Denture Design - IPN 3D Digital Denture Teeth in 3Shape

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Denture Design - IPN 3D Digital Denture Teeth in 3Shape

The purpose of this section is to assist the denture designer in using Dentsply Sirona tooth libraries and denture base materials in the 3Shape design software. This section is not intended to replace in-depth training provided by a 3Shape reseller.

Design Engine

The 3Shape Dental System enables you to design dentures and output through printing or milling. The Dentsply Sirona collaboration with 3Shape provides access to market leading tooth libraries and materials.

<table>
<thead>
<tr>
<th>Denture Teeth</th>
<th>Denture Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPN 3D Portrait Inspired</td>
<td>Lucitone Digital Print for Printing</td>
</tr>
<tr>
<td>for Printing or Milling</td>
<td></td>
</tr>
<tr>
<td>Portrait* IPN*</td>
<td>Lucitone Digital Fuse for Printing</td>
</tr>
<tr>
<td>for Milling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lucitone Digital Try-in for Printing</td>
</tr>
<tr>
<td></td>
<td>Lucitone 199* Disc for Milling</td>
</tr>
</tbody>
</table>

Access to IPN 3D Portrait Inspired and Portrait IPN Digital Libraries

Dentsply Sirona tooth libraries are dongle encrypted. To obtain the Dentsply Sirona libraries:
• Contact our Dentsply Sirona sales representative or Email: dsdigitaldentures@dentsplysirona.com.
• Have your 3Shape dongle information available. This is needed to activate your account.
• Access to the DME files for tooth libraries and Lucitone material is then provided by your 3Shape reseller.

DME Design Thicknesses and Space Settings

Material DME files default settings:
• Fuse space: 0.17mm
  - DO NOT change Fuse space default setting. Modifying this default setting could compromise tooth fit in the pocket.
• Upper arch minimum denture base thickness: 2.5mm (Manual adjustment required)
• Lower arch minimum denture base thickness: 3.5mm (Manual adjustment required)

Note: When using Portrait IPN tooth library for milling, adjust Fuse space to 0.10mm.
Tooth Libraries

Selecting the right tooth library for each patient’s case and processing output is important. The 3Shape Smile Designer software includes IPN 3D Portrait Inspired and Portrait IPN tooth libraries.

IPN 3D Portrait Inspired Tooth Digital Library

- Distinctly designed for printed or milled dentures.
- 14 anterior mould forms and 12 posterior mould forms cover >80% of patient needs.
- Highly aesthetic teeth, the unique form factor virtually eliminates intaglio breakthrough.
- Pre-configured and pre-occluded, the IPN 3D library software designs to the intricate details of the tooth, enabling rapid set-up.
- Balanced and linguinal occlusal libraries support lab and clinician preferences for set-up across Class I, Class II, or Class III maxillary-mandibular relationships.
- Semi-anatomical 10˚ and anatomical 33˚ posterior teeth.

Selecting IPN 3D Teeth for the Denture Design

Selecting the best IPN 3D tooth mould for the denture design is based upon specific measurements. Consider the ridge relationship and measurement of the prosthetics space. The IPN 3D mould numbers reflect the measurements. The following key illustrates the meaning of each number and letter in the mould classification:

### Anterior Tooth Selection

<table>
<thead>
<tr>
<th>First Number</th>
<th>Second Number</th>
<th>Third Number</th>
<th>Fourth Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td>Width on Curve</td>
<td>Central Length</td>
<td>Low Articulation</td>
</tr>
<tr>
<td>1 Upper</td>
<td>0 Less than 47mm</td>
<td>0 Less than 9.80mm</td>
<td>5DP</td>
</tr>
<tr>
<td>1 Lower</td>
<td>1 47mm to 48mm</td>
<td>1 9.80mm to 10.40mm</td>
<td>5HP</td>
</tr>
<tr>
<td>2 Upper</td>
<td>2 48mm to 49mm</td>
<td>2 10.40mm to 11.00mm</td>
<td>5JP</td>
</tr>
<tr>
<td>2 Lower</td>
<td>3 49mm to 50mm</td>
<td>3 11.00mm to 11.60mm</td>
<td>5MP</td>
</tr>
<tr>
<td>3 Upper</td>
<td>4 50mm to 51mm</td>
<td>4 11.60mm to 12.20mm</td>
<td>5QP</td>
</tr>
<tr>
<td>3 Lower</td>
<td>5 51mm to 52mm</td>
<td>5 12.20mm to 12.80mm</td>
<td>5SP</td>
</tr>
<tr>
<td>4 Upper</td>
<td>6 52mm to 53mm</td>
<td>6 Greater than 12.80mm</td>
<td>5VP</td>
</tr>
<tr>
<td>4 Lower</td>
<td>7 53mm to 54mm</td>
<td>7 Portrait Inspired</td>
<td>SVP</td>
</tr>
<tr>
<td>5 Upper</td>
<td>8 54mm to 55mm</td>
<td>8 Genios Inspired</td>
<td>PBP</td>
</tr>
<tr>
<td>5 Lower</td>
<td>9 Greater than 55mm</td>
<td>9 Greater than 52mm</td>
<td>GSI</td>
</tr>
</tbody>
</table>

### Posterior Tooth Selection

<table>
<thead>
<tr>
<th>First Number</th>
<th>Second Number</th>
<th>Third Number</th>
<th>Fourth Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td>Width on Curve</td>
<td>Length of Central</td>
<td>Low Articulation</td>
</tr>
<tr>
<td>1 Upper</td>
<td>0 Less than 47mm</td>
<td>Less than 43mm</td>
<td>5DP</td>
</tr>
<tr>
<td>1 Lower</td>
<td>1 47mm to 48mm</td>
<td>48mm to 49mm</td>
<td>5HP</td>
</tr>
<tr>
<td>2 Upper</td>
<td>2 48mm to 49mm</td>
<td>44mm to 46mm</td>
<td>5JP</td>
</tr>
<tr>
<td>2 Lower</td>
<td>3 49mm to 50mm</td>
<td>46mm to 47mm</td>
<td>5MP</td>
</tr>
<tr>
<td>3 Upper</td>
<td>4 50mm to 51mm</td>
<td>47mm to 48mm</td>
<td>5QP</td>
</tr>
<tr>
<td>3 Lower</td>
<td>5 51mm to 52mm</td>
<td>48mm to 49mm</td>
<td>5SP</td>
</tr>
<tr>
<td>4 Upper</td>
<td>6 52mm to 53mm</td>
<td>49mm to 50mm</td>
<td>5VP</td>
</tr>
<tr>
<td>4 Lower</td>
<td>7 53mm to 54mm</td>
<td>50mm to 51mm</td>
<td>7PBP</td>
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<tr>
<td>5 Upper</td>
<td>8 54mm to 55mm</td>
<td>51mm to 52mm</td>
<td>7GSI</td>
</tr>
<tr>
<td>5 Lower</td>
<td>9 Greater than 55mm</td>
<td>Greater than 52mm</td>
<td>GSI</td>
</tr>
</tbody>
</table>

Need Help? Email dsdigitaldentures@dentsplysirona.com or call 800-243-1942 ext 54212.
Understanding the mould classification enables the designer to use the patient’s distal canine-to-distal canine measurements for selection of the mould size. Dentsply Sirona recommends using the patient’s Width on Curve from the maxillary distal canine-to-distal canine. The following table details the measurements associated with each IPN 3D anterior mould:

<table>
<thead>
<tr>
<th>Mould</th>
<th>Size</th>
<th>Width on Curve</th>
<th>Width on Flat</th>
<th>Central Length</th>
<th>Lower Anterior Articulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>110DP</td>
<td>S</td>
<td>47mm to 48mm</td>
<td>43mm to 44mm</td>
<td>Less than 9.80mm</td>
<td>5DP</td>
</tr>
<tr>
<td>112HP</td>
<td>S</td>
<td>47mm to 48mm</td>
<td>43mm to 44mm</td>
<td>10.40mm to 11.00mm</td>
<td>5HP</td>
</tr>
<tr>
<td>120JP</td>
<td>M</td>
<td>48mm to 49mm</td>
<td>44mm to 46mm</td>
<td>Less than 9.80mm</td>
<td>5JP</td>
</tr>
<tr>
<td>122MP</td>
<td>M</td>
<td>48mm to 49mm</td>
<td>44mm to 46mm</td>
<td>10.40mm to 11.00mm</td>
<td>5MP</td>
</tr>
<tr>
<td>142QP</td>
<td>M</td>
<td>50mm to 51mm</td>
<td>47mm to 48mm</td>
<td>10.40mm to 11.00mm</td>
<td>5QP</td>
</tr>
<tr>
<td>163SP</td>
<td>L</td>
<td>52mm to 53mm</td>
<td>49mm to 50mm</td>
<td>11.00mm to 11.60mm</td>
<td>5SP</td>
</tr>
<tr>
<td>185VP</td>
<td>L</td>
<td>54mm to 55mm</td>
<td>51mm to 52mm</td>
<td>12.20mm to 12.80mm</td>
<td>5VP</td>
</tr>
</tbody>
</table>

**PRO TIP:** If the distal canine-to-distal canine Width on Curve is not available, the designer can also use the Width on Flat measurement. The 3Shape Smile Designer software enables the designer to measure point-to-point distances, using the **distance on a line tool**. Measure distance from A to B and B to C for selection of Width on Flat.

**Posterior Tooth Selection**

Similar to the maxillary anterior teeth it is important to consider the ridge relationship, measurements of the prosthetic space, and the resorption level of the alveolar ridge.
- • 10° posterior teeth can be used with semi-resorbed to fully-resorbed alveolar ridges.
- • 33° posterior teeth are recommended for healthy alveolar ridges with minor resorption.

The following table includes the IPN 3D posterior tooth measurements:

<table>
<thead>
<tr>
<th>Posterior Upper</th>
<th>Posterior Lower</th>
<th>Size</th>
<th>1 x 4 Width Upper</th>
<th>1 x 4 Width Lower</th>
<th>Depth Left First Molar Upper</th>
<th>Depth Left First Molar Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>7L10P</td>
<td>9L10P</td>
<td>L</td>
<td>34.00mm</td>
<td>36.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
<tr>
<td>7M10P</td>
<td>9M10P</td>
<td>M</td>
<td>32.00mm</td>
<td>34.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
<tr>
<td>7S10P</td>
<td>9S10P</td>
<td>S</td>
<td>30.00mm</td>
<td>32.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
<tr>
<td>7L33P</td>
<td>9L33P</td>
<td>L</td>
<td>34.00mm</td>
<td>36.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
<tr>
<td>7M33P</td>
<td>9M33P</td>
<td>M</td>
<td>32.00mm</td>
<td>34.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
<tr>
<td>7S33P</td>
<td>9S33P</td>
<td>S</td>
<td>30.00mm</td>
<td>32.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
</tbody>
</table>

**Portrait IPN® Tooth Library**

- • Intended for milled dentures.
- • Approved mills: inLab MC X5, Roland DWX 50, 51D, 52, 52DC, 52DCI and imes iCore 350i
- • Digitized into a library for 3Shape denture design.
- • Portrait IPN teeth can be relied upon for perfect geometry and shading to suit every case.
3Shape Dental System Order Form

Set up an order form for the patient case.

1. In the upper right-hand corner, under Scan Settings, select the object type to be scanned:
   a. Model
   b. Impression
   c. Digital impression
2. Select the teeth you wish to include in the design.

3. Select materials:

**Anatomy > Artificial Tooth**
Choose settings:

- **Material:** Dentsply Sirona IPN
- **Type:** DS IPN 3D Portrait Inspired
- **Manufacturing Process:** Premanufactured Teeth

**Gingiva > Model Material**
Choose setting:

- **Material:** DS Lucitone Digital Print 3D Denture Resin (for final denture)
- **Type:** DS Print
  - DS Try-in

When selecting IPN 3D Portrait Inspired teeth and Lucitone Digital Print gingiva, the 3Shape Dental System will provide the correct CAD output of your design for a pocketed denture.

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Scanning

Please follow the scanning instructions in the 3Shape software. (Note: If scanning an impression, scan spray may be needed.)

Define the occlusal plane

Place three control points by following the line between the maxillary and mandibular rims. The second point defines the anterior tooth placement.

The tilt and angulation of the occlusal plane follows the bite rim or records provided by the clinician.

Model Analysis

Model analysis is critical to design success. If your model or impression does not have the correct landmarks, it will negatively affect the design of the denture base.

At a minimum, ensure your scans include the following landmarks:

- Incisive Papilla
- Tuberosity
- Buccal Frenum

Additional landmarks shown in the examples are also helpful.
Use three-point alignment to connect bite rim scan to the model scan.

Mark the landmarks
- Start with the maxillary arch
- Mark five points:
  1. Right Tuberosity
  2. Incisive Papilla
  3. Left Tuberosity
  4. Right Canine
  5. Left Canine

The position of the canines is important. The canine placement helps to determine the tooth selection. The canine marks should be placed on the model to coincide with the lines provided by the clinician.

Note: If the bite rim does not indicate the canine placement:
- Approximate the position slightly anterior to the buccal frenum
- Place the marks approximately 4mm back from incisive papilla
- Measure from the central mark on the wax rims
- Place in relationship to the most prominent rugae

It is not necessary to be exact. The software allows for general area placement.

Move to the mandibular arch and mark the landmarks:
- Retromolar pad (3 points: central, buccal, and lingual)
- Central ridge
- Second retromolar (3 points: central, buccal, and lingual)
- Right canine
- Left canine

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Determine Ridge Relationship Class

The patient’s jaw position can influence denture design. The clinician should indicate if the patient has a Class I, Class II, or Class III ridge relationship.

- **Class I** (normal):
  The maxillary alveolar ridge crest is directly above the mandibular ridge. This is usually the most favorable ridge relation for complete dentures. Class I patients have moderate mandibular horizontal range of movement.

- **Class II** (retrognathic):
  The mandibular ridge is narrower and shorter than the maxillary ridge. In some instances it may be as wide as the maxillae in the posterior. Class II patients will have the most mandibular horizontal range of movement that makes balanced occlusion important.

- **Class III** (prognathic):
  The mandible is longer and wider than the maxillae. Such patients rarely show excessive jaw excursions but a straight opening and closing mandibular movement. Class III cases have no mandibular horizontal range of movement and posterior occlusal schemes tend to be in a cross-bite relationship.

For more information on ridge relationship classes, refer to the Ridge Relationship Rules.
**Vertical Positioning of Denture Teeth**  
Many factors such as ridge condition, class, size, aesthetic preferences, etc. will influence teeth positioning. The illustration shows the vertical positioning of anterior denture teeth based upon averages.

The IPN tooth library will have preset overbites and overjets based upon the mould selected; this can be adjusted, if needed.

Use the 3Shape design feature, **Show Overlaps**, to review and adjust the overlap and overjet in the denture design.

**Balanced Occlusion**  
Balanced articulation is the bilateral, simultaneous occlusal contact of the anterior and posterior teeth in excursive movements. These contacts with reciprocating nonworking-side occlusal contacts are developed for the purpose of stabilizing dentures.* The IPN 3D tooth library includes pre-occluded balanced set-ups for both semi-anatomical 10° posterior teeth and anatomical 33° posterior teeth.

**Lingualized Occlusion**  
A posterior tooth arrangement method that eliminates tooth contact points on the buccal cusps to assure seating and minimize tipping of the lower denture upon contact. The upper posterior teeth are set in a turned-out position so that only the lingual cusps of the upper posterior teeth contact the center of the occlusal table (the fossa) of the lower posterior teeth. The IPN 3D tooth library includes pre-occluded lingualized set-ups 33° over 10°.

For more information on denture tooth set-up, refer to the **Dentsply Sirona Anterior and Posterior Tooth Arrangement Manual.**

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Smile Composer

Follow these steps when using Dentsply Sirona IPN 3D Digital Denture Teeth.

Step 1  Select Provider: DS IPN 3D Portrait Inspired

Step 2  Select: Show Full Arch Libraries Only
Step 3: Select: Anterior Mould and Occlusion

- The IPN 3D tooth libraries are organized based upon the maxillary anterior teeth. To select the correct maxillary anterior teeth, reference Table 1: IPN 3D Anterior Mould Classification below.

**Table 1: IPN 3D Anterior Mould Classification**

<table>
<thead>
<tr>
<th>Mould</th>
<th>Size</th>
<th>Width on Curve</th>
<th>Width on Flat</th>
<th>Central Length</th>
<th>Lower Articulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>110DP</td>
<td>S</td>
<td>47mm to 48mm</td>
<td>43mm to 44mm</td>
<td>Less than 9mm central</td>
<td>SDP</td>
</tr>
<tr>
<td>112HP</td>
<td>S</td>
<td>47mm to 48mm</td>
<td>43mm to 44mm</td>
<td>9.5mm to 10mm central</td>
<td>SHP</td>
</tr>
<tr>
<td>120JP</td>
<td>M</td>
<td>48mm to 49mm</td>
<td>44mm to 46mm</td>
<td>Less than 9mm central</td>
<td>SJP</td>
</tr>
<tr>
<td>122MP</td>
<td>M</td>
<td>48mm to 49mm</td>
<td>44mm to 46mm</td>
<td>9.5mm to 10mm central</td>
<td>SMP</td>
</tr>
<tr>
<td>142GP</td>
<td>M</td>
<td>50mm to 51mm</td>
<td>47mm to 48mm</td>
<td>9.5mm to 10mm central</td>
<td>SQP</td>
</tr>
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</tr>
<tr>
<td>185VP</td>
<td>L</td>
<td>54mm to 55mm</td>
<td>51mm to 52mm</td>
<td>11mm to 11.5mm central</td>
<td>SVP</td>
</tr>
</tbody>
</table>

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Step 4 Select: Anterior Posterior Combination

In Step 3, the Maxillary Anterior Mould Form was selected. Following that Maxillary Anterior mould form, choose which Posterior teeth you want for the denture design. Reference Table 2, IPN 3D Posterior Mould sizes below.

Table 2: IPN 3D Posterior Mould Classifications

<table>
<thead>
<tr>
<th>Posterior Upper</th>
<th>Posterior Lower</th>
<th>Size</th>
<th>1 x 4 Width Upper</th>
<th>1 x 4 Width Lower</th>
<th>Depth Left First Molar Upper</th>
<th>Depth Left First Molar Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>7L10P</td>
<td>9L10P</td>
<td>L</td>
<td>34.00mm</td>
<td>36.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
<tr>
<td>7M10P</td>
<td>9M10P</td>
<td>M</td>
<td>32.00mm</td>
<td>34.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
<tr>
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<td>9S10P</td>
<td>S</td>
<td>30.00mm</td>
<td>32.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
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<tr>
<td>7L33P</td>
<td>9L33P</td>
<td>L</td>
<td>34.00mm</td>
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<td>34.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
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<tr>
<td>7S33P</td>
<td>9S33P</td>
<td>S</td>
<td>30.00mm</td>
<td>32.50mm</td>
<td>8.40mm</td>
<td>8.70mm</td>
</tr>
</tbody>
</table>
Please note: The IPN 3D tooth library is pre-occluded for full-over-full dentures for articulation in either balanced or lingualized set-up schemes. This speeds the design process.

- Denture designers **should not manipulate the individual position of the posterior teeth.** The posterior teeth should be moved as a block.
- If tooth movement is needed, use the Arch Set-up setting.
- The Arch Set-up setting will adjust the setting of all teeth, not a single tooth.
- If occlusal plane movement is needed, use the Occlusal Plane Adjustment tool.
- For single-arch cases, individual posterior teeth may need to be manipulated.

**Step 5: Final Review**

- Review to verify that all of your selections are correct.
Detailing the Gingiva

Dentsply Sirona has preset the gingival lines for all libraries. Designers should not need to modify. However, if the designer would like to add characterization material can be added or removed using the Sculpt Toolkit. Adjusting the gingiva material, by adding and removing material, creates an extra touch that can further personalize the design for the patient.

In the Premanufacturing Sub Toolkit the Tweezer Tool can be used to pull the gingiva down, filling the interproximal spaces.
Rugae details can also be added to the denture.

When you have finished adding gingiva details, add support bars.

**Support Bar Placement**

Adding support bars to the upper and lower arch designs is required for printing. The bar supports optimize the accuracy of the final denture.

**Upper Arch Bar Supports**

1. Under the “Sculpt Toolkit,” select “Attachment”

2. The “Attachment Settings” should be as follows:
   a. Group > Attachments
   b. Attachment > Bar
   c. Default orientation > View direction

3. Hide the “Preparation” block

4. Make the “Full Dentures” partially transparent
5. Rotate the denture so that the view is from the side
   a. Right click to rotate the view of the denture
   b. Click and hold the mouse wheel to move/center the denture on the display screen

6. Click to place the first bar:
   a. This bar should be placed between the first and second molars of the denture base
   b. The bar should be placed 3-5mm below the gingival line

**CAUTION:** Placing the bar more than 5mm below the gingival line may affect print accuracy.
7. Rotate the denture base so that the view is looking down on the cameo surface of the denture

8. Use the yellow dot in the middle of the bar to move the bar to the correct location on the lingual side of the denture base
9. Going forward with this bar placement, use a combination of the green and blue dots (located next to each other on the end of the bar):
   a. Use the green dot to lengthen and shorten the bar so that it spans the denture base without going all the way through to the intaglio surface
      1. The bar will lengthen on both sides
   b. Use the blue dot to move/center the bar

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10. If the bar is not straight across, click the red rotational dot (on the end of the bar next to the green and blue dots) to straighten the bar such that the bar is horizontal from left to right on the denture.

![Image of a 3D dental design software showing a bar being adjusted]

11. If the bar is too close or too far away from the gingival line and/or the bar is not between the first and second molars, left click and drag the bar into the proper location.
   a. Alternatively, click the yellow translational dot and move the bar to the correct location.

12. Make sure the bar is not going through the tooth pockets
   a. Check by hiding the “Anatomy Design”
   b. Shorten and/or move the bar if necessary

![Image of a 3D dental design software showing a bar being adjusted]
13. Rotate the denture so that the view is looking down on the cameo surface of the denture.

14. Click to place the second bar:
   a. This bar should be run from the center of the first bar down to the denture base to be perpendicular to the first bar.
15. Use the green dot to lengthen/shorten the second bar and use the blue dot to move/center the bar.

16. If the bar is not straight, click the red rotational dot (on the end of the bar next to the green and blue dots) to straighten the bar such that the second bar is perpendicular to the first bar.

17. If the bar is not centered, click and drag the bar so that it is both horizontally and vertically on the first bar.
   a. Alternatively, click the yellow translational dot and move the bar to the correct location.
18. Make sure the bar is fully attached to both the denture base and the first bar without going through the denture base/bar.

19. Rotate the denture base so that the view is from the side

20. Click to place the third bar:
   a. This bar should be placed between the first and second premolars of the denture base.
   b. The bar should be placed approximately 3mm below the gingival line.

21. Follow the same design steps for the third bar as the first bar (steps 7-12).

22. Rotate the denture base so that the view is looking down on the cameo surface of the denture.
23. Click to place the fourth bar:  
   a. This bar should be run from the center of the third bar down to the denture base to be perpendicular to the third bar.

24. Follow the same design steps for the fourth bar as the second bar (steps 15-18).

25. Click “Next”
Lower Arch Bar Supports

1. Make the “Full Dentures” partially transparent
2. Rotate the lower denture base so that the view is from the side
3. Click to place the first bar on the lower denture:
   a. This bar should be placed between the first and second premolars of the denture base.
   b. The bar should be placed 3-5mm below the gingival line.

4. Follow the same design steps for placing this bar in the lower arch as done for the upper arch (steps 7-12).

- Note: Unlike what was done for the upper arch, do not add a bar that runs perpendicular to this bar.
5. Rotate the denture base so that the view is from the side

6. Click to place the second bar on the lower:
   a. This bar should be placed between the first and second premolars of the denture base.
   b. The bar should be placed 3-5mm below the gingival line

7. Follow the same design steps for this bar as the first lower bar:
   a. This bar should be placed between the first and second premolars of the denture base.
   b. The bar should be placed 3-5mm below the gingival line
8. Rotate the lower denture base so that the view is from the back.

9. Click to place the third bar on the lower denture:
   a. This bar should be placed in front of the center of the second bar.

10. Follow the same design steps for the third lower arch bar as the second upper bar (steps 15-18):
    a. This bar will connect to the second lower bar and extend to the lingual gingiva below the central incisors.
Deleting a Bar Support
1. Right click to select the bar to be deleted.
2. Select delete.
3. If you have moved forward in the software and want to go back to delete or move a bar, click the down arrow next to the undo button.
   a. You will need to undo the steps up to the point of adding that bar.

Save

In the save step, you can preview your order, and then close dental designer.

Need Help? Email dsdigitaldentures@dentsplysirona.com or call 800-243-1942 ext 54212.
STL File Creation

1. When the denture design is complete, save and close.

2. In Dental Manager choose the job you want to export, right click with the mouse. Select Advanced. Then choose Generate CAM Output.

3. The files will be exported to the 3Shape directory on your computer.

4. From this directory, the files are ready to be uploaded to a Carbon printer or CAM milling software.

Need Help? Email dsdigitaldentures@dentsplysirona.com or call 800-243-1942 ext 54212.
**Monoblock Try-In**

The Try-In appliance is an important element of the digital denture workflow. This permits the initial design to be placed with the patient to evaluate: fit, occlusion, registration and other aesthetic requirements. Providing feedback by the Clinician to the Designer is a critical milestone for achieving an optimal final appliance. Additionally, the Try-In is an excellent early experience for the patient to calibrate expectations on how the final appliance will appear when completed.

Designing a monoblock Try-In with 3Shape Dental System follows the same steps as a denture, with a few minor modifications.

- Model Analysis > Surveying and Blocking > Smile Composer > FD Initial Setup > Anatomy Design > Save.

**Order Form for Monoblock Try-In**

Select Gingiva and use the drop down lists to select the Dentsply Sirona materials.

![Material Selection](image1)

Next select Anatomy, Artificial Teeth the use the drop down to select the Dentsply Sirona materials.

![Material Selection](image2)
Denture Design Q & A

**How much time is needed to design a denture?**
- As with all skills, proficiency is developed with experience. Dentsply Sirona’s observations suggest that a new user will take approximately 40 minutes to design a denture. A skilled designer can complete a design in approximately 20 minutes.

**The design is showing interproximal space between some of the posterior teeth. What is the recommendation to correct the space since the posterior teeth are not intended to be moved?**
- Some interproximal space has been intentionally left in the library to accommodate for Lucitone Digital Fuse material, and standard manufacturing tolerances. The interproximal space can be closed using the sculpting tools to pull the gingiva down into the space. The interproximal space may appear larger on the screen, especially if magnified, compared to the actual size.

**What is intaglio breakthrough?**
- Intaglio breakthrough is when the tooth breaks through the tissue side of the denture.

**How do I determine if my design has intaglio breakthrough?**
- During full denture initial set-up one or more teeth will protrude through the ridge. No space between the tooth/teeth and ridge will be visible.

- In the anatomy design, review the underside of the denture. Teeth breaking through the base will be visible.

**How can the design be modified if intaglio breakthrough is present?**
- If the intaglio breakthrough is occurring with the anterior teeth, try a smaller length mould form. If breakthrough continues try adjusting the teeth to eliminate the breakthrough.

- If the breakthrough is present with posterior teeth, first attempt to move the teeth as a block up or down occlusally, if possible. If the intaglio breakthrough is not corrected, select a smaller length mould form or a different angle mould form. If breakthrough continues to occur with smaller posterior teeth you will need to adjust the teeth. When adjusting the posterior teeth, use the distal mode in the software to move all of the posterior teeth as a block. Please note that if you added gingiva sculpting prior to adjusting the teeth, it could be compromised or lost.

- You should mill or use a traditional denture workflow for cases where intaglio breakthrough cannot be avoided.

**Can Portrait IPN denture teeth be used in a printed denture base?**
- The Portrait IPN tooth line is not recommended for use with printed denture bases. In many cases, the teeth will break through the intaglio surface. Portrait IPN teeth are recommend for use only with milled denture bases. With milling, the break through portions of the teeth can be removed.

**The design shows the denture base protruding through the occlusal surface of the teeth. What is the recommendation to correct this?**
- Use the sculpting tools to remove the material. Reference the Detailing the Gingiva Section in this Guide.
If I have your library, can I mill or print my own teeth?
• No. The Dentsply Sirona IPN 3D Portrait Inspired Library will not output milling/printing files. Only a monolithic Try-In can be printed using Dentsply Sirona libraries. It is the same for the Portrait IPN library.

Which 3Shape Design Software version do I need?
• Denture Design Module 2019 or higher

Can I design a single-arch against natural dentition using 3Shape Denture Design Module?
• Yes. When setting up your Order Form select only the upper or lower arch that will support the denture. For scanning you will need an upper model, lower model and a bite rim.

What happens if I do not use bar supports?
• This will impact the accuracy of the appliance. Follow the DFU for our DS Print Materials.

Are their types of denture cases that should not be printed?
• There are unique cases that are challenging to print. For example, cases where intaglio breakthrough cannot be avoided. These cases can be milled using Lucitone 199 denture discs and IPN 3D teeth or Portrait IPN teeth. The cases can also be completed following a traditional denture workflow.

How do I add characterization to the denture base?
• When designing the denture, gingiva material can be added or removed. Characterization during finishing and polishing, such as stippling and festooning can also be done.

My initial scan did not turn out the way I thought?
• Spray model surfaces and bite rim with scanning spray. Make sure the impression or model is secured on the scan plate.