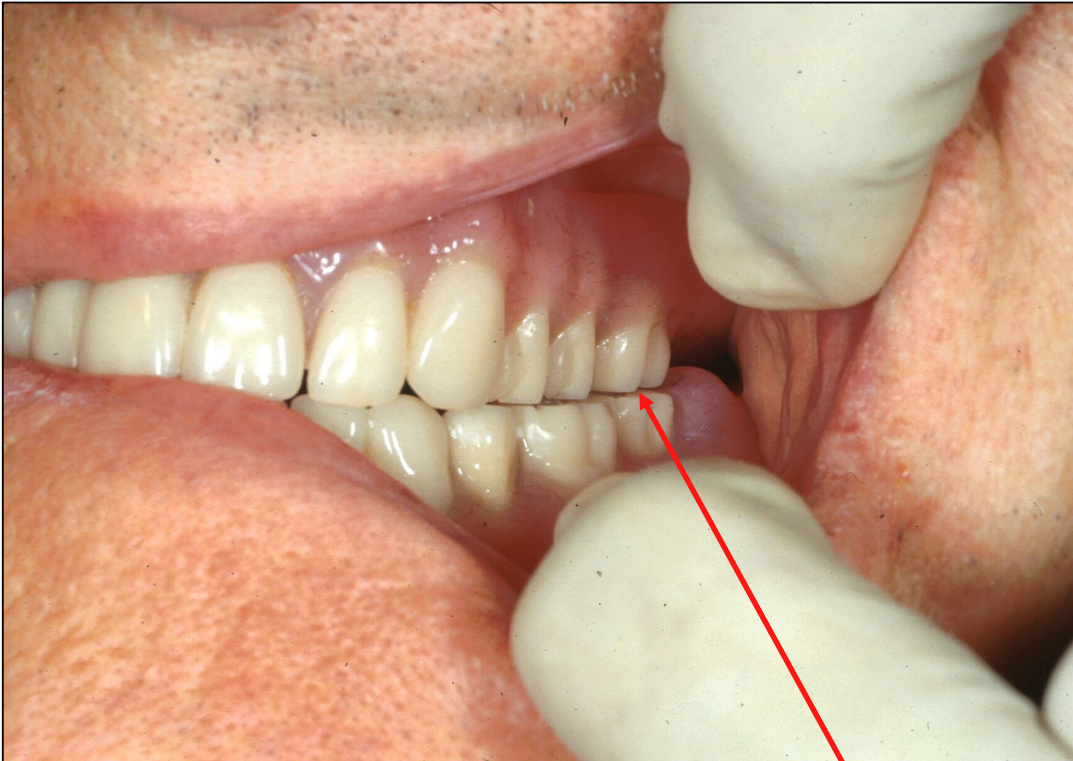
even if we do everything perfectly.

- **Neuromuscular control may be the single most significant factor in the successful manipulation of complete dentures under function**
- **Tongue function and denture wearing experience are important prognostic indicators.**
- **Provide adequate space for tongue.**



Nueromuscular control may be the single most significant factor, and some people got it and others don't. And it's not that they're being difficult or they're not cooperating. It's just that some people have a capacity to adapt to a lot of different things and some people don't.

# CHEEK BITING



- Almost always due to Mx and Md buccal cusps being end on end.
- Must provide horizontal offset by adjusting buccal surface of buccal cusps-usually mandibular.

Keep biting! This always comes up. **Almost always due to maxillary and mandibular buccal cusps being end on end (and nobody remembers this when they get to clinic), you need to have a horizontal offset!** If they're in cross bite then the mandibular teeth are going to be to the buccal and the maxillary teeth to the lingual. In a normal relationship, the maxillary teeth are going to be to the buccal and the mandibular teeth are going to be to the lingual. It doesn't matter there needs to be a horizontal offset. However **if they end up end on end, that's when you're going to get cheek biting.** That's the first thing you should look at and then you're going to have to adjust the teeth. Like in this example, it looks like it's in cross bite. I would roll these mandibular cusps in a little bit with an acrylic bur to create a horizontal offset.

# Problems with Phonetics

- **Check the thickness of the maxillary palatal portion. A common problem is excessive thickness.**
- **Reevaluate the position of the maxillary anterior teeth.**
- **If everything appears normal it may require more time for the patient to adapt.**
- **Reevaluate whether vertical dimension must be altered**
- **Ask patient if upper and lower teeth seem to tap against each other when they count from 60 to 70. If the answer is yes, it is likely that the VDO is too great.**

palate should be on complete dentures, they make it too thick especially along the posterior border. Problems with phonetics, the position of the maxillary anterior teeth. Patients can adapt pretty well phonetically because they hear the difficulty and it's kind of like a feedback mechanism and they kind of automatically adjust. Again, the vertical dimension may be too excessive when they tap the upper against the lower.

## **Problems with Esthetics**

- **Allow the patient to wear the denture for a period of time.**
- **If the patient is unhappy with their appearance occasionally the anterior teeth must be changed, or more likely, the dentures will have to be remade.**

Skipped

# Problems with Gagging

- **Mx palate excessively thick.**
- **Mx posterior palatal border too long (extends onto movable soft palate) or edge of posterior border not tapered.**
- **Md-Lack of tongue space (teeth set too far to the lingual).**
- **Md-Sublingual extensions too long.**
- **VDO too great.**
- **RPD Mx major connector not in contact with palate.**

**Problem with sore throat-Md retromylohyoid extensions too long.**

- **Complaints of soreness that involve more than a discrete spot and seem to make the whole segment sore typically are results of OCCLUSAL DISCREPANCIES.**

And then we're going to go into clinical remount, but I'm going to wait to do that.

## **Laboratory remounts correct for processing errors:**

- **Polymerization shrinkage**
- **Minor tooth movement**
- **Flasking errors**
- **Done immediately after deflasking**



# **Clinical remounts correct for clinical errors**

- **Mainly, inaccurate interocclusal records**
- **The problem: Records are made on record bases that rest on movable tissue. It is a challenge to ensure that:**
  - The base is stable during CR manipulation
  - The patient is actually in CR
  - You do not distort tissue while you hold the base in place
  - Therefore, records must be ‘proved’ multiple times.

- **When faced with denture problem, a clinical remount is generally a good procedure to correct occlusal problems.**
- **At the least, you can verify that the occlusion is NOT the culprit.**
- **The groan factor**

# Why spend time studying clinical remounts?

## Is it really necessary?

### Isn't it a lot of extra work?

- Remount casts must be made.
- Preserve facebow transfer or make new one.
- New IOR and have to go to lab to equilibrate.
- Then have to recontour teeth and polish.

**It is, without a doubt, one of the most important procedures to be mastered by anyone who performs denture treatment.**

### Not really

- Everything can be prepared beforehand by auxiliary personnel.
- All that must be done is obtain an IOR, mount Md denture, and adjust.
- Usually, unless there is a problem, equilibration is minor.
- And it saves postoperative treatment time, preserves oral tissue, and it can correct longstanding problems.

# Remount Casts



**The remount casts will be used to mount the clinical remount records on the articulator.**

# **You are now ready to perform the clinical remount procedure**

- **Maxillary remount cast has been connected to the upper member of the articulator by means of the facebow transfer jig**
- **Mandibular denture with remount cast will be mounted with clinical interocclusal record**



**When making interocclusal record, opposing denture teeth **SHOULD NOT** contact**



- Any contact is a prematurity and can cause subtle deflection and movement of denture base
- Record should show impressions of teeth on upper and lower surface, but no show through
- If so, redo
- The result is that the VDO is slightly open on the articulator, but insignificant
- Multiple records to verify **BEFORE** adjustment
- Carpenter's rule "Measure twice, cut once"

**Clinical remount procedure may seem like a lot steps, but really takes very little time**

- **Make remount casts**
- **Record facebow transfer**
- **Mount MX remount cast with patient's denture**
- **Make interocclusal record**
- **Mount MD remount cast with patient's denture**
- **Equilibrate in CR to get bilateral balanced contacts**

# A Problem Denture Case

- Patient reported for multiple denture adjustments.
- Had recurring sore spots with no obvious signs of trauma.
- This went on for months, adjusting (grinding) on intaglio surface without any real guide where to grind.

**What to do?**

Always consider occlusion, a very underrated cause of all sorts of denture complaints.

A clinical remount should be part of diagnosis procedure.



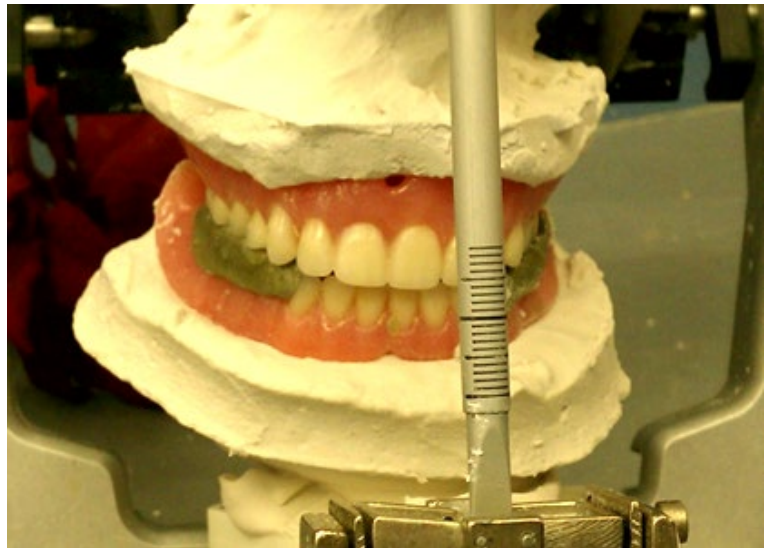
# **Identify problem and find cause.**

**Patient's complaint was lower denture tipping and upper denture falling down on right side.**

**First checked retention of Mx denture-okay.**

**Then checked Md teeth over ridge and not placed buccal-okay.**

**Asked patient to identify first “feather” touch when closing in CR. She indicated left posterior, about half way back.**



# Verification of mounting

- “Prove the record” several times
- This is verified by remount.
- Measure twice, cut once.
- Single contact where patient indicated.



# Adjustment

- Remove prematurities to bring other teeth into function.
- Notice contact 12 not on palatal cusp.



**Results of clinical remount are almost always positive and frequently elicit dramatic patient response.**

### **Function**

- **Patient was very happy with function-no more tipping.**
- **She could feel the difference in occlusion-  
"like night and day".**