3D Printing Splints with Formlabs SLA 3D Printers

Dental LT Clear Resin (V2) is Formlabs' second-generation, long-term biocompatible material for directly 3D printing affordable, high-quality splints and occlusal guards. Highly durable and resistant to fracture, this color-corrected material prints clear, polishes to high optical transparency and resists discoloration over time for a finished appliance you'll be proud to deliver.

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Contents

Essentials

Needed From the Dentist

A physical or digital impression of the patient's dentition

Required Hardware and Materials

Made by Formlabs

- Form 2 or Form 3B 3D printer
- Form 2 Resin Tank LT or Form 3 Resin Tank V2 or higher
- Build Platform
- Dental LT Clear (V2) Resin
- Form Wash
- Form Cure
- Finishing kit or secondary wash station

Made by Third Parties

- Desktop scanner (if physical impression or model)
- Dental design software
- Dental handpiece with cutting and finishing wheels
- Polishing equipment and materials
- Isopropyl alcohol (IPA) ≥ 99%

Required Software

PreForm 3.6.1 or higher

Firmware 1.7.3 or higher

Dental design software or outsourcing to a dental design provider

1. Scan

Dental design software requires a digital impression of the patient's anatomy in order to design a splint or occlusal guard. To acquire this data, scan the patient directly with a 3D intraoral scanner or scan a physical impression or a poured model with a desktop 3D scanner.
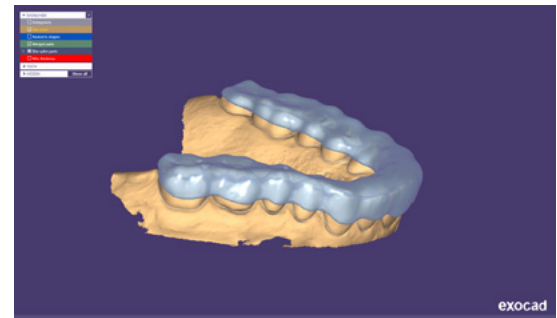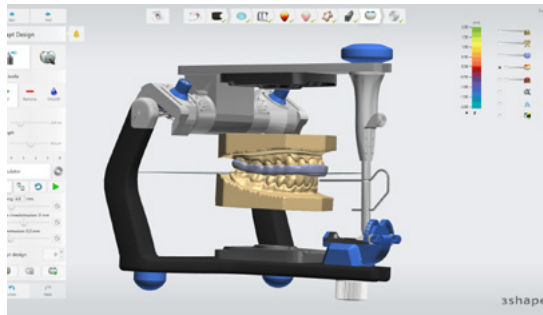
2. Design

2.1 Design the Appliance

There are several dental software options for digitally designing occlusal splints. In this application guide, we will be outlining parameters for 3Shape Dental System and ExoCAD.

There are also outsourced dental CAD providers where you can send a digitized impression for creating the design.

GENERAL CONSTRUCTION REQUIREMENTS

Minimum occlusal surface thickness	2 mm
Minimum wall thickness	1 mm

3Shape & ExoCAD Settings

Offset from 0.05 to 0.10 mm (depending on the desired snugness and case design, the smaller the value the tighter the fit)

2.2 Export the STL File

Once the case has been designed to specification manufacturing can begin. The majority of dental design software generates a manufacturing file in .stl format. Locate the file and move it into the print preparation software, PreForm.

3. Print

> **Note:** Use PreForm version 3.6.1 or higher and firmware 1.7.3 or higher
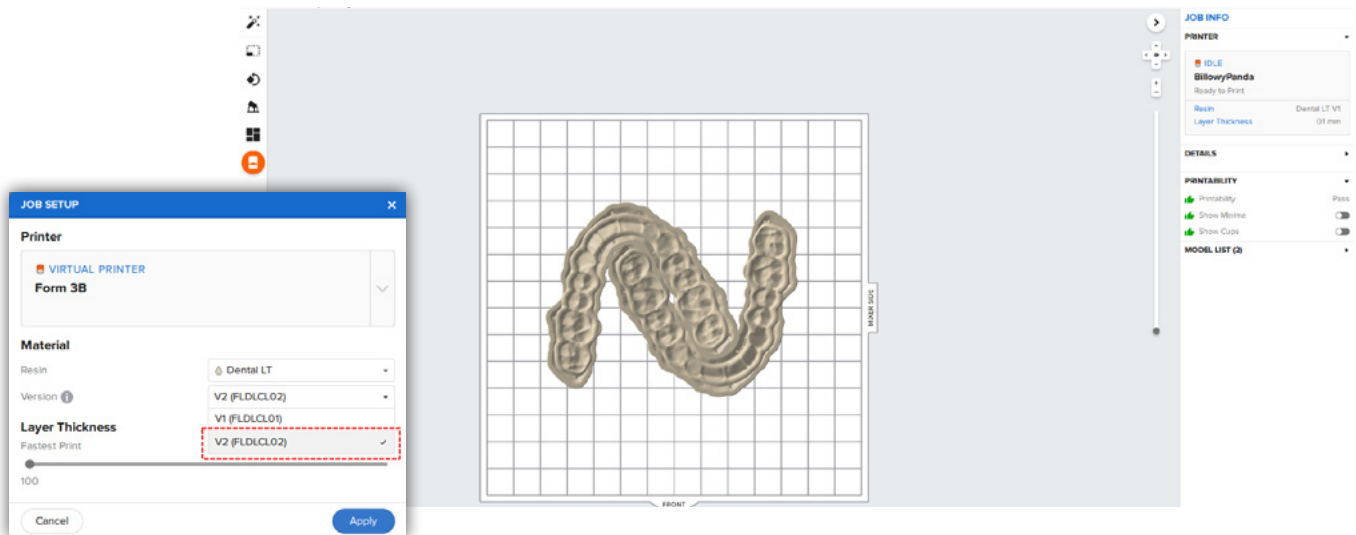
3.1 Import File(s)

Import or open the design file(s) by dragging them into Preform or opening them using the "File" menu and locating them on your computer or network.
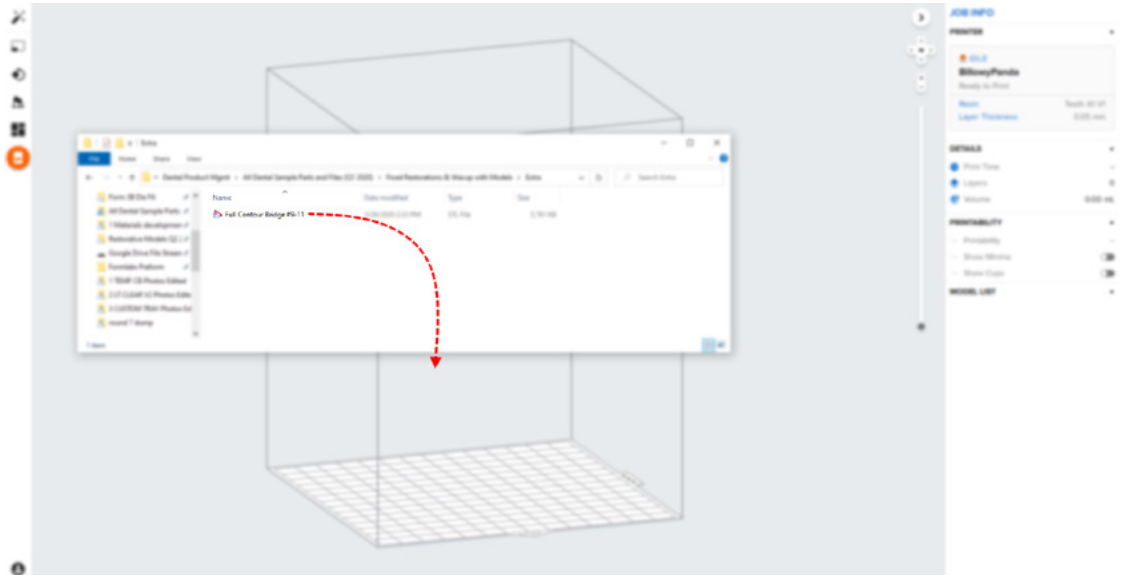
3.2 Material Selection

Select the material for printing by clicking the printer box in the "Job Info" menu on the right hand side.
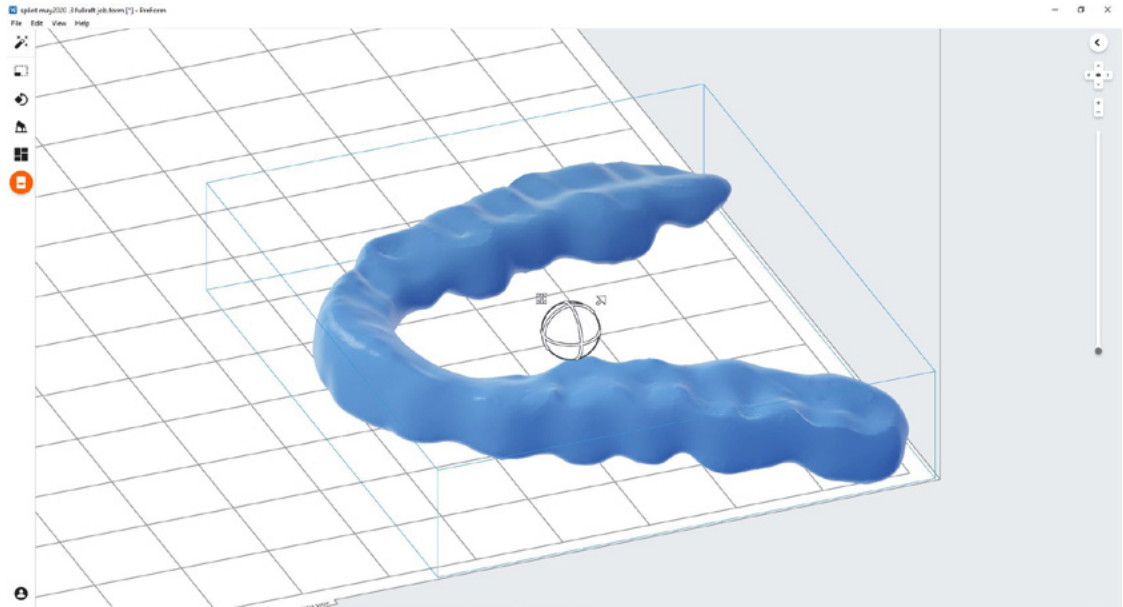
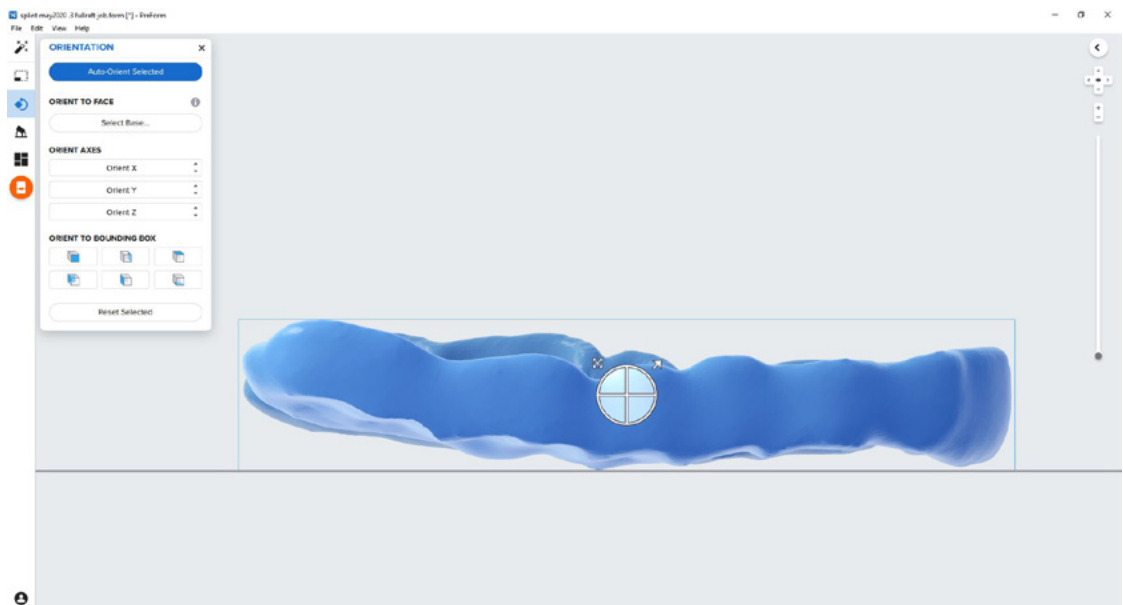Select Dental LT Clear (V2) in the material pull down.

3.3 Orientation

Proper part orientation is critical to ensure part accuracy and fitment.

Always position the splint horizontal to the built platform with the intaglio surface facing away from the build platform.

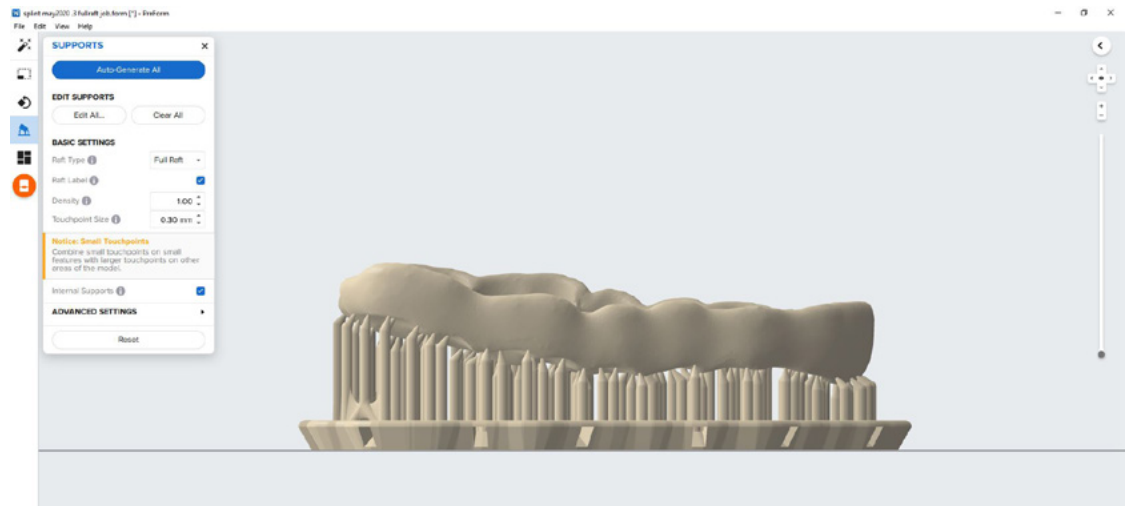To rotate a splint, click on the part and "click and drag" the sphere.

3.4 Generate Supports

3.4.1 Automatic Support Generation

While having the part(s) selected, click the "Supports" button on the left toolbar.

Under "Basic Settings" confirm that "Support Density" is 1.00 and "Touch Tips" is 0.30 mm.

Once the settings are confirmed, click "Auto-Generate" to add the required supports.


3.4.2 Manual Support Editing

If a support point is not in an ideal location, it can be moved after automatic generation by clicking the "Edit…" button in the Supports menu.

Be sure not to reduce the number of supports and always properly support the parts of the splint closest to the build plate.

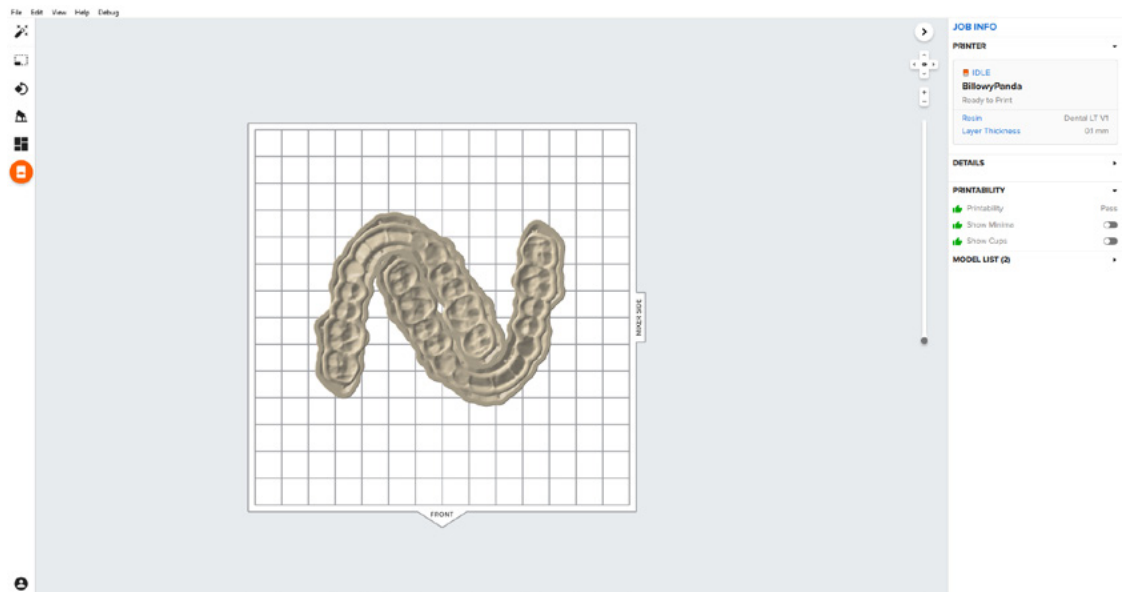Preform will indicate in red what areas might require additional support.
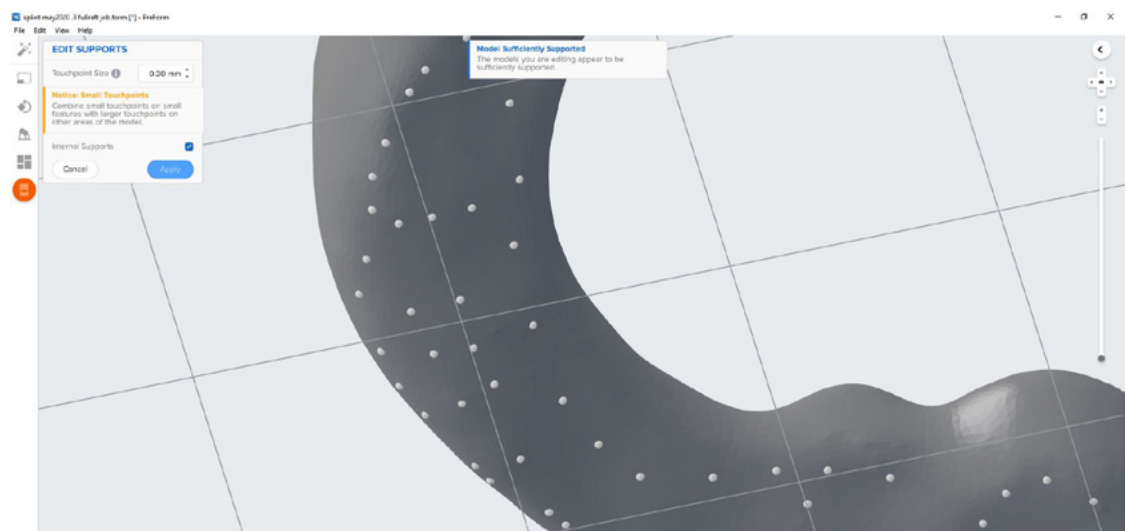
Confirm under the "Job Info" menu bar on the right side of the window that "Printability" has green thumbs-up.
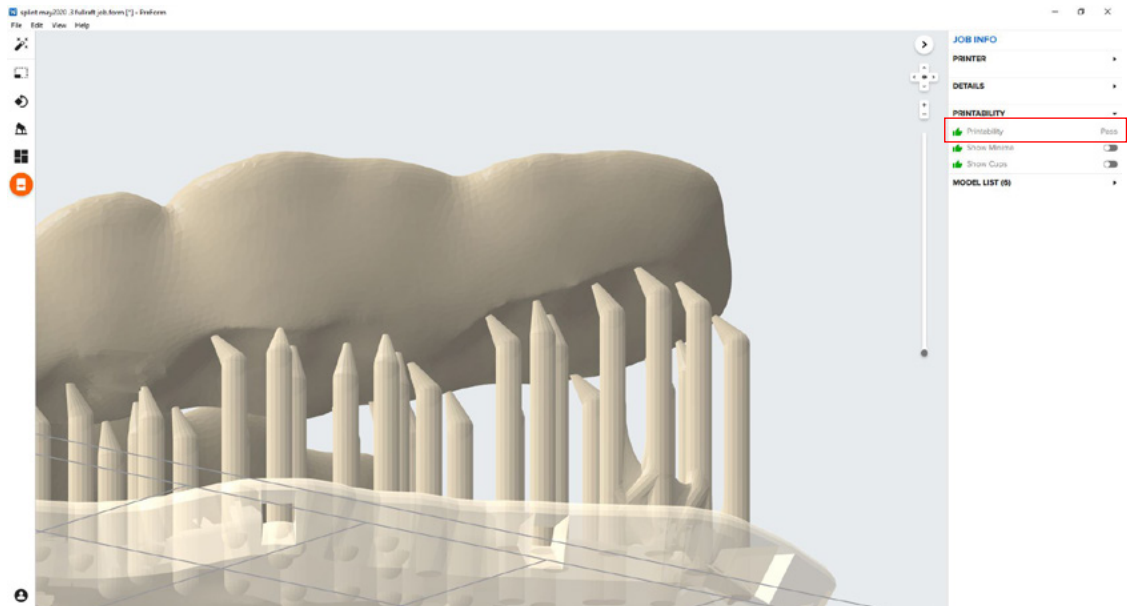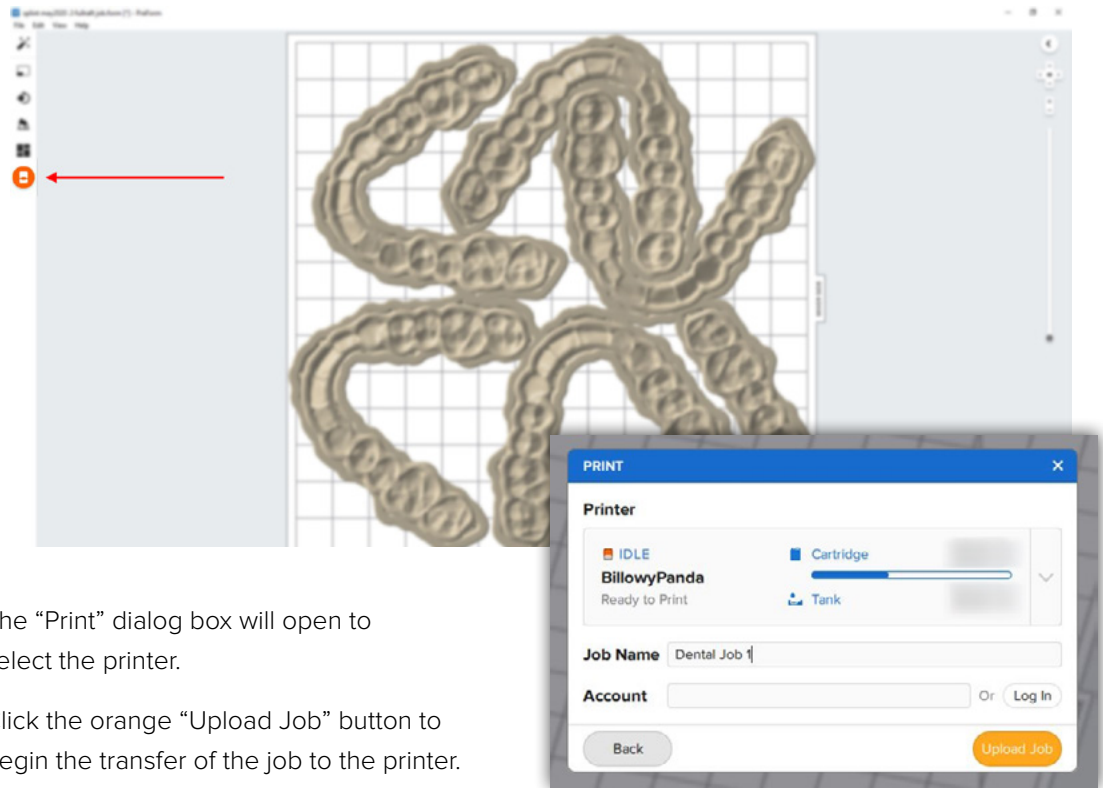

3.5 Printing Layout

For normal printing, it is best to place parts toward the middle of the build plate.

Tip: When printing multiple cases, overlapping rafts can optimize the use of the build volume and save material.

3.6 Transferring Job to the Printer

Send the job to the printer by clicking the orange printer icon on the left.

The "Print" dialog box will open to select the printer.

Click the orange "Upload Job" button to begin the transfer of the job to the printer.

3.7 Set up the Printer

Shake the Dental LT Clear Resin (V2) cartridge and then insert the cartridge, a build platform, and a compatible resin tank into the Form 2 or Form 3B printer.

- Begin printing by selecting the print job from the printer's touch screen
- Follow any prompts or dialogs shown on the printer screen
- The printer will automatically complete the print

Attention: For full compliance and biocompatibility, Dental LT Clear Resin (V2) requires a dedicated resin tank and build platform. Only use the Form Wash with other Formlabs biocompatible resins, such as Surgical Guide Resin.

4. Post Processing

Always use gloves when handling uncured resins and parts.

4.1 Part Removal

Remove printed parts from the build platform by wedging the part removal or scraping tool under the part raft and rotating the tool.

4.2 Washing

Precautions

1. When washing the printed part with solvent, it should be in a properly ventilated environment with proper protective masks and gloves.
2. Expired or unused Dental LT Clear Resin (V2) shall be disposed in accordance with local regulations.
3. IPA shall be disposed of in accordance with local regulations.
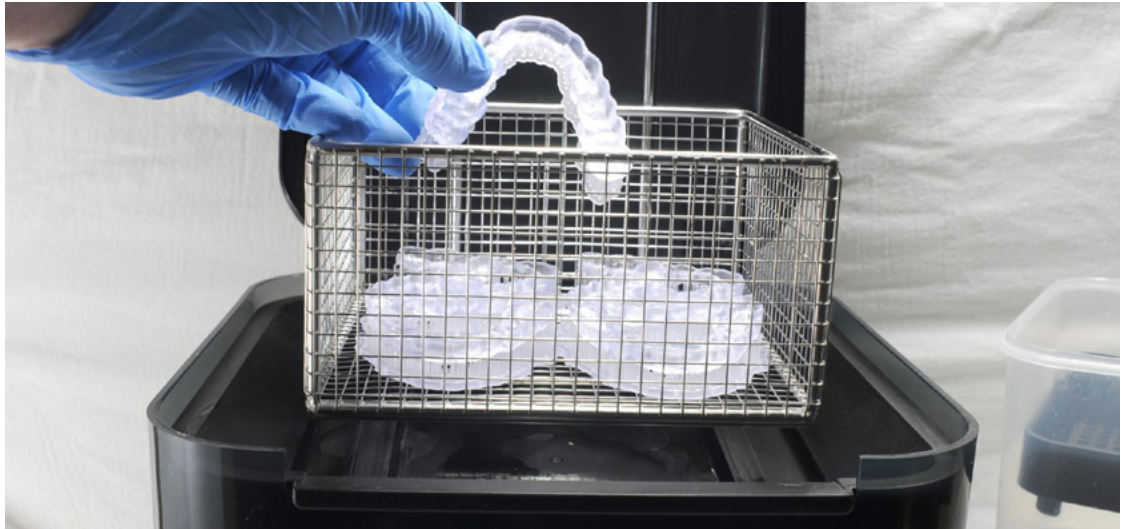
Place the printed parts in a Form Wash filled with isopropyl alcohol (IPA, ≥99%) and wash them for 15 minutes.

Make sure the parts are fully submerged in IPA when washing.

Exceeding wash duration may affect dimensional accuracy and performance of printed parts over time.

Remove parts from the Form Wash and soak them in fresh isopropyl alcohol (IPA, ≥99%) for an additional 5 minutes.

> **Note:** Using a squeeze bottle of fresh IPA and compressed air can help make parts clean, especially in deep parts of the intaglio anatomy.

4.3 Drying

Remove parts from the IPA and leave to air dry at room temperature for at least 30 minutes.

Inspect printed parts to ensure that they are clean and dry.

No residual alcohol, excess liquid resin or residue particles may remain on surface before proceeding to subsequent steps.

> **Note:** If any residual resin remains (it will look shiny) reference the previous section for an additional rinse in clean IPA.

4.4 Post Curing

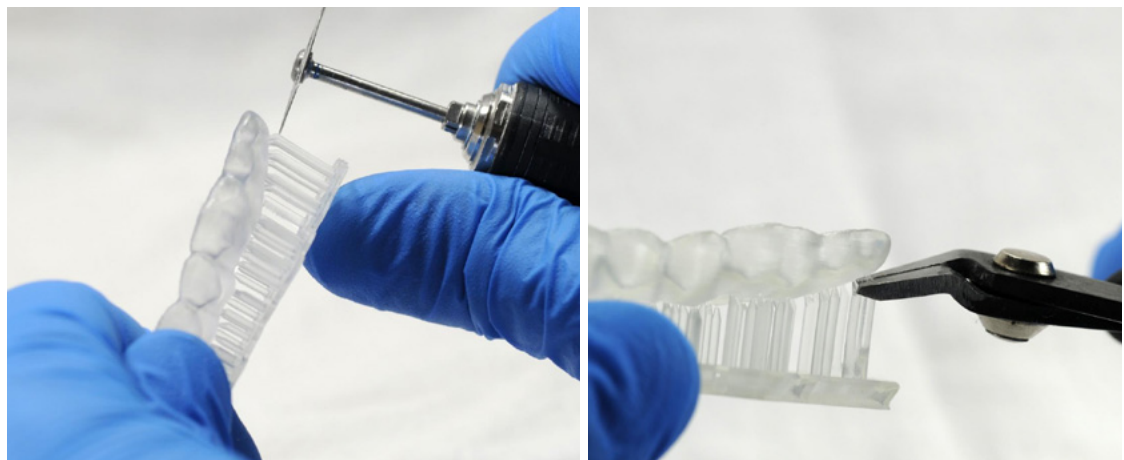Place the dried printed parts in a Form Cure and post cure at 60°C for 60 minutes.

Allow Form Cure to cool down to room temperature between cure cycles.

> **Note:** Leaving the Form Cure door open will help the unit cool between cycles quicker.

4.5 Support Removal

Remove supports using a cutting disk and handpiece, or other part removal tool.

> **Note:** While ripping the supports from the part might be quicker, it can leave divots in the part. We recommend cutting the supports off individually.

Removing supports should leave a small positive feature.

As sections of the supports are removed, the raft can be cut to give more room for the next area of the part to be cut.
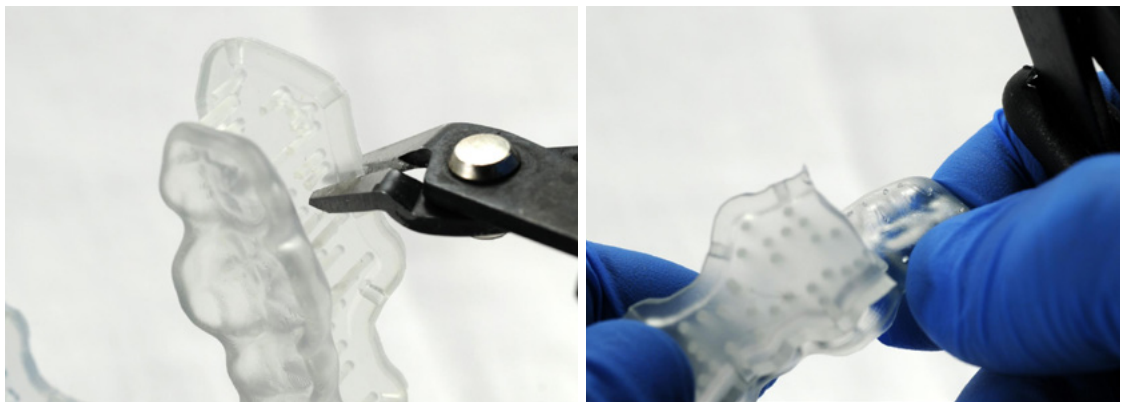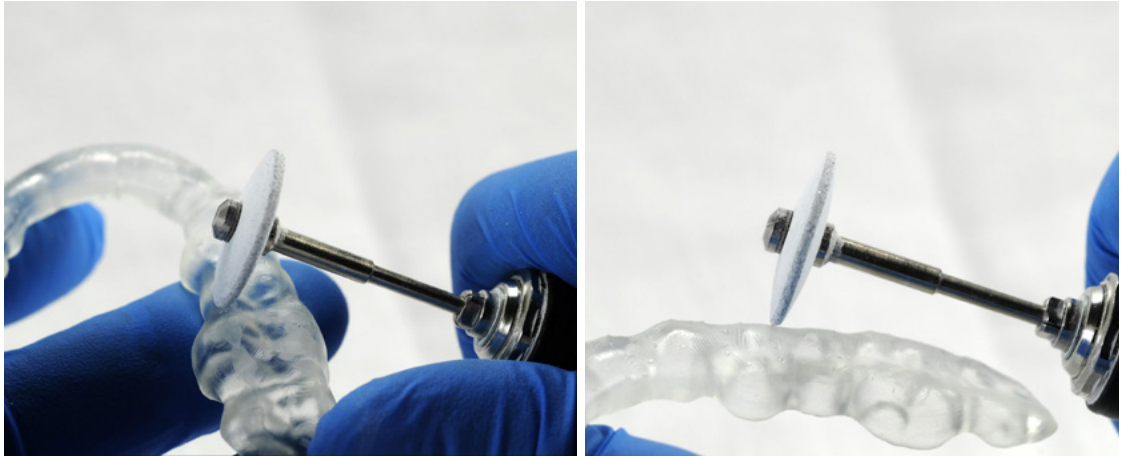

As sections of the supports are removed, the raft can be cut to give more room for the next area of the part to be cut.

Inspect the appliance. Discard and reprint the part if any cracks are detected.

4.6 Finishing and Polishing

Smooth down the support surfaces with a carbide or wheel rotary and handpiece.

> **Note:** Depending on what tools are used for finishing, it might be necessary to have a second finishing step with a "scotch-brite" type rotary.

Once the surface is finished to satisfaction, polish and smooth the outside of the splint for patient comfort.

A high gloss shine can be achieved with traditional polishing tools and materials commonly used for dental acrylics.
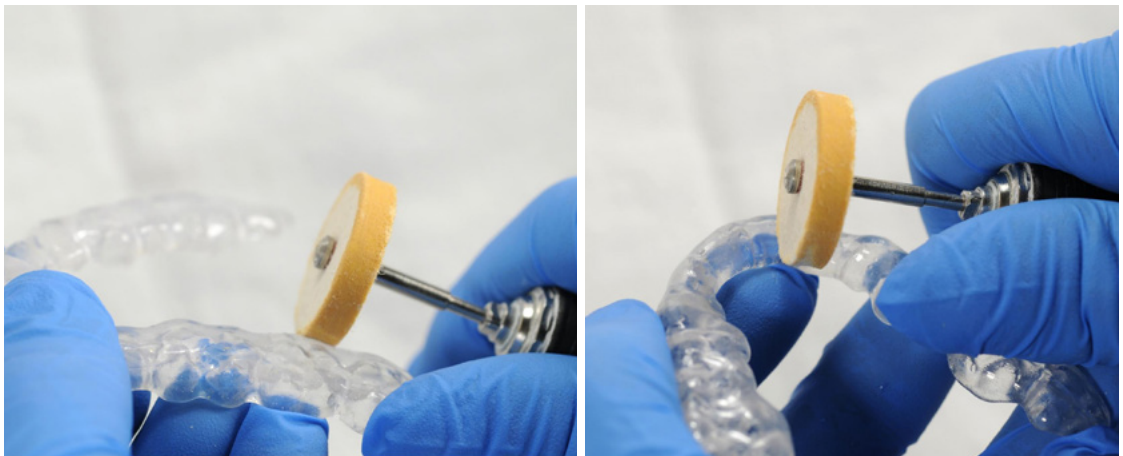

> **Note:** Lathes with rag or felt wheels, pumice, and high shine compound make the process quick and easy.

5. Cleaning and Disinfection

5.1 Cleaning the Parts

Fully post processed parts can be cleaned using a dedicated soft toothbrush with neutral soap and room temperature water.

Do not use toothpaste or any other abrasive cleaning products on parts printed with Dental LT Clear Resin (V2). Abrasive cleaning products may affect surface finish and patient comfort.
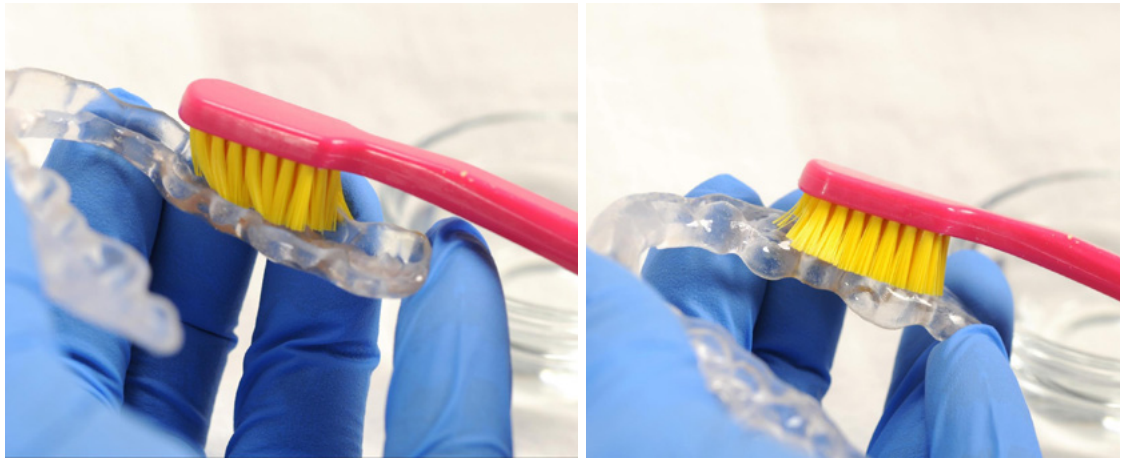
After cleaning, always inspect the part and discard it if any damage or cracks are detected.

5.2 Disinfection

A tested method of disinfection includes soaking the finished part in fresh 70% IPA for 5 minutes.