



Dental Application Guide

3D Printing Surgical Guides

SprintRay's Surgical Guide Resin allows you to print accurate surgical guides for dental implants. It is a biocompatible photopolymer resin with high strength and excellent dimensional accuracy.

In this workflow guide we will cover the following topics:

- ✓ Best Practices for 3D Printing Surgical Guides
- ✓ Cleaning and Post Processing

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STEP 1

Treatment Planning and Surgical Guide Design

Implant Treatment Planning

Implant surgical guides are a dental appliance that is used to assist the clinician in placing dental implants in the preoperative designed location. In order to design this dental appliance, a few items are required:

1. DiCom Scan of Patient's Oral Anatomy: This scan is captured via a dental CBCT system.
2. Digital Impression: This data can be captured by an intraoral impression scanner or a desktop impression scanner.
3. A treatment planning software that comes with .STL file export capability.

Recommended Minimum Features for Optimum Strength and Durability

Thickness	Offset From Teeth	Retention Amount	Offset From Sleeve
3mm	0.2mm	0	0.7mm

Surgical Guide Design & Export

Once the guide design is finalized, create an .STL or .OBJ file format from the fully designed guide. Below are some implant guide softwares compatible with MoonRay.



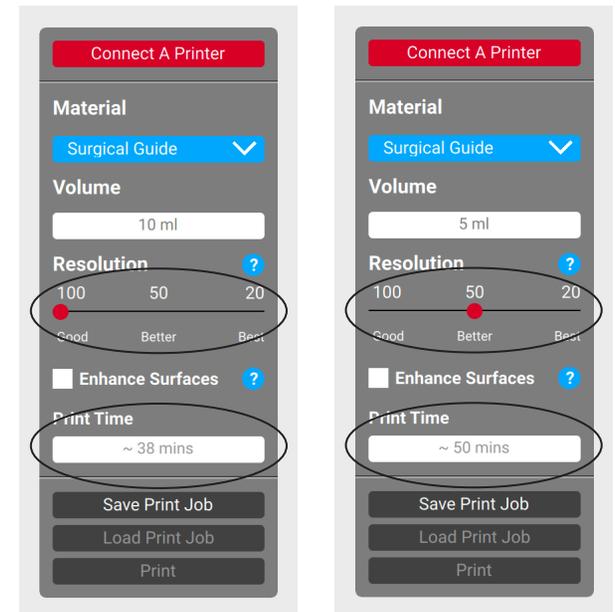
STEP 2

Print Preparation in Software

Import the surgical guide model into SprintRay Software to set up the print. Recommended layer thickness for surgical guides is 100 microns. Note that they can be printed at 50 microns, but this will slow the print time.

Note that at 100 microns, print time for full arch surgical guides oriented flat takes 38 minutes.

At 50 microns, print time for full arch surgical guides oriented flat takes 50 minutes.

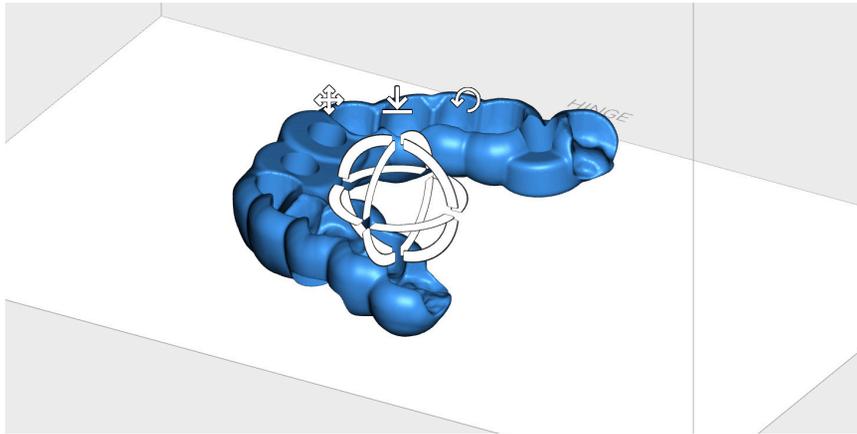


Setting Up Accurate Prints

To print precisely with SprintRay Surgical Guide resin, it is important to orient the model such that no support structures are generated on guide sleeve holes or surfaces. This ensures accuracy of the fit.

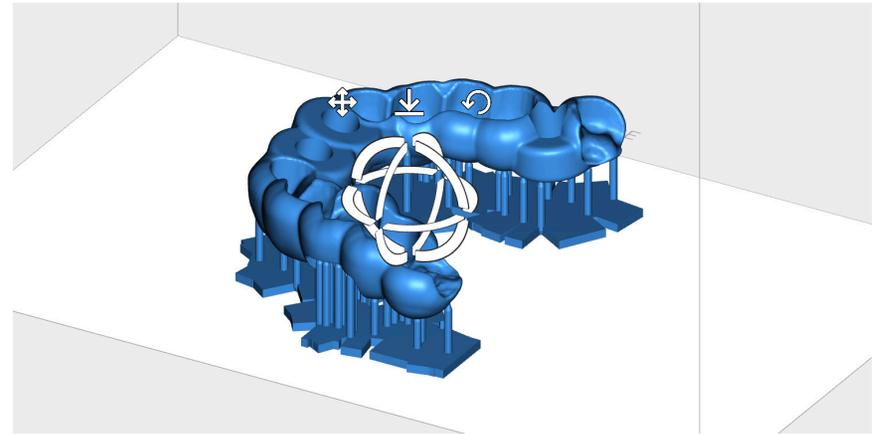
STEP 2

Setting Up Accurate Prints



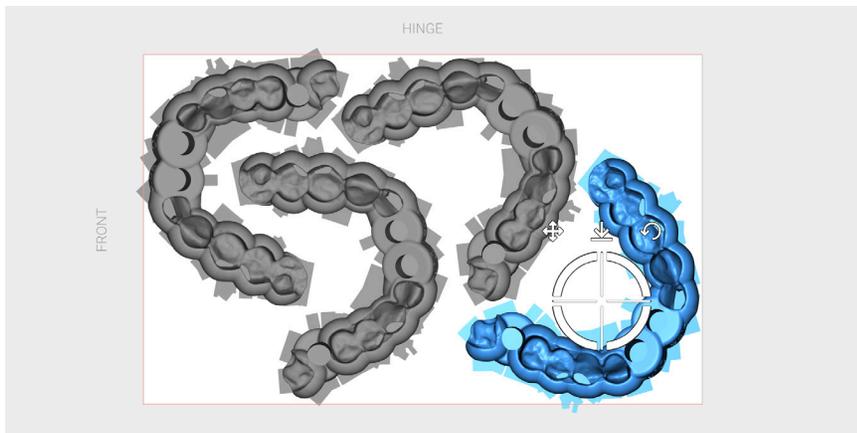
Orient Model

Begin by orienting occlusal surfaces away from the build platform to generate the best placement of support structures.



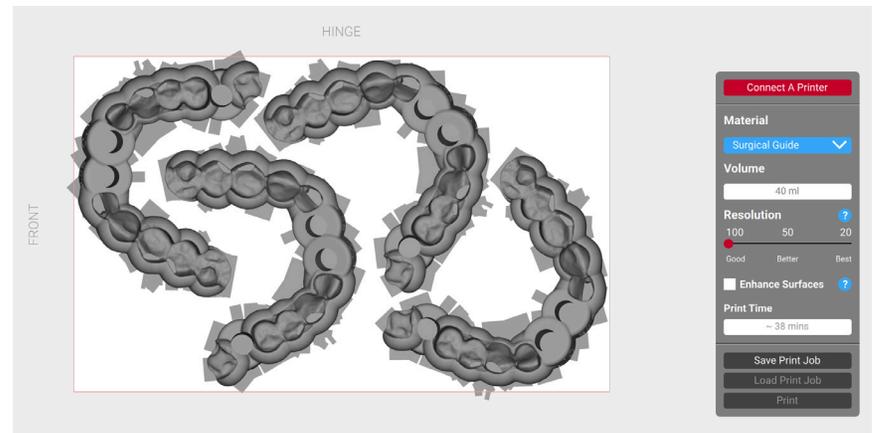
Add Supports and Edit

Verify the placement of support structures to ensure an accurate print. Note that you can add or remove supports if necessary.



Create Duplicates (Optional)

Duplicate as many surgical guides as needed that fit within the parameters of the build platform. If your support structure lands outside the build parameters, the print is still able to proceed without impacting the model.



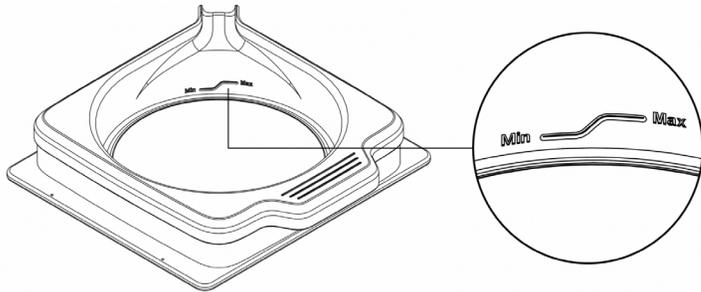
Print

Connect to a printer, select desired settings, and send to print.

STEP 3

Printing on MoonRay

Before you begin printing, shake the SprintRay Surgical Guide Resin bottle to ensure complete mixture of the resin's chemical formulation. Fill the tank with the resin while being mindful of the minimum and maximum fill lines. Now the print can begin.



If there is leftover resin in the tank from the previous print, use the provided resin wiper to stir the resin before printing. This ensures that the resin is properly mixed and clean.

Maintaining the Resin Tank Drum

When cared for properly, the resin drum in MoonRay is designed to last for 50 liters of use. Resin left over after a print can be left in the tank for up to 24 hours. However, note that prolonged exposure to bright lights and air may inadvertently cause it to begin curing. It's therefore recommended that you pour extra resin back into the bottle and clean the tank within 24 hours.

To clean, gently use a paper towel and isopropyl alcohol to wipe the interior. Avoid using a coarse cloth or sharp tools to loosen cured resin from the tank, as this may cause damage. After 50 liters of use, the tank may become cloudy, causing your models to peel. If this happens, replace your resin tank to ensure continued print accuracy.

STEP 4

Post-Processing

After printing, models must be rinsed, dried, removed from support structure and then post-cured. Read the following for detailed instructions on how to effectively post-process the surgical guide model.

[Washing Parts](#) *(Click on the link to learn how to best clean your prints)*

Bathe the surgical guide model in a bath of 96% isopropyl alcohol (IPA) to remove any liquid resin. Use a toothbrush to scrub the surface of the model to remove any partially-cured resin.

Once the majority of the resin is removed, transfer the model into an ultrasonic cleaner filled with clean IPA for no more than 5 minutes. For this process, orient the occlusal surface of the model downward to allow resin to fall away during the agitation process.

In total, the print should spend no more than 10 minutes in alcohol to avoid micro-cracks and abrasions. Once cleaned, air-dry the print using compressed air. If there are any particles or residue still on the model, spray it down with more alcohol. Rinse, dry, and repeat until all uncured resin is removed.

FIRST

IPA Brush
<5 minutes

SECOND

UltraSonic
<10 Minutes

THIRD

Air Dry
5 Minutes

[Removing Supports](#) *(Click on the link to learn how to best remove the supports)*

Manually snap-off or use a flush cutter to snip off the support structure from the surgical guide. Using the flush cutter included in the finishing kit, cut the supports as close as possible to their attachment points on the surgical guide. Be careful not to nick the surgical guide itself, as this can cause pitting that may be difficult to remove during sanding.

STEP 4



Based on the specifications of your curing unit, total curing time for the model may change.
Stages from left to right: Printed, Washed and Supports Removed, Post-cured, Assembled.

Post-Curing Requirements

The surgical guide must be properly post-cured to manufacturer's specifications before use. The color of the model will change from translucent yellow to a translucent pink during the post-curing process. Recommended minimum post-cure time is between 15-25 minutes depending on the specification of your curing unit.

Polishing Printed Guides (Optional)

To ensure a smooth surface finish, take a small file and sand away small nubs left over by the support structure. Sand in a circular motion to remove the nubs without leaving deep sanding marks; the goal is to blend the nubs into the surface of the print. Once finished, use high grit sandpaper to blend the sanded areas. To achieve a polished look, apply chapstick to mask the sanding scratches.

Assembly

Insert the guide sleeves into printed parts prior to sterilization.

Sterilization

Sterilize printed Dental Surgical Guides parts in an autoclave after fully rinsing, drying, post-curing, and assembling. A sterilization pouch is optional. If disinfection is required, use non-chemical products. If this is not possible, ethanol solution is recommended for disinfection purposes.

Recommended Autoclave Presets		
121°C for 15 minutes	134°C for 6 minutes	138°C for 3 minutes



Customer Support

Printer uptime is crucial to your practice. If you're experiencing issues, please get in touch. Our Los Angeles support team works Monday through Friday, 9AM - 5PM PST.

www.support.sprintray.com

Free Consultation

Set up a free consulting session with our sales team to see how 3D printing can dramatically enhance your dental practice and help improve patient care from day one.

sales@sprintray.com



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