

## Restorative Mastery for the Dental Hygienist



# Restorative Mastery for the Dental Hygienist

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GRESHAM, OREGON



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Dentistry is often referred to as an art and a science. Nowhere is this more evident than in the tiny sculptures clinicians create while performing restorative dentistry. Hands-on skills are best learned through demonstration, practice, reflection, and correction. Videos created using the clinical experience of Dr. Richard Aronstein DDS can be watched repeatedly as an introduction or refresher to the material and positive visualization before exams. Many of the documents included were created and successfully used to aid students in self-reflection by Loretta Johnson RDH, BS, EPDH. Additional resources introduce concepts common for teaching fine art and aid students in 3D visualization.





# I. Preparation to Place a Filling

## Chapter I:

### 1.1 Placing a Rubber Dam video

### 1.2 Placing a Matrix Band video

### 1.3 Supplies

### 1.4 Transcripts

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## 1.1 Placing a Rubber Dam

This video demonstrates how to place and remove a rubber dam including common safety precautions.



*One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=5>*

See transcript below.

## 1.2 Placing a Matrix Band

An introduction to the tofflemire holder and matrix band. This video demonstrates how to load and place a tofflemire band on a typodont. It covers wedging, working parts, and proper orientation of the matrix and tofflimer. This technique is applicable to amalgam and composite restorations.



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See transcript below.

## 1.3 Supplies

Click the links below for lists and descriptions of the supplies needed for the procedures explained in the videos above.

1. Amalgam Set Up: List and description of the supplies needed to place a two surface amalgam filling as described in Chapter 2.
2. Composite Set Up: List and description of the supplies needed to place a two surface composite filling with a tofflemire band as described in Chapter 3 videos.
3. Rubber Dam Set Up: List and description of the supplies needed to place a rubber dam

## 1.4 Transcripts

### *Video Transcript: 1.1 Placing a Rubber Dam*

Using a rubber dam protects the patient from harmful dental materials and makes it easier to keep a clean dry field.

Review the materials and tools needed.

Stamp the dam with a punch guide.

It's good practice to make a guide mark in the upper right quadrant. It's easy to get turned around when the dam is partially inserted.

Choose the correct hole size

Make clean punch holes without rips.

Punch holes one place behind the prep through one past the midline. We will be working on #29 so, in this case, punch 30- 24.

Choose the proper clamp and place a ligature on the arch with a simple cow hitch also known as a larks head knot. The ligature is always on the buccal side to keep it out of your way while working. And the larks head knot allows you to move it from side to side if needed.

Use the clamp forceps to place the clamp one tooth behind the prep. Check that it is secure and does not rock. If it does, reposition or get a different clamp.

Thread the ligature through the rubber dam in the #30 slot and gently wiggle the clamp loop through the hole. It's ok to use a non bladed instrument to help with this steep.

Use the guide hole to orient the dam and place the upper right frame pin in it.. Pull the other corners tight and secure.

Stretch the dam and slide each tooth into the corresponding hole pushing it into the occlusal embrasure.

Carefully floss each section through the contact.

secure the final tooth with a widget if needed.

Finally invert the rubber dam into the gingiva to create a seal with a plastic instrument

Now you're ready to place a filling!

To remove the dam, loop an explorer through two holes and pull tight to expose the interdental piece. This makes it easy to cut the dam out without accidentally cutting your patient.

When all the interdental pieces are cut, remove the dam, frame, and clamp checking that no pieces are left behind.

It's just that easy!

## *Video Transcript: 1.2 Placing the Matrix Band*

You will need a tofflemire holder, matrix band, cotton pliers, wedge, and ball burnisher.

Know the parts of the Tofflemier holder.

The outer knob adjusts the spindle while the inner knob adjust the diagonal slot holding the matrix band. Turning the right tightens and turning to the left loosens.

Begin with the outer slot holder close to the inner slot holder and the spindle pin removed from the diagonal slot.

When placing the matrix band, consider the shape. Gently press the outer edges of the matrix band, aligning them together. This will create a circle.

The smaller circumference will face the gingiva. Place the ends of the matrix band with the smaller circumference facing the slots being careful not to pinch the matrix band as this will leave a crease.

Orientate the matrix band through the outer slots straight.

Bring the band close to the tooth you'll be working on. Determine whether the matrix band should come from the right or the left knowing that it will need to end with the slots down and the smooth surfaces up towards the crown.

Adjust the matrix band toward either the right or left orientation using the outer knob to loosen the hold in the diagonal slot of the matrix band if needed.

Now tighten the outer knob making sure that the diagonal slot is close to the outer slots.

Using the smooth part of the ball burnisher stretch the matrix band from the mesial and distal aspect so that the loop is longer from mesial to distal than buccal to lingual.

Now you're ready to place this on your tooth.

The tofflemire will rest on the buccal side with the slots pointing toward the gingiva.

Pull the tofflemire toward the buccal closing the gap.

Now adjust the knob to reduce the circumference of the matrix band while checking to make sure the outer knob is still secure.

Now you're ready to wedge the tooth.

Grasp the wedge with the cotton pliers on the square end. Aiming the pointed end toward the gingiva move from the lingual to the buccal inserting the wedge in the embrasure space.

Once it is secure, flip the cotton pliers to the flat end to push the wedge into place.

Overwedging will make the contact too tight while under wedging will leave the contact too loose.

When the wedge is properly inserted, the gap between the matrix band and the floor of the prep will close.

Let's watch that again.

Now you're ready to burnish the contact.

Failure to burnish will result in a contact that is not tight, and an embrasure space that is not well shaped.

Use the ball burnisher side to side and up and down, burnishing the matrix band along the contact of the adjacent tooth.

This will leave a small mark in the matrix band.

And now you're ready to place a filling.

# 2. Placing Amalgam Restorations

## Chapter 2:

### 2.1 Loading the Amalgam Carrier

#### 2.2 Amalgam: Fill the Prep

#### 2.3 #14 MO Amalgam Carving

#### 2.4 #19 DO Amalgam Carving

#### 2.5 Transcripts

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### 2.1 Loading the Amalgam Carrier

Review the instruments and handling techniques for safe effective amalgam delivery.



*One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=21>*

See transcript below.

## 2.2 Amalgam: Fill the Prep

This video demonstrates filling and condensing a class two typodont prep with amalgam. Here a first molar is used but the same technique works for any class 2 restoration.



*One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=21>*

See transcript below.

## 2.3 #14 MO Amalgam Carving

This video demonstrates the carving of anatomy for a class two typodont prep on a maxillary first molar. It includes techniques for clearing flash, shaping embrasures, and marginal ridge height. Also, there are additional explanations of common anatomy terms and identifies tools used.



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See transcript below.

## 2.4 #19 DO Amalgam Carving

This video demonstrates the carving of anatomy for a class two typodont prep on a mandibular first molar. It includes techniques for clearing flash, shaping embrasures, and marginal ridge height. Also, there are additional explanations of common anatomy terms and identifies tools used.



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See transcript below.

## 2.5 Transcripts

### *Video Transcript: 2.1 Loading the Amalgam Container*

Your amalgam carrier will safely carry workable bits of amalgam from your work area to the prep.

Carriers come in different sizes, often with a small and large carrier on one handle.

Depressing the lever ejects a preloaded pellet from the carrier on command so it's important to stabilize the lever while loading the carrier.

Press the head of the carrier against the amalgam well, taking little bites of fresh amalgam to fill the carrier.

The carrier should be full and flush, not overfilled.



## *Video Transcript: 2.2 Amalgam: Fill the Prep*

Before you begin, examine the prep noting the varying shapes and location of landmarks. Some of this will be hard to see when the band is on.

Now take a look at your amalgam carrier and plugger. They have two ends. One is large and the other smaller. Check to see which end of the plugger and carrier fits inside the prep.

Load the amalgam carrier and place amalgam in the deepest part of the prep. This is called the box.

Do not put more amalgam in the prep than you can properly condense at one time.

Tack the amalgam in with the largest end on the plugger that will fit using light pressure.

Making sure to completely fill every corner and level the amalgam. Angle the condenser toward the matrix band and all corners of the box ensuring full coverage. This will eliminate open margins in your final restoration.

To condense the amalgam use more pressure and “walk” the plugger using overlapping steps. Like tamping out a fire with your feet. Wouldn’t want to miss a spot!

When you have the right pressure you will hear a squeaking sound. It sounds like this:

Not using enough pressure when condensing leaves a weak restoration resulting in flaking when carving and marginal ridge fracture when removing the band, a minor tragedy for sure.

If you have a large surface to cover use the larger end of the amalgam carrier use it and move the head of the carrier around. It’s easier and more efficient.

Continue layering and condensing amalgam. Overfill the prep but not so much that you can’t find the margins again.

Most condensing is done parallel to the long axis of the tooth, however the last layer is condensed perpendicular to the enamel surface, aiming the condenser and compressing amalgam against the margins.

After the prep is full and condensed burnish with an acorn.

At this stage the amalgam should be very pliable like the consistency of room temperature butter. Burnishing is a delicate gesture. Use very light pressure, like buttering a piece of toast.

One or two passes is all it takes to remove excess material, exposing the margins, and bring up the shiny mercury rich layer.

Now you have a blank canvas and you're ready to carve.

### *Video Transcript: 2.3 #14 MO Amalgam Carving*

Before beginning, imagine the finished product. If you can't remember the defining features, review the anatomy.

Clear excess amalgam and locate the margins of your prep. A Beavertail works well for laying placemarkers for major groves. Lay the bevertail with the face 90degrees or perpendicular to the enamel surface everywhere except the marginal ridge.

Leave carving the transverse and marginal ridge until the end so not to overcarve while the amalgam is soft.

Lay the blade in the major groves and define them. This serves as a quick sketch to guide more detailed work.

Using the cleoid end of the discoid-cleoid begin to define the distal pit with a rotating motion like scooping ice cream.

Rest the cleoid along the edge of the prep, not freehand, and move with long fluid strokes careful not to carve beyond the central grove.

Major landmarks are refined by taking repeated strokes and removing small amounts of amalgam.

Leave the marginal ridge high but begin to shape the occlusal embrasure imagining where the contact will be.

Remember to face the blade of the cleoid perpendicular to the enamel. This will look as if it is facing down when carving down a cusp slope and facing you when carving up .

When the amalgam is more solid, but not set, connect the mesial

and distal pits by continuing the central grove over the transverse ridge.

For this, freehand the cleoid with little pressure and slightly off parallel to the long axis of the tooth.

What you do from one side is repeated on the other.

Remove the band before the amalgam sets. Place a finger over the band and rotate it up and out of the contact gently.

A ball burnisher can support the ridge too.

Now it's time to shape the embrasure. Using a quade or greg remove excess amalgam from the buccal, lingual, and occlusal surfaces toward the contact removing flash and rounding the material.

Using light pressure mark the height of the marginal ridge using the adjacent tooth as a guide and begin to remove amalgam rounding off any sharp edges.

Continue defining grooves, pits and removing flash. Adjusting, checking from multiple angles and re-adjusting are just part of the process.

Note some strokes are long and others use a scoping motion.

Following short strokes with long strokes makes a smooth shiny restoration.

Keep the restoration clean. It's easier to do a good job when you can see what you're doing.

Check that the contact is not too tight or loose and adjust as needed.

In the final restoration note the transverse ridge is slightly higher and the central grove runs up and over it. This is a critical detail of the 1st maxillary molar.

After a final check for flash and occlusion with articulating paper your amalgam is done.

## *Video Transcript: 2.4 #19 DO Amalgam Carving*

Before beginning, imagine the finished product and begin with the end in mind.

First expose the margins of the prep using the bevertail.

Leave the marginal ridge while the amalgam is still soft. It's easy to overcarve.

Mark the location of major grooves by resting the bevertail on the enamel surface and moving it in a scooping motion. These placemarkers are shallow and can be changed later so see if you like their location.

Keep the restoration clean. It's easier to do a good job when you can see what you're doing.

Clear the occlusal embrasure with a shallow sweep of the explorer.

Use the cleoid to further define the location of buccal and lingual grooves resting on enamel and making the marks shallow. Remember to keep the face of the instrument perpendicular to the enamel surface.

To begin carving in earnest, angle the point of the cleoid slightly more apical as you remove amalgam to shape the top third of the cusp slope. (1m 38s)

Continue to define the grooves by slowly angling the pointed end of the cleoid more apical with each stroke. You might notice defining the grooves also shapes the cusp slope which is a slightly curved line, almost like the back of a spoon, from tip to grove.

Begin to make the distal pit and fossa.

Carve only on the buccal or lingual of the central grove.

Carefully remove the tofflemire, wedge, and band using a finger to support the delicate marginal ridge.

Using a quade or greg shape the buccal-lingual curve of the occlusal embrasure and set the height of the marginal ridge even with it's neighbor.

Then shape the distal curve of the occlusal embrasure. The

finished product will curve from the occlusal embrasure into the distal pit resembling a curling wave.

The marginal ridge may also have a slight v shape where the lingual and buccal cusps meet when viewed from distal to mesial.

Check for and clear flash in the gingival embrasure with a quade or montana jack.

Before the amalgam sets, refine details with long strokes to create a smooth shiny surface.

Check for flash, tightness of the contact,

And the occlusion.

Note the slight W shape of the central groove. This is a defining feature of the 1st mandibular molar. ...and now your amalgam is done.

# 3. Placing Composite Restorations

## Chapter 3:

### 3.1 Fill the Box Using a Tofflemire Band

#### 3.2 Shaping the Occlusion Using a Tofflemire Band #14 MO

#### 3.3 Shaping the Occlusion Using a Tofflemire Band #30 DO

#### 3.4 Polishing and Contouring Composite Restorations

#### 3.5 Transcripts

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### 3.1 Fill the Box Using a Tofflemire Band

This video demonstrates filling the box with composite for a shallow class two typodont prep using a tofflemire band as retention. No flowable or layering are used but a short description and rationale for different techniques are described. Here a first molar is used but the same technique is applicable for any shallow tooth prep.



*One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=24>*

See transcript below.

### 3.2 Shaping the Occlusion Using a Tofflemire Band #14 MO

This video demonstrates filling the remainder of a class two typodont prep. Anatomy is placed on a maxillary first molar primarily using a tofflemire band, tinbrdilly, shoshan, mini-greg and discoid cleoid. It includes techniques for clearing flash, shaping embrasures, and marginal ridge height. Also there are additional explanations of common anatomy terms and tools used plus a demonstration of relieving a tight contact.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=24>

See transcript below.

### 3.3 Shaping the Occlusion Using a Tofflemire Band #30 DO

This video demonstrates filling the remainder of a class two typodont prep. Anatomy is placed on a mandibular first molar primarily using a tofflemire band, tinbrdilly, shoshan, mini-greg and discoid cleoid. It includes techniques for clearing flash, shaping embrasures, and marginal ridge height. Also there are additional explanations of common anatomy terms and tools used.



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See transcript below.

## 3.4 Polishing and Contouring Composite Restorations

Brief description of common tools used for finishing and polishing composite restorations followed by a demonstration using the Enhance system to polish and recontour a typodont tooth.



*One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=24>*

See transcript below.

## 3.5 Transcripts

### *Video Transcript: 3.1 Fill the box using a tofflemire band*

There are many techniques for placing composite restorations. The



one a clinician uses is determined by tooth location, size and depth of the prep as well as personal preference. Large preps may require a steeped technique or base liner like flowable or glass ionomer. This is done to reduce shrinkage, cusp deflection, microleakage, and post-operative sensitivity.

This video will demonstrate a 2 step application for small preps, using a toflimer

First examine the prep.

When placing composite on real teeth etch, prime, bond, and cure the tooth according to product instructions first

Place the composite applicator tip in the deepest part of the prep and dispense approximately 2mm of material.

Wipe up the side of the prep so not to pull the material out

Here's another view

Compress composite with a light touch making sure to fill all corners of the box

Failure to adapt the material to all surfaces of the tooth will create voids which can cause post-operative sensitivity and recurrent decay

Do not use your amalgam plugger. It has serrations that will catch and pull the composite.

Instead, use a tmbrdilly or composite plugger and wipe often with alcohol to prevent sticking, another common cause of voids.

Laying the timbrdilly flat, level the composite with the floor of the prep. Push it toward the matrix band to begin creating a contact.

Remove excess material aiming to fill the box to the contact and not above as you will want to control the occlusal embrasure when shaping the occlusal surface in steep 2.

Once the desired height is achieved light cure and your ready to fill and shape the occlusal surface.

## *Video Transcript: 3.2 Shaping the occlusion using a tofflemire band #14 MO*

Begin by placing the tip at the base of the prep, Fill from the bottom up and wipe against the enamel to prevent material lifting and creating voids.

Because this is a shallow prep, no layering is needed.

Before shaping anatomy, pause and imagine the finished product. Begin with the end in mind.

Condense composite, filling voids, and pressing material against the prep margins. Using a walking bouncing motion. Like kneading bread. This will move excess material toward the marginal ridge

Work one side of the central grove at a time and what is done on one side should be done to the other.

Remove excess material or add more if needed, and wipe instruments often to prevent composite from sticking.

Check for and remove flash from the prep margin often.

A timbrdilly or shoshan can be used to mark the buccal and lingual groves.

Notice the rotating motion used here

Once the major landmarks are mapped out it's time to shape the marginal ridge. Using a plastic instrument or greg remove excess composite to create the arched shape of the occlusal embrasure.

Heres another view,

Angle the instrument 45 degrees from the matrix band and sweep from the center toward each side and against the prep closing the margin

Notice how often the margins are checked

Use the shoshan to define the central grove working on one side at a time and careful to leave the marginal ridge high.

Let's see a quick recap from another view

Notice how shaping the cusps or groves changes the marginal ridge and creates flash. Also how the material is patted into shape or wiped against the prep margin when rounding the occlusal embrasure.

It can be difficult to see with the band on but estimate the marginal ridge height imagining the distal ridge height of #13.

Here a ball burnisher and timbrdilly are used to define the mesial occlusal pit and set the marginal ridge height. Both work well with a light touch.

When everything looks right light cure and remove the band,

Don't worry there's always a little clean up to do. But hopefully all you need is a montana jack because it's much harder to fix the embrasure with burs and disks.

After checking the contact, occlusion, final ridge height, and for flash you can decide if polishing is needed.

### *Video Transcript: 3.3 Shaping the occlusion using a tofflemire band #30 DO*

Begin by placing the composite applicator tip at the base of the pre., Fill from the bottom up. Because this is a shallow prep no layering is needed.

Condense the composite, filling voids, and pressing material against the prep margins.

Before shaping anatomy pause and imagine the finished product. Begin with the end in mind.

Remove excess material if needed and wipe instruments often to prevent composite from sticking.

Use the discoïd to remove flash periodically, It's easier to do it often. Rest the instrument on the edge of the prep so not to over carve.

Use the Shoshan in a rotating motion to mark the buccal lingual grooves.

Continue to shape the top 1/3 of the cusps using a walking or kneading motion,

Work on one side of the central groove at a time pushing composite as you go.

Whatever you do to one side you must do to the other.

Clearing the margins is done often.

To deepen the grooves use the tinberdilly or shoshan in a rotating motion angling more apical and wiping agents the prep margins.

Once the major landmarks are mapped out it's time to shape the marginal ridge. Using a plastic instrument or greg remove excess composite to create the arched shape of the occlusal embrasure.

This will create flash so follow up with the discoid cleoid.

Notice the instrument walking with a bouncing motion. Like kneading bread.

The rounded end of the tinbrdilly is great for defining pits

The mini greg works well for the marginal ridge Use it to shape the occlusal embrasure

Composite responds best to a light touch. Simply touching the material makes it soften.

The only time a pulling motion is used is when making the buccal and lingual grooves.

All other times use the walking, bread kneading movement.

To clear flash in grooves and depressions use a scooping motion.

Make sure to remove all flash before curing.

Once cured remove the band and cure from buccal and lingual again.

Using a cutting instrument like the T-3 or montana jack to clear flash from the embrasure.

Check the contact with floss. Thankfully this composite is too tight not too loose. An easy fix.

Wedge the contact open and use an interproximal reducer to slightly relieve the contact.

Perfect now.

Make a final check for occlusal flash and the occlusion. If no adjustments are needed, you're done!

### *Video Transcript: 3.4 Polishing and contouring composite restorations*

A well contoured composite restoration needs little polishing. If recontouring the embrasure or defining critical anatomy is needed it can be a tough grind.

Finishing burs and stones both recontour and polish.

Diamond burs are color-coded to distinguish aggressiveness while finishing carbide burs will have many, shallow, closely placed blades.

All polishing systems have the potential to remove tooth structure

Disks and wheels work like sandpaper moving from aggressive to fine polishing

While polishing systems like Shofu and Enhance use pressure to control abrasiveness.

Even polishing brushes, if used with excessive pressure or for a long time, will remove composite so use care when polishing.

Here an Enhance point is used to polish grooves and cusp faces. Applying more pressure will define or recontour and light pressure will polish.

Use polishing instruments on the restoration only avoiding tooth structure whenever possible.

A cup works well for the occlusal embrasure.

Varying pressure from moderate to light slowly will smooth scratches and improve the finish.

# 4. Common Problems and Solutions

## Chapter 4:

### 4.1 The Matrix Band is In My Way

#### 4.2 The Contact is Too Tight

#### 4.3 Transcripts

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The best learners are not afraid to make mistakes and learn from them. This is true for students and seasoned clinicians. Use this space to add examples of common problems and strategies to avoid or correct them.

### 4.1 The Matrix Band is In My Way

Problem: The matrix band is in my way

Solution: Customize the matrix band



*One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=26>*

See transcript below.

## 4.2 The Contact is Too Tight

Problem: composite or amalgam contact is too tight

Solution: use an interproximal reducer



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://mhcc.pressbooks.pub/restoratedentistry/?p=26>

See transcript below.

## 4.3 Transcripts

### *Video Transcript: 4.1 The Matrix Band is In My Way*

Sometimes the matrix band or tofflemire holder limit instrument use making it impossible to get in the right spot.

One common problem is that the tofflemire guide channel is placed between two cusp tips at the lowest point on the marginal ridge.

To fix, simply move it to line up with a buccal cusp tip where instruments want a steeper angle anyway.

Another common problem, the matrix band gets in the way. As we all have experienced one size does not fit all and a little alteration might be in order.

Customize the band by marking the highspot,

Either with a marker, If you can keep from drawing on the tooth, or scratching guides in the soft metal. Remove the band and cut away the high spot. Burnish out the rough edges and reposition the band on the tooth.

That's better.

### *Video Transcript: 4.2 The Contact is Too Tight*

Thankfully this composite is too tight not too loose. Wedge the contact open and use an interproximal reducer to slightly relieve the contact.

An easy fix.

Perfect now.



# 5. Additional Resources

## Chapter 5:

### **5.1 Restorative Cookbook**

#### **5. 2 Restorative Rubric**

#### **5. 3 Anatomy Practice & Review**

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### **5.1 Restorative Cookbook**

A handy checklist when preparing for restorative treatment. Add or remove items and use when gathering supplies for your board exam.

- Restorative Cookbook

### **5.2 Restorative Rubric**

A copy of the grading form used in restorative clinic at Mount Hood Community College.

- Restorative Rubric

## 5.3 Anatomy Practice & Review

Most learners can not memorize all the details of a tooth in one sitting. Reviewing anatomy through images, descriptions, and drawing can help you find tiny details previously missed. Small changes make a big difference to the final restoration.

### *Directions for drawing mandibular first molar*

Directions for reproducing a two dimensional replication of first molars. These directions can also guide three dimensional wax carvings for a deeper understanding of dental anatomy.

- Mandibular First Molar
- Maxillary First Molar

### *Anatomy review*

A brief review of the critical anatomy needed when placing restorations in first molars. Use this review to clarify technical terms, remember defining features or if you notice low marks in one area of the rubric consistently.

- Mandibular First Molar review
- Maxillary First Molar review

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