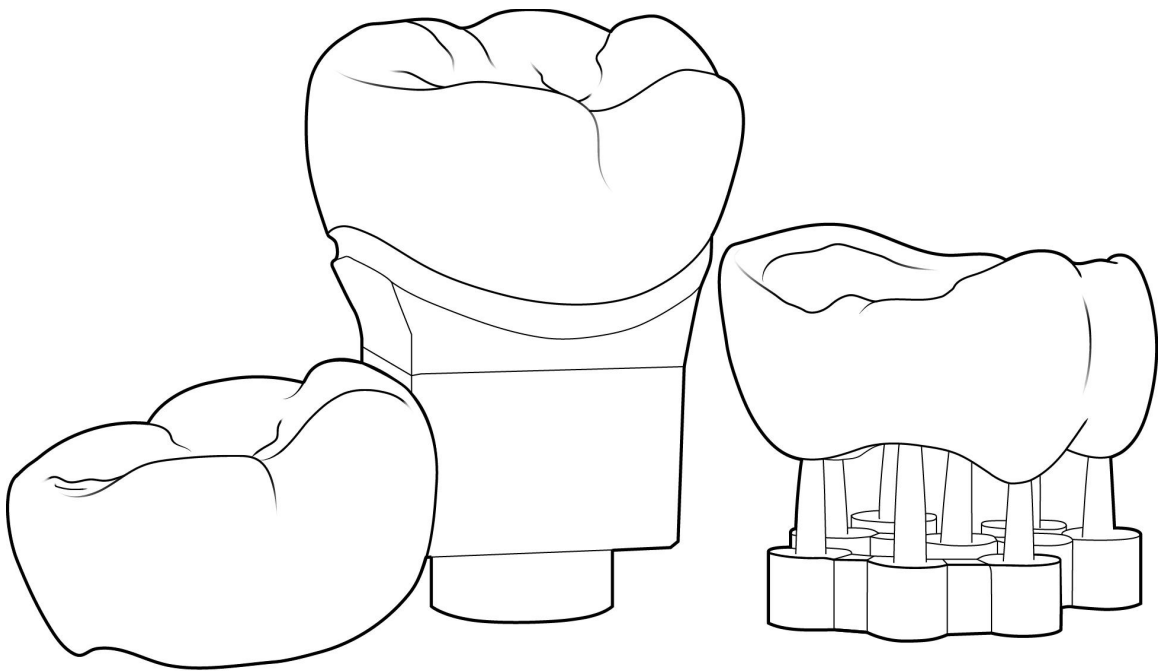


Workflow Guide:

3D Printing for Chairside Ceramic Crowns



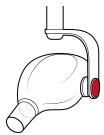
With 3D printing, you can provide chairside ceramic crowns to more patients for a fraction of the cost of other in-office methods. This guide will walk you through the process of data gathering, design, fabrication, preparation, and placement.

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

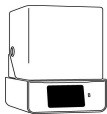


Time:
5 mins



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. Wash with IPA

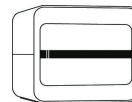


Time:
5 mins



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

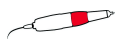


Time:
5 mins



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

8. Prepare Prosthetic



Time:
10 mins

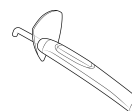


Tools:
- Lab handpiece
- Polishing wheels
- Toothbrush & soapy water
- Glazing or polishing tools

9. Lute the Crown



Time:
10 mins



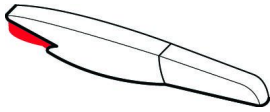
Tools:
- Panavia V5 Resin Cement
- Panavia V5 Tooth Primer
- Clearfil Ceramic Primer Plus
- Handheld curing light

1. Capture Data and Prep Tooth

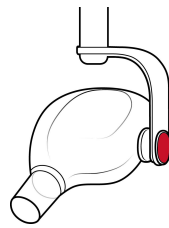
Time

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.

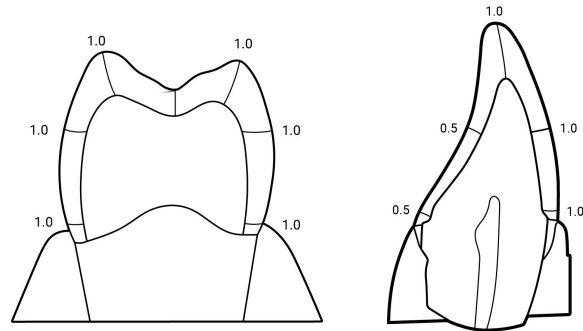


Scans may be taken after the patient goes numb, but scanning beforehand will provide the most accurate data for your design

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.

- Posterior crowns: 1 mm reduction
- Anterior crowns: 1mm labial and incisal edge, 0.5 mm lingual



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

1.3 Post-prep Scans

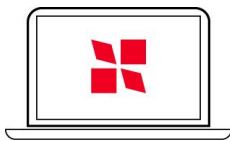
Retract the surrounding gums. You'll need to generously capture the margin around the prep in order to use AI design. Remove blood and saliva from the affected area before scanning.

2. Plan Treatment

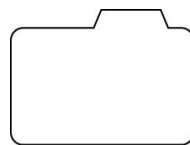
Time

5 minutes

Tools



Computer with internet
access



Pre- and post-prep patient
data



SprintRay account

2.1 Submit AI Treatment Request

Visit dashboard.sprinray.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:

- Your patient needs a single posterior crown
 - No inlays or onlays accepted
 - Premolars and molars only
- The scan data includes exactly 1 fully prepped tooth
 - Min incisal shoulder width 0.5 mm
 - Min occlusal shoulder width 1.0 mm
- The 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 design within 24 hours.

2.2 Review and Approve Design

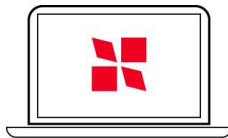
Thanks to AI technology, you can receive a crown design in just a few minutes. Review the design and approve or request a redesign. Once you approve, you'll be able to download and send it to print.

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 be using. Use 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 design 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 the print platform. Choose 'Max Strength' supports.



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.



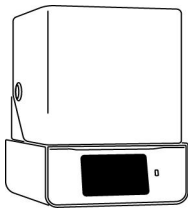
You can use the 'Print Now' button if your prefer, but thoroughly inspect your printer before you start to avoid potential issues

4. 3D Print

Time

15 minutes

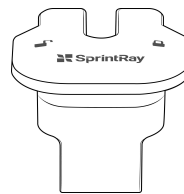
Tools



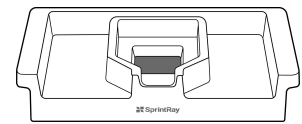
SprintRay Pro S



Crown Resin



Crown Platform



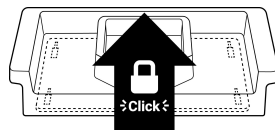
Crown Tank

4.1 Install the Crown Kit

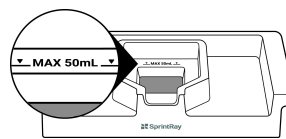
Install the Crown Kit, following the onscreen prompts to set up.



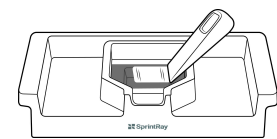
Check that the platform is clean, locked, and ready



Check that the resin tank is seated in its cradle



Fill the tank to the max line

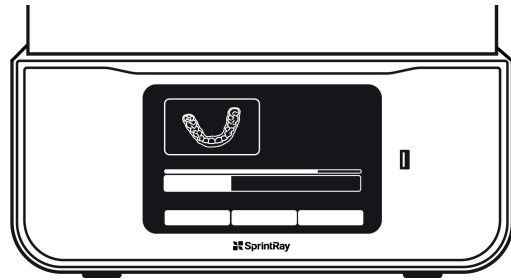


Mix resin with the Crown Kit squeegee

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 RayWare Cloud.



5. Wash with IPA

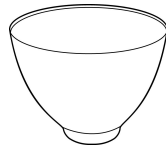
Time

5 minutes

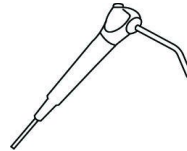
Tools



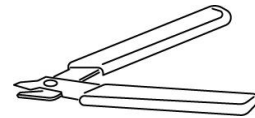
Micro applicator



Small Bowl with IPA
91%



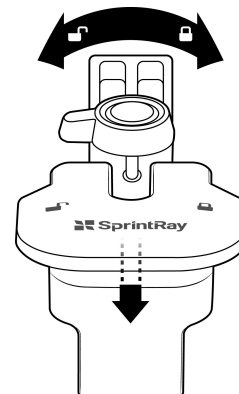
Compressed Air



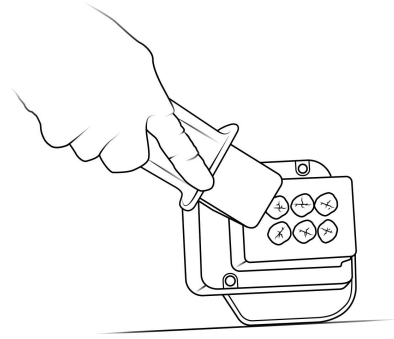
Snippers

5.1 Remove From the Build Platform

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

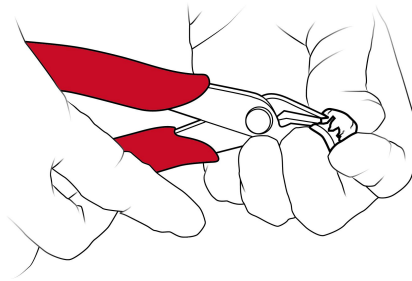


Twist the prosthetic(s) to remove by hand. If the print job doesn't release easily, place the platform on a flat surface and use the print removal tool to scrape it off.



5.2 Remove Supports

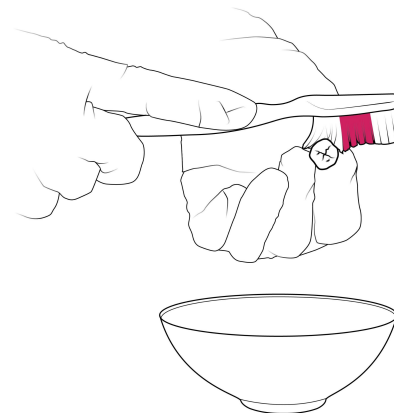
If there are any supports remaining on the crown, use flush cutters to clip them off. Don't worry if there are still small stubs left on the model, you'll remove those later.



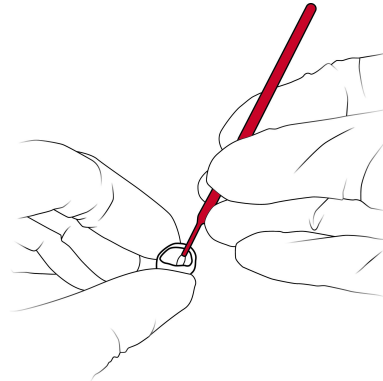
5.3 Clean

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 $\sim\frac{1}{2}$ 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. Repeat if necessary.



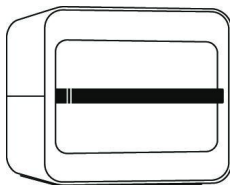
Do not let IPA stand on the surface of the prosthetic for more than 30 seconds, otherwise it may develop a chalky surface finish that will require sandblasting

6. Post Cure Prosthetic

Time

7 minutes

Tools



ProCure 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 along the center line and select Bolt Mode for the fastest results.

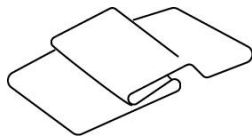
If you're using ProCure 1, place the prosthetic in the chamber and select the correct profile. The curing process may take up to 60 minutes.

7. Wash with IPA

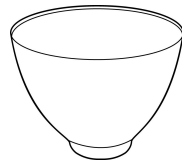
Time

5 minutes

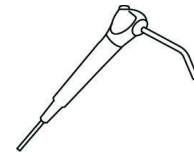
Tools



Blue shop towel



Small Bowl with IPA 91%



Compressed Air

7.1 Rinse the Crown

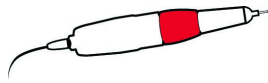
After post curing, the prosthetic needs a final rinse. Submerge the crown in IPA within a small bowl and brush all surfaces, then remove from IPA and wipe off the surface with shop towel. Use compressed air to thoroughly dry the prosthetic.

8. Prepare for Placement

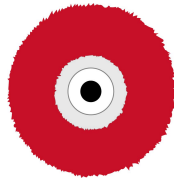
Time

10 minutes

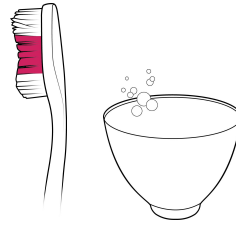
Tools



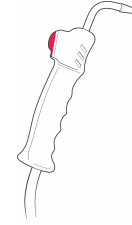
Lab handpiece



Polishing wheel



Toothbrush and soapy water



Steamer (optional)

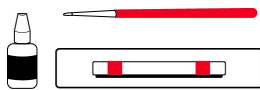
8.1 Smoothen the Prosthetic

Use a fine lab carbide bur or a polishing wheel attachment to remove remaining stubs left by the support structures until the surface is smooth and uniform.

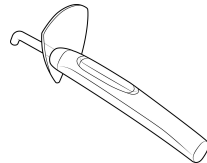
8.2 Characterize

Tools

If Glazing

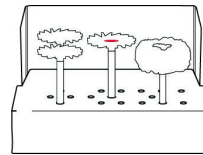


GC OptiGlaze™ kit



ProCure 1 or handheld curing light

If Polishing



SprintRay Restorative Finishing Kit



Dental lathe

Glaze

1. Prepare

Tool: IPA and compressed air
Technique: Clean and dry

Polish

1. Prepare

Tool: Lab handpiece
Polishing Wheel: Meisinger Pink Polisher (9769M-170)
Technique: Light, consistent pressure
Speed: 7000-10,000 rpm

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

Apply light, consistent pressure across all surfaces except the intaglio.

2. Apply

Tool: Brush and glaze
Technique: Thin, even coats

Shake the bottle thoroughly, then pour 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.

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

2. High Shine

Tool: Lab handpiece
Polishing Wheel: Meisinger Brown Polisher (9790-170)
Technique: Light, consistent pressure
Speed: 10,000 rpm

Shine all surfaces of the restoration except the intaglio.

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. High Gloss

Tool: Cotton buff wheel
Polishing Wheel: Meisinger Cotton Wheel (150-220)
Bar: Hatho Polistar Pink bar, Keystone (670546)
Technique: Consistent pressure

Use polishing compound and cotton wheel to achieve a high gloss on all surfaces except the intaglio.

8.3 Disinfect

Disinfect the crown using a steamer if available, then brush lightly with dish soap before placement. Make sure that the crown is completely dry before cementation.

9. Lute the Crown

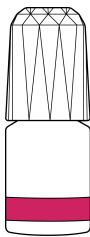
Time

10 minutes

Tools



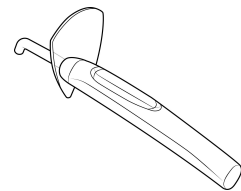
Panavia V5 Resin
Cement



Panavia V5 Tooth
Primer



Clearfil Ceramic
Primer Plus



Handheld curing light

9.1 Luting Protocol

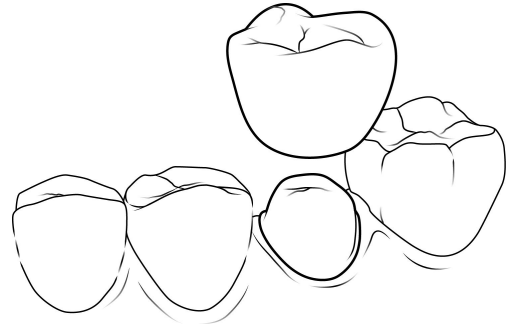
Follow the SprintRay recommended workflow to maximize the strength between the resin cement and Ceramic Crown.



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

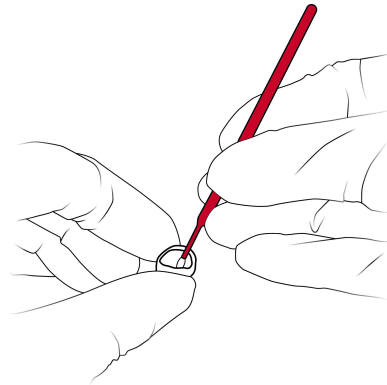
Fit Check

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



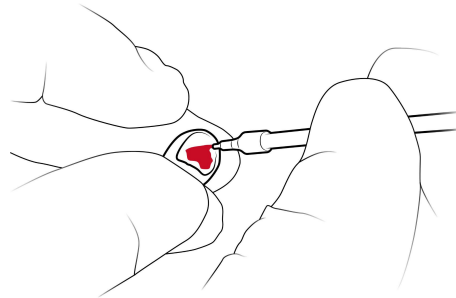
Clean and Prepare the Crown

Clean and prepare the intaglio surfaces of the crown. Remove residue from the crown by washing thoroughly with IPA. For maximum bond strength, you may 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

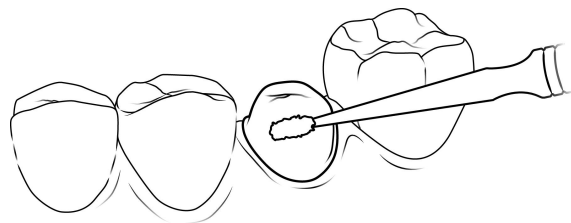
Clean the surfaces of the prepped tooth or Ti Base.

For Ti Base:

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

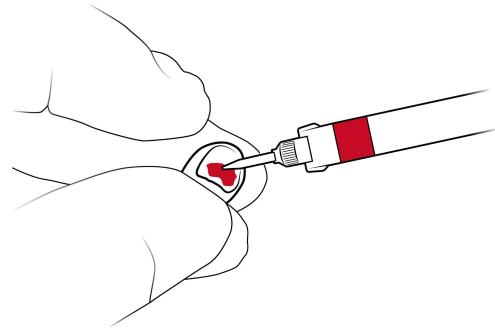
For Prepped Tooth:

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



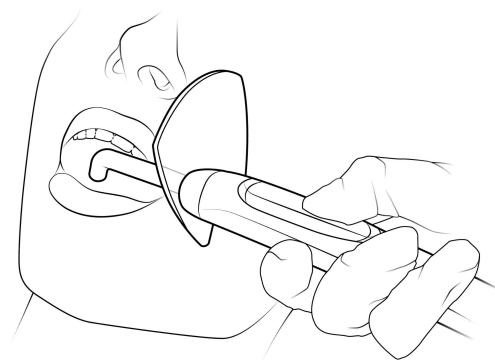
Apply Cement

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 polymerization.



Final Check

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

