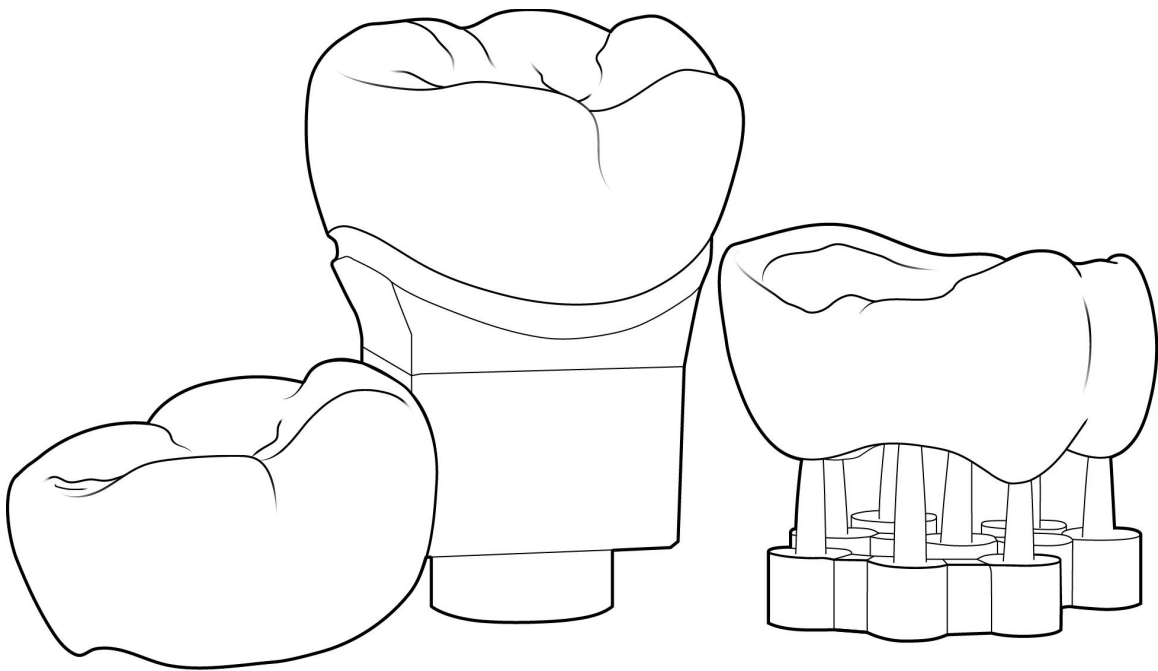


## Workflow Guide: 3D Printing for Chairside Ceramic Crowns



With 3D printing, you can provide chairside ceramic crowns to more patients for a fraction of the cost of other in-office methods. This guide will walk you through the process of data gathering, design, fabrication, preparation, and placement.

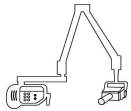
# Workflow at a Glance

## 1. Prep and Data Capture



Time:

30 mins



Tools:

- Intraoral scanner
- Digital X-ray

## 2. Plan Treatment



Time:

5 mins

Tools:

- Computer with internet
- Patient data

## 3. Create a Print Job



Time:

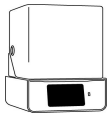
5 mins

Tools:



- Computer with internet
- SprintRay account

## 4. 3D Print



Time:

15 mins

Tools:



- SprintRay Pro S 3D printer
- Pro S Crown Kit
- Ceramic Crown resin

## 5. Clean



Time:

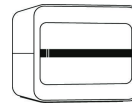
5 mins

Tools:



- Blue shop towel
- Spray bottle with IPA 91%
- Compressed air
- Snippers

## 6. Post Cure



Time:

7 mins

Tools:

- SprintRay ProCure 2

## 7. Wash with IPA



Time:

5 mins

Tools:



- Blue shop towel
- Spray bottle with IPA 91%
- Compressed air

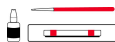
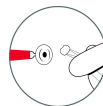
## 8. Prepare Prosthetic



Time:

10 mins

Tools:



- Lab handpiece
- Scotch-Brite Fuzzies
- Toothbrush & soapy water
- Glazing or polishing tools

## 9. Lute the Crown



Time:

10 mins

Tools:



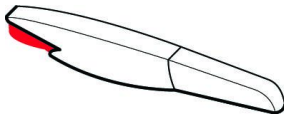
- Panavia V5 Resin Cement
- Panavia V5 Tooth Primer
- Clearfil Ceramic Primer Plus
- Handheld curing light

# 1. Capture Data and Prep Tooth

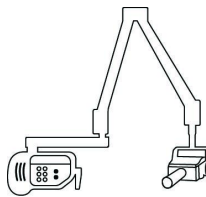
## Time

30 minutes

## Tools



Intraoral scanner



Digital X-ray

## 1.1 Pre-prep Scans

### Digital X-ray

Capture an X-ray of the current tooth for documentation and to understand the patient's anatomy.

### Pre-prep Scans

Before the patient is numb, use an intraoral scanner to capture the opposing arch and bite scan.

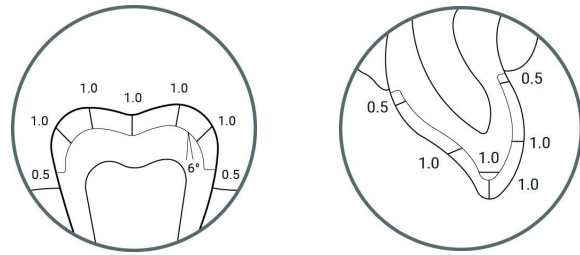


*Scans may be taken after the patient goes numb, but scanning beforehand will provide the most accurate data for your design*

## 1.2 Prep Tooth

Evenly reduce the tooth while observing the minimum thickness, creating a circular shoulder with rounded inner edges. Always consult the IFU for the material you're using. Below are best practice guidelines when prepping for a 3D printed crown.

- Shoulder width: 0.5 mm incisal, 1 mm occlusal
- Vestibular or lingual reduction: 1 mm for anterior and posterior
- Incisal edge: 1 mm



For partial crown and veneer cases, consult the resin IFU for guidelines and minimum thicknesses.

### 1.3 Post-prep Scans

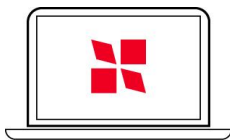
Retract the surrounding gums. You'll need to generously capture the margin around the prep in order to use AI design. Remove blood and saliva from the affected area before scanning.

## 2. Plan Treatment

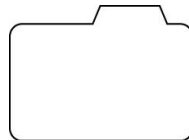
### Time

5 minutes

### Tools



Computer with internet  
access



Pre- and post-prep patient  
data



SprintRay account

### 2.1 Submit AI Treatment Request

Visit [dashboard.sprintray.com](https://dashboard.sprintray.com) and sign in or sign up for a SprintRay account. Select or add your patient, then choose the 'AI Crown' treatment type. Follow the prompts on the screen to upload all the data you gathered during step 1.

To get a successful AI design, there are a few requirements your case and data must meet:

- Patient needs a single posterior crown
  - No inlays or onlays accepted
  - Premolars and molars only
- The prep scan includes exactly 1 fully prepped tooth
  - Min incisal shoulder width 0.5 mm
  - Min occlusal shoulder width 1.0 mm
- Upper & lower intraoral scans are in bite relation
  - Bite scans and model scans are not accepted

If your case doesn't meet all the requirements or has a difficult path of insertion, request a human crown design. An expert member of our staff will deliver a crown within 24 hours.

## 2.2 Review and Approve Design

Thanks to AI technology, you can receive a crown design in just a few minutes. Review the design and approve or request a redesign. Once you approve, you'll be able to download and send it to print.

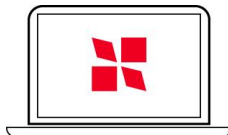
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## 3. Create a Print Job

Time

5 minutes

Tools



Computer with Internet  
Access



SprintRay Account

### 3.1 Import into RayWare

Navigate to [RayWare Cloud](#), then start a new print job. Select appropriate job type, then select the printer you'll use for this job. Select the Crown Kit platform for maximum speed and minimum material waste.

Select the material you'll use for this print job. For definitive crowns, we recommend SprintRay Ceramic Crown in the shade best suited to your patient. Select your printer and platform type. For this treatment, we recommend the Crown Kit for maximum speed. Continue to Upload and add your crown treatment file.

### 3.2 Verify Setup

RayWare Cloud uses AI to determine the best orientation for your print job and will automatically avoid placing supports in the ingalio surface. Double-check that the orientation is correct with the occlusal surface facing down. Choose 'Max Strength' supports.



*Always print with the occlusal surface facing the platform or it may not print properly*

### 3.3 Queue to Printer

Once you're happy with the setup of your print, select the 'Send to Queue' button, then choose the printer you'd like to use for this print job.



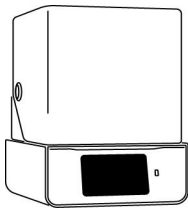
*You can also use the 'Print Now' button, but be sure to thoroughly inspect your printer before you start printing.*

## 4. 3D Print

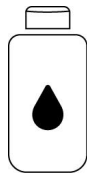
Time

15 minutes

Tools



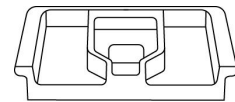
SprintRay Pro S



Crown Resin



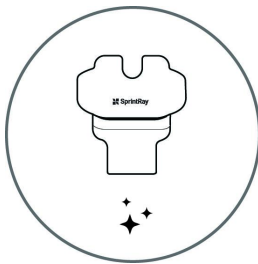
Crown Platform



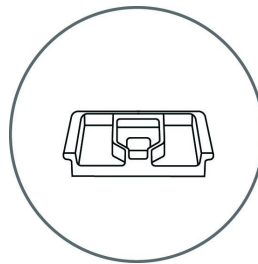
Crown Tank

### 4.1 Install the Crown Kit

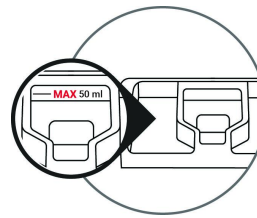
Install the Crown Kit, following the onscreen prompts to set up.



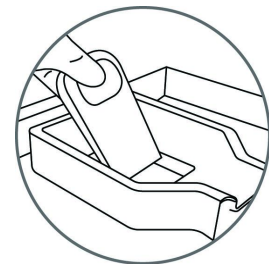
Check that the platform is clean, locked, and ready



Check that the resin tank is seated in its cradle



Fill the tank to the max line



Mix resin with the Crown Kit squeegee

### 4.2 Start the Print Job

On the printer touchscreen, go to the 'Queue' tab and locate your crown print job. Select 'Start Print'. It may take a few minutes before the printer arm starts to lower, depending on whether or not the resin tank and/or build platform need to be heated up.

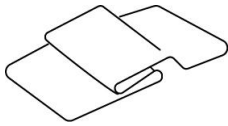
You can view the progress of your print on the printer's touchscreen, including how much time is left before your job is complete. This information can also be viewed via our cloud Dashboard and on RayWare Cloud.

## 5. Clean

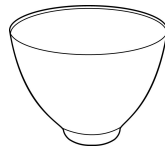
Time

5 minutes

Tools



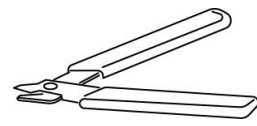
Blue shop towel



Small Bowl with IPA  
91%



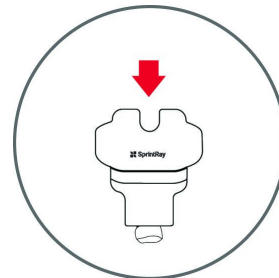
Compressed Air



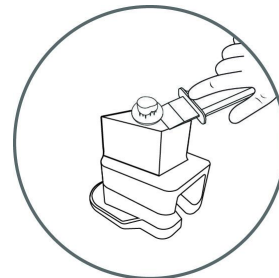
Snippers

### 5.1 Remove From the Build Platform

Unlock the build platform and gently pull it toward you to release it from the printer.



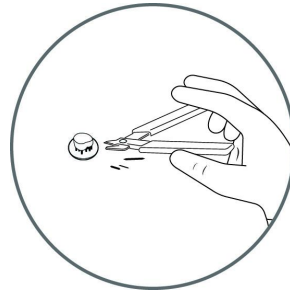
Twist the prosthetic to remove it by hand. If it doesn't release easily, place the platform on a flat surface and use the print removal tool to scrape it off.





## 5.2 Remove Supports

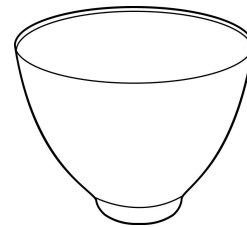
If there are any supports remaining on the crown, use flush cutters to clip them off. Don't worry if there are still small stubs left on the model, you'll remove those later.



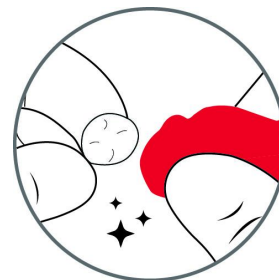
## 5.3 Clean

For most clinics, we recommend washing Ceramic Crown by hand. Resins with high ceramic content can develop a chalky surface if left in contact with IPA for too long.

Fill a small bowl with ~½ inch of IPA.  
Submerge the crown and brush all the surfaces.



Use a micro applicator to thoroughly clean the intaglio socket. Remove the crown from the bowl and use compressed air to thoroughly remove IPA residue. Repeat if necessary.



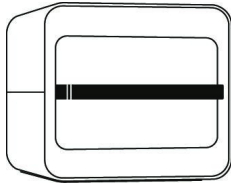
*Do not let IPA stand on the surface of the prosthetic for more than 30 seconds, otherwise it may develop a chalky surface finish.*

## 6. Post Cure Prosthetic

### Time

7 minutes

### Tools



Pro Cure 2

### 6.1 Place in ProCure 2

Place the crown in ProCure 2. On the touchscreen, select the curing profile for the resin you used to print the prosthetic. If you're only curing a few crowns at once, place them in the center and select Bolt Mode curing for the fastest results.

If you're using ProCure 1, place the prosthetic in the chamber and select the correct profile. The curing process may take up to 60 minutes.

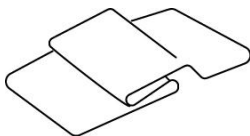
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## 7. Wash with IPA

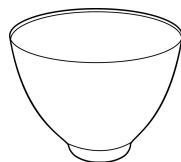
### Time

5 minutes

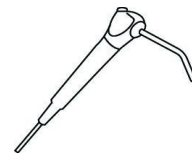
### Tools



Blue shop towel



Small Bowl with IPA 91%



Compressed Air

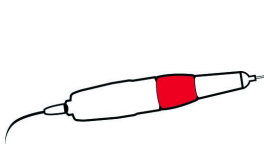
After post curing, the prosthetic needs a final rinse. Submerge the crown in IPA within a small bowl and brush all surfaces, then remove from IPA and wipe off the surface with shop towel. Use compressed air to thoroughly dry the prosthetic.

## 8. Prepare for Placement

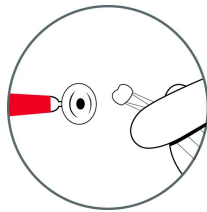
Time

10 minutes

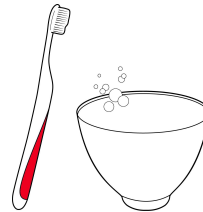
Tools



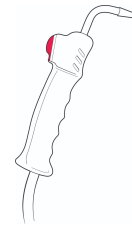
Lab handpiece



Red Scotch-Brite™  
Fuzzies



Toothbrush and  
soapy water



Steamer (optional)

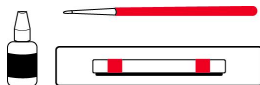
### 8.1 Smoothen the Prosthetic

Use a fine lab carbide bur or a red Scotch-Brite™ Fuzzies attachment to remove remaining stubs leftover by the support structures until the surface is smooth and uniform.

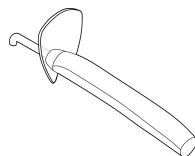
### 8.2 Characterize

Tools

If Glazing

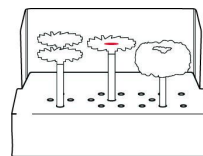


GC OptiGlaze™ kit

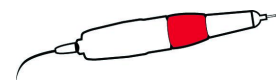


ProCure 1 or  
handheld curing  
light

If Polishing



Polishing wheels



Lab handpiece

## Glaze


### 1. Prepare

Tool: IPA and compressed air  
Technique: Clean and dry

Spray the crown with IPA to clean the surface, then dry with compressed air.

### 2. Apply

Tool: Brush and glaze  
Technique: Thin, even coats

 *Do not glaze intaglio surfaces inside of the crown and do not blow air.*

Shake bottle thoroughly before use and dispense into a dispensing dish. Apply thinly on the crown surface with a brush. If applying a second coat of glaze, use an intermediate (short) cure before applying the second coat.

## Polish

### 1. Smoothen

Tool: Lab handpiece  
Polishing Wheel:

- Diamond Polisher Twisted Blue (Med) [Meisinger - 9771M-170-HP](#)

Technique: Medium, consistent pressure  
Speed: 7,000-8,000 rpm

Use on all sides and the occlusal surface of the restoration.

### 2. Polish

Tool: Lab handpiece  
Polishing Wheels:

- One-Step Composite Polisher Cup (Ultra-fine) [Komet - 9525UF](#)
- One-Step Composite Polisher Pointed (Ultra-fine) [Komet - 9523UF](#)

Technique: Medium, consistent pressure  
Speed: 7,000-8,000 rpm

Use the **polisher cup** on the facial, lingual/palatal, and proximal surface.

Use the **pointed polisher** on the occlusal surface of the crown.

### 3. Light Cure

Tool: Handheld curing device with 400-430nm wavelength  
Technique: Light exposure on all surfaces

Use a handheld curing device at an approximate distance of 1 cm. Cure each coated surface, repeating as needed to fully cure any undercuts or areas in shadow.

**⚠** *OptiGlaze cannot be fully cured with ProCure 2; use ProCure 1 (0°C for 1 min) or a handheld curing light with a wavelength of 400-430nm (30 sec per surface)*

### 3. Finish

Tool: Lab handpiece  
Polishing Wheels:

- Jiffy Original Composite Brush (Regular) [UltraDent - 850](#)
- Jiffy Original Composite Brush (Regular) [UltraDent - 1009](#)

Technique: Medium, consistent pressure  
Speed: 4,000-5,000 rpm

Use the **regular composite brush** on the facial, lingual, and proximal surface.

Use the **composite pointed brush** on the occlusal surface.

## 8.3 Disinfect

Disinfect the crown using a steamer if possible, then brush lightly with dish soap to disinfect the crown before placement. Ensure that the crown is completely dry before cementation.

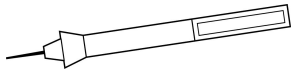
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## 9. Lute the Crown

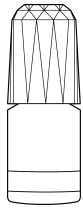
### Time

10 minutes

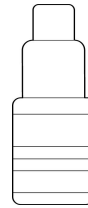
### Tools



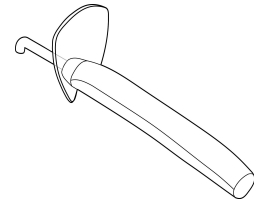
Panavia V5 Resin  
Cement



Panavia V5 Tooth  
Primer



Clearfil Ceramic  
Primer Plus



Handheld curing light

### 9.1 Luting Protocol

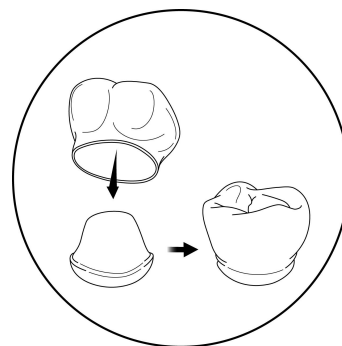
Follow the SprintRay recommended workflow to maximize the strength between the resin cement and Ceramic Crown.



*This protocol uses recommended products based on SprintRay research to maximize strength. Ceramic Crown is compatible with a wide range of cements and primers.*

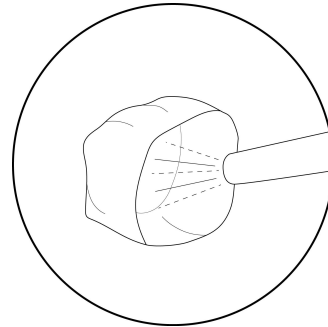
#### Fit Check

Check the fit of the restoration on the prep. If necessary, make adjustments to the crown to ensure a proper fit.



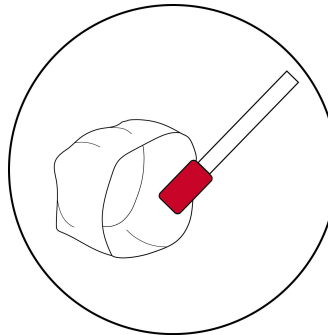
### **Clean and Prepare the Crown**

Clean and prepare the intaglio surfaces of the crown. Remove residue from the crown by washing thoroughly with IPA. For the best bond strength, sandblast the intaglio to create surface roughness.



### **Apply Primer to Crown**

Apply Clearfil Ceramic Primer Plus to the intaglio bonding surface of the crown. Dry the adherent surface with compressed air.



### **Clean and Prepare Tooth or Ti Base**

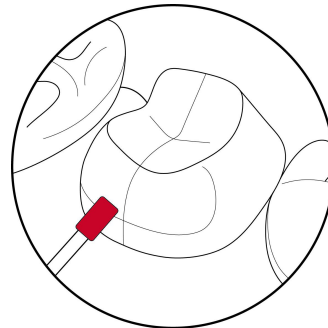
Clean the surfaces of the prepped tooth or Ti Base.

For Ti Base:

Follow the manufacturer's instructions for Clearfil Ceramic Primer Plus for priming the Ti base.

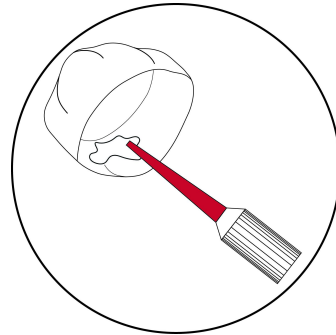
For Prepped Tooth:

Follow the manufacturer's instructions for Panavia V5 Tooth Primer for priming of the prepped tooth.



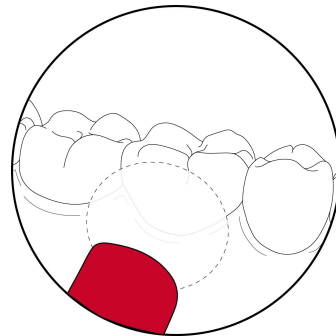
### **Apply Cement**

Apply the cement to the intaglio surface of the crown, distributing evenly. Place the crown onto the prepped tooth. Apply gentle pressure until it is fully seated.



### **Initial Polymerization**

Remove excess cement from the margins of the crown and light cure for 5 seconds. Remove remaining excess cement with a dental hand instrument. Ask patient to bite softly and hold in occlusion for 3 minutes for initial polymerization.



### **Final Check**

Perform a final check to ensure that it is fully seated, the margins are sealed, and the occlusion is correct.

