

# Edent 430

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## Introduction Lecture

Denturist Scope of Practice	
<b>They Cannot</b>	<ul style="list-style-type: none"> <li>- Expose or interpret <b>Radiographs</b></li> <li>- Make <b>implant supported partial dentures</b></li> <li>- Cannot <b>reline or repair dentures</b> (unless Pt has been seen by dentists within 1 year)</li> <li>- Cannot <b>cut, grind, scale, clean, restore, alter, or polish natural teeth crowns or implants</b></li> <li>- Cannot administer <b>anesthetics</b></li> <li>- <b>Dx</b> disease, disorder or conditions as the cause of any signs/symptoms of the Pt</li> <li>- Perform procedures on tissues below the surface of a mucous membrane or below the surface of teeth</li> <li>- Put an instrument or device into any artificial opening in the body (Implants)</li> <li>- Reduce a dislocated joint</li> </ul>

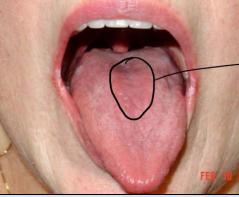
### So What?

- Its very important for the full care of our patients that we are able to make dentures if they want us to. We can perform a much more complete Diagnostic and technical procedure...not to say that denturist make bad dentures, but we are able to assess more
- 

## Oral Mucosal Disorders in Denture Patients

- Pretty common to find if Pt are not wearing or caring for dentures properly

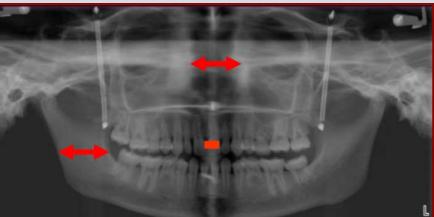
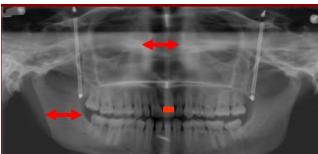
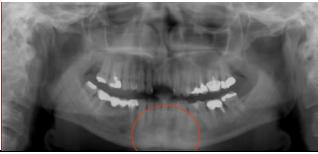
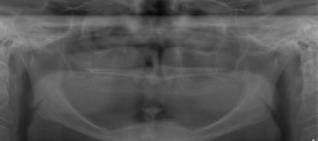
	<p><b>Tori</b></p> <ul style="list-style-type: none"> <li>- Variation of <b>normal</b> -&gt; Nothing pathological</li> <li>- Get in the way of dentures, <b>if you cannot circumvent them surgical removal might be indicated</b></li> <li>- Typically pale = ↓ blood flow and ↑ healing time with surgery 😞</li> </ul>
	<p><b>Traumatic Hyperplasia/ Epulis Fissuratum</b></p> <ul style="list-style-type: none"> <li>- Mucosal Hyperplasia from <b>poorly fitting dentures</b></li> <li>- Remove <b>surgically</b> and make sure you <b>adjust the denture</b></li> </ul>
	<p><b>Inflammatory Papillary Hyperplasia</b></p> <ul style="list-style-type: none"> <li>- Same thing as a fibroma/scar but on masticatory mucosa</li> <li>- <b>Small bumps</b> occur vs 1 large bump b/c the palatal mucosa is so tightly bound to bone</li> <li>- <b>Bumps will remain</b> after denture is relined and cleaned -&gt; kinda like scars</li> </ul> <p><u>Causes:</u></p> <ul style="list-style-type: none"> <li>- <b>Ill-fitting denture and unclean denture</b></li> <li>- Excessive wear of Complete Upper Denture (CUD) -&gt; <b>Wearing throughout the night</b></li> <li>- <b>Candida Albicans</b></li> </ul> <p><u>Tx:</u></p> <ul style="list-style-type: none"> <li>- Improved <b>denture hygiene</b> and oral hygiene (including brushing palate)</li> <li>- <b>Nighttime denture removal</b></li> <li>- <b>CUD tissue conditioning reline</b></li> <li>- <b>Surgery may be needed if there is no resolution w/ other Tx.</b></li> </ul>
	<p><b>Denture Stomatitis</b></p> <ul style="list-style-type: none"> <li>= Type of <b>erythematous candidiasis</b></li> <li>- Can occur w/ or w/o inflammatory papillary hyperplasia <ul style="list-style-type: none"> <li>- Need to Tx both conditions if this is the case</li> </ul> </li> </ul> <p><u>Causes:</u></p> <ul style="list-style-type: none"> <li>- Poorly fitting dentures</li> <li>- ↓ denture hygiene</li> <li>- Dry mouth</li> <li>- Steroid Tx</li> </ul> <p>But what about Allergic stomatitis?? -&gt; Has to be included in the differential Dx</p> <ul style="list-style-type: none"> <li>- <b>Allergic stomatitis will only affect metal or acrylic bearing areas</b> (but likely not both)</li> </ul>
	<p><b>Angular Cheilitis</b></p> <ul style="list-style-type: none"> <li>= Inflammation (usually bilateral) at the corners of the mouth (the commissures)</li> <li>- Has both <b>an irritational and candida component</b></li> </ul> <p><u>Causes:</u></p> <ul style="list-style-type: none"> <li>- ↓ OVD</li> <li>- <b>Hypersalivation AND Hyposalivation</b></li> <li>- <b>Systemic disorders</b></li> <li>- <b>Poor oral and denture hygiene</b></li> </ul> <p><u>Tx:</u></p> <ul style="list-style-type: none"> <li>- Antifungal cream/ointment (Nystatin, Viaderm)</li> <li>- ↑ OVD</li> <li>- ↑ Oral Hygiene</li> </ul>

<b>Median Rhomboid Glossitis</b> 	<ul style="list-style-type: none"> <li>- Depapillated middle dorsum of the tongue</li> <li>- Usually will see candidiasis on the roof of the mouth as well</li> </ul>
<b>Traumatic Ulcer</b> 	<ul style="list-style-type: none"> <li>- Pretty self explanatory at this point</li> </ul>
<b>Hyperkeratosis</b> 	<ul style="list-style-type: none"> <li>- Once you have ruled out Leukoplakia and Cancer this one is also pretty self explanatory</li> </ul>
<b>MRONJ</b> 	<p><u>Bisphosphonates:</u> ↓ bone turnover by inhibiting osteoclast activity</p> <ul style="list-style-type: none"> <li>- LONG half life</li> <li>- = necrotic bone by ↓ its ability to heal and remodel when damaged or exposed</li> </ul> <p><u>Denosumab:</u> modern antiresorptive -&gt; RANKL inhibitor</p> <ul style="list-style-type: none"> <li>- Inhibits osteoclast function and associated bone resorption</li> <li>- Administered SC (subcutaneous) q6 months</li> <li>- Washes out faster than Bisphosphonates -&gt; Need constant doses though as a result</li> <li>- ↓ risk of vertebral, non-vertebral and hip fractures in osteoporotic Pt's</li> </ul>
<b>Lymphoma</b> 	<p><u>DDx:</u></p> <ul style="list-style-type: none"> <li>- Malignant salivary gland tumor</li> <li>- Lymphoma</li> <li>- Neural tumor</li> </ul> <p>**Doesn't really look mucosal b/c the borders are not super well demarcated**</p>
<b>Squamous Cell Carcinoma</b> 	<ul style="list-style-type: none"> <li>- Lateral border of the tongue is super common for SCC</li> <li>- Non-homogenous is a sign that it's scary</li> </ul>
<b>Verrucous Carcinoma</b> 	<ul style="list-style-type: none"> <li>- Not hyperplastic Candidiasis because it moves from the alveolar ridge to the vestibule and the buccal mucosa through different mucosal types</li> </ul>

## Radiology for Edentulous Patients

<b>Indications for Pan radiographs</b>	<ul style="list-style-type: none"> <li>- Assessment of <b>growth and development of dentition</b> at 6, 12, and 18 years old</li> <li>- <b>Baseline assessment of jaws</b> of the edentulous patient (Prosthetic and Implant)</li> <li>- Evaluation of <b>possible mandibular fracture</b></li> <li>- Evaluate lesions too large to see in an Intraoral Rads</li> </ul>
<b>If Pan is not available for Edent Pt</b>	<b>15 Intraoral films (size 2)</b> <ul style="list-style-type: none"> <li>- 1 x Central Incisor</li> <li>- 2 x Lateral/Canine</li> <li>- 2x Premolar</li> <li>- 2 x Molar</li> </ul>

### Critical Criteria for obtaining diagnostic images:

<b>1. Properly Positioned Antero-posteriorly</b>	<p><i>If Anterior to Focal area: -&gt; Things appear Smaller</i></p> <ul style="list-style-type: none"> <li>- Orbita too close</li> <li>- Smaller ramus</li> <li>- Too much vertebrae</li> </ul>  
<b>2. Frankfurt Plane parallel to the floor</b>	<p><i>Posterior to Focal area: -&gt; Things appear wider</i></p> <ul style="list-style-type: none"> <li>- Orbita too far apart</li> <li>- Nasal anatomy not visible</li> <li>- Mandibular angle bogger</li> <li>- Little or no vertebrae</li> </ul>  
<b>3. Centered</b>	<p><i>Chin Up -&gt; Frown</i></p> <ul style="list-style-type: none"> <li>- Hard Palate line + Dentition shows sad smile</li> <li>- Orbit rims far apart + <b>Max. incisor apices out of focus and superimposed with hard palate</b></li> <li>- Deformed mandibular shape</li> </ul>  <p><i>Chin Down -&gt; Smile</i></p> <ul style="list-style-type: none"> <li>- Hard palate line shows smile</li> <li>- Much higher ghost image of hard palate</li> <li>- Orbita are closer</li> <li>- Superimpositions of hyoid</li> </ul>  
<b>4. Tongue positioned touching the palate</b>	<p>Ensure head is <b>not tilted or tipped</b></p> <p><b>** Tell patient to pretend they are sucking through a straw **</b></p> <ul style="list-style-type: none"> <li>- Keeps the tongue on the roof of the mouth to eliminate the palatoglossal air space</li> </ul>  

## Interpretation of the Pan

Pans magnify structures by 20% -> unequal magnification, depending on relation to focal area

- Horizontal distortions are the greatest
- Calibrate in Romexis to 130mm height, or compare to a tooth size or ramus width and show as a percentage

Common Findings		Other Conditions
<ul style="list-style-type: none"> <li>- Impacted Teeth</li> <li>- Retained Roots</li> <li>- Abnormalities of residual ridge</li> <li>- Pneumatization of Max. alveolar right</li> <li>- Condylar flattening and osteophytes</li> </ul>		<ul style="list-style-type: none"> <li>- Residual Cysts or infection</li> <li>- Bony Spicules along alveolar ridge</li> <li>- Intra-bony tumors</li> <li>- Calcified carotid artery</li> </ul>
Sequence		
	1. Image Evaluation	<ul style="list-style-type: none"> <li>- Is it Diagnostic?</li> <li>- Evaluate the potential errors listed above</li> </ul>
	2. Look for asymmetries, Non-Tooth related pathology	<ul style="list-style-type: none"> <li>- Check for CCAA! We cannot Dx, but need to refer to family doc</li> <li>- Retained Roots</li> <li>- Pneumatization</li> <li>- Tori</li> <li>- Fractures</li> </ul>
	3. Evaluate Alveolar Ridges	<ul style="list-style-type: none"> <li>- Height of ridges</li> <li>- Mental Foramen Height</li> <li>- Sinus proximity</li> <li>- Ridge abnormalities</li> </ul>

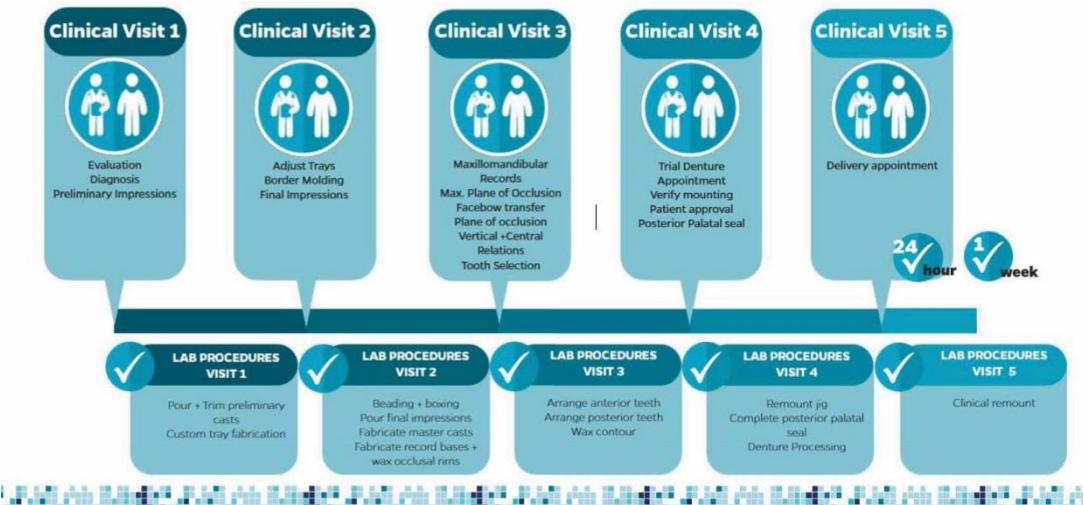
### Intraosseous Lesion Descriptions (5S's)

<u>Site (Localize)</u>	<u>Shape</u>
<ul style="list-style-type: none"> <li>- Anatomic Position</li> <li>- Localized or Generalized</li> <li>- Unilateral or Bilateral</li> <li>- Single or Multifocal</li> </ul>	<ul style="list-style-type: none"> <li>- Circular</li> <li>- Scalloped</li> <li>- Irregular</li> </ul>
<u>Surroundings (Periphery)</u>	<u>Shade</u>
<i>Well Defined</i> <ul style="list-style-type: none"> <li>- Punched Out</li> <li>- Corticated</li> <li>- Sclerotic</li> <li>- Soft Tissue Capsule</li> </ul> <i>Ill Defined</i> <ul style="list-style-type: none"> <li>- Blending</li> <li>- Invasive</li> </ul>	<ul style="list-style-type: none"> <li>- Radiolucent</li> <li>- Radiopaque</li> <li>- Mixed</li> </ul>
	<u>Surrounding structure Effects</u>
	<ul style="list-style-type: none"> <li>- IAN, Mental foramen</li> <li>- Maxillary Sinus</li> <li>- Surrounding bone density and trabecular pattern</li> <li>- Outer Cortical Bone</li> </ul>

## Initial Patient Exam

1. Med Hx
2. Chief Concern (Denture Hx, etc What worked before? What didn't work?)
3. EP Exam Form (Ask Patient's evaluation, and do your own evaluation)
  - a. Retention = Resistance to movement from supporting tissues
  - b. Stability = Resistance to movement under functional stress
  - c. Note habits (lifting with tongue, clenching teeth etc) -> encourage change throughout Tx
  - d. Mouth Opening measurement: < 50mm is small (need space for teeth and acrylic base etc)
  - e. Resorption: Note any pain over mental foramina (ensure the mental nerve hasn't migrated up to be uncomfortable for pt)
  - f. Mucosal Pathology (Epulis Fissuratum, Denture Stomatitis, Angular Cheilitis, Traumatic Ulcer, Hyperkeratosis, Glossitis, Oral Cancer)
    - > Be sure to chart these in Romexis also
4. **Radiographic Findings:** Impactions, Root Tips, Radiolucencies, **Mandibular Bone Height (Looking for >20mm)**
  - a. Bone Loss affects -> Bony support in denture bearing zones
  - b. Tissues remaining for construction
  - c. Facial Muscle Support/Attachment
  - d. Total Facial Height
  - e. Ridge Morphology

## EDENTULOUS PATIENT VISIT TIMELINE



## Tx Planning

Edent Patients = 3 Step Tx Plan in Romexis

- Some patients may require Phase I Tx before starting with a new CRDP -> Oral + Denture Hygiene Instruction, Tx Mucosal disorders, Denture Modifications....Then Re-assess and proceed if possible

**\*\*Pt education is MAJOR: Manage Expectations, How to eat with dentures, Oral & Denture Hygiene Instructions, Follow-Up & Maintenance\*\***

- Use UBC Brochure: "Keeping Your Mouth Healthy and Complete Dentures Comfortable"

**Phase II** -> Making the PRDP or CRDO

**Phase III** -> Individualized to the patient: Follow-up with chronic conditions, Update Hx, Examine dentures for fit and cleanliness, Review Oral and Denture hygiene, Address and negative habits, Possibly need to Reline

Denture Fit Assessment	
<b>Retention</b>	Resistance to <b>Displacement along path of insertion</b>
<b>Stability</b>	Resistance to <b>Horizontal displacement</b> (push down on 1 side and see if the other lifts up)
<b>Denture Relining</b>	
<b>What Is it?</b>	<p>Included in Phase III Tx for ALL cases w/ recent exo's</p> <p><b>Resurfacing the internal aspect of a denture to improve its fit</b></p> <ol style="list-style-type: none"> <li>1. Apply impression material to the inside of the denture base -&gt; Take a <b>functional impression</b></li> <li>2. Send denture to lab -&gt; They replace the impression material w/ denture base resin</li> </ol> <p><b>**Most of ridge resorption happens w/l 1 year post-exo: Advise Pt/ they will likely need reline (and document this convo)**</b></p>

Sample <b>Tx Plan</b> for this patient	
<b>Phase I</b>	<ul style="list-style-type: none"> <li>◊ Adjust CUD ..... <b>Good prognosis</b></li> <li>◊ Tissue conditioning reline + OHI ± antifungal agent .... <b>Good prognosis</b></li> <li>◊ Assess effectiveness of above and proceed to Phase II if disease management achieved – otherwise, reassess steps and setup new steps to address concerns</li> </ul>
<b>Phase II</b>	<ul style="list-style-type: none"> <li>◊ New CRDP while continually ensuring disease management achieved..... <b>Good Prognosis</b></li> <li>◊ Assess effectiveness of rehabilitation before proceeding to Phase III</li> </ul>
<b>Phase III</b>	<ul style="list-style-type: none"> <li>◊ Reassess in 1 year</li> </ul>

# Impression Materials

## 3 main categories:

<b>Rigid Materials</b> <ul style="list-style-type: none"> <li>- Plaster of Paris</li> <li>- Zinc Oxide Paste</li> </ul> <p><u>Properties:</u></p> <ul style="list-style-type: none"> <li>- Chem. Setting reaction is <b>exothermic</b> and expands on setting</li> <li>- Setting influenced by <b>powder/liquid ratio, mixing time, particle size, temperature</b></li> </ul> <p>**ONLY use with patients that have no or very shallow undercuts -&gt; It will get stuck otherwise**</p>					
<b>Thermoplastic Materials</b> <ul style="list-style-type: none"> <li>- Modeling Plastic (green stick compound)</li> <li>- Impression Waxes</li> </ul> <p><u>Properties:</u></p> <ul style="list-style-type: none"> <li>- <b>Rigid and Stable</b></li> <li>- <b>Poor thermal conductor</b> -&gt; Needs sufficient heating to soften (45-60°) and sufficient cooling to harden <ul style="list-style-type: none"> <li>- As it hardens in the mouth move the tissues and tongue around to gain a functional impression</li> </ul> </li> </ul>					
<b>Elastic Materials</b> <p><u>Reversible Hydrocolloids</u></p> <ul style="list-style-type: none"> <li>- Agar</li> </ul> <p>Very messy and smells bad -&gt; Not really in use anymore in dentistry</p> <p><u>Irreversible Hydrocolloids</u></p> <ul style="list-style-type: none"> <li>- Alginate</li> </ul> <p>Alginitic Acid undergoes an irreversible chemical reaction to <b>form insoluble calcium alginate</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #ffff00;"> <th style="text-align: center; padding: 2px;">Dental Uses</th> <th style="text-align: center; padding: 2px;">Properties (Exam Q)</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"> <ul style="list-style-type: none"> <li>- Diagnostic casts</li> <li>- Master casts for RPD's</li> <li>- Pick-up impression techniques</li> <li>- Orthodontic casts</li> <li>- Duplicating casts</li> </ul> </td> <td style="padding: 5px;"> <ul style="list-style-type: none"> <li>- Accurate</li> <li>- Easy to use</li> <li>- Inexpensive</li> <li>- Non-toxic or irritating</li> <li>- No special equipment needed</li> <li>- Satisfactory consistency, texture and elastic properties</li> <li>- One of the most used impression materials used by dentists</li> </ul> </td> </tr> </tbody> </table>	Dental Uses	Properties (Exam Q)	<ul style="list-style-type: none"> <li>- Diagnostic casts</li> <li>- Master casts for RPD's</li> <li>- Pick-up impression techniques</li> <li>- Orthodontic casts</li> <li>- Duplicating casts</li> </ul>	<ul style="list-style-type: none"> <li>- Accurate</li> <li>- Easy to use</li> <li>- Inexpensive</li> <li>- Non-toxic or irritating</li> <li>- No special equipment needed</li> <li>- Satisfactory consistency, texture and elastic properties</li> <li>- One of the most used impression materials used by dentists</li> </ul>	
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<p><u>Polysulfides</u></p> <ul style="list-style-type: none"> <li>- Comes in low, medium, or high consistency</li> <li>- <b>Hand mixing only</b></li> </ul> <p><u>2 Components:</u></p> <ul style="list-style-type: none"> <li>- Base -&gt; Polysulfide polymer + Titanium Oxide ;</li> <li>- Catalyst: Lead Oxide + Dibutyl Phthalate + Sulfur</li> <li>- <b>Stinky! Not used that much</b></li> </ul>					
<p><u>Condensation Silicones</u></p> <ul style="list-style-type: none"> <li>- <b>Hydrophobic</b></li> </ul> <p><u>2 Components</u></p> <ul style="list-style-type: none"> <li>- <b>Base:</b> Polydimethylsiloxane, Fillers</li> <li>- <b>Accelerator:</b> Liquid or paste stannous octoate suspension + Alkyl silicate</li> </ul> <p>**Unstable and has a short shelf life**</p> <ul style="list-style-type: none"> <li>- <b>Ethyl alcohol is released during setting</b></li> </ul>					
<p><u>Polyethers</u></p> <ul style="list-style-type: none"> <li>- Available as low, medium or heavy body</li> <li>- <b>Base:</b> Polyether copolymer + Triglycerides</li> <li>- <b>Catalyst:</b> Aliphatic cationic starter</li> </ul>					
<p><u>Addition Silicones -&gt; PVS</u></p> <ul style="list-style-type: none"> <li>- <b>Hydrophobic</b>, the most popular</li> <li>- Consistency: Extra-light, light, regular, heavy body or extra-heavy (Putty)</li> </ul> <p><u>2 Components:</u></p> <ul style="list-style-type: none"> <li>- <b>Base:</b> Polymethylhydrosiloxane</li> <li>- <b>Catalyst:</b> Platinum catalyst -&gt; <b>Reacts with sulfur in latex gloves = inhibits complete setting. Use bare hands or nitrile</b></li> </ul> <p>**Releases hydrogen gas during the setting reaction -&gt; wait 30 min before pouring casts**</p>					

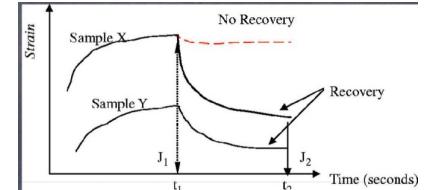
## Techniques

<b>Simultaneous, Dual Viscosity technique</b>	<p>Low viscosity</p> <ul style="list-style-type: none"> <li>- injected directly onto teeth in important areas -&gt; Crown margins + occlusal surfaces</li> </ul> <p>High viscosity</p> <ul style="list-style-type: none"> <li>- Fill the custom tray</li> </ul> <p>Place tray in mouth and hold for 5 mins while it sets</p>	
<b>Single-viscosity, Monophase technique</b> <ul style="list-style-type: none"> <li>- Used mostly for dentures</li> </ul>	<p>Medium Viscosity</p> <ul style="list-style-type: none"> <li>- Placed in tray and impression taken</li> <li>- Not recommended for tooth preps (not enough detail) but just fine for edent.</li> </ul> <p><b>*Use Light body if the tissue is loose and flabby*</b></p>	
<b>Putty-wash technique</b> <a href="https://www.youtube.com/watch?v=ROoYgdjSFl&amp;t=368s">https://www.youtube.com/watch?v=ROoYgdjSFl&amp;t=368s</a>	<p><u>High Viscosity/Putty</u></p> <ul style="list-style-type: none"> <li>- Initial impression taken 1<sup>st</sup></li> <li>- Areas of interest are cut out of the impression (Cavity preparation space)</li> </ul> <p><u>Low Viscosity</u></p> <ul style="list-style-type: none"> <li>- Syringed in the space and the impression reinserted into mouth</li> <li>- VERY important that the tray is inserted exactly in the same position as the first impression.</li> </ul>	

## Properties

	Working Time	Setting Time	Distortion @ 24hrs	Pour within...	Multiple pours?
<b>Polysulfide</b>	3-7min (longest)	7-10mins	-0.45%	1 hr	No
<b>Condensation Silicone</b>	2-4min	6-8min	-0.6%	15-30min	No
<b>Addition Silicone (PVS)</b>	2-4min	4-6min	-0.14%	7-14 days	Yes
<b>Polyether</b>	2-3min (shortest)	6 min	-0.24%	7-14 days	Yes

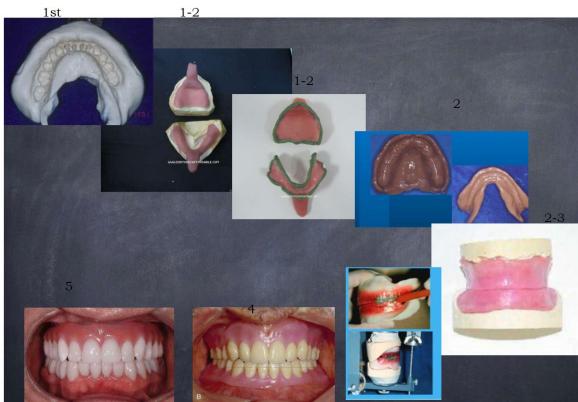
Some Properties Definitions	
<b>Elastic Recovery</b>	Ability to <b>recover shape after removal from the mouth</b> (Important if there are undercuts!) <ul style="list-style-type: none"> <li>- <b>Addition Silicone</b> &gt; Condensation Silicone , Polyether &gt; Polysulfide</li> </ul>
<b>Strain in Compression</b>	Measure <b>Flexibility / Stiffness of the material</b> <ul style="list-style-type: none"> <li>- Varies with consistency</li> <li>- Polyether&gt; <b>A. Silicone</b> &gt; <b>C. Silicone</b> &gt; Polysulfide</li> </ul>
<b>Flow (Wettability)</b>	Ability of a material to <b>flow into small crevices and give anatomic details</b> <ul style="list-style-type: none"> <li>- Polysulfide &gt; C. Silicone, Polyether &gt; <b>A. Silicone</b></li> </ul>
<b>Hardness</b>	Varies with consistency -> ↑ hardness you need to block out undercuts or it will get stuck <ul style="list-style-type: none"> <li>- A Silicones and polysulfides = no change over time</li> <li>- C. Silicones and polyethers = Hardness ↑ over time</li> </ul>
<b>Tear Strength</b>	Ability to <b>withstand tearing in thin areas</b> <ul style="list-style-type: none"> <li>- ↑ w/ consistency</li> <li>- Polysulfides &gt; Polyethers &gt; <b>A. silicones</b> &gt; C. Silicones</li> </ul>
<b>Creep Compliance (Deformation under mechanical stress)</b>	Curve of strain divided by stress at given time -> Shows <b>how quickly a material recovers from viscoelastic deformation</b> <ul style="list-style-type: none"> <li>- <b>A. Silicone</b> &gt; Polyethers &gt; C. Silicones &gt; Polysulfides</li> </ul>
<b>Detail Reproduction</b>	This one is duh



## Summary

	Advantages	Disadvantages	Precautions
<b>Polysulfide</b>	Hydrophilic ↑ tear strengths ↑ surface details Easy to pour	Difficult and messy to mix Bad smell ↑ ↑ setting time Fair stability	Pour within 1 hr
<b>Condensation Silicone</b>	Easy to use Short setting time	Hydrophobic ↓ wetting ↓ stability	Pour immediately
<b>Addition Silicone</b> <i>*Used for denture impression*</i>	Dimensionally stable Easy to use Accurate ↓ setting time Can be poured 2x	Hydrophobic Poor wetting Expensive Set release of hydrogen	Delay pour by 30 mins
<b>Polyether</b>	Dimensionally stable Hydrophilic Accurate and easy to use ↓ setting time Can be poured 2x	Very stiff Tray can get stuck on teeth/undercuts Short working time	Cannot be used w/ undercuts Might break teeth when separating from cast

## Preliminary Impression



### Traditional Denture Appointments

1. Clinical Exam, Med Hx, Tx Plan Informed Consent Preliminary Impressions
  - This is the most important appointment
2. Final Impressions and Border Molding
3. Jaw Relation Records and Teeth Selection
4. Wax Try-in
5. Delivery
6. Follow-Up

## House's Personality Classification

**\*\*Class finals and boards questions\*\***

House's Personality Classifications		
Philosophical	<b>LITTLE MISS WISE</b> By Roger Hargreaves 	<ul style="list-style-type: none"> <li>- Pt accepts dentist's judgement and expertise w/o question</li> <li>- LOVE these patients -&gt; best attitude for denture acceptance</li> <li>- Motivation is generalized</li> <li>- Pt pays attention and follows instructions</li> <li>- Best prognosis 😊</li> </ul>
Exacting	<b>LITTLE MISS BOSSY</b> By Roger Hargreaves 	<ul style="list-style-type: none"> <li>- Has all of the good attributes of the philosophic patient</li> <li>- Methodical, Precise but demanding</li> <li>- Lots of detailed questions and likes to have each step explained in great detail</li> <li>- Requires extreme care, effort and patience</li> <li>- Can have excellent prognosis if intelligent and understanding -&gt; BUT you cannot deviate from exactly what you told them at all</li> </ul>
Indifferent	<b>MR. GRUMPY</b> By Roger Hargreaves 	<ul style="list-style-type: none"> <li>- Low motivation and desire for care</li> <li>- Little appreciation for your efforts</li> <li>- Pt gives up easily if problems are encountered</li> <li>- Pt doesn't pay attention to instructions and is uncooperative</li> <li>- ↑ time needed to give instruction on the value and use of their dentures</li> </ul>
Hysterical	<b>LITTLE MISS BITCHY</b> By Roger Hargreaves 	<ul style="list-style-type: none"> <li>- Emotionally unstable, excitable, apprehensive, hypertensive</li> <li>- Unfit for dentures</li> <li>- Blames the world for their problems</li> <li>- Pt will never be satisfied -&gt; Send them away</li> </ul>

## Alginate Impressions

\*\*Don't forget to shake container to fluff it up before measuring -> Give a more accurate measurement\*\*

Average Alginate working times			
	Total Working Time	Mixing Time	Working time before setting
Fast Set (Type I)	1.25-2mins	45 sec	20-75 sec
Regular Set (Type II)	3-5 mins	60 sec	2-3 mins
Jeltrate Caulk (Dentsply)			
	Fast Set	Regular Set	
Mixing time	45 sec	60 sec	
Total working time	1.5 min	2min 15 sec	
Initial setting time	1min 45 sec	2min 30 sec	
Setting time	2min 30sec	3min 30sec	

### Kromopan

Type of Type I Alginate -> Color change indicates setting times (easy!)

- **Purple:** Mixing until pink appears
- **Pink:** Working Time, load tray and wait for white
- **White:** Initial setting time, insert into mouth to make impression
- **Setting time:** 30 seconds in the mouth -> Move tissues to get good borders!

\*FUN FACT: Perforated trays are more accurate than Rim-lock trays\*\*



### Tips:

#### Add powder to the water

- Adding water to powder we get remnants of unmixed material = ↓ quality of impression



#### Inject alginate into the vestibule with finger or monojet syringe

- Ensures you get an amazing impression of the vestibule and get nice and deep!



#### Disinfect

- Wash off saliva and blood with water -> Then coat with Optim 33 solution
- Store in plastic bag until pouring casts



#### Pouring Casts

- Use Type III Stone
- Trim study cast with **2mm of land areas**
- Draw tray extensions **2mm from the functional vestibule depth** on the cast
- Block out undercuts with pink wax

### Custom Tray Prescription

Please fabricate custom trays in SR-Ivolin auto-polymerizing acrylic resin following the line marked on the casts, no spacer.

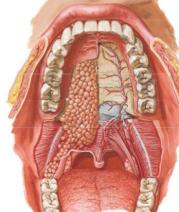
(Note to the lab any unusual extension, any undercut blockout, and request a handle shape that will not interfere with your impression – think of how you'll request this)

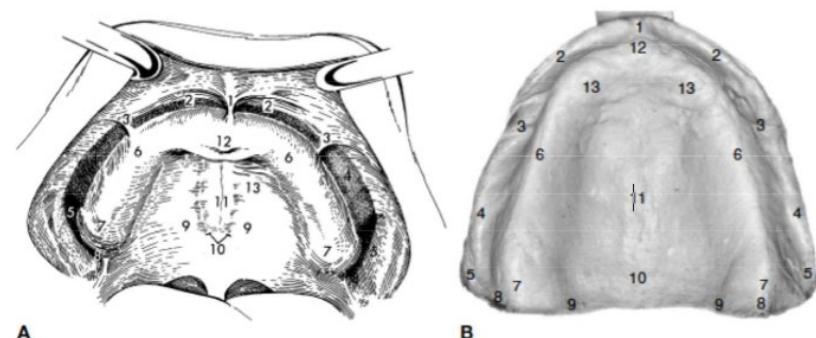
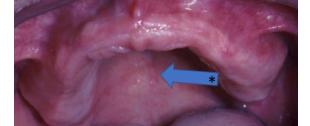
Return the study casts with custom trays by \_\_\_\_\_ at \_\_\_\_\_ AM/PM. Thank you.



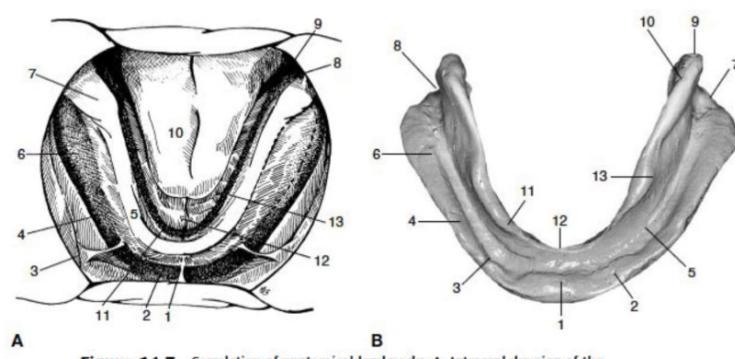
## Border Molding and Final Impressions

### Maxillary Anatomy

General Anatomy	
<ul style="list-style-type: none"> <li>- Incisive Papilla</li> <li>- Palatal Rugae</li> <li>- Greater Palatine foramen</li> <li>- Tendon of tensor veli palatini</li> <li>- Palatopharyngeus muscle</li> <li>- Palatoglossus muscle</li> <li>- Uvula</li> </ul>	

Edentulous Anatomy	
As labeled in A/B	
<ol style="list-style-type: none"> <li>1. Labial Frenum/Notch</li> <li>2. Labial vestibule/Flange</li> <li>3. Buccal frenum/Notch</li> <li>4. Buccal Vestibule/ Flange</li> <li>5. Coronoid Bulge/Contour</li> <li>6. Residual Alveolar Ridge/Alveolar Groove</li> <li>7. Maxillary Tuberosity/ Area of tuberosity</li> <li>8. Hamular Notch / Pterygomaxillary seal</li> <li>9. Posterior Palatal Seal</li> <li>10. Fovea Palatinae</li> <li>11. Median Palatine raphe / groove</li> <li>12. Incisive papilla / fossa</li> <li>13. Rugae</li> </ol>	
<b>Frena</b>	<p>Folds of mucous membrane -&gt; <b>Don't contain significant muscle fibers</b></p> <ul style="list-style-type: none"> <li>- High attachments can compromise denture retention (lacks vestibule)</li> <li>- <b>Consider frenectomy if frenum is high</b></li> </ul> 
<b>Canine Eminence</b>	<p>Bony eminence that provides denture support and stability</p> <ul style="list-style-type: none"> <li>- <b>Prevents denture from rotating</b></li> </ul> 
<b>Incisive Papilla</b>	<p>Pad of fibrous CT overlying the orifice of the nasopalatine canal</p> <ul style="list-style-type: none"> <li>- <b>Pressure on this can lead to pain or burning</b></li> </ul> 
<b>Maxillary Tuberosity</b>	<p>Primary denture support area</p> <ul style="list-style-type: none"> <li>- <b>Provides resistance to horizontal movements of denture</b></li> </ul>
<b>Hamular Notch</b>	<p>Area behind the tuberosity</p> <ul style="list-style-type: none"> <li>- <b>Important for retention and posterior palatal seal</b></li> </ul> 
<b>Posterior Palatal Seal Area</b>	<p>Anterior border:</p> <ul style="list-style-type: none"> <li>- <b>Junction of HP &amp; SP</b></li> </ul> <p>Posterior Border:</p> <ul style="list-style-type: none"> <li>- <b>Junction between movable and immovable SP (Vibrating line)</b></li> </ul> 

## Mandibular Anatomy

Edentulous Anatomy	
<ol style="list-style-type: none"> <li>1. Labial Frenum</li> <li>2. Labial Vestibule</li> <li>3. Buccal Frenum</li> <li>4. Buccal Vestibule</li> <li>5. Alveolar Ridge</li> <li>6. Buccal Shelf</li> <li>7. Retromolar Pad</li> <li>8. Pterygomandibular Raphe</li> <li>9. Retromylohyoid Fossa</li> <li>10. Tongue</li> <li>11. Lingual Sulcus</li> <li>12. Lingual Frenum</li> <li>13. Premylohyoid eminence</li> </ol>	
<b>Mandibular Labial Frenum</b>	Same as Max. labial frenum - Folds of tissue without any significant muscle fiber
<b>Buccal Frenum</b>	
<b>Labial Vestibule</b> - <b>Mentalis Muscle</b>	Mentalis Muscle raises the lower lip - Originates from the crest of alveolar ridge and inserts into the chin - Labial Vestibule is limited inferiorly by mentalis and internally by residual ridge and labially by lip
<b>Buccal Shelf</b>	Primary Support area of denture - Dense bone parallel to the occlusal plane - Bordered by External oblique line and the residual alveolar ridge
<b>External Oblique Ridge</b>	Ridge of dense bone from the mental foramen to the anterior ramus - Attachment site of the buccinator muscle - Guides lateral extension of the buccal flange
<b>Mental Foramen</b>	Where inferior alveolar nerve exits anteriorly - In majorly resorbed ridges, must relieve denture base in this area to prevent nerve compression and pain
<b>Retromolar Pad</b>	Constant unchanging structure - Contains: Gland tissue, loose CT, Lower margin of pterygomandibular raphe, Fibers of buccinator, Superior Constrictor and Temporal tendon
<b>Masseter Groove</b>	Masseter reflects the buccinator in Superior and Medial Direction - This action dictates the distobuccal flange of the denture - Get patient to close on tray during final impression to capture this
<b>Suprathyroid Muscles</b>	Elevate hyoid bone and larynx Depress the mandible - Digastric - Stylohyoid - Mylohyoid - Geniohyoid
<b>Retromylohyoid Fossa</b>	This is how we get most of the stability and retention for the Mandibular denture

## Support Summary

	Maxillary	Mandibular
Primary	Hard Palate	Buccal Shelves
Secondary	Alveolar Ridge Ruggae	Alveolar Ridge Retromolar pad Retromylohyoid Fossa

## Classifying Edentulism Cases

Diagnostic Criteria		
<b>Bone Height (Mandibular)</b>		Type I (Ideal): 21mm Type II: 16mm-20mm Type III: 11-15mm Type IV: <10mm
<b>Maxillomandibular Relationship</b>		Class I (Ideal): -> Tooth Position is normally articulated w/ teeth by the residual ridge Class II: Requires tooth position outside normal ridge relation for esthetics, phonetics and articulation Class III: Tooth Position outside of normal for esthetics, phonetics and articulation -> Crossbite etc (more severe than Class II)
<b>Residual Ridge Morphology (Maxilla)</b>		<p><b>Type A:</b></p> <ul style="list-style-type: none"> <li>- Anterior labial + Posterior Buccal vestibular depth resists vertical + Horizontal movement of denture base</li> <li>- Palate resists Vert. + Horiz. Movement of denture</li> <li>- Sufficient Tuberosity to provide support w/ well defined hamular notch</li> <li>- Absence of Tori</li> </ul> <p><b>Type B:</b></p> <ul style="list-style-type: none"> <li>- Loss of posterior buccal vestibule</li> <li>- Palatal vault provides support</li> <li>- Tuberosity + Hamular notch are poorly defined</li> <li>- Tori/ Exostoses are rounded and don't effect the posterior extension of denture</li> </ul>
<b>Muscle Attachments (Mandible)</b>	<b>Type A:</b>	<p><b>Type C:</b></p> <ul style="list-style-type: none"> <li>- Loss of anterior labial vestibule</li> <li>- Minimal support from palate</li> <li>- Tori/Exostoses have undercuts that DON'T affect posterior extension of denture base</li> <li>- Hyperplastic, mobile anterior ridge offering little support</li> <li>- ↓ of post malar space by coronoid process during mandibular opening</li> </ul>
	<b>Type B:</b>	<p><b>Type D:</b></p> <ul style="list-style-type: none"> <li>- Loss of anterior and posterior buccal vestibules</li> <li>- Palatal vault doesn't offer support</li> <li>- Tori/Exostoses interfere w/ posterior border</li> <li>- Hyperplastic, redundant anterior ridge</li> <li>- Prominent nasal spine</li> </ul>
	<b>Type C:</b>	<p><b>Type D:</b></p> <ul style="list-style-type: none"> <li>- Attached mucosal base everywhere except anterior Buccal AND labial vestibule (Canine to canine)</li> </ul>
	<b>Type E:</b>	<p><b>Type D:</b></p> <ul style="list-style-type: none"> <li>- Attached mucosal base only in posterior lingual region</li> </ul> <p><b>Type E:</b></p> <ul style="list-style-type: none"> <li>- No attached mucosa anywhere</li> </ul>

Using these diagnostic criteria, we can assess if they are Minimally, Moderately, Significantly, or Severely compromised and then classify based on that



	Bone Height (Mand)	Muscle Attachment (Mand)	Ridge Morphology (Max.)	Max. Mand Interrelationship
<b>Class I</b> -Great Support and anatomy	Type I ( $\geq 21\text{mm}$ )	Type A, B	Type A	Class I
<b>Class II</b> -Minor Modifiers ( Mild Psychosocial, Systemic Disease)	Type II (16-20mm)	Type A, B	Type A, B	Class I
<b>Class III</b> -Needs Preprosthetic surgery (ST/HT Procedures, Simple Implant placement, Multi Exo's) -Limited Interarch space (18-20mm) -Moderate psychosocial, or systemic conditions	Type III (11-15mm)	Type C	Type C	Class I, II, III
<b>Class IV</b> - Major Proprs. Surgery (Complex Implant, Dentofacial deformities, HT augmentation) - Hx Paresthesia or dysesthesia - Insufficient interarch space - Severe systemic disease or psychosocial condition	Type IV ( $\leq 10\text{mm}$ )	Type D, E	Type D	Class I, II, III

## Custom Trays and Border Molding

Ensure the Custom tray is trimmed 2mm short of the functional vestibule

- This creates enough space for the green stick compound to properly mold

Also make sure there is sufficient space around the frenum



### Border Molding

- Do this so our final impression doesn't extend beyond the functional vestibule

[https://www.youtube.com/watch?time\\_continue=261&v=N2Eg5wXkJ8](https://www.youtube.com/watch?time_continue=261&v=N2Eg5wXkJ8)

- This is a good link showing you what to do



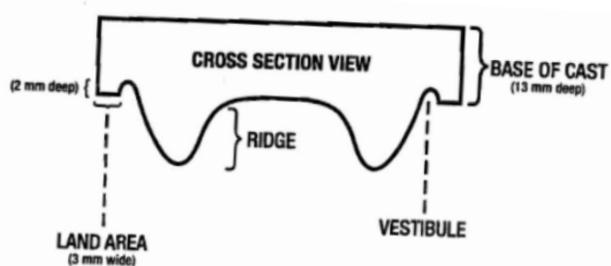
### Final Impression

- Ensure that there is a uniform layer of PVS over the entire tray (including the green stick compound)
- Seat the tray in the same way you seated it during the border molding
- Mold the tray again (but with the PVS in place) -> Make sure the tray does not move around!

### Final Cast

Beading the edge of the impression with wax helps to create a peripheral roll needed for the denture in the future

- Ask the lab to produce a land area of 3mm outside the functional vestibule



### Record Base

- This is a hard base added to the cast to which the wax occlusal rim will be added (so it's not permanently added directly to your nice final master cast) -> Its really just like a custom tray
- Made Of:
  - Hard Wax
  - Shellac
  - Acrylic Resin
  - Omivac Vinyl
  - 3d Printed Resin



-> Wax is added to make occlusal Rim



\*\*Average Maxillary Occlusal Rim height = 22mm; Mandibular Rim height = 18mm request this from the lab\*\*

Lab Prescription for Master Casts
<b>DETAILED INSTRUCTIONS:</b> <ul style="list-style-type: none"> <li>-Pour both with type III stone</li> <li>-Please fabricate an acrylic resin base with wax occlusal rims</li> <li>-Tissue surface on maxillary 2mm - as land area</li> <li>-Maxillary rim height as 22mm</li> <li>-Mandibular rim height at 18 mm</li> </ul> <p>-Please have the patients name on the heel of the cast with an indellible marker</p>

## Wax Rims and OVD

### Record Bases

<p><b>Ideally it is:</b></p> <ul style="list-style-type: none"> <li>- Strong and Rigid</li> <li>- Doesn't rock on the cast</li> <li>- Smooth, rounded with well polished (not sharp borders)</li> </ul> <p><b>Thickness of borders and palate must resemble the finished dentures</b></p> <ul style="list-style-type: none"> <li>- Palate 1-2mm thick (if its too thick it will have a noticeable effect on speech, keep it thin)</li> <li>- Thickness and contour is defined by the land area on the master cast -&gt; Don't extend onto the land area though</li> </ul> <p><b>**Block out things on the master cast like Undercuts, Frenum, Rugae, Irregularities**</b></p>	
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### Materials

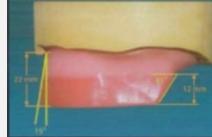
<p><b>Autopolymerizing Acrylic Resin</b></p> 	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>- Strong and accurate</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>- Technique sensitive</li> </ul>
<p><b>Light Cure Resin (Triad)</b></p> 	<p><b>Pros:</b></p> <ul style="list-style-type: none"> <li>- Quick and easy</li> </ul> <p><b>Cons:</b></p> <ul style="list-style-type: none"> <li>- Brittle,</li> <li>- ↑ \$\$ (but at UBC we don't give a shit)</li> </ul>

### Wax Rims

= A means of transfer of the facebow record -> Relationship to Maxillary plane to Nasion and ear



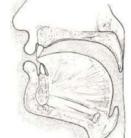
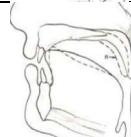
- Aids in anterior tooth placement and the orientation of the occlusal plane
- Provides proper support of the lips and cheeks when appropriately contoured
- Determines the Vertical Dimension of Occlusion (VDO) and to make a tentative centric relation record

Wax Rim Checklist	
<ul style="list-style-type: none"> <li>✓ All surfaces of wax rims must be smooth and free of voids</li> <li>✓ Posterior section should be tapered to avoid contact w/ retromolar pad</li> <li>✓ Curvature of the anterior portion must simulate the curvature of the edentulous arch</li> <li>✓ Occlusal portion of the rim should be sufficiently thick <ul style="list-style-type: none"> <li>✓ Posterior: 8-10mm</li> <li>✓ Anterior Region: 3-6mm</li> </ul> </li> </ul>	
Maxillary	Mandibular
<ul style="list-style-type: none"> <li>✓ Rim is 22mm</li> <li>✓ Labial aspect is 8-10mm forward of the center of the incisal papilla (~15°)</li> </ul> 	<ul style="list-style-type: none"> <li>✓ Rim is 18mm</li> <li>✓ Lingual contours don't impinge on tongue space</li> <li>✓ Wax Rim goes to ½ - 2/3rds of retromolar pads</li> </ul> 

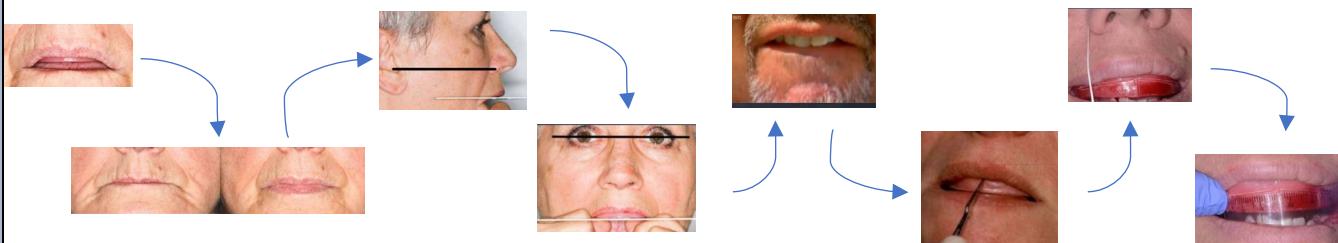
## Assessing the OVD

The main ones we look for:	Other things to assess:
<ul style="list-style-type: none"> <li>- Esthetics</li> <li>- Physiologic Rest Position (Freeway space) -&gt; <u>Approx. 2-3mm</u> <ul style="list-style-type: none"> <li>o Patient can swallow, or say "Emma" to enter a relaxed position</li> <li>o RVD – OVD</li> <li>o Place tape, or marks on tip of nose and chin -&gt; Measure distance when relaxed (ask them to swallow and measure right after) and when teeth are coming together naturally</li> </ul> </li> <li>- Phonetics</li> </ul>	<ul style="list-style-type: none"> <li>- Is it the same as pre-extraction records?</li> <li>- Can they swallow fine?</li> <li>- Tactile sense: Is it comfy?</li> <li>- Biting Forces</li> <li>- Cephalometric Evaluation</li> </ul>

## Assessing Phonetics

Closest Speaking Space	<p>Assesses OVD -&gt; Upper and Lower incisors should come close to touching but not touch</p> <p>Sounds: "S" -&gt; "66", "Mississippi"</p> <ul style="list-style-type: none"> <li>- If space is <u>too narrow</u> = whistling sound</li> <li>- If space is <u>too wide</u> = Lisp sound</li> </ul>
Bilabial Sounds	<p>Assess correct inter-arch space and labial fullness</p> <ul style="list-style-type: none"> <li>- Sound made mostly from open arch space and air on the lips</li> </ul> <p>Sounds: "B", "P", "M"</p>
Labiodental Sounds	<p>Assess the length of the maxillary rim</p> <p>Sounds: "F", "V" -&gt; "Fifty Five"</p> <ul style="list-style-type: none"> <li>- If <u>V sounds like F</u> = upper anterior are too short (set too high)</li> <li>- If <u>F sound like V</u> = Upper anterior teeth are too long (set too far down)</li> </ul> 
Linguodental Sounds	<p>Assess the labio-lingual position of anterior teeth</p> <p>Sound: "Th"</p> <ul style="list-style-type: none"> <li>- If <u>3mm of tongue is not visible</u> then teeth are too far buccal</li> <li>- If <u>6mm+ of tongue extends between teeth</u>, they are too far lingual</li> </ul> 
Linguoalveolar Sounds	<p>Assess the labiolingual position of the Max anteriors as well</p> <p>Sound: "T", "D"</p> <ul style="list-style-type: none"> <li>- <u>T sounds like D</u> = too far lingual</li> <li>- <u>D sounds like T</u> = too far buccal</li> </ul> 

## So now what do you actually do

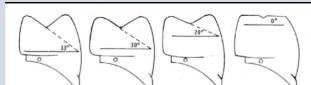
Maxillary	<ol style="list-style-type: none"> <li>1. Adjust Occlusal height as needed to display an appropriate amount of teeth below the upper lip when relaxed (a few mm)</li> <li>2. Adjust labially for appropriate lip and cheek support</li> <li>3. Adjust angulation to be parallel with Fox Plane (Ala Tragus line) and the Inter Pupillary Place (Between the eyes)</li> <li>4. Adjust for proper Fricative Sounds ("55")</li> <li>5. Mark Midline and Ala Lines on wax -&gt; Calculate Anterior Tooth Space (Ala to Ala distance + 8mm)</li> </ol> 
Mandibular	<ol style="list-style-type: none"> <li>1. Follow anatomy of the ridge for proper horizontal alignment of the rim</li> <li>2. Ensure the occlusal plane is <math>\frac{1}{2}</math> to <math>\frac{2}{3}</math>rds the height of the retromolar pad</li> <li>3. The wax = where the teeth will go, so the anterior Mandibular rim should be 2-3mm posterior to the maxillary rim</li> <li>4. Make sure the bases are not touching in the posterior aspect and preventing the anterior from occluding</li> <li>5. Check the Sibilant sounds and adjust the Closest Speaking Space and OVD ("S" sounds)</li> <li>6. Check M sounds to verify the freeway space (aim for 2mm)</li> <li>7. Check F and V sounds to verify occlusal plane</li> </ol> 

## Denture Tooth Selection

### Materials

Acrylic Resin Teeth	
Indications	<ul style="list-style-type: none"> <li>- Limited inter-max. space</li> <li>- Oppose natural teeth or gold restorations</li> <li>- Poor ridge condition (Hypersensitive crests)</li> <li>- Older patients</li> <li>- Maxillo-facial prosthesis</li> </ul>
Advantages	<ul style="list-style-type: none"> <li>- Most commonly used</li> <li>- Available in wide range of forms, shades and dimensions</li> <li>- Easy to grind/polish</li> <li>- Can be set up and adjusted for esthetic and function</li> <li>- Chemically bonds to prosthetic base</li> <li>- Tough</li> <li>- Good abrasion resistance -&gt; In the context of Crowns and Enamel. Doesn't wear THOSE down</li> <li>- Can be adjusted to occlude with natural teeth (Because it's a softer material, it <b>won't wear enamel</b>)</li> <li>- <b>High impact strength</b> (Softness makes it absorb more, nicer on the arch and material)</li> <li>- <b>Less abrasive than porcelain</b> (Doesn't wear natural teeth)</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Low abrasion resistance (Soft material) -&gt; <b>Wears down faster and bad for bruxers</b> (this is actually a bonus in terms of other dentition though)</li> <li>- Wear might result in loss of VDO</li> <li>- Discoloration</li> <li>- Higher tendency to stain</li> </ul>
Porcelain Teeth	
Indications	<ul style="list-style-type: none"> <li>- Good ridge support</li> <li>- Adequate space</li> <li>- Complete edentulism</li> </ul>
Advantages	<ul style="list-style-type: none"> <li>- <b>Resistant to abrasion</b> (Very hard material)</li> <li>- <b>Superior esthetics</b></li> <li>- Can be grinded and shaped to obtain desired esthetic (need to polish though after still)</li> <li>- Color stability (<b>doesn't stain</b>)</li> <li>- Dimensionally stable</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- Needs very thorough polishing if you grind them down</li> <li>- <b>Poor bond to denture base</b></li> <li>- <b>Cannot be used when space is limited</b> (needs a certain thickness to be strong)</li> <li>- <b>Brittle (easily broken)</b> if dropped</li> <li>- Transmits mastication shocks to supporting structures (buccal shelf etc, not alveolar ridge) -&gt; <b>Causes ridge resorption because there is no flexion of the denture contacting the ridge</b></li> <li>- Abrasive</li> <li>- Occasional cracking</li> </ul>
Metallic Teeth	
Advantages	<ul style="list-style-type: none"> <li>- <b>Cast directly onto the frame</b> (Stronger denture overall)</li> <li>- Occlusal morphology specific and designed on the waxup</li> <li>- <b>Ideal when limited space</b> between ridge and opposing teeth, or interproximal small space between 2 natural teeth (Still strong with minimal thickness)</li> <li>- Hard</li> <li>- Resistant to abrasion and low abrasiveness</li> <li>- Good impact Strength</li> <li>- <b>Street cred</b></li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>- <b>Difficult to adjust</b></li> <li>- Hard to polish</li> <li>- Not esthetic -&gt; This is pretty subjective though; <b>some people want to look like a pirate</b></li> </ul>
Metal Insert Teeth	<ul style="list-style-type: none"> <li>- Artificial denture teeth containing <b>metal cutting edges on incisal and occlusal surfaces</b></li> <li>- When acrylic teeth wear too fast, over the occlusal with waxed-up gold surface (Especially when the opposing is a gold surface)</li> <li>- Allows functional, durable occlusal contacts</li> <li>- BUT kinda unaesthetic -&gt; Not really an option for anteriors</li> </ul>

## Tooth Form Classifications

<b>Anatomic Teeth</b>		
		
<b>Angle of the anatomy:</b>	<b>30° – 40°</b>	
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Natural teeth anatomy</li> <li>- Better esthetics</li> <li>- Good chewing efficiency</li> <li>- Can be articulated for balanced occlusion</li> <li>- Resists rotation of denture bases</li> <li>- Provide guide for proper jaw closure</li> </ul>	
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>- Hard to articulate</li> <li>- More traumatic</li> <li>- Requires a remounting procedure</li> <li>- Relining and rebasing is more difficult</li> </ul>	
<b>Semi-Anatomic Teeth</b>		
<b>Angle of Anatomy</b>	<b>10-20°</b>	
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Easier to articulate</li> <li>- Decently Esthetic</li> <li>- Good enough mastication</li> <li>- Average lateral forces</li> </ul>	
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>- Lateral forces are only average</li> </ul>	
<b>Non-Anatomic Teeth</b>		
<b>Angle of the anatomy</b>	<b>0°, flat plane</b>	
<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Easiest to articulate and equilibrate</li> <li>- Low lateral forces</li> <li>- Adapts easily to Class II and Class III jaw relations</li> <li>- Adapts to alveolar changes</li> <li>- Relining and rebasing less difficult</li> </ul>	
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>- Less esthetic</li> <li>- Poor chewing efficiency</li> <li>- Balanced occlusion is harder to achieve</li> </ul>	

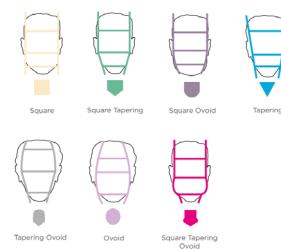
## Mould Guide Tooth Selection

### 1. First number: Classification

Using the classification form listed above, select the number from 1 to 7 that best represents the patient's facial form. The number selected is the first character of the mould identification number, located in the upper left corner of the tooth card.

1. Square
2. Square Tapering
3. Square Ovoid
4. Tapering
5. Tapering Ovoid
6. Ovoid
7. Square Tapering Ovoid

7 Basic Facial Forms:



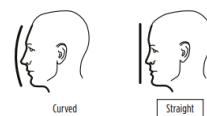
<b>Square Face</b> 	<b>Facial Form:</b> <ul style="list-style-type: none"> <li>- Width of Forehead, Zygomatic arch and mandibular angle are all the same</li> </ul> <b>Profile:</b> <ul style="list-style-type: none"> <li>- Straight and Flat ala area: Sturdily built and looks masculine</li> </ul> <b>Incisal Form:</b> <ul style="list-style-type: none"> <li>- Mesial and Distal line angle are almost parallel until at 2/3rds away from the incisal edge</li> </ul> <b>Labial surface of the incisor:</b> <ul style="list-style-type: none"> <li>- Flat surface mesio-distally</li> </ul>
<b>Ovoid Face</b> 	<b>Facial Form</b> <ul style="list-style-type: none"> <li>- Width of Zygomatic arches = wider than forehead and angle of the mandible</li> </ul> <b>Profile</b> <ul style="list-style-type: none"> <li>- Freshly ovoid and ovoid in the ala: Tender build, looks gentle</li> </ul> <b>Incisal Form</b> <ul style="list-style-type: none"> <li>- Mesial and Distal lines are curved</li> </ul> <b>Labial Surface of Incisor:</b> <ul style="list-style-type: none"> <li>- Gently rounded surface mesiodistally</li> </ul>
<b>Tapering</b> 	<b>Facial Form:</b> <ul style="list-style-type: none"> <li>- Width narrows from forehead to zygomatic arch to mandibular angle</li> </ul> <b>Profile:</b> <ul style="list-style-type: none"> <li>- Curved or flat, Ala area is almost flat: Convex build, looks delicate</li> </ul> <b>Incisal Form:</b> <ul style="list-style-type: none"> <li>- Mesial and Distal line angles narrow from incisal edge to cervical</li> </ul> <b>Labial surface of incisor:</b> <ul style="list-style-type: none"> <li>- Convex surface M-D</li> </ul>

## 2. Second number: Proportion & Contour

Using a flat device such as the Dentsply Sirona Tooth Indicator (#98981), select the number from 1 to 6 that represents both the proportion of the tooth (long, medium or short) as well as the facial contour (straight or curved).

The number selected is the second character of the mould identification number.

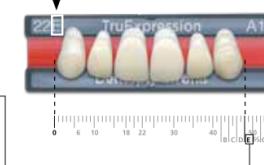
Proportion of the Tooth	Facial Contour
1. Long	Straight
2. Medium	Straight
3. Short	Straight
4. Long	Curved
5. Medium	Curved
6. Short	Curved



## 3. Letter Step: Width of Upper Six Anterior Teeth on Curve

Using the Dentsply Sirona MM Ruler (Part #3496), measure the width of the upper six anterior teeth on the curve, from distal to distal. The measurement will fall into one of the ranges identified with the letters B through J. The letter selected is the third character of the mould identification number.

- B. less than 44.00 mm
- C. 44.00 to 45.50 mm
- D. 45.50 to 48.00 mm
- E. 48.00 to 49.00 mm
- F/x. 49.00 to 51.50 mm
- G. 51.50 to 54.00 mm
- H. 54.00 to 56.00 mm
- J. 56.00 mm or greater



Some moulds may vary from this standard. Please consult mould chart dimensions.

### To measure the width of the Anteriors:

- Draw a line **straight down** from the edge of the ala of the nose (both sides).
- Mark this on the wax rim
- **Measure the distance on the arch and add 8mm** -> This is the number you use to reference with the mould guide

## Posterior Teeth

Identified using a 2 digit number, 1 letter and a shade

<b>Number</b>	Represents the M-D- width of Maxillary posterior teeth  X = Width of <b>upper Posteriors</b> Y = Width of <b>lower Posteriors</b> U = Depth of upper left 1 <sup>st</sup> molar L = Depth of lower left 1 <sup>st</sup> molar	
<b>Letter</b>	Represents <b>Occlusal gingival height</b>  S = Short (7=8.5mm) M = Medium (8.5mm-10mm) L = Long (>10mm) LS = Long Buccal, Short Lingual	

## Using Demographics to determine Mould

Gender	Male	Female	
	Large, Square teeth Darker shades Straight smile line  Slight rotation of laterals Consider adding a diastema	Small, ovoid or tapering teeth Lighter shades Curved smile line Curved arches  Consider rotating or crowding the laterals	
Age	Young  Lighter shades Translucent incisal edge Curved smile line Pointed canines	Old  Darker shades Incisal Edge more opaque Straight smile line Worn edges  Include some gingival recession (have teeth with long roots)	
Personality	Delicate  Tapering Light shades	Medium Pleasing  Ovoid Medium Shade	Vigorous  Square Dark Shades

Once you have selected the Maxillary anterior teeth you can use the Combination Table to choose the corresponding posterior teeth (for whichever angulation you want) and the corresponding mandibular anteriors

## Combination Table

Select upper anterior mould form, and use table to determine recommended lower anterior and posterior options.

TruExpression® Anteriors		TruExpression® Posterior					
Anterior Upper Mould No.	Articulates with Anterior Lower	Non-Anatomical		Semi-Anatomical		Anatomical	
		0°	10°	20°	33°	40°	
11H	S	433, 634	VF-L, 334	33M	VF-L, 34M	c36, c36R, c36XL, c36XR	
12E	N	431, 632	VF-M, 332	31M	VF-M, 32M	c34, c34R, c34XL, c34XR	
12G	R	433, 632	VF-L, 334	33M	VF-L, 34M	c36, c36R, c36XL, c36XR	
13E	H	431, 630	VF-S, 330	31M	VF-S, 30M	c31, c34XL, c34XR	
14G	Hc, Lc	433	VF-L, 334	33M	VF-L, 34M	c34, c34R, c34XL, c34XR	c36, c36R, c36XL, c36XR
14J	Lc, Tc	433	VF-L, 334	33M	VF-L, 34M	c36, c36R, c36XL, c36XR	
15FX	Dc, Fc, Hc	431	VF-M, 332	31M	VF-M, 32M	c34, c34R, c34XL, c34XR	
21C	C	429, 630	VF-S, 330	29M	VF-S, 30M	c31, c34XL, c34XR	
21D	F	429, 630	VF-S, 330	29M	VF-S, 30M	c31, c34XL, c34XR	
21J	K1	433, 634	VF-L, 334	33M	VF-L, 34M	c36, c36R, c36XL, c36XR	
22E	H	429, 630	VF-S, 330	29M	VF-S, 30M	c31, c34XL, c34XR	
24F	F, H	431, 632	VF-M, 332	31M	VF-M, 32M	c34, c34R, c34XL, c34XR	
24G	Hc, Lc	433	VF-L, 334	33M	VF-L, 34M	c34, c34R, c34XL, c34XR	c36, c36R, c36XL, c36XR
25FX	Dc, Fc, Hc	433	VF-L, 334	33M	VF-L, 34M	c34, c34R, c34XL, c34XR	
26D	Bc, Fc	431	VF-S, 330	31M	VF-S, 30M	c31	
26E	Dc, Fc, Hc	431	VF-M, 332	31M	VF-M, 32M	c34, c34R, c34XL, c34XR	
26FX	Bc, Dc	431	VF-M, 332	31M	VF-M, 32M	c31	
32E	H	431, 632	VF-M, 332	31M	VF-M, 32M	c34, c34R, c34XL, c34XR	
42D	F	429, 630	VF-S, 330	29M	VF-S, 30M	c31, c34XL, c34XR	
42F	H	431, 632	VF-M, 332	31M	VF-M, 32M	c34, c34R, c34XL, c34XR	
42G	P	431, 632	VF-M, 332	31M	VF-M, 32M	c34, c34R, c34XL, c34XR	
45H	R	433, 634	VF-L, 334	33M	VF-L, 34M	c36, c36R, c36XL, c36XR	
55D	E	429, 630	VF-S, 330	29M	VF-S, 30M	c31, c34XL, c34XR	
62G	K1, R	433, 634	VF-L, 334	33M	VF-L, 34M	c36, c36R, c36XL, c36XR	
65G	Dc, Hc	433, 634	VF-L, 334	33M	VF-L, 34M		
75E	N	429, 630	VF-S, 330	29M	VF-S, 30M	c31, c34XL, c34XR	

### Sample Rx

Please order

1 x 6 Max. Anterior TruExpression teeth, Mould 12E Shade P62,

The corresponding 1 x 6 mandibular anteriors mould N

The corresponding Anatomical 30° posteriors VF-M, 32M

## CR Record and Facebow Transfer

### Centric Relation

= Maxillomandibular relationship where the condyles articulate with the thinnest avascular part of the disk -> The most anterior-superior position against the articular eminences

- Movement is ONLY rotational around the horizontal axis in CR, there is no translation
- This is a stable and reproducible position that acts as a reliable guide in developing occlusion where there is none (like in the edentulous patient)



In only 10% of the pop. CR will coincide with Maximum Intercuspal Position (MI). Usually there will be a slight slide from initial tooth contact (in CR) to where the teeth maximally intercuspal.

### Manipulation

- First ensure there is no interference caused by the wax rims or base plates (This can typically happen if the lab sucks and the don't taper the posterior in the mandibular rims)
- Ensure the patient is fully relaxed -> Tense muscles can cause mandibular deviation
  - o Play some soothing Kenny G to really get them in the CR Mood



## Jaw Relation Record

= Relates how the Max and the Mand will come together in occlusion

1. Cut "V" notches into the maxillary posterior region, and "Windows" into the corresponding mandibular posterior regions
2. Coat the notches and windows with Vaseline -> **THIS IS VERY IMPORTANT** so you can remove the Jaw Relation material and take facebow registration
3. Seat in patients mouth
4. Take Jaw Relation Material (Aluwax) -> Heat over flame and fold in half to ↑ thickness. Cut a section that fits in the Mandibular window. **Shape it like a fin** and place in windows
5. Close patient in CR -> The **Maxillary Notches will then imprint into the wax** and create a single way that the two arches will come together
6. Trim the excess off and make it look pretty. We ain't no scrubs!



## Facebow record

Facebows are used to record the **special relationship of the Max. to the Nasion and the Ears** (which is roughly estimated as the location of the condyles) -> This can then be transferred to the articulator and allows us to orient the casts the same way that the jaws are oriented

\*\*In case you have forgotten how to do this...here are the instructions \*\*



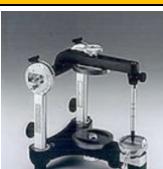
[http://whipmix.com/wp-content/uploads/Facebow-Registration-Instructions\\_0117.pdf](http://whipmix.com/wp-content/uploads/Facebow-Registration-Instructions_0117.pdf)

## Articulators

= Instrument that simulates the Mandible and TMJ Movements

- Lots of different types and levels of complexity

<b>Function</b>	Hold opposing casts in predetermined fixed relationship To open and close Produce border and intra-border diagnostic sliding action of teeth (Similar to in mouth) Diagnose Occlusion issues Plan dental procedures Aid in fabrication of prostheses Correct and modify completed resto's
<b>Parameters to Consider</b>	<ol style="list-style-type: none"> <li>1. Intercondylar Distance (This is usually fixed)</li> <li>2. Condylar Inclination</li> <li>3. Mandibular arc of closure</li> <li>4. Hinge Axis position</li> </ol>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>- Subject to human use error</li> <li>- Cannot completely duplicate condylar movements</li> <li>- Subject to metal fatigue and wear over time -&gt; Make sure it stays calibrated</li> </ul>

ARCON Articulators	Non-ARCON Articulators
<b>ARtriculator + CONdyle</b> <ul style="list-style-type: none"> <li>- The <b>Condylar elements</b> are part of the <b>lower frame</b></li> <li>- <b>Condylar guides</b> are part of the <b>upper frame</b></li> </ul> <p>This is like the human body</p>	<ul style="list-style-type: none"> <li>- Condyle is part of the upper frame</li> <li>- Condylar guides are on the lower frame</li> </ul>  

<b>Non-Adjustable Articulators</b>	<p>= Simple Single articulators</p> <ul style="list-style-type: none"> <li>- Accepts 1 or 2 occlusal record options -&gt; Facebow, Centric Jaw Relation Record, Protrusive Record</li> </ul>
<b>Semi-Adjustable Articulators</b>	<p>Limited condylar adjustments available</p> <ul style="list-style-type: none"> <li>- Accepts all 3 records (<a href="#">Facebow</a>, <a href="#">Centric Jaw RR</a>, <a href="#">Protrusive Record</a>)</li> </ul>
<b>Fully Adjustable Articulators</b>	<p>Complete adjustability, usually need a Pantographic tracing or Cadiax to set it up</p> <ul style="list-style-type: none"> <li>- Accepts all records: <a href="#">Facebow</a>, <a href="#">CJRR</a>, <a href="#">Protrusive Record</a>, <a href="#">Lateral Records</a>, <a href="#">Indercondylar Distance Record</a></li> </ul>

## Setting Anterior Teeth

Select teeth with the patient involved

- Keep in mind that prosthetic teeth are typically smaller and lighter in color vs natural teeth
- Involve the family/spouse -> **GET CONSENT** before ordering

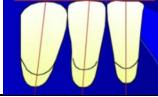
### Anterior Teeth Lab Rx

- Please supply 1x6 Maxillary Anterior Truexpression Teeth, Mold \_\_\_\_\_, Shade \_\_\_\_\_
- Please Supply the corresponding 1 x 6 Mandibular Anterior Truexpression Teeth, Mold\_\_\_\_\_, Shade \_\_\_\_\_

Thank You

## Arranging the Teeth

<b>Considerations</b>	<ul style="list-style-type: none"> <li>- <b>Midline</b> (Keep it inline with the facial midline? Or move it left or right) -&gt; This is why we mark it on the wax rims</li> <li>- <b>Occlusal Plane</b> (Keep it same as wax rim or tilt it/move up or down/teeth more or less visible)</li> <li>- Dental Arch (Moved in/out, less curved or flat)</li> <li>- <b>Lip Support</b></li> <li>- Unique features (incisal wear, chips, rotations, spaces etc)</li> </ul>
<b>Goals</b>	<ul style="list-style-type: none"> <li>- Good Esthetics</li> <li>- Appropriate phonetics</li> <li>- Teeth positioned for max comfort, stability and retention of dentures</li> </ul>
<b>Wax Rim Landmarks</b>	<p><u>Labial Contour shaped to support lips</u></p> <ul style="list-style-type: none"> <li>- Arch Form, Lip support, Facial contours</li> </ul> <p><u>Midline</u></p> <p><u>Ala Line</u></p> <ul style="list-style-type: none"> <li>- Should approximate the <b>center of the canines</b></li> </ul> <p><u>OVD of Rims</u></p> <ul style="list-style-type: none"> <li>- ~22mm Mx, ~18mm Mn</li> <li>- Determines vertical position of the teeth</li> </ul> <p><u>Rim made parallel to interpupillary line</u></p> <ul style="list-style-type: none"> <li>- Gives flat vs curved smile</li> </ul> <p><u>Smile Line</u></p> <ul style="list-style-type: none"> <li>- How much anterior teeth is showing</li> </ul> <p><u>Incisive Papilla</u></p> <ul style="list-style-type: none"> <li>- Guides the midline for Max. centrals and the prominence of the mx incisors and canines</li> <li>- Labial surface of the central incisors ~8-10mm in front of the papilla normally</li> </ul>
<b>Inclinations</b>	<p>Anterior teeth are not perfectly vertical</p> <ul style="list-style-type: none"> <li>- Create a <b>slight distal inclination</b> (~8°)</li> </ul> <p><b>Gingival Zenith</b> = Most apical point of the gingival margin</p> <ul style="list-style-type: none"> <li>- <b>Slightly distal</b> to the midline of the tooth</li> </ul>

Maxillary		
<b>Centrals</b>	<p><b>Set these first</b></p> <ul style="list-style-type: none"> <li>- Make sure you mark the midline on the cast first, it will disappear in the wax</li> <li>- Most <b>critical teeth to set</b> -&gt; Establishes the midline and provides esthetic lip support</li> </ul> <p>Heat a #7 wax spatula and remove enough wax to allow you to place the tooth within the shape of the wax</p> <ul style="list-style-type: none"> <li>- Teeth should be inset so the incisal edge and labial surface is in line with the wax rim</li> </ul>	
<b>Laterals</b>	<p>Place the lateral next to the central</p> <ul style="list-style-type: none"> <li>- Depress the neck slightly</li> <li>- Incisal edge should be 0.5-1mm gingival to the central</li> </ul>	
<b>Canines</b>	<p>Place so the <b>mesial half of the incisal edge is along the same place as the lateral and central as it curves around the wax rim</b></p> <ul style="list-style-type: none"> <li>- It should be at the <b>same incisal level as the central</b></li> <li>- <b>Tilt the neck slightly more distal than the central and lateral</b></li> <li>- Neck should stick out more/be more prominent</li> </ul> <p><b>Turn the corner!</b></p> <ul style="list-style-type: none"> <li>- You should <b>only</b> be able to see the mesial 1/2 of the canine on the frontal view</li> </ul>	
Mandibular		
<b>Centrals</b>	<p>Set at midline and <b>tipped slightly labially</b></p> <ul style="list-style-type: none"> <li>- Incisal edge at height of occlusal rim</li> <li>- Create <b>0mm overbite and 1-2mm horizontal overjet with max anterior</b></li> </ul> <p><b>↑ Overbite steepens the interincisal angle</b> = posterior teeth separate more quickly  <b>↑ Overjet shallows the interincisal angle</b> = posterior teeth separate less quickly → <b>↑ balanced occlusion in protrusion</b> and <b>↓ the force on the weak ass anteriors</b></p>	
<b>Laterals</b>	<p><b>More upright</b></p> <ul style="list-style-type: none"> <li>- Set at the <b>same height as centrals</b> (this is different vs max.)</li> </ul>	
<b>Canines</b>	<p>Most prominent neck  Create <b>1/2 tooth offset with the Max and Mand teeth</b></p>	

\*Important to remove excess wax from the lingual of the set anterior teeth -> You don't need it for anything and it gets in the way of the tongue for assessing phonetics. Also gives the patient an unrealistic idea of the thickness of the real denture\*\*

- Don't remove too much but you should be able to get away with removing everything down to the cingula and then taper/thin it out nicely there

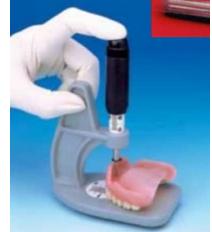
#### Now We Check

<b>Aesthetics</b>	<p>Nasolabial line should be ~90° -&gt; shows appropriate lip support  Check adequate OVD and VDR</p> <ul style="list-style-type: none"> <li>- <b>Canines should touch the vermillion border</b></li> <li>- <b>Mesial half of the canine should be visible</b> with the smile</li> <li>- <b>At rest only 2-3mm of teeth should show under lip</b></li> </ul>	 
<b>Phonetics</b>	<p>Fricative Sounds ("Fifty Five")</p> <ul style="list-style-type: none"> <li>- Assesses the incisal edge relative to the lower lip (Make sure the mand. rim is in too)</li> <li>- <b>Too much air "f"</b> = incisors are not low enough</li> <li>- <b>Too much "v" sound</b> = incisors are too low on the lip</li> </ul> <p>Sibilant Sounds ("Sixty Six, Mississippi")</p> <ul style="list-style-type: none"> <li>- Assesses inter incisal height between the max and mand</li> <li>- Incisal edges should approach but not touch</li> <li>- <b>Too narrow = whistle sound</b></li> <li>- <b>Too wide = lisp</b></li> </ul>	

## Setting Posterior Teeth

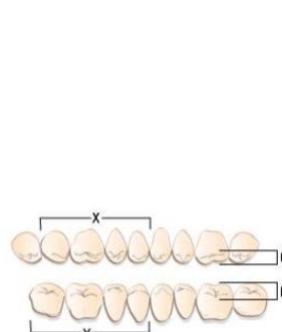
In order to ensure the teeth are set directly on the alveolar ridge, make your life easier and draw straight lines along the ridge to mark the setting location of both the anterior (confirm), and the posteriors

- Extend these lines along that plane onto the land area of the cast so you can see it with the teeth set to confirm. This is also to ensure the lab did a good job.
- Also mark the retromolar pads (Mand) and indicate 1/2 – 2/3 the height -> This is your mandibular occlusal plane

Mandibular Drawing	Maxillary Drawing
	 <p>The Alma gauge can be used to determine the projection of the teeth in relation to the incisive canal</p>

## Selecting Posterior Teeth

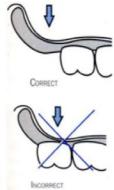
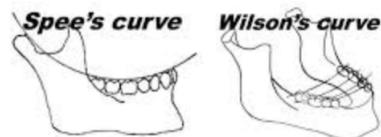
- While anterior teeth are selected based off esthetics -> Posterior teeth are selected by masticatory and functional requirements:

Cuspal Incination	<p><u>0 Degree</u> = Non-Anatomical  <u>10-20 Degree</u> = Semi-Anatomical  <u>30-40 Degree</u> = Anatomical</p> <p><u>Recommended:</u></p> <ul style="list-style-type: none"> <li>- 10-20 degree for Max</li> <li>- 0 Degree for Mand.</li> </ul>
TruExpression guide	<p><u>Number on the tab:</u>  Tells us the Average width of 1x4 Maxillary posteriors</p> <ul style="list-style-type: none"> <li>- Measure your available space and determine if you can fit them all, might need to forgo a premolar if there is not enough space</li> </ul> <p><u>Letter on the Tab:</u>  Tells us the Occluso-gingival height</p> <ul style="list-style-type: none"> <li>- S = Short</li> <li>- M = Medium</li> <li>- L = Long</li> </ul> <p>X: Avg width of 4 set UPPER posteriors  Y: Avg width of 4 set LOWER posteriors  U: Avg depth of the upper L 1<sup>st</sup> molar  L: Avg depth of the Lower L 1<sup>st</sup> molar</p>  

## Setting Posteriors

**\*\*Very Important:** There is no periodontium, therefore ↓ proprioception -> if 1 tooth is misaligned the entire arch is unstable because it acts as 1 unit\*\*

- Bilateral Posterior balance is required
- Incisal contact with complete dentures ↓ the retention. No incisal contact for the anteriors

Mandibular Posteriors	Maxillary Posteriors
<p><b>Buccolingually:</b> Central groove over the center of the ridge</p> <ul style="list-style-type: none"> <li>- This is why you drew those lines</li> </ul> <p><b>Occlusal Plane:</b></p> <ul style="list-style-type: none"> <li>- Canine tip <math>\frac{1}{2}</math> up the retromolar pad -&gt; Posteriors will maintain that height</li> </ul>  <p><b>Posterior Limit:</b></p> <ul style="list-style-type: none"> <li>- Only set posteriors MAX to the anterior border of the retromolar pad <ul style="list-style-type: none"> <li>- → Never set tooth on incline on the pad (Patient bites down and the denture flies out of the mouth)</li> </ul> </li> <li>- If you only have room for 3 posterior teeth -&gt; ditch the 1<sup>st</sup> premolar</li> </ul>  <p><b>Lingual Limit:</b></p> <ul style="list-style-type: none"> <li>- Lingual cusps of molars aligned with the mylohyoid ridge</li> <li>- If too lingual = Tongue crowding, Tongue biting, Denture imbalance from tongue function</li> </ul> 	<p><b>Occlude with mandibular teeth</b></p> <ul style="list-style-type: none"> <li>- If mandibular ridge crest is &gt;8mm outside the Max ridge crest then teeth need to be set in crossbite</li> </ul> <p><b>1mm anterior overjet</b></p>  <p><b>Do not set on tuberosity</b> = Cheek biting</p> <ul style="list-style-type: none"> <li>- 4 Max. posterior teeth can oppose only 3 mandibular posterior teeth -&gt; Gives support to cheeks</li> </ul> <p><b>Placing too far buccally:</b></p> <ul style="list-style-type: none"> <li>- Cheek Biting, Esthetic issues, Instability</li> </ul> <p><b>Lingualized Occlusion:</b></p> <ul style="list-style-type: none"> <li>- <b>Balanced:</b> All posterior teeth AND anterior teeth contact in excursions.</li> <li>- To get this: Place anterior-posterior curve in the arch (Compensating Curve... kinda like the Curve of Spee in real teeth). Also set a curve of Wilson</li> </ul>  <p><b>Pros of Lingualized Occlusion:</b></p> <ul style="list-style-type: none"> <li>- Esthetics</li> <li>- Simple to create</li> <li>- ↓ lateral force on ridge</li> <li>- Can be used in Class I, II, III, and crossbite!</li> <li>- Mastication</li> <li>- ↑ Stability</li> <li>- Easy to adjust</li> </ul>

### Posterior Setting Rx for Lab:

Please order and set posterior teeth 6x TruExpression Mold\_\_\_\_, Non-Anatomical teeth for Mandible (Shade\_\_\_\_)

- Exclude 1<sup>st</sup> premolar on both sides (if needed)

Please order and set posterior teeth 6 x TruExpression Mold\_\_\_\_, Semi-anatomical (20 degree) (Shade\_\_\_\_) for Maxilla.

- Exclude 1<sup>st</sup> premolar on both sides (if needed)

Ensure all teeth are on the center of the ridge and not extending over the vestibule.

Please create a lingualized occlusion with occlusal plane of mandibular teeth extending 1/2 – 2/3rds the way up the retromolar pads as marked on the cast

Articulator Settings as follows:

- Incisal Pin: Set to 0
- Condylar Guidance: 25°
- Progressive Side Shift: 7°
- Immediate Side Shift: N/A

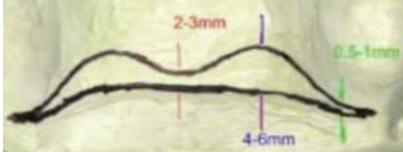
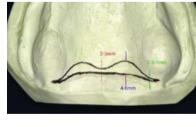
Please send back the mounted axed model for try-in

Thank you.

## Wax Try-In

Steps	What are you Checking?
<b>1. Check on Articulator</b>	<ul style="list-style-type: none"> <li>- Did the Lab follow your instructions?</li> <li>- Check Occlusal Plane</li> <li>- Check Teeth position</li> <li>- Check Occlusion</li> </ul>
<b>2. Try in Mouth</b>	<ul style="list-style-type: none"> <li>- Assess aesthetics,</li> <li>- Assess Occlusal Plane</li> <li>- Assess OVD (Retromolar pads, corners of the mouth, fox plane)</li> <li>- Assess Occlusion -&gt; Adjust to create a canine rise on excursion</li> <li>- Fricitive and Sibilant sounds again,</li> <li>- Is it comfortable?</li> </ul> <p><b>Issues?</b></p> <p>Occlusal contacts different in the mouth vs articulator? -&gt; Re-do the CR and re-mount the mandible 😞</p> <p>Occlusal Plane off in the patients mouth? -&gt; Re-Facebow 😞</p>
<b>3. NOW the patient can see it in their mouth.</b>	<p>Always assess it first yourself in and out of the mouth</p> <ul style="list-style-type: none"> <li>- Get esthetic approval from patient and the instructor and yourself</li> </ul>

## Post Dam

<b>Purpose</b> Posterior Palatal seal to compensate for the acrylic shrinkage during processing	<ul style="list-style-type: none"> <li>- ↑ retention of max. denture</li> <li>- Firm contact w/ palate ↓ gag reflex</li> <li>- ↓ food trapping</li> <li>- ↑ strength</li> <li>- Border of denture is less conspicuous for the tongue (less annoying)</li> </ul> <p>It is carved out of the cast and creates a "ledge" on the inside of the denture.</p> <p><b>Dimensions:</b></p> <ul style="list-style-type: none"> <li>- 0.5-1mm wide at the tuberosity</li> <li>- 4-6mm wide between tuberosity and midline</li> <li>- 2-3mm wide at midline</li> </ul> 	   
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## Most Common Errors at the Wax-Try-in

- Occlusion
- OVD
- Position of occlusal plane (too high or too low)
- Level of the occlusal plane (Canted L-R or A-P)



## Denture Processing

"Mostly for your knowledge, but could be on the boards" -> Likely not tested on Final

Materials							
Nylon	- Flexible (Causes warpage and distortion) - Discolours - ↑ surface roughness w/ ↓ polishing - ↑ bacterial contamination						
Acrylic (Polymethylmethacrylate, PMMA)	Usually a powder-liquid system  <u>Subtypes:</u> <ul style="list-style-type: none"><li>- Heat Cured -&gt; this is mostly what is used for dentures</li><li>- Cold-Cured</li><li>- Light-Activated -&gt; This is custom try material</li></ul>						
	<table border="1"> <thead> <tr> <th>Pros</th><th>Cons</th></tr> </thead> <tbody> <tr> <td>↑ esthetics Adequate strength ↓ H<sub>2</sub>O absorption ↓ solubility Non-toxic Easy to repair Accurate representation of wax-up</td><td>Shrinkage during polymerization<ul style="list-style-type: none"><li>- Distorts palate = inaccurate fit (this is why we Post Dam)</li><li>- Affects position of teeth</li></ul></td></tr> </tbody> </table>			Pros	Cons	↑ esthetics Adequate strength ↓ H <sub>2</sub> O absorption ↓ solubility Non-toxic Easy to repair Accurate representation of wax-up	Shrinkage during polymerization <ul style="list-style-type: none"><li>- Distorts palate = inaccurate fit (this is why we Post Dam)</li><li>- Affects position of teeth</li></ul>
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	<p><b>Heat Cured Acrylic</b></p> <ul style="list-style-type: none"> <li>- Heat activation at 70°C <ul style="list-style-type: none"> <li>- -&gt; Heat assures long, slow, polymerization but causes shrinkage (6% volume, 0.2-0.5% linear)</li> </ul> </li> <li>- Unreacted methyl methacrylate is an allergen -&gt; issues if any is left unreacted</li> </ul> <p><b>Powder Contains:</b></p> <ul style="list-style-type: none"> <li>- Polymer</li> <li>- Plasticizer (↑ impact strength, ↓ hardness, elastic modulus and compressive strength)</li> <li>- Pigment</li> <li>- Opacifiers</li> <li>- Dyes</li> </ul> <p><b>Liquid Contains:</b></p> <ul style="list-style-type: none"> <li>- Monomer (pure methyl methacrylate)</li> <li>- Plasticizer</li> <li>- Inhibitor -&gt; Prevents premature polymerization in storage</li> <li>- Cross-linking agent to ↓ cracking</li> </ul>						

## Techniques

- Compression Molding -> This is the main one
- Injection molding
- Microwave
- Fluid resin
- Visible Light

Compression Molding			
1. Preparation for Flushing	<ul style="list-style-type: none"> <li>- Wax-up completed (including post dam in master cast)</li> <li>- Borders sealed with wax to prevent investment material from seeping underneath</li> </ul> <p><b>**Soak cast for 5 minutes in water to prevent breakage of cast when you separate from mounting plaster**</b></p> <ul style="list-style-type: none"> <li>- Use pneumatic hammer to separate the cast from the mount</li> </ul>		

<b>2. Flasking</b>	<p>Hanau ejector-type flask helps remove the trial denture without breakage 😊</p> <ul style="list-style-type: none"> <li>- Both the cast and the Bottom half of the flask (the drag) are lubricated w/ petroleum for removal ease</li> </ul>  <ul style="list-style-type: none"> <li>- Add Lab plaster to the bottom half of the flask up to the land area of the cast. Smooth and clean the plaster w/sandpaper for easier separation from Stone investment</li> <li>- Add petroleum to lubricate the investment plaster and flask (NOT the wax up)</li> </ul>  <ul style="list-style-type: none"> <li>- The Cope (top half of flask) is added (metal-metal contact). Trim plaster away that prevents this metal-metal. Lubricate the inside of the cope</li> <li>- Mix Stone and vibrate it into the cope.</li> </ul>  <ul style="list-style-type: none"> <li>- Pour slightly above the level of the teeth, and then with your finger <a href="#">remove stone to expose the tips of the teeth</a></li> </ul>  <ul style="list-style-type: none"> <li>- After 2<sup>nd</sup> pour is firm...add the 3<sup>rd</sup> section of stone on top, slightly above the top level of the "cope"</li> <li>- Stone should come out of the holes in the lid (let set for 35-40 minutes)</li> </ul> 
<b>3. Boilout</b>	<p>= Removal of wax from the mold using heat</p> <ul style="list-style-type: none"> <li>- Flask is placed in boiling water for 6 minutes to soften wax. Don't want to completely melt it!</li> <li>- Separate the drag from the cope carefully</li> <li>- Ideally the acrylic teeth stay in the stone and the wax comes off on the investment lab plater</li> <li>- Run both under stream of boiling water to ensure the acrylic teeth are set firmly in stone and don't come out</li> </ul> 
<b>4. Tinfoil Substitute/Separation Medium</b>	<p>After stone is dry (but still warm), paint w/ tinfoil substitute on inside of mold and cast (2x)</p> <ul style="list-style-type: none"> <li>- Avoid contact with the acrylic teeth, and prevent pooling of material around the teeth</li> </ul>
<b>5. Preparation for Packing</b> <ul style="list-style-type: none"> <li>- Lucitone 199 Acrylic</li> </ul>	<p>Powder:Liquid Ratio = 21.0g/10mL        Mixing time: 30 sec.        Doughing time: 11 min        Packing time: 30 mins</p> <ul style="list-style-type: none"> <li>- Generally Polymer/monomer ratio = 3:1 by vol. or 2:1 by weight</li> <li>- <a href="#">If ↑ polymer used = ↓ rxn time and ↓ polymerization shrinkage</a></li> <li>- Mix in baby food container using spatula until its "doughy". When it's ready to pack it will "snap" when pulled</li> </ul> <p>Use cotton applicator w/ monomer to clean off denture teeth that may have gotten excess tinfoil substitute on them</p>  
<b>6. Packing</b>	<p>Place pieces of dough into flasks</p> <ul style="list-style-type: none"> <li>- Around buccal, labial and palatal surfaces of upper</li> <li>- Around labial and lingual surfaces of lower</li> </ul> <p>Separate Cope and Drap w/a wetted densilk plastic sheet -&gt; Prevents sticking to opposing cast</p> <ul style="list-style-type: none"> <li>- Now connect the cope and the drag and place in machine for Trial Pack (at 1500 PSI)</li> </ul> 

	<p>After each Trial Pack, separate the pieces and remove excess flash at the denture border using scalpel</p> <ul style="list-style-type: none"> <li>- Add resin to any areas that are deficient</li> </ul>  <p>Trial Pack about 3x until you no longer see "flash" acrylic seen between the Cope and Drag</p>  <p>-&gt; This is the flash you don't want to see</p> <p>Final Pack is done at 3000 PSI and w/o the plastic sheet</p> <p>Remove and add Spring clamp -&gt; Closes tightly while not fully compressing the flasks. Allows resin to expand while processing and contract while still under pressure</p> <ul style="list-style-type: none"> <li>- Place clamp in vice, transfer the flask over and close the clamp quickly</li> <li>- Wait 30-60 minutes to allow liquid to penetrate the powder thoroughly</li> </ul> 
<b>7. Curing</b>	<p>Flask + Clamp is placed in for 10 hours</p> <ul style="list-style-type: none"> <li>- 1hr preheat</li> <li>- 9hr at 165°F</li> </ul> <p>**Don't cut corners with the curing times -&gt; Leaves unpolymerized monomer and causes allergic reaction</p>
<b>8. Deflasking</b>	<p>Cool flask to room temp for 30 minutes -&gt; then immerse in cool water for 15 mins</p> <ul style="list-style-type: none"> <li>- If not left to cool properly = distortion of acrylic</li> </ul> <p>Tap the center of the drag -&gt; separates the cope from the drag and leaves the metal center in the plaster</p> <p>Turn over and separate the lid from the cope</p> <ul style="list-style-type: none"> <li>- Place center piece from drag on stone below the removed lid -&gt; use hammer to knock the investment out of the cope</li> <li>- Use pneumatic hammer to remove the 3<sup>rd</sup> stone layer (should reveal the edges of the teeth), repeat with the 1<sup>st</sup> layer of plaster</li> </ul>  <p>- Because you added petroleum initially, it should be easy to separate the plaster from the plaster from the master cast</p> <p>Use hammer to carefully remove stone from the denture</p> 
<b>9. Finishing</b>	<p>Walnut blast residual stone off of the denture</p> <p>Sticky was the master cast back onto the articulator mount (you saved this before)</p> <ul style="list-style-type: none"> <li>- Correct occlusion errors that result from processing distortions</li> <li>- Remove the denture from the cast</li> <li>- Polish with a series of different grits of pumice and polish compound</li> </ul> <p>Soak denture in water for 24hrs to remove any residual monomer</p> 
<b>10. Characterization and Label</b>	<p>** Get Pt's name labeled on the denture! Very important for nursing homes**</p> <p>Can add tints and stains to the teeth and acrylic for a realistic appearance</p> 

Other Techniques

<b>Injection Molding</b>		
<b>Microwave</b>		Plastic Bits! Stick it in a microwave with your Hungryman Meal
<b>Visible Light Cure</b>	<p>Not super great just yet</p> <ul style="list-style-type: none"> <li>- ↓ stain resistance</li> <li>- Inferior Transverse strength</li> <li>- Similar Polymerization Shrinkage</li> <li>- Poor cohesion/Adhesion to PMMA resins when used as a repair</li> </ul>	

Processing Mistakes

<b>Errors in Flasking</b>	<ul style="list-style-type: none"> <li>- Failure to ID and block-out Undercuts</li> <li>- Incorporating air inclusions in the investing stone</li> <li>- Forget to pain a separating medium on the investing stone</li> </ul>
<b>Errors in Applying the tinfoil substitute</b>	<ul style="list-style-type: none"> <li>- Omitting the tinfoil substitute</li> <li>- Using contaminated tinfoil substitute           <ul style="list-style-type: none"> <li>- Failure of tooth/acrylic bond</li> </ul> </li> <li>- Inadvertently coating the ridge laps of resin teeth w/ tinfoil substitute</li> </ul>
<b>Errors in Packing</b>	<ul style="list-style-type: none"> <li>- Too much monomer           <ul style="list-style-type: none"> <li>- Produces porosity in final denture</li> </ul> </li> <li>- Not enough resin (underpacking)</li> <li>- Packing resin at the wrong stage           <ul style="list-style-type: none"> <li>- <u>Too early?</u> Viscosity too low for pressure packing</li> <li>- <u>Too Late?</u> Hard to get metal-metal contact, ↓ detail in denture, Fracture of teeth or gypsum, ↑ VDO</li> </ul> </li> <li>- Failure to bench cure the packed denture prior to curing</li> <li>- Failure to achieve metal-to-metal contact of the flask</li> </ul>
<b>Errors in Deflasking</b>	<ul style="list-style-type: none"> <li>- Not completely bench cooled before deflasking</li> <li>- Breaking of the denture</li> <li>- Breaking of the cast -&gt; or both...and then you cry</li> </ul>

## Denture Delivery

Clinical Question

Can you make a new alginate of the denture to remount the cast?

- **No!** The impression relies on the pressure applied to the tissues. If you applied different pressures from the 1<sup>st</sup> impression (the one the denture is made off), and the new impression you are making of the cast then it won't fit.

## Clinical Remount

Make sure you make (or request from the lab) a *remount jig* for the maxillary cast in case the cast gets broken. This allows you to make occlusion adjustments on the articulator and not having to constantly pop the dentures in and out of the pt's mouth

<https://www.youtube.com/watch?v=WtQ9LwCINCc>



This glob of plaster is a remount jig, it preserves the angulation of the Maxillary cast (the facebow registration). Necessary to reattach the casts to the articulator (the Lab has to break them off the mounting plaster) and allows us to make adjustments on the articulator.

### But why do we need to remount the dentures twice?

- *Lab Remount* -> Removes processing errors created by the lab
- *Clinical remount* -> Makes it easier to refine the occlusion for the patient

## Assessing Fit and Comfort:

Maxilla	Mandible
<p>Assess:</p> <ul style="list-style-type: none"> <li>- Support -&gt; No rocking when you push on either side</li> <li>- Retention</li> <li>- Stability -&gt; Flanges are good length and when Pt moves tongue the denture doesn't pop out (if the flanges are too long it will pop out easy)</li> <li>- Comfort</li> <li>- Occlusion (Do this on the articulator first though)</li> <li>- Esthetics</li> <li>- Phonetics</li> </ul>	<p>Assess:</p> <ul style="list-style-type: none"> <li>- Stability</li> <li>- Have Pt lift tongue to top lip</li> <li>- Comfort</li> <li>- Occlusion (Do this on the articulator first though)</li> <li>- Esthetics</li> <li>- Phonetics</li> </ul>
<p><b>Pressure Indicating Paste (PIP)</b></p>	<p>Paint a thin, uniform layer on the paste on the inside of the denture -&gt; Place it in the patients mouth</p> <ul style="list-style-type: none"> <li>- Places where the paste as "rubbed off" or "rubbed thin" are high spots on the acrylic -&gt; Grind those areas down</li> <li>- Try again until there is no rub through areas or it is all uniform</li> </ul>

### Clinical Question

Uh Oh...You put the denture in and there is an *Anterior Open Bite*...now what!?



- There is premature posterior contact :( You probably fucked up the CR step, now you have to redo it
- Take a new CR with the dentures -> Verify this
- Remount the casts to this new CR on the articulator -> Verify this as well
- Adjust the occlusion on the articulator -> *Adjust the fossa's*, unless the cusp tip is creating an interference
- Confirm occlusion intraorally



## Balanced Denture Occlusion

1. Centric Relation
2. Protrusive Movements
  - Aiming to maintain balanced Anterior-Posterior contacts. This will maintain the pressure and keep the seal
  - 2 contacts on the back (bilateral) and 1 on the front -> Triangulate!
3. Lateral Excursions

## Post Op Instructions

1. Don't wear at night
2. Clean the dentures with a denture brush (or a soft toothbrush) and using Soap + Water -> **No toothpaste** it will abrade the acrylic teeth and make a rough surface for plaque to adhere to
3. **Don't soak overnight** -> Water allows bacteria to grow
4. Bleach is OK to use, but it bleaches out the pigment -> make sure to dilute it if you are going to use it

**\*\* Insert Post Op Booklet here\*\***

### **What Should You Expect from a New Denture?**

Your mouth is soft and it changes with time but dentures are relatively hard and stable. Consequently, your new dentures will probably need several adjustments, and you will need time and practice to adapt to them before they feel comfortable.

Here are some suggestions to help you adapt to them and to keep your mouth healthy.

#### **EATING**

Begin by eating small pieces of soft food as you gain confidence to manage your normal diet. Use a knife and fork to prepare the food so that you can chew it tastefully in small bites with the dentures, and try to chew on both sides of your mouth.

#### **CLEANING**

Keep your mouth and dentures very clean. Wash all of the denture surfaces with soap and a soft hand-brush, or a special denture-brush, at least once a day. Avoid rough and abrasives cleaners that might scratch the polished surface of the dentures. Soak the dentures in a denture cleaning solution for a short time each day. You can use any commercially available cleaning solutions or a DILUTE solution of bleach [1 teaspoon (4.74 mL) of bleach (5% sodium hypochlorite) diluted in 8 oz (227 mL) of water].

Be careful with the bleach, and DO NOT soak dentures in the diluted solution for more than 15 minutes. Rinse the dentures under running water before replacing them in your mouth.

Clean and stimulate the lining (mucosa) of your mouth with a medium toothbrush at least once a day, especially the mucosa covered by the denture because the bacteria and fungi in the sticky plaque that collects every day on the surface of the denture can irritate the lining of your mouth.

#### **RESTING YOUR MOUTH**

Rest your mouth by removing the denture as often as possible, especially when you are sleeping. You can reduce the growth of germs on the denture when it is not in your mouth by storing it in a DRY container.

#### **MAINTAINING THE FIT**

Your mouth must be examined at least once a year to confirm that the lining mucosa remains healthy and that the stress from the denture is spread evenly on the ridges. The shape of your gums will change as the ridges shrink normally. Consequently, the denture must be adjusted and relined from time-to-time to keep it fitting accurately. However, DO NOT adjust the denture yourself.

### **You Might Notice:**

**Excess Saliva:** The flow of saliva in your mouth will increase for a short while after you begin to wear the new denture. This is the normal response of the saliva, and should settle to the usual flow after a few weeks.

**Soreness:** Minor irritations or sore spots underneath a new or relined denture are very common. Remove the denture to ease the pain if necessary. However, please try to wear the denture for a few hours if possible before attending for an adjustment; this will show where the denture should be adjusted. DO NOT adjust the denture yourself.

**Gagging:** This is rarely a problem that lasts long, but the denture might need an adjustment if it persists.

**Talking:** The new denture might disturb your speech at first. Fortunately, the problem does not usually persist for more than a few days. Reading aloud can help you adapt to your tongue and lips to the shape and position of the new teeth as you talk.

## Denture Adjustments

Typical Complaints:

<b>Pain</b>	<p>Use PIP paste to find high spots If there is a <b>sore on the pt. ridge</b> -&gt; <b>Mark it with an indelible marker</b> and then place the denture in. The mark will transfer to the exact place on the denture that is causing the sore = allows you to reduce that spot more specifically</p> 
<b>Gagging</b>	<p>Causes:</p> <ul style="list-style-type: none"> <li>- <b>Loose Denture</b></li> <li>- <b>Thick distal border</b> of the maxillary denture</li> <li>- Occlusal plane is too low (Maxillary denture is too long)</li> <li>- Maxillary posterior teeth are placed too lingual</li> </ul>
<b>Pain lingual to the mandibular anterior ridge</b>	<p>Causes:</p> <ul style="list-style-type: none"> <li>- Over-extension of the mandibular anterior lingual area -&gt; <b>Pinching on the frenum</b></li> <li>- <b>Lack of anterior overjet</b> -&gt; <b>Biting on the incisors</b></li> <li>- Excessive anterior overbite -&gt; <b>Lack of balance</b> = denture tilts</li> <li>- Last <b>mandibular molar placed on ascending part of the ridge</b> = contact on inclined plane causing ↑ anterior force on the denture</li> <li>- Protrusive slides</li> <li>- Occlusal plane not properly oriented = Masticatory forces pushing the dentures anteriorly</li> <li>- Pressure on the tubercles</li> </ul>
<b>Clacking sound when teeth contact during speech</b>	<p>Causes:</p> <ul style="list-style-type: none"> <li>- <b>Excessive OVD</b> -&gt; No room to close/ No freeway space</li> <li>- <b>Loose dentures</b></li> <li>- Lack of muscular control/skill/perception by the patient</li> </ul>
<b>Denture Looseness</b>	<p>Causes:</p> <ul style="list-style-type: none"> <li>- <b>Border under or over-extended</b> (errors in the final impression stage <ul style="list-style-type: none"> <li>- -&gt; Making denture from alginate leads to <b>over-extension</b></li> </ul> )</li> <li>- Errors in border width (too narrow or too wide)</li> <li>- Tooth Position errors</li> <li>- Xerostomia (causes diffuse soreness as well b/c lack of lubrication)</li> <li>- Occlusal errors</li> <li>- Anatomical limitations</li> </ul>
<b>Cheek Biting</b>	<p>Causes:</p> <ul style="list-style-type: none"> <li>- Neutral zone violation (space btwn cheek and teeth)</li> <li>- Inadequate posterior overjet -&gt; End to end contact of maxillary and mandibular buccal cusps</li> </ul>

### Making Adjustments:

- Keep them to a **minimum and in small increments** -> Avoid making the denture unstable or not retentive by accidentally going too HAM on the adjustments
- Patients should express some relief after the adjustment, but might not be completely pain free until the irritated area has had a few days to heal

### Polishing:

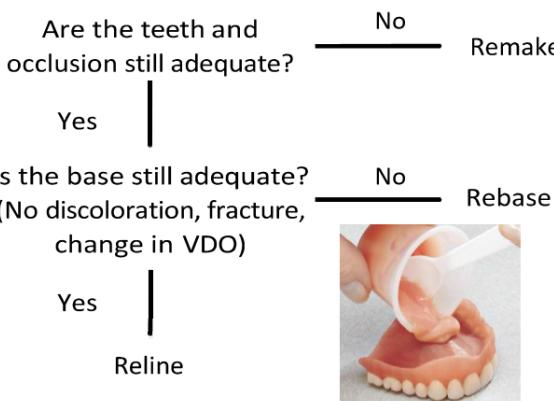
- Acrylic burs used to make adjustments can leave a rough surface and create plaque traps -> Polish these areas with rubber acrylic resin polishing points
- Adjustments made to the borders are to be polished with wet pumice and wet rag wheels on a bench motor (in the OHC Lab)



## Denture Reline, Rebase and Repair

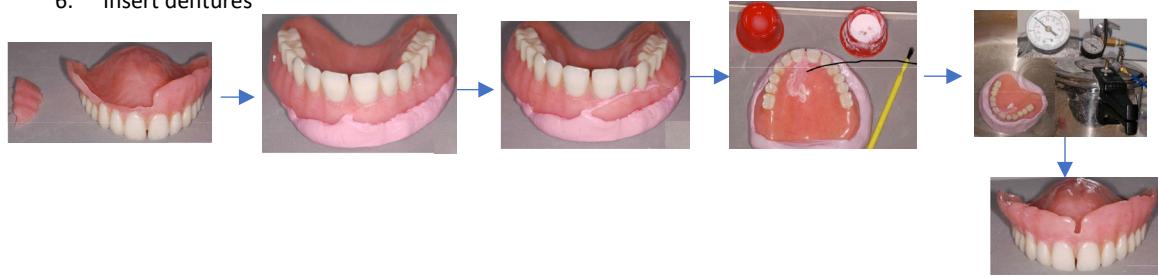
Dentures are reassessed annually, we check for:

- Patient complaints (Fracture, Discoloration, Discomfort, Loosening)
- Resorption of the residual ridge (Changes in maxillomandibular relationship, ↓ VDO, TMD, Repetitive headaches can be caused by overclosure)
- Mucosal Trauma
- Oral and Denture hygiene
- Oral cancer

Definitions		
<b>Reline</b>	Procedures used to <b>resurface the tissue side of a removal denture with new base material</b> to produce an accurate adaptation to the denture foundation areas <ul style="list-style-type: none"> <li>- *Only the surface contacting the tissues is replaced</li> </ul>	
<b>Rebase</b>	<b>Laboratory process of replacing the entire denture base material on an existing prosthesis</b> (Teeth may be intact, but there is a large change in fit over a short time) <ul style="list-style-type: none"> <li>- *All base acrylic is replaced</li> </ul>	
<b>Indications for Reline/Rebase/Remake</b>	<ul style="list-style-type: none"> <li>- To enhance the fit (Retention, Stability, Support)</li> <li>- ↑ VDO</li> <li>- Restore appearance</li> <li>- Re-establish occlusion and articulation</li> </ul>	
<b>Decision Tree</b>	<pre> Are the teeth and      No      Remake occlusion still adequate?   Yes   Is the base still adequate?      No      Rebase (No discoloration, fracture, change in VDO)   Yes   Reline </pre>	 

## Techniques

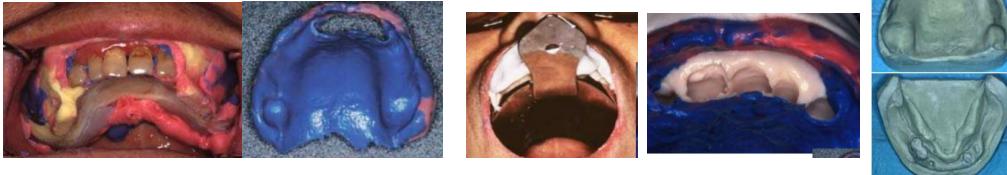
<b>Chairside Reline</b>	<ol style="list-style-type: none"> <li>1. <u>Diagnosis and Tx Plan</u> <ul style="list-style-type: none"> <li>- Determine the issue and decide what you need to do to fix it</li> </ul> </li> <li>2. <u>Denture Preparation</u> <ul style="list-style-type: none"> <li>- Remove undercuts or overextension flanges</li> </ul> </li> <li>3. <u>Mix together the reline kit contents according to manufacturer's proportions</u> <ul style="list-style-type: none"> <li>- Wait until you get a <b>doughy texture</b></li> </ul> </li> <li>4. <u>Apply to denture intaglio surface</u></li> <li>5. <u>Border Mold</u> <ul style="list-style-type: none"> <li>- Seat denture with even pressure and ask Pt to close in CR (<b>hold lightly for 15 minutes</b>)</li> <li>- Border mold the lips while it sets</li> </ul> </li> <li>6. <u>Assess Results</u> <ul style="list-style-type: none"> <li>- Ideal: <b>2mm even thickness, no bare spots, Peripheral roll, maintained VDO</b></li> </ul> </li> <li>7. <u>Trim excess off the buccal with scalpel and deliver</u> <ul style="list-style-type: none"> <li>- Ask Pt to wear for a few days to allow healing</li> </ul> </li> </ol>				
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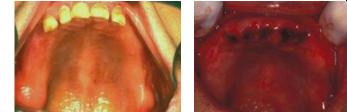
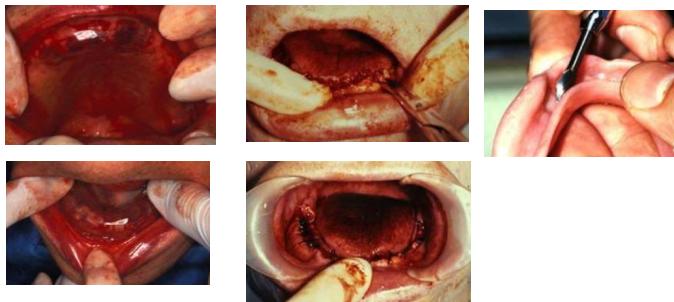
<b>Rebase</b>	<ol style="list-style-type: none"> <li>1. <b>Denture Preparation</b> <ul style="list-style-type: none"> <li>- Determine the location and extent of adjustments and addition that are needed to the denture</li> </ul> </li> <li>2. <b>Impression + Border Mold</b> <ul style="list-style-type: none"> <li>- Use denture as the custom tray -&gt; <b>Border mold the flanges</b></li> <li>- Apply tray <b>adhesive</b> to intaglio surface + Vaseline the patient commissures -&gt; <b>Load Light body PVS into denture (maintains tissue shape)</b></li> <li>- Seat the denture with even pressure and get the patient to close in CR -&gt; <b>Hold lightly for 6 minutes</b></li> </ul> </li> <li>3. <b>Assess:</b> <ul style="list-style-type: none"> <li>- Ideally: Retentive and stable, 2mm thickness, no bare spots, peripheral roll, Maintained VDO</li> </ul> </li> <li>4. <b>Send to the lab to Process</b> <ul style="list-style-type: none"> <li>- Make sure all undercuts are removed before sending to the lab or the denture will get stuck in the flasking</li> </ul> </li> <li>5. <b>Insertion and Adjustments as needed</b></li> </ol>	 
<b>Repair</b>	<ol style="list-style-type: none"> <li>1. Index the pieces <ul style="list-style-type: none"> <li>- <b>Crazy glue them back into place</b></li> </ul> </li> <li>2. Pour a Cast (or a putty model)</li> <li>3. Cut a <b>1mm space to widen the fractures</b></li> <li>4. <b>Apply new acrylic resin to seam</b> -&gt; Use Bead-Brush technique, adding excess to give space for polishing</li> <li>5. Add to pressurized contained to cure the acrylic</li> <li>6. Insert dentures</li> </ol> 	

## Immediate Dentures

<b>Conventional Dentures</b>	<b>Immediate Dentures</b>
<ol style="list-style-type: none"> <li>1. Extract Teeth</li> <li>2. Heal for 6 weeks</li> <li>3. Take Impressions</li> <li>4. Fabricate Denture</li> <li>5. Insert Denture</li> </ol>	<ol style="list-style-type: none"> <li>1. Initial Exo's</li> <li>2. Take Impressions (4-6 weeks post exo's)</li> <li>3. Fabricate Denture</li> <li>4. Extract Teeth</li> <li>5. Insert Denture</li> <li>6. Heal</li> <li>7. Reline</li> </ol>

- About 50% of patients can get away with a reline for 1 year, but there might be so much bone remodelling in that year that a completely new denture will be needed -> **Make sure they know this!**

Immediate Dentures		
Pros and Cons	Advantages	Disadvantages
	<p>Maintain Esthetics</p> <p>Maintain Function</p> <p>Comfort and Healing</p> <ul style="list-style-type: none"> <li>- Pt may think the “sores” associated with denture fit are from the surgery, so they can better handle it while the tissues adapt (less complaining)</li> </ul> <p>Good Adaptation</p> <ul style="list-style-type: none"> <li>- Faster speech and function adaptation</li> </ul> <p>Short Tx Time</p>	<p>More Complicated</p> <p>Final esthetics can't be evaluated prior to fabrication</p> <p>Retention can be an issue</p> <p>Need more maintenance, Adjustments, relines etc</p> <p>More expensive (when incorporating the Reline, lab reline, remake etc)</p>
Steps	<p>1. <u>Diagnosis and Tx Planning</u></p> <p>2. <u>Disease Control</u></p> <ul style="list-style-type: none"> <li>- Initial exo's (Emergency teeth and posterior teeth)</li> <li>- Aleolotomy/Aveolectomy</li> </ul> <p>3. <u>Impressions (4-6 weeks after initial extractions)</u></p> <ul style="list-style-type: none"> <li>- Do a 2-step impression (<b>Pickup Impression</b>) if there is a risk of pulling remaining teeth out -&gt; <b>Cut a window in a custom tray</b> for the teeth that remain. <b>Border mold, PVS Impression</b> etc. Then (with the 1<sup>st</sup> PVS impression in place, place a stock tray over your custom tray and fill it with alginate to capture the teeth sticking out of the window</li> <li>- Pour up casts</li> </ul>  <p>4. <u>Take Jaw Relation + Wax Rims</u></p> <ul style="list-style-type: none"> <li>- By keeping some teeth in, they will hold the original VDO (easy for the wax rims)</li> <li>- If Pt has teeth still occluding, then you don't even need to take a CR because they can generate a reproducible bite</li> </ul>  <p>5. <u>Wax Try-In</u></p> <ul style="list-style-type: none"> <li>- Idealise the occlusion once the denture is made (Don't worry about super-erupted teeth at this point)</li> </ul>  <p>6. <u>Surgerize the Casts</u></p> <ul style="list-style-type: none"> <li>- <b>Cut the stone teeth off of the models to simulate the post surgery ridge anatomy</b> -&gt; Don't reduce too much though, if you “under” reduce it will just create a void spot that is easy to fill vs trying to find a high sore spot on a blood ridge post extraction</li> </ul>  <p>7. <u>Denture Fabrication + Surgical Guide Fabrication</u></p>  <p>8. <u>Extractions</u></p>	

	<ul style="list-style-type: none"> <li>- Regular surgery instructions for the patient -&gt; Painkillers, No bending or heavy lifting, No straws or spitting etc</li> <li>- <b>Leave Denture in at all times for 24 hrs</b> (helps control swelling and cleanliness of the surgical site)</li> </ul> 
	<p><b>9. Check Pressure Spots and Make Adjustments</b></p> <ul style="list-style-type: none"> <li>- Place clear surgical guide and <b>look through for spots of blanched tissues</b> -&gt; These are areas to reduce on the denture</li> <li>- Once all adjustments have been made, suture up the ridge</li> </ul> 
	<p><b>10. Insert Denture</b></p> 
	<p><b>11. Reassessments</b></p> <p><b>The next day!</b></p> <ul style="list-style-type: none"> <li>- Clean the denture (probably will be bloody)</li> <li>- Evaluate the wound healing</li> <li>- Adjust denture base if needed</li> <li>- Remount dentures and adjust occlusion</li> <li>- Reinforce denture hygiene</li> <li>- Remind Pt of future need for re-eval and reline as bone resorbs</li> </ul> <p><b>1 Week</b></p> <ul style="list-style-type: none"> <li>- Remove sutures</li> </ul> <p><b>Monthly (for 3 months)</b></p> <ul style="list-style-type: none"> <li>- Check it once per month for fit and stability as bone resorbs</li> <li>- Reline as needed</li> </ul> <p><b>12. Completion</b></p> <ul style="list-style-type: none"> <li>- Complete healing takes about 9 months -&gt; results in 20-30% ↓ in ridge volume</li> <li>- Perform a heat-processed (Lab) reline 9-12 months after extractions</li> </ul>

## Overdentures

= Removable partial or complete dentures **that covers and rests on 1+ remaining natural teeth, the roots of natural teeth and/or dental implants**

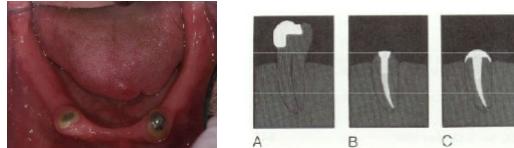
Indications	Contraindications
<p>Patients with <b>congenital and/or acquired defects</b></p> <ul style="list-style-type: none"> <li>- Severely stained and malformed teeth</li> <li>- Partial anodontia</li> <li>- Dentinogenesis imperfecta</li> <li>- Amelogenesis imperfecta</li> <li>- Severely eroded and abraded teeth</li> </ul> 	<p>Presence of remaining <b>teeth</b> that can be used for fixed or removable <b>partial prosthesis</b></p> <p><b>Poor oral hygiene</b> -&gt; Still at risk for perio + caries risk for remaining teeth. Pt needs to really keep their OHE high</p>

<b>Advantages</b>	<ul style="list-style-type: none"> <li>- Preserves alveolar bone (Where the teeth are remaining)</li> <li>- Preserves proprioceptive response</li> <li>- ↑ support, ↑ esthetics and phonetics (vs fixed prosthesis)</li> <li>- ↑ retention</li> <li>- ↑ Masticatory ability (Natural Teeth: 90%, Overdenture: 79%, Complete denture: 59%)</li> <li>- ↑ Patient acceptance</li> <li>- Psychological advantages</li> <li>- Cheaper vs fixed prosthesis</li> <li>- Easier access for hygiene compared to a fixed prosthesis</li> <li>- Improves C:R Ratio -&gt; if mobility and poor C:R, when you cut the crown to gingival level the mobility will ↓ and the C:R ratio improves!</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>- Longer Tx Time</li> <li>- More Technique sensitive</li> <li>- <b>More Expensive than conventional dentures</b> (when you include Fillings, RCT etc)</li> <li>- ↑ Maintenance and recall procedures</li> <li>- Retained teeth can still develop caries or Perio disease</li> </ul>

**There are different types of Support for overdentures:**

Supports	Talking About Supports
<b>Roots w/o Locator attachments</b>	<ul style="list-style-type: none"> <li>- Cut the crown off the tooth to the root level. Perform an RCT and fill the chamber with something like amalgam or silver reinforced RMGIC. <b>Dome the top of the root+filling</b></li> <li>- Ensure there are no places that are pressing on the remaining teeth too much otherwise the roots will crack</li> </ul> <ol style="list-style-type: none"> <li>1. Do RCT</li> <li>2. Seal with amalgam or composite</li> </ol>  
<b>Roots w/ locator attachments</b>	<p>For teeth with RCT -&gt; Attachments are inserted into the canal and gives something for the denture to snap onto</p> <ol style="list-style-type: none"> <li>1. Do RCT</li> <li>2. Use bur dictated by manufacturer of attachment to create a snug, retentive shape for attachment insertion</li> </ol>   
<b>Teeth</b>	<p>If Pt can't afford the RCT and teeth have excessive wear -&gt; we can grind the crown down to gingival level (Likely the pulp has receded a lot so we arnt worried about pulp exposure (confirm radiographically though!))</p> 
<b>Implants w/ bar</b>	
<b>Implants w/ single attachments</b>	<ul style="list-style-type: none"> <li>- Easier and cheaper than bars</li> <li>- Better for hygiene vs bars also (Don't need to clean under the bar)</li> </ul>  

## Tooth Supported Overdenture

Procedure					
<b>1. Diagnosis and Treatment Planning</b>					
<b>2. Disease Control and Abutment Selection</b>	<p><u>Ideally:</u></p> <ul style="list-style-type: none"> <li>- Bilateral Abutments (Canines and Premolars do well)</li> <li>- Avoid multi-rooted teeth for abutments, they just ↑ \$\$ of RCT</li> </ul> <p><u>Assess possible abutment teeth:</u></p> <ul style="list-style-type: none"> <li>- Angulation for Path of insertion -&gt; Especially important if using Locator Attachments</li> <li>- Crown:Root Ratio</li> <li>- Periodontal Conditions</li> <li>- Caries Risk</li> <li>- Endo possibility</li> </ul>				
<b>3. Endo + Exo + Filling</b>	<p>Any teeth surviving the purge -&gt; <b>Reshape to remove undercuts and ↓ height to gingival level</b></p> <ul style="list-style-type: none"> <li>- Excellent OHE is needed to be able to keep abutment teeth/roots</li> </ul> <p>Can also make a cast coping to cap the teeth if they have sensitivity and have iffy caries control (but good perio prognosis)</p>  <table border="1" data-bbox="538 876 1517 1108"> <thead> <tr> <th>Amalgam or Silver-Filled GI (Ketac-Silver) Plug</th> <th>Cast Coping</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>- Teeth reduced to gingival margin (or slightly above)</li> <li>- About 4mm of RCT filling material is removed</li> </ul> <p><b>*Unable to provide protection for the remaining tooth structure -&gt; Need low caries risk*</b></p> </td><td> <p><b>*Offers ↑ support and protection for the remaining tooth structure*</b></p> <ul style="list-style-type: none"> <li>- Indicated when remaining cervical tooth structure has insufficient bulk or strength</li> <li>- Can cast an attachment ↑ ↑ improvement in retention is desired</li> </ul> </td></tr> </tbody> </table>	Amalgam or Silver-Filled GI (Ketac-Silver) Plug	Cast Coping	<ul style="list-style-type: none"> <li>- Teeth reduced to gingival margin (or slightly above)</li> <li>- About 4mm of RCT filling material is removed</li> </ul> <p><b>*Unable to provide protection for the remaining tooth structure -&gt; Need low caries risk*</b></p>	<p><b>*Offers ↑ support and protection for the remaining tooth structure*</b></p> <ul style="list-style-type: none"> <li>- Indicated when remaining cervical tooth structure has insufficient bulk or strength</li> <li>- Can cast an attachment ↑ ↑ improvement in retention is desired</li> </ul>
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<b>4. Impressions, Jaw Relation</b>					
<b>5. Wax Try-in</b>					
<b>6. Overdenture Fabrication (If immediate OD = Surgerize the master cast)</b>					
<b>7. Insert Overdenture (If immediate OD = Decoronate, restore abutments, possibly reline)</b>					

<b>8. Reassessment</b>	<u>Check for</u> <ul style="list-style-type: none"> <li>- Recurrent Decay</li> <li>- Gingivitis</li> <li>- Periodontitis</li> <li>- Trauma etc</li> </ul>
<b>9. Maintenance</b>	<u>Ensure adequate OHE:</u> <ul style="list-style-type: none"> <li>- Can place Fl inside the denture (1 drop wherever the teeth are) -&gt; Teeth will then soak in Fl gel all day and delay/protect against recurrent decay</li> </ul> <u>CHX Rinse</u> <ul style="list-style-type: none"> <li>- This normally stains teeth if used for a long time -&gt; But who cares here, the teeth are covered by nicer acrylic denture teeth</li> </ul>

## Single Dentures

They are what they sound like... *Just one set of Dentures (Max or Mand) opposing:*

- Natural teeth
- Fixed resto's
- Removable partial denture
- Existing complete denture that was previous make

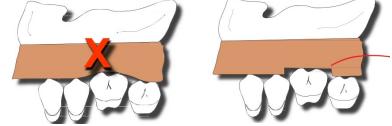
### Why are Single Dentures more difficult to make?

- Heavy occlusal forces due to opposing natural teeth
  - Causes Displacement (Retention & Stability issues), Fractures, and Ridge Resorption
- Denture foundation can't resist high occlusal force -> Advanced bone loss of residual alveolar ridge
- Supra-eruption of opposing natural teeth -> Unharmonious vertical plane, minimize vertical space to set denture teeth
- Mesial Drifting of opposing natural teeth -> Unharmonious occlusal plane

<b>Maxillary Single Denture</b>	<ul style="list-style-type: none"> <li>- Easier to Make</li> <li>- More Common</li> <li>- Bone is less dense and there are more single rooted teeth (they are lost easier vs Mandible)</li> </ul>
<b>Mandibular Single Denture</b>	<p><b>*Avoid when possible*</b></p> <ul style="list-style-type: none"> <li>- Mandible undergoes severe ridge resorption with the forces applied by a complete denture           <ul style="list-style-type: none"> <li>-&gt; employ stress reduction measures (Consider Exo of Max. healthy teeth for the long term health of the mouth)</li> </ul> </li> <li>- Denture supporting tissues are smaller vs maxilla</li> <li>- Mucosa and Submucosa overlying the periosteum and bone is thin in mandible</li> </ul> <p><i>Would prefer -&gt; Overdentures or Implant retained dentures</i></p> <p><b>So when do we do?</b></p> <ol style="list-style-type: none"> <li>1. Class III Jaw Relationship</li> <li>2. Cleft Palate = ↓ opposing forces (not to mention there would be more issues in a cleft palate if we Exo'd the healthy teeth on Max to make a complete denture)</li> <li>3. Mandibular reconstruction due to trauma or cancer with an intact maxillary arch</li> </ol>

## Technique

<b>1. Diagnosis and Tx Planning</b>	<u>When Evaluating the patient, look for:</u> <ul style="list-style-type: none"> <li>- Uneven alignment of teeth (Tipping, Extrusion etc)</li> <li>- Occlusal Surface (uneven abrasion, wear surface)</li> <li>- Cross-Bite relationship</li> <li>- Number and position of natural teeth           <ul style="list-style-type: none"> <li>- Malpositions ↓ stability and make balancing occlusion very challenging</li> </ul> </li> </ul> <p><b>Combination Syndrome</b></p> <p><b>CAUTION: Avoid single Max. denture against mandibular anterior teeth</b></p>	 
<b>2. Impressions</b>	Mostly as per usual <ul style="list-style-type: none"> <li>- Border Mold</li> <li>- Final Impressions (Max and Mand)</li> </ul>	  

	<p><b>3. Wax Rims and JRR</b></p> <p>Wax Rims might not be parallel to ala-tragus line (Fox Plane) -&gt; Opposing occlusal surface of natural teeth will dictate the occlusal plane</p> <p>Labiolingual thickness of anterior wax rims will interfere with establishing the correct VDO -&gt; Create a vertical overlap in the rim</p> <ul style="list-style-type: none"> <li>- Anterior lingual of Maxillary anterior wax rim must be thin and/or be ledged to allow vertical overlap of lower incisors</li> </ul> <p>Create Wax modification to establish proper OVD -&gt; <b>No inclines/slopes in the wax.</b> If there are steps in the occlusal plane, create opposing steps in the wax to account for this</p>  <p><b>If denture is against a PRDP:</b></p> <ul style="list-style-type: none"> <li>- Fabricate the occlusal rim on the RPD framework after the altered cast impression</li> <li>- Adapt wax to oppose CD wax rim and optimize occlusion</li> </ul>  <p><b>If Denture is against Crowns or FPD:</b></p> <ul style="list-style-type: none"> <li>- Do Wax rims before Crown -&gt; Lab will make the denture and then make the crowns to occlude nicely</li> </ul> 
	<p><b>4. Wax Try In</b></p> <p><b>Setting Anterior Teeth</b></p> <ul style="list-style-type: none"> <li>- More difficult</li> <li>- Might produce excessive overbite with natural teeth if too focused on esthetics</li> </ul> <p><b>Setting Posterior Teeth</b></p> <ul style="list-style-type: none"> <li>- ↑ adjustment to obtain stable centric contacts</li> <li>- <b>Denture teeth won't usually articulate well w/ natural teeth</b></li> <li>- Watch for inclines, rotated teeth etc</li> </ul> <p><b>Setting Tips:</b></p> <ul style="list-style-type: none"> <li>- Increase the incisal pin to 1mm</li> <li>- Set Posterior teeth (30-33°)</li> <li>- Return pin to original position -&gt; Adjust occlusion until pin touches the table</li> </ul> <p><b>Denture Teeth Wear:</b></p> <ul style="list-style-type: none"> <li>- ↑ wear against natural teeth = ↑ recalls</li> <li>- Constantly adjusting occlusion to prevent changes in stress distribution</li> <li>- <b>NEVER use porcelain teeth -&gt; Causes SEVERE attrition</b></li> </ul> 
	<p><b>5. Occlusal Adjustments</b></p> <p><u>Adjust natural teeth if you need</u></p> <ul style="list-style-type: none"> <li>- ↓ Curve of Spee (COS) = Level supraeruptions</li> <li>- Recountour rotated teeth to permit contacts on flat surfaces</li> </ul> <p><u>Assess desired occlusal plane</u> -&gt; then adjust occlusal plane of the natural teeth to that desired standard</p> <ul style="list-style-type: none"> <li>- Any VERY malposition teeth should be considered for Ortho or Extraction</li> </ul> <p>If the try in is against a Crown in progress or FPD -&gt; Wax them up on the preps and optimize occlusion</p>
	<p><b>6. Denture Fabrication</b></p> <p>This is the same shit as before</p> <p><b>Cast metal Denture Base</b></p> <ul style="list-style-type: none"> <li>- Used if: <ul style="list-style-type: none"> <li>- <b>Very limited space on a strong patient</b> (Acrylic will be too thin and weak)</li> <li>- If denture fractures repeatedly: Make sure denture is not contacting on inclines</li> </ul> </li> </ul>
	<p><b>7. Denture Delivery</b></p> <p>Ensure Pt knows that they will need more frequent recalls due to denture wear</p> <p>Explain how to take care of the denture</p>

## Combination Syndrome

<b>What is it?</b>	<p>Occurs when Pt has a <b>single Maxillary denture against mandibular anterior teeth</b></p> <ul style="list-style-type: none"> <li>- <b>Resorption, Loosening, Fracture</b> -&gt; Combination Syndrome</li> <li>- Tell patient to bite mostly on their posterior teeth, if they have none...this isn't a great situation</li> </ul> <div style="text-align: center; margin-top: 10px;">   </div>
<b>Main Symptoms</b>	<ul style="list-style-type: none"> <li>- Loss of bone from anterior Maxillary ridge</li> <li>- Overgrowth of the tuberosities</li> <li>- Papillary hyperplasia in the hard palate</li> <li>- Extrusion of the lower anterior teeth</li> <li>- Loss of bone under the denture bases</li> </ul> <p><b>Others:</b></p> <ul style="list-style-type: none"> <li>- Loss of VDO</li> <li>- Occlusal plane discrepancy</li> <li>- Anterior spatial repositioning of the mandible</li> <li>- Poor adaptation of the prostheses</li> <li>- Epilis fissuratum</li> <li>- Periodontal changes</li> </ul>
<b>How did this happen!?</b>	<p>↑ ↑ force from mandibular anterior teeth</p> <ul style="list-style-type: none"> <li>- Early bone loss in Anterior Maxilla</li> <li>- Enlarged Fibrous tuberosities in the posterior maxilla</li> </ul> <p>Migration of the occlusal plane</p> <ul style="list-style-type: none"> <li>- Migration of the mandibular natural teeth</li> </ul> <p>Poor esthetics and migration of denture</p> <p>Inflammatory papillary hyperplasia</p>
<b>How to Avoid:</b>	<p><b>Make a distal Free End RPD on Mandible for stress distribution</b></p> <ul style="list-style-type: none"> <li>- Make this at the same time as the maxillary Complete denture so the occlusion is optimum</li> <li>- *Patient needs to wear them both!</li> </ul>

## Implant Overdenture

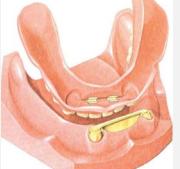
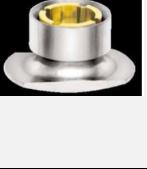
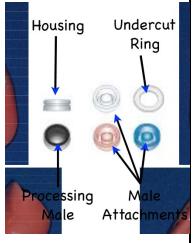
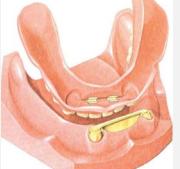
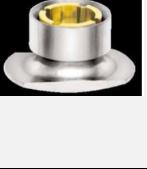
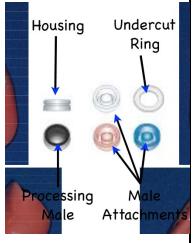
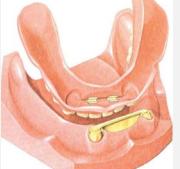
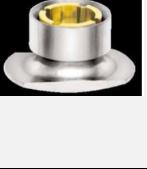
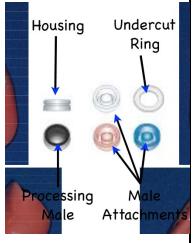
<b>Advantages</b>	<p><b>Preserves alveolar bone</b></p> <p>Significantly ↑ retention and stability vs conventional mandibular complete denture</p> <ul style="list-style-type: none"> <li>- Usually these are retrofitted from regular dentures</li> </ul> <p>Patient acceptance</p> <p>↑ Masticatory efficiency compared to CD</p> <p>Psychological</p> <p>↓ or eliminate denture flanges</p> <p>Require fewer implants and less critical positioning than fixed implants prostheses</p> <p>Decreased cost compared to a fixed prosthesis</p> <p>Ease of oral hygiene procedure</p> <p><b>Why Implants?</b></p> <ul style="list-style-type: none"> <li>- Provide static, stable base</li> <li>- ↑ occlusion by more accurate jaw records</li> <li>- ↓ trauma of a denture base to the supporting tissues</li> <li>- Maintains bone height in locations where implants are placed</li> </ul> <div style="text-align: right; margin-top: 10px;">  </div>
<b>Disadvantages</b>	<p>Longer Tx Time</p> <p>More technique sensitive</p> <p>More expensive than conventional dentures</p> <p>↑ maintenance and recall procedures</p> <ul style="list-style-type: none"> <li>- Need to change clips over time for ↑ retention</li> </ul> <p>Need more interarch space</p> <ul style="list-style-type: none"> <li>- ~12mm of space between crest of bone and the occlusal plane. Depending on the Attachment being used</li> </ul>

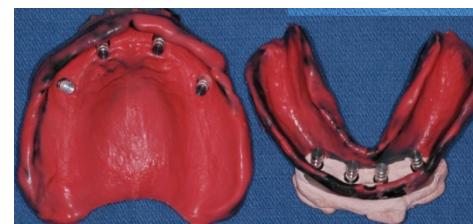
<b>Indications for Implant OD's</b>	<p>Advanced ridge resorption necessitating replacement of hard and soft tissues</p> <p><b>High muscle attachment</b> complicating CD fabrication</p> <ul style="list-style-type: none"> <li>- Strong muscles keep popping CD's off</li> </ul> <p>Patient who prefers a removable prosthesis over fixed</p> <p>Trauma w/ large soft and hard tissue deficiency</p> <p>Patients w/ congenital or developmental defects</p> <ul style="list-style-type: none"> <li>- Cleft Lip +/- Palate</li> </ul> <p>Parafunction</p> <p>Nerve impingement</p> <p><b>Lack of vestibular and lingual depth</b></p> <p>Gagging</p>
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<u>Masticatory Performance</u>
(Probably an exam Q...its been brought up a few time)
<u>Natural Teeth:</u> 90%
<u>Overdentures:</u> 79%
<u>Complete Dentures:</u> 59%
Maximum occlusal force of a patient w/ conventional dentures may ↑ 300% with an implant-supported prosthesis

## Technique

<b>1. Diagnosis and Tx Planning</b>	<p>Patient is <b>unhappy with conventional (well-made) Dentures</b></p> <ul style="list-style-type: none"> <li>- <b>Implants are not an excuse for poorly MADE dentures, assess the denture 1<sup>st</sup></b></li> </ul> <p>Explain <b>Financial expectations</b></p> <ul style="list-style-type: none"> <li>- Regular maintenance and changing of the clips costs money. Pt will have to still need to come in frequently</li> </ul> <p>Assess overall health and ability to tolerate surgery</p> <p>Assess bone volume and quality</p> <p>Patient understands risks and benefits</p> <p><b>Options for Mand. OD:</b></p> <ul style="list-style-type: none"> <li>- Single implant w/ attachment</li> <li>- 2+ Independent implants w/ attachments <ul style="list-style-type: none"> <li>- Balls, Locators or ERA attachments</li> <li>- If ridge shape is odd (like a V) then do this instead of a bar</li> <li>- MUST be parallel</li> </ul> </li> <li>- 2+ Implants joined by a bar <ul style="list-style-type: none"> <li>- Bar needs to be &gt;2mm away from soft tissue</li> <li>- <b>Cross-section:</b> Anything but round to ↓ flexibility</li> <li>- Clips placed perpendicular to the axis of prosthesis rotation</li> </ul> </li> <li>- 3+ Implants joined by a bar w/ distal cantilevered extension <ul style="list-style-type: none"> <li>- Extension ↑ the support from the bar</li> </ul> </li> </ul> 
<b>2. Consent to Surgical Tx</b>	<p><b>Include your diagnosis!</b></p> <ul style="list-style-type: none"> <li>- Write the nature and objective of the Implant Tx</li> </ul> <p>Explain ALL risks to the patient</p> <p>Explain alternative options (FPD, RPD, CD, IF-FRD)</p> <p><b>Give fair prognosis depending on your patient's situation</b></p> <p>Detail the cost and duration of Tx</p> <p>Highlight the need for long term regular follow-up</p>
<b>3. Radiographic guide and Surgical guide</b>	<p>*More info in subsequent lectures*</p> 

<b>4. Implant Placement + Healing</b>	<p><b>Stage 1:</b> Expose bone so you can visualise it directly -&gt; Lets to make sure you haven't perforated the buccal plate</p>  <p><b>Healing Time:</b></p> <ul style="list-style-type: none"> <li>- Usually 2-3 months for a healthy patient</li> <li>- Depends on bone quality, type of implant, and initial stability of implant</li> </ul>						
<b>5. Uncover Implants and Abutment Selection</b>	<p><b>Stage 2:</b></p> <ul style="list-style-type: none"> <li>- Open gingiva</li> <li>- Place healing abutments</li> <li>- <u>Let gingiva heal before prosthetic phase:</u> <ul style="list-style-type: none"> <li>- 4 weeks for Completely edentulous</li> <li>- <u>For Fixed Pros:</u> 4 weeks for Posterior, 8 weeks anterior + 6 months w/ temp crown for optimal gingival esthetics</li> </ul> </li> </ul> <p><b>Abutment Selection</b></p>  <p>Abutments are placed with Impression copings added on top so the implant placement and angulation can be captured in the impression.</p>						
	<p><b>Types of Attachments</b></p> <table border="1" data-bbox="518 918 750 1235"> <tr> <td data-bbox="518 918 750 1235">     </td> <td data-bbox="750 918 1537 1235"> <p><b>Hader Bar</b> These clip onto implants connected by a bar <b>Minimum 5mm long bar, with max bulk at 1.9mm</b></p> <ul style="list-style-type: none"> <li>- Smallest clip is 3mm long</li> <li>- 20° clip rotation</li> <li>- 3 different levels of retention</li> </ul> <p><b>Old style:</b> Whenever you change clip sizes you need to grind out the acrylic on the denture and re pickup and cure new acrylic around the new size clip.</p> <p><b>New Style:</b> Metal Housing makes it easier to pop in and out different sizes without re-curing new acrylic</p> </td></tr> </table> <table border="1" data-bbox="518 1235 750 1552"> <tr> <td data-bbox="518 1235 750 1552">     </td> <td data-bbox="750 1235 1537 1552"> <p><b>O-Ring Ball</b> Lamellae surrounded by a PVC ring</p> <ul style="list-style-type: none"> <li>- Height: 4mm -&gt; Need minimum 5mm (Abutment + Attachment)</li> <li>- 0.4mm resiliency</li> </ul> <p>*Male component is not replaceable*</p> <p><i>Recommended for OD when rotation, resilience and fixation are desired</i></p> <p>Easy to change the clips (female part) for ↑ retention.</p> <ul style="list-style-type: none"> <li>- Takes 5 seconds, but do it in the back so the Pt doesn't feel like they are getting ripped off paying you so much -&gt; clips cost \$90!</li> </ul> <p>Wide range of movement (6 different directions)</p> <p>Low cost</p> <p>Variable degrees of retention</p> </td></tr> </table> <table border="1" data-bbox="518 1552 750 1831"> <tr> <td data-bbox="518 1552 750 1831">     </td> <td data-bbox="750 1552 1537 1831"> <p><b>Locators</b> Total attachment height: 3.7mm</p> <ul style="list-style-type: none"> <li>- Comes in straight and extended range models</li> <li>- Different colors for different levels of retention</li> </ul> <p><b>Female attachment can be on the implant and the male on the denture</b></p> <ul style="list-style-type: none"> <li>- Need to ensure the female part is very clean or it can break the male attachment if it is forced into a receiver filled with muck</li> </ul>  </td></tr> </table>	 	<p><b>Hader Bar</b> These clip onto implants connected by a bar <b>Minimum 5mm long bar, with max bulk at 1.9mm</b></p> <ul style="list-style-type: none"> <li>- Smallest clip is 3mm long</li> <li>- 20° clip rotation</li> <li>- 3 different levels of retention</li> </ul> <p><b>Old style:</b> Whenever you change clip sizes you need to grind out the acrylic on the denture and re pickup and cure new acrylic around the new size clip.</p> <p><b>New Style:</b> Metal Housing makes it easier to pop in and out different sizes without re-curing new acrylic</p>	 	<p><b>O-Ring Ball</b> Lamellae surrounded by a PVC ring</p> <ul style="list-style-type: none"> <li>- Height: 4mm -&gt; Need minimum 5mm (Abutment + Attachment)</li> <li>- 0.4mm resiliency</li> </ul> <p>*Male component is not replaceable*</p> <p><i>Recommended for OD when rotation, resilience and fixation are desired</i></p> <p>Easy to change the clips (female part) for ↑ retention.</p> <ul style="list-style-type: none"> <li>- Takes 5 seconds, but do it in the back so the Pt doesn't feel like they are getting ripped off paying you so much -&gt; clips cost \$90!</li> </ul> <p>Wide range of movement (6 different directions)</p> <p>Low cost</p> <p>Variable degrees of retention</p>	 	<p><b>Locators</b> Total attachment height: 3.7mm</p> <ul style="list-style-type: none"> <li>- Comes in straight and extended range models</li> <li>- Different colors for different levels of retention</li> </ul> <p><b>Female attachment can be on the implant and the male on the denture</b></p> <ul style="list-style-type: none"> <li>- Need to ensure the female part is very clean or it can break the male attachment if it is forced into a receiver filled with muck</li> </ul> 
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6. Impressions, JRR, Wax Try In	  	7.
8. Overdenture Fabrication	 	
9. Insert Overdenture		
10. Maintenance	<p>Patient needs to be able to take care of their dentures themselves</p> <ul style="list-style-type: none"> <li>- Patient should gently brush around the abutments</li> </ul> <p><b><u>Overdenture hygiene:</u></b></p> <ul style="list-style-type: none"> <li>- Diluted bleach will disintegrate the attachments! -&gt; DON'T USE</li> <li>- Mouthwash solutions will stiffen and make attachments more brittle -&gt; DON'T USE</li> <li>- Water or regular denture cleaner works -&gt; ONLY USE THESE</li> </ul>	

#### Finances:

In private practice these are very expensive:

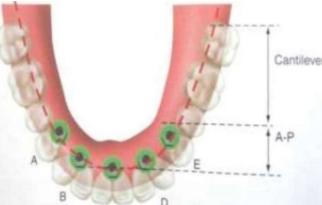
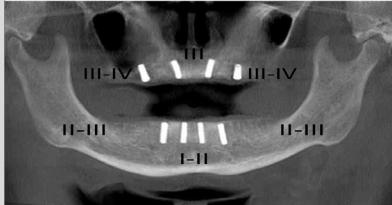
- o Implants (Surgery + Materials): \$2000-\$2500 per implant (Usually 4 implants per arch)
- o Overdenture: \$2500-\$3000 per denture
- o Total: ~ \$15000 Per denture

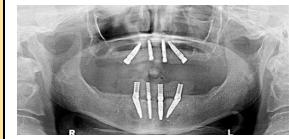
## Implant Guides for Overdentures

### Implant Site Selection Analysis:

- Minimum Bone height: >10-12mm
- Pathologies: Cysts?, Infections? Bone Resorption?
- Position of Anatomical Structures: Inferior Alveolar Nerve, Sinus (often need grafting and sinus lifts need to happen in Max Molar area)
- Quality of Bone
- Location of adequate bone

Contraindications to Implant Placement	<ul style="list-style-type: none"> <li>- Recent MI</li> <li>- Valvular Prosthesis</li> <li>- Severe Renal Disorder</li> <li>- Treatment-resistant Diabetes</li> <li>- Generalized secondary osteoporosis</li> </ul>	<ul style="list-style-type: none"> <li>- Chronic and Severe alcoholism</li> <li>- Radiotherapy (Dose &gt; 4000cGy)</li> <li>- Severe hormone deficiency</li> <li>- Drug addiction</li> <li>- Heavy smoker</li> </ul>
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Anterior-Posterior Spread	 <p>Typically we limit implants to only in the anterior area of the Mandible to avoid the IAN Nerve</p> <p>Distance from most anterior to most posterior implant x 1.5 = Distance your bar can cantilever posteriorly w/o breaking</p> <ul style="list-style-type: none"> <li>- Measure from the <b>middle</b> of the anterior implant to the <b>distal</b> of the most posterior implant</li> </ul>								
Quality of the Bone	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;"><b>Type I</b></td> <td style="padding: 5px;"><u><a href="#">Homogenous Cortical Bone</a></u> <ul style="list-style-type: none"> <li>- Too thick and strong, not enough vascularization for fast healing</li> <li>- Common after radiation</li> </ul> </td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>Type II</b></td> <td style="padding: 5px;"><u><a href="#">Thick Cortical bone with marrow cavity</a></u> <ul style="list-style-type: none"> <li>- This is best for implant placement</li> <li>- Good stability from the cortical bone and good blood flow from the marrow</li> </ul> </td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>Type III</b></td> <td style="padding: 5px;"><u><a href="#">Thin Cortical bone with dense trabecular bone of good strength</a></u> <ul style="list-style-type: none"> <li>- Can be too soft for implants</li> </ul> </td> </tr> <tr> <td style="text-align: center; padding: 5px;"><b>Type IV</b></td> <td style="padding: 5px;"><u><a href="#">Very thin cortical bone with low density trabecular bone of poor strength</a></u> <ul style="list-style-type: none"> <li>- Way too soft for implants</li> </ul> </td> </tr> </table> <div style="text-align: center; margin-top: 10px;">  </div>	<b>Type I</b>	<u><a href="#">Homogenous Cortical Bone</a></u> <ul style="list-style-type: none"> <li>- Too thick and strong, not enough vascularization for fast healing</li> <li>- Common after radiation</li> </ul>	<b>Type II</b>	<u><a href="#">Thick Cortical bone with marrow cavity</a></u> <ul style="list-style-type: none"> <li>- This is best for implant placement</li> <li>- Good stability from the cortical bone and good blood flow from the marrow</li> </ul>	<b>Type III</b>	<u><a href="#">Thin Cortical bone with dense trabecular bone of good strength</a></u> <ul style="list-style-type: none"> <li>- Can be too soft for implants</li> </ul>	<b>Type IV</b>	<u><a href="#">Very thin cortical bone with low density trabecular bone of poor strength</a></u> <ul style="list-style-type: none"> <li>- Way too soft for implants</li> </ul>
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<b>Radiographs</b>	<b>Periapical</b>		
	<b>Panoramic</b>		Easily available Visualize anatomical structures Easily available Low Cost Low Radiation
	<b>Cephalometric</b>		Can evaluate thickness and vertical height of bone in the midline Easily available (Usually just refer to Ortho office) Cost = between PAN and CT Rarely used for implant planning though
	<b>CT-Scan</b>	<u>Pros:</u> <ul style="list-style-type: none"> <li>- 3D view of the bone and anatomy -&gt; Reassuring, but actually overkill</li> <li>- &lt; 2% distortion</li> </ul> <u>Cons:</u> <ul style="list-style-type: none"> <li>- Expensive</li> <li>- ↑ Radiation</li> </ul>	

#### Distortion Vs Radiation -> Find a middle ground!

	Pan	PA	CT-Scan
<b>Distortion</b>	25% (Lots)	14%	2%  (NOICE)
<b>Radiation</b>	6.7 uSv	1.7 uSv (NOICE)	314 uSv (NOT NOICE) 

#### Recommendation for Radiographs and number of implants

	PA	Occlusal	PAN	CT-Scan
<b>1 Implant</b>	X	X	X	
<b>2-7 Implants</b>	X	X	X	?
<b>8 Implants</b>	X		X	X

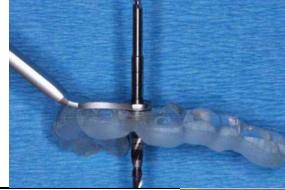
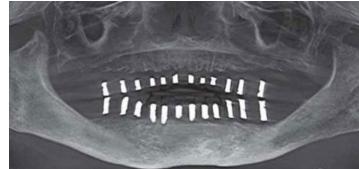
1 Implant w/o suspected resorption: PA

Multiple sites w/o suspected resorption: PA + PAN

Posterior implants close to the IAN or Maxillary sinus: CT-Scan

<b>Radiographic Surgical Guides</b>	<p>Using a <b>marker of known length</b> -&gt; We can determine the exact magnification of a PAN or PA and be able to <b>accurately measure the amount of bone for the implant</b>. Doing this we don't need to CT and all the rads they come with!</p> <ul style="list-style-type: none"> <li>- We can also train a CDA to do this...making it quicker, easier and cheaper than farming out guide fabrications to labs</li> </ul>	
	<b>PA Method</b>	Metal tube (known length) is incorporated into clear acrylic resin in the desired axis of insertion 
	<b>Pan Method</b>	GP markers are measured and placed into the clear acrylic resin to evaluate distortion in various sites - Can also duplicate a current denture 
	<b>CT Scan</b>	Patients take CT without guide in place....then the guide and a cast are sent to the lab to scan and then superimpose the images - Traditionally we would just get patient to wear the guide while in the CT Scan

## Traditional Radiographic Guide Steps

<b>Step 1</b>	- Examine existing old dentures - Wax-up missing teeth/dentures if no old denture is available (or is old denture teeth are shit) - Reline old unstable denture if needed	
<b>Step 2</b>	- <b>Duplicate wax up denture or existing denture in clear acrylic resin</b> <b>OR</b> - If Pt doesn't care about old denture you can make the guide directly into it	
<b>Step 3</b>	Grind out the desired implants sites using implant lab kit drills	
<b>Step 4</b>	Fill implant sites with GP or Prefabricated implant metal tubes	
<b>Step 5</b>	Have Pt wear guide and take the radiograph	

## Surgical Guide Steps

<b>Step 1</b> <ul style="list-style-type: none"> <li>- Get <a href="#">radiographic guide</a> back after the CR-or PAN</li> <li>- <a href="#">Adjust implant locations as you need</a></li> </ul>	<ul style="list-style-type: none"> <li>- Remove the GP from the sites where you want to place the implants</li> <li>- If you used the metal tubes for the radiographic guide and the placement is good then you are already done!</li> </ul> <p><b>Nobel Guides</b></p> <ul style="list-style-type: none"> <li>- Super expensive and convenient (Price is ↓, but it stated at \$1000 per guide) -&gt;</li> </ul>
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<b>Step 1</b> <p>Clinical Diagnostic assessment Examine Pt and take impression for study cast and master cast</p>	
<b>Step 2</b> <p>Diagnostic teeth setup/wax up or duplicate existing denture</p>	
<b>Step 3</b> <p>Fabricate the radiographic guide by the lab</p> <ul style="list-style-type: none"> <li>- <a href="#">Transform the tooth setup into a radiographic guide</a> -&gt; This is the prosthetic reference during planning</li> </ul>	
<b>Step 4</b> <p>Digitize w/ CT-Scan</p> <ul style="list-style-type: none"> <li>- Make CT Scan of the patient and radiographic guide by following the <a href="#">double scan protocol</a></li> </ul>	
<b>Step 5</b> <p>3D Diagnostics and Treatment Planning</p> <ul style="list-style-type: none"> <li>- Define implant positions from a clinical, anatomical and prosthetic perspective (combine tooth setup with patient anatomy)</li> </ul>	
<b>Step 6</b> <p>Treatment communication</p> <ul style="list-style-type: none"> <li>- <a href="#">Educate the patient</a> so they understand the Tx plan and helps communicate the plan from the restorative dentist to the surgeon</li> </ul>	
<b>Step 7</b> <p>Guided surgery</p> <ul style="list-style-type: none"> <li>- <a href="#">Fully guided drilling and implant insertion using customized surgical template</a> based on the digital Tx plan and scans</li> </ul>	

## Impressions for Implant Overdentures

### Indirect and Direct Impressions

#### Parts needed:

- [Impression copings](#) -> Different sizes depending on the size of the implant (color coded)



Indirect Copings

Direct Copings

Indirect (Closed Tray) TransferCopings are smooth with no undercuts

- They will remain in the mouth when you remove the impression -> So they must not create any retention in the PVS

**\*\*This technique is rarely used as a final impression technique\*\*** -> Not accurate for multiple implants...usually make a cast of this, make a custom tray and then use open tray technique for a definite implant position anyways

- Implants cannot be connected together using this technique
- Can use this method to fabricate a transfer jig for the final impression
- Need a Pt with a wide mouth opening -> Needs to be at least the height of the copings + the thickness of the impression tray



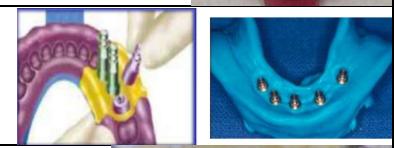
<b>Step 1</b>	<b>Remove healing abutments (1 at a time) and replace with impression copings</b> <ul style="list-style-type: none"> <li>- One at a time in case there is some swelling of the tissue around the implant after removal of the healing abutment....by the time the last abutment is out the swelling may make it harder to place the impression coping (and you might have tissue between it and the implant) -&gt; It also hurts the patient</li> </ul>	
<b>Step 2</b>	<b>Place impression copings (the tapered ones)</b> <ul style="list-style-type: none"> <li>- If the implant-coping junction is subgingival, take a radiograph to ensure its fully seated</li> <li>- If implant-coping junction is visible, use a non-abrading implant explorer to ensure its fully seated</li> </ul>	
<b>Step 3</b>	<b>Block out hex holes with wax</b> <ul style="list-style-type: none"> <li>- Kinda optional, but it makes for a nicer impression</li> </ul>	
<b>Step 4</b>	<b>Verify the fit of the tray over the copings</b> <ul style="list-style-type: none"> <li>- Usually can use a dentate metal tray so there is enough room for the impression copings</li> </ul>	
<b>Step 5</b>	<b>Make the impression and wait for it to set</b> <ul style="list-style-type: none"> <li>- While assistant loads tray, you inject light body PVS around the implant to capture tissue contour accurately</li> </ul>	
<b>Step 6</b>	<b>Remove impression from the mouth -&gt; Then remove the impression copings from the mouth (replace with healing abutments)</b> <ul style="list-style-type: none"> <li>- Attach the implant lab replica to the impression copings</li> </ul>	
<b>Step 7</b>	<b>Reinsert the impression coping + Lab replica into the impression -&gt; Ensure the copings realign perfectly into the impression</b> <ul style="list-style-type: none"> <li>- Most inaccuracies happen here -&gt; Make sure they are pushed deep enough, but not so hard that the PVS is torn at the bottom</li> </ul>	
<b>Step 8</b>	<b>Fabricate master cast with soft tissue masking</b> <ul style="list-style-type: none"> <li>- Inject Pink PVS like material around the implants. This will allow you to still contour the soft tissue around the implant while its in the stone cast</li> <li>- Once pink gingiva has set you can pour the cast</li> </ul>	

**Direct (Open-Tray) Technique / Pick-up impression**

Copings have **retentive elements** and screw is longer to ensure it sticks out of the impression so you can unscrew it after impression has set

- These are more forgiving to be reused. If there are any scratches or anything on these its no problem

<b>Step 0</b>	<p>Fabricate implant transfer jig on preliminary cast (the one you made with the indirect technique) 24hrs in advance -&gt; <b>Section and relute it to ↓ stress from polymerization shrinkage</b></p> <ul style="list-style-type: none"> <li>- <b>Without a transfer jig it is pretty much impossible to reposition multiple implants perfectly</b></li> </ul> <ol style="list-style-type: none"> <li>1. Tie floss around the implants to <b>create a “web”</b></li> <li>2. Add <b>GC pattern resin or duralay</b> one drop at a time over the web</li> <li>3. Once completely covered, let set for 24hrs and section the pieces (width of credit card) to relieve polymerization shrinkage</li> <li>4. <b>Recommended to lute a few of these pieces back together so you know which parts go where</b></li> </ol>			
<b>Step 1</b>	<p>Make a custom tray with <b>open windows fabricated over the implant areas for access to the screws</b></p> <ul style="list-style-type: none"> <li>- Ensure it is wide enough for the impression copings -&gt; Frequently if made off an alginate impression with healing abutments the window turns our too narrow</li> </ul> <p><b>Custom Tray</b></p> <ul style="list-style-type: none"> <li>- Block out areas above implant with base plate wax over healing abutments to simulate positions of the implant transfer</li> </ul>			
<b>Step 2</b>	<p><b><u>One Screw Test</u></b></p> <ul style="list-style-type: none"> <li>- Remove healing abutments one and a time and replace with impression coping -&gt; Verify seating visually or radiographically</li> <li>- If making a bar overdenture -&gt; <b>seat impression copings w/ transfer jig and perform 1 screw test</b></li> </ul> <p>1 screw test verifies <b>passivity of the transfer jig</b>: Once screw is in place (but not torqued) apply gentle pressure on transfer jig to see if there is any movement</p> <ul style="list-style-type: none"> <li>- <b>If there is movement</b> = its not passive...your cast sucks ass, make a new one</li> <li>- <b>No movement</b> = Take a <b>radiograph of the implant from the opposite end of where the screw is</b>...if its not passive you will see a space between implant and coping.</li> </ul> <p>If the 1-screw test shows it is not a passive fit:</p> <ul style="list-style-type: none"> <li>- Section your transfer jig (credit card thickness) and lute back together in the patients mouth</li> </ul>			
<b>Step 3</b>	<p><b>Verify screw/tray clearance</b></p> <ul style="list-style-type: none"> <li>- You have made some modifications...make sure it didn't fuck you up with tray clearance now</li> <li>- Make sure wall of the tray is high enough to cover the impression copings, but not so high that they cover the screw access</li> </ul> <p><b><u>If Mouth opening is too small for preliminary closed tray impression:</u></b></p> <ul style="list-style-type: none"> <li>- Fabricate the transfer jig directly in the mouth</li> <li>- Confirm seating of all impression copings with radiographs</li> <li>- Tie floss around the retentive elements and apply resin to the floss web</li> </ul>			
<b>Step 4</b>	<p><b>Make full arch impression -&gt; Ensure all the screws are visible and exposed before the material sets</b></p> <ul style="list-style-type: none"> <li>- Inject thin layer of light body around the implants under the jig</li> <li>- <b>Cover the window on the custom tray with thin pink wax so the medium body does splay out</b> when transferring to the patients mouth -&gt; Remove the wax once in the mouth</li> </ul>			

<b>Step 5</b>	Unscrew all retaining screws -> Remove tray with the impression copings and transfer jig in the impression - All impression copings will be solidly attached in your impression when you retrieve it	
<b>Step 6</b>	Attach implant analog/replica to pick-up impression copings inside the impression	
<b>Step 7</b>	Create soft tissue border and fabricate working cast	

Here is a video of them doing the Open window technique (For a fixed case, but the principle is the same)

- Remember we still need to border mould and do the rest of the denture procedures

<https://www.youtube.com/watch?v=vZNEh-71pNs&feature=youtu.be&t=31s>

## Fabricating Base Plates

Base w/o attachments	Base w/ attachments
<ul style="list-style-type: none"> <li>- If plan to pick up attachments chairside after the overdentures are processed</li> </ul> <p>*Place wax around the healing abutments (on the cast) so that the baseplate doesn't stay stuck on the cast when you retrieve it</p> <ul style="list-style-type: none"> <li>- Otherwise make it the same as usual</li> </ul> 	<p><b>*More accurate*</b></p> <ul style="list-style-type: none"> <li>- Less struggle w/ unretentive baseplates</li> <li>- BUT its not all sunshine and rainbows...takes additional chair time to remove healing abutments and screw in the baseplate</li> </ul> <ul style="list-style-type: none"> <li>- Plan to have attachments processed at the same time as the overdenture</li> <li>- Plan to have a bar overdenture</li> </ul> <p>*Use plastic (or metal) temporary abutments instead of impression copings*</p> <ul style="list-style-type: none"> <li>- Copings are too long and will interfere with occlusal plane (also they are metal and cannot be adjusted if you are changing the VDO)</li> <li>- Cutback excess screw (if plastic) to not interfere with JRR</li> </ul> 

- Jaw Relation Record



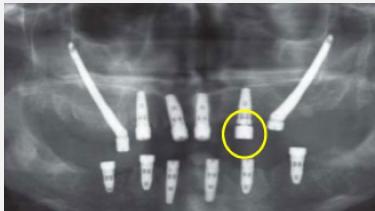
- Tooth Setup



Wax Try-in



## Implant Overdenture Complications

<p><b>Poor Denture Hygiene</b></p> <ul style="list-style-type: none"> <li>- Leads to Candida infection</li> </ul> 	<p><b>Poor Oral Hygiene</b></p> <ul style="list-style-type: none"> <li>- Food/debris caught in implant abutments will prevent the denture from seating completely and can cause breakage</li> <li>- Calculus and inflammation can occur under the bar and can cause peri-implant Mucositis and progress to peri-implantitis</li> </ul>  
<p><b>Tissue hyperplasia</b></p> <ul style="list-style-type: none"> <li>- Prevents proper seating of a denture</li> </ul> 	<p><b>Attachment wear</b></p> <p>Blue = Weakest strength Pink = Medium Strength Clean = Strongest strength</p> 
<p><b>Abutment/Bar wear</b></p> <ul style="list-style-type: none"> <li>- Pretty rare, and if it happens there is likely something wrong with the fit</li> </ul>  	<p><b>Lack of retention</b></p> <ul style="list-style-type: none"> <li>- Poor implant angulation</li> <li>- High Soft Tissue attachments (and you fucked up capturing them in your border moulding)</li> <li>- Food debris in attachments</li> </ul> 
<p><b>Denture Teeth Wear</b></p> 	<p><b>Fracture of Denture Base</b></p> <ul style="list-style-type: none"> <li>- Due to high occlusal forces by patients. They lack the proprioception to really know how hard they are biting down</li> <li>- If you can fit the pieces back together you can repair it (GC Pattern resin, Chairside repair resin, or a lab repair)</li> </ul> 
<p><b>Loosening of abutments or Abutment Fracture</b></p>  	<p><b>Screw Fracture</b></p> <ul style="list-style-type: none"> <li>- Slowly tease it out with an explorer</li> </ul>  
<p><b>Bone Loss</b></p> 	<p><b>Implant Loss</b></p> 

## Maintenance

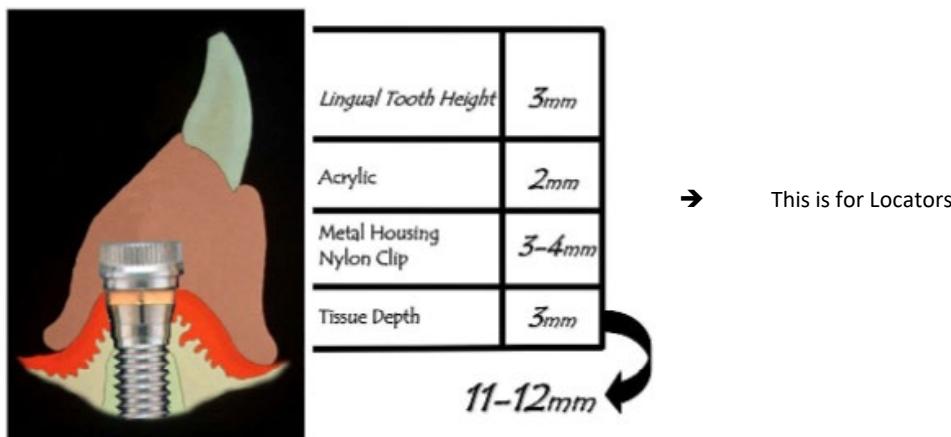
- Just because there are implants, doesn't mean the patient doesn't need to come in for checkups and maintenance!

Patient Recalls	Dental Exam should happen <b>every 6 months</b> <ul style="list-style-type: none"> <li>- Depending on risk (Age, dexterity, medical complications) they may need more frequent exams</li> </ul>
Professional Maintenance	<p><b><u>Biological</u></b></p> <ul style="list-style-type: none"> <li>- OHI</li> <li>- <b>Hygiene instructions for the prosthesis AND implants</b></li> </ul> <p><b><u>Mechanical</u></b></p> <ul style="list-style-type: none"> <li>- Must <b>check the prosthesis and its components</b> to ensure everything is functioning normally</li> </ul>
Home Maintenance	<p>Educate Pt on how to <b>brush the implants/bar</b> 2x daily</p> <ul style="list-style-type: none"> <li>- We can make the intaglio surface convex on the mandible to easy of cleaning (not maxilla, creates drinking and speech issues)</li> <li>- Create a gap under the implant supported prosthesis so you can clean under it easily</li> </ul> <p><b>Overdentures should be cleaned 2x daily with a denture brush and cleaning agent</b></p> <p>Remove overdenture while sleeping and store it in cleaning solution</p>

## Attachments for Overdentures

Factors for Attachment Selection	<ul style="list-style-type: none"> <li>- Available Bone</li> <li>- Pt's Prosthetic expectations</li> <li>- Finances</li> <li>- Personal choice and expertise of dentist</li> <li>- Experience and knowledge of the lab</li> </ul>
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When using Attachments, the prosthetic space needs to be adequate to ensure minimum thickness of the acrylic denture base



### Stud Attachments

Extra Radicular: Male component projects from Root/implant

Intra Radicular: Male component forms part of denture base and engages a designed “depression” within the root/implant contour

#### Ball Attachment



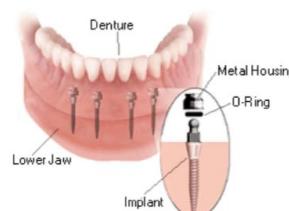
- Donut shaped synthetic gasket in the denture for ball to insert into
- Gasket can bend w/ resistance and return to original shape
- Attaches to a post w/ a groove or undercut area for O-ring to seat into

#### Advantages:

- Ease of changing the attachment (the O-ring)
- Wide range of movement
- Low Cost
- Different O-rings can confer different degrees of retention
- Possible elimination of time and cost of superstructure

#### Components:

<b>Metal Housing/Encapsulator</b>	Permits easy replacement of O-ring <ul style="list-style-type: none"> <li>- Internal cavity/undercut that houses the ring</li> <li>- Usually made of stainless steel</li> </ul>
<b>Ball Post</b>	Cannot be changed <ul style="list-style-type: none"> <li>- Attached to implant, and is usually made of titanium alloy</li> <li>- Has a head, neck and body -&gt; Head wider than neck</li> </ul>
<b>O-Ring</b>	Variety of diameters (3 sizes) <ul style="list-style-type: none"> <li>- Made of nitrile and fluorocarbon</li> </ul>



#### Locator Attachment



These are resilient, universal hinges

- Profile height: 2.5mm
- Diameter: 4.1mm

Inter-attachment angle allows for corrections off implant placement of up to:

- Standard Range Nylons: 40°
- Extended Range Nylons: 60°



Attachment resiliency = is associated with the movement between the abutment and the prosthesis in a predetermined direction or directions

#### Magnets



#### Advantages:

- Great if Pt have limited dexterity
- Easy to Clean

#### Disadvantages:

- High maintenance -> Poor bond to denture base
- Expensive -> Need to use rare earth metals to avoid corrosion issues associated with ferrous magnets

### Bar Attachments

#### Dolder Bar

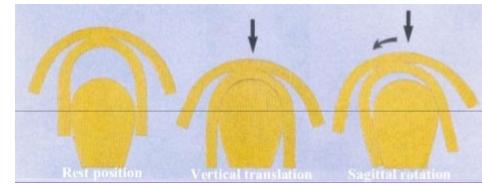
Egg shaped bar in cross section -> with Open Sided Sleeve

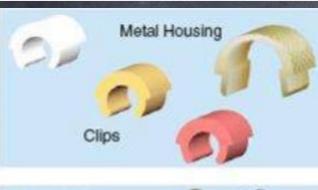
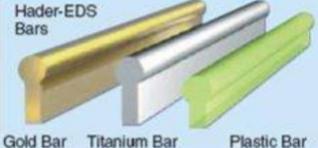
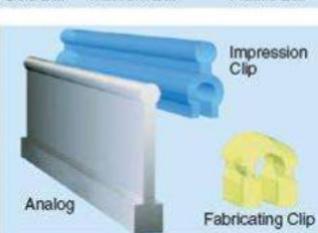
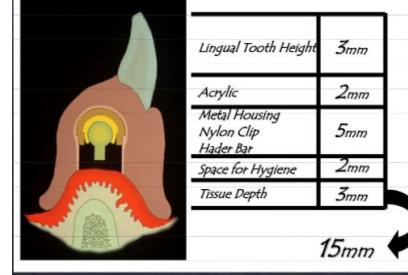
- Spacer allows for ↑ degree of movement



#### 2 sizes:

- 3.5mm x 1.6mm
- 3.0mm x 2.2mm



<p><b>Hader Bar</b></p>  <p><b>Hader-EDS Bars</b></p>   	<p>Bar cast out of prefabricated plastic pattern</p> <ul style="list-style-type: none"> <li>- Clips into Resin/Plastic sleeve</li> </ul> <p>No Spacer = ↑ support</p> <p><u>Size:</u></p> <ul style="list-style-type: none"> <li>- Bar: 3mm tall</li> <li>- Clip/Housing: 2mm tall</li> </ul> 				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #90EE90;"> <th style="text-align: center; padding: 5px;">Advantage</th> <th style="text-align: center; padding: 5px;">Disadvantage</th> </tr> </thead> <tbody> <tr style="background-color: #D9EAD3;"> <td style="padding: 5px;"> <ul style="list-style-type: none"> <li>- Prefabricated plastic pattern = no need for soldering</li> <li>- Precise fit, simple and versatile</li> <li>- Rigidly splints the implants</li> <li>- Provides good retention, Stability and Support</li> <li>- Gives cross arch stabilization</li> <li>- Positioned close to alveolar bone (↓ lever forces)</li> </ul> </td> <td style="padding: 5px;"> <ul style="list-style-type: none"> <li>- Bulky bar</li> <li>- Plaque accumulation</li> <li>- Wear</li> <li>- Pt needs decent manual dexterity</li> </ul> </td> </tr> </tbody> </table>	Advantage	Disadvantage	<ul style="list-style-type: none"> <li>- Prefabricated plastic pattern = no need for soldering</li> <li>- Precise fit, simple and versatile</li> <li>- Rigidly splints the implants</li> <li>- Provides good retention, Stability and Support</li> <li>- Gives cross arch stabilization</li> <li>- Positioned close to alveolar bone (↓ lever forces)</li> </ul>	<ul style="list-style-type: none"> <li>- Bulky bar</li> <li>- Plaque accumulation</li> <li>- Wear</li> <li>- Pt needs decent manual dexterity</li> </ul>	
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### Attachment Resiliency

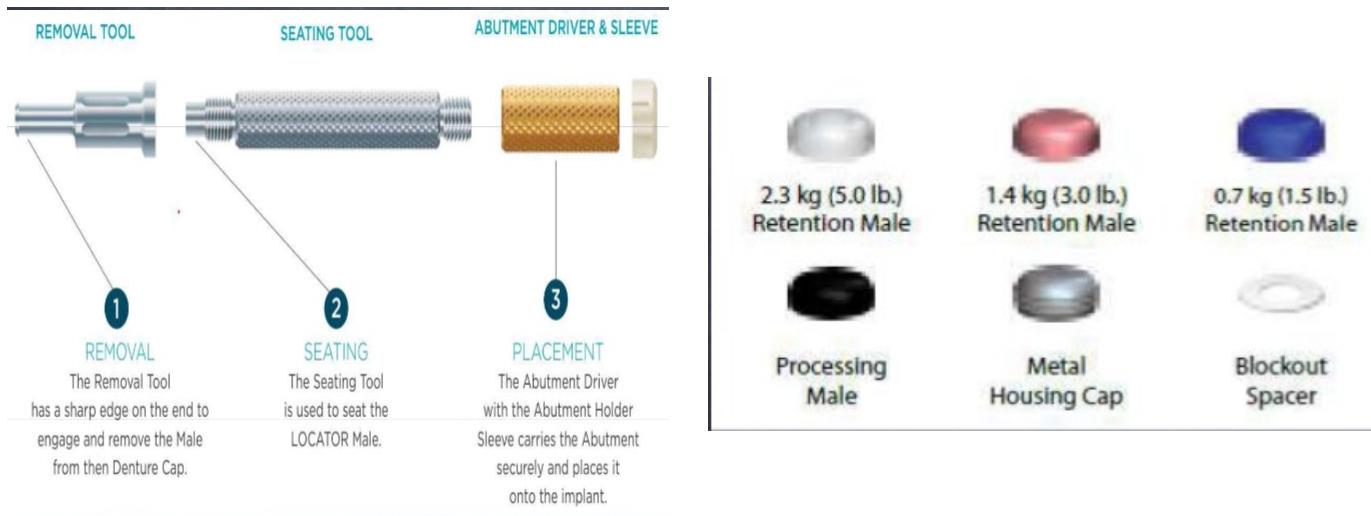
= movement between the abutment and the prosthesis in a predetermined direction or directions. ↓ Resiliency = ↑ force on Bone and Implant

<b>Rigid Non-resilient Attachments</b>	Ex: Strew retained hybrid over denture	
<b>Restricted Vertical Resilient Attachments</b>	= Prosthesis can move up and down but NO lateral, tipping, or rotary movement	
<b>Hinge resilient attachments</b>	Resist lateral tipping, rotational and skidding forces	
<b>Combination Resilient Attachments</b>	Allows unrestricted vertical and hinge movement	
<b>Rotary Resilient Attachments:</b>	Prosthesis can provide hinge and rotary movements	
<b>Universal resilient attachments</b>	= Provide vertical, hinge, translation and rotation movements	
	- Ex: Hader Bar	
	- Ex: Dolder Bar Joint	
	- Ex: Magnet attachments	

This is a good little review doc:

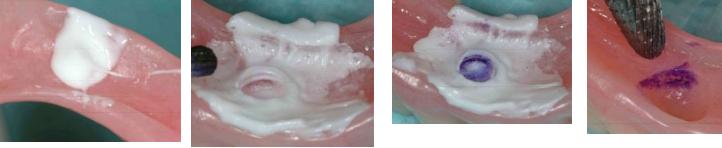
<https://pdfs.semanticscholar.org/312a/7b045503130953eaa66ce146cb8c0e5ff8bc.pdf>

## Attaching all the components



### 2 Techniques:

In the Lab	
1. Lab places Locator-Implant analog in Implant level impression -> Fabricates Cast	
2. Jaw Relation, Wax-Up and Try-In (Usual stuff)	<p></p> <p><b>Trial Denture</b></p> <p><b>Trial denture appointment</b></p> <ul style="list-style-type: none"> <li>❖ Verify vertical dimension of occlusion</li> <li>❖ Verify centric relation record</li> <li>❖ Make protrusive and lateral records</li> <li>❖ Refine anterior esthetics</li> </ul> <p>Note absence of anterior denture flange.</p>
3. Lab places White Ring, Black Processing male and Locator Cap on the Cast -> Processes Denture as usual - This will all come out attached to the denture	

Chairside with conventional denture			
1. Remove Healing Abutment from implant			
2. Seat Locator Abutments			
3. Hand Tighten Locator	 		
4. Torque to 20Ncm			
5. Create Space inside Overdenture			
6. Place white Block-out ring over Abutment and the housing over the abutment			
7. Indicator Paste placed in overdenture -> Inspect for show through. Mark with Indelible marker and relieve the marked areas			
8. Clean Site with alcohol			
9. Apply bonding agent to overdenture and dry the housing			
10. Load material into overdenture and housing	 		

<b>11. Light Cure if needed. Remove denture and inspect for voids (Fill if necessary) and give a final cure</b>		
<b>12. Remove Place Processing Male from the housing</b>		
<b>13. Insert Retentive Make</b>		 