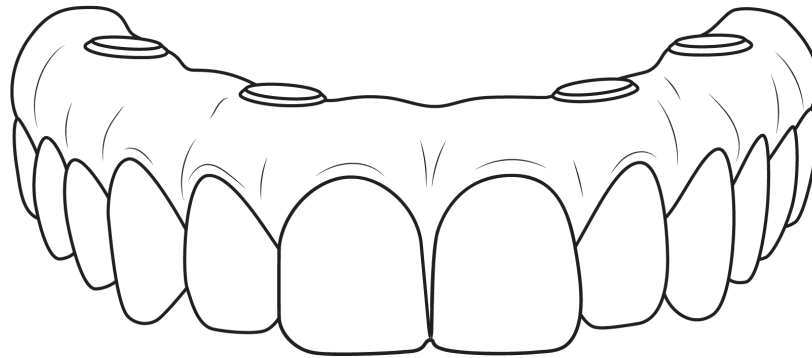


Workflow guide: 3D printing for fixed dentures



With 3D printing, you can provide fixed hybrid dentures in a single appointment to more patients for a fraction of the cost of other methods. This guide will walk you through data gathering, design, fabrication, preparation, and placement.

Resins compatible with this workflow:

- SprintRay OnX Tough 2 - any shade



This guide covers the post-surgical placement of fixed hybrid dentures. For information on 3D printing for surgical guide workflows, consult the relevant IFU/workflow guide.



Zest LOCATOR workflow

If you're using the Zest LOCATOR workflow for placing a removable overdenture, scan the QR code for an addendum to this guide that walks you through the necessary steps.

Workflow at a glance

1. Pre-surgical data capture



- Tools:
- Intraoral scanner
 - Camera

2. Schedule design appt



- Tools:
- Computer with internet
 - Patient data
 - Pre-surgical data

3. Post-surgical data capture



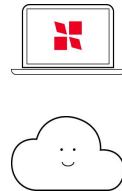
- Tools:
- Intraoral scanner
 - Camera (optional)
 - Photogrammetry scanner

4. Get design



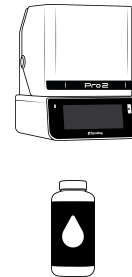
- Tools:
- Computer with internet
 - Patient data
 - Post-surgical data

5. Create a print job



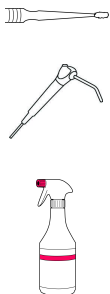
- Tools:
- Computer with internet
 - SprintRay account

6. 3D print



- Tools:
- SprintRay 3D Printer
 - OnX Tough 2 resin

7. Wash and clean



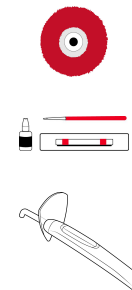
- Tools:
- Micro applicator
 - Compressed air
 - IPA 91% in a spray bottle
 - Soft paper towel

8. Post cure



- Tools:
- SprintRay Cure Device (NanoCure preferred)

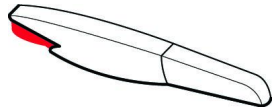
9. Prepare for placement



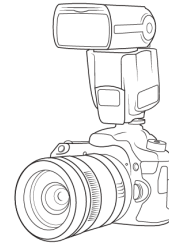
- Tools:
- Vita Akzent LC kit
 - Lab handpiece
 - Handheld curing light
 - Abrasive fiber wheel
 - Other optional tools

1. Capture pre-surgical data

Tools



Intraoral scanner



Camera

1.1 Intraoral Scans

Take upper and lower scans of the patient's current dentition before surgery. This will allow our designers to create the template for the post-surgical hybrid denture.



Upper scan



Lower scan



Bite scan



If the patient is already edentulous and has a denture, perform pre-op upper, lower, and bite scans of the denture; you'll submit these during the planning phase

1.2 Patient photos

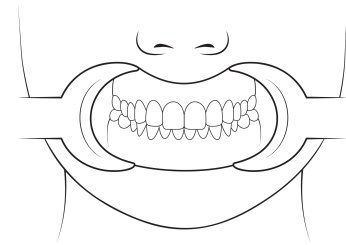
Photos of the patient allow your designer to create a fixed hybrid denture with the perfect aesthetics. Capture the following intraoral photos:



Rest position



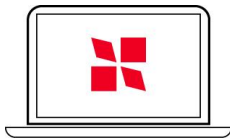
High line smile



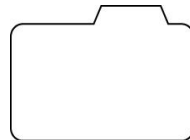
Retracted

2. Submit data & schedule an appointment

Tools



Computer with internet
access



Pre-surgical patient data



SprintRay account

2.1 Submit a request on Cloud Design

Visit dashboard.sprinray.com and sign in or sign up for a SprintRay account.

Select or add your patient, then choose the 'Hybrid Denture' treatment type. Follow the prompts on the screen to upload all the data you gathered during step 1.



Hybrid implant dentures designed by SprintRay will feature a T-bar to improve accuracy. We recommend this feature if you design the prosthetic yourself or use another lab.

2.2 Schedule an appointment for the date of surgery

During the treatment request form, you'll be given a link to schedule the date & time of your hybrid placement appointment. When choosing your appointment, **select when you will be ready to send us the post-surgical files.**

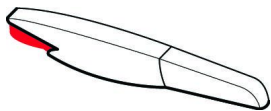
Our designer will be on standby during the appointment window you select. You'll upload post-surgical data and receive the 3D printable design within 30-45 minutes.

2.3 Review provisional hybrid design

3 days after submission, we'll send you the provisional hybrid denture. Work with the designer to create the exact hybrid denture you want, which will be used on the surgery date. We'll use this exact design, just with screw channels added with post-surgical data.

3. Capture post-surgical data

Tools



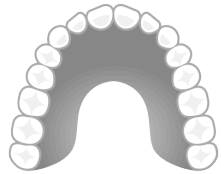
Intraoral scanner



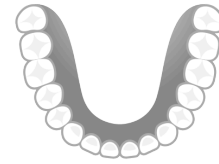
Photogrammetry scanner

3.1 Intraoral scans

Once the surgery is complete, take an intraoral scan of the patient's tissue with the healing caps positioned over the implants. This will give your designer an understanding of the implants' position.



Upper tissue scan



Lower tissue scan

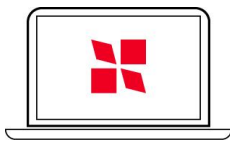
3.2 Photogrammetry scans

Attach the scan bodies to the implants, then perform photogrammetry to the manufacturer's specifications. This will record the exact final positioning of the implants so that your lab partner can adjust their design accordingly for a good passive fit.

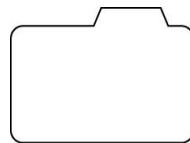
Keep the entire information folder intact - you'll upload it all at once during the treatment planning phase. If you have any questions about this process, please contact the manufacturer of your photogrammetry scanner.

4. Get the final design

Tools



Computer with internet



Post-surgical patient data



SprintRay account

4.1 Open case in Cloud Design

Sign in to Cloud Design and open the patient's case during the appointment. You'll use the chat function during this appointment to send the post-surgical patient data to your designer.

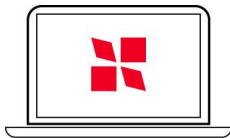
Once the files have been transferred, your designer will prepare the hybrid denture design. This will take a maximum of 45 minutes.

4.2 Review and approve design

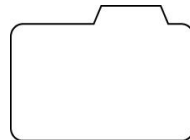
Once the printable hybrid denture is ready, your designer will send the printable file for you to review. If you'd like changes, you can communicate with your designer live via the chat function. Once you approve the design, you'll be able to download the design and close out the appointment.

5. Create a print job

Tools



Computer with internet access



Hybrid denture design file(s)



SprintRay account

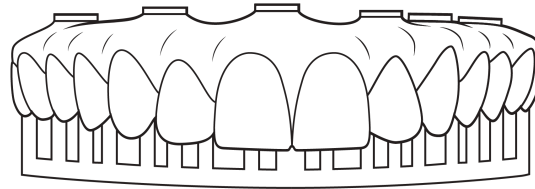
5.1 Build job in RayWare

Visit rayware.sprinray.com and sign in with your SprintRay account. Then, go to Cloud Design, select the hybrid denture case, and open the job in RayWare.

RayWare setup details

RayWare should automatically set up your print job, but for verification purposes, ensure you use the following settings:

| | |
|--------------------|--|
| Job Type | Hybrid Denture |
| Material | SprintRay OnX Tough 2 - any shade |
| Thickness | 100 microns |
| Orientation | Occlusion facing the build platform, occlusion parallel to build platform |
| Supports | Default settings, at least 3 supports on the incisal edge, no supports around screw channels |



5.2 Send to printer

Once you've set up the print job, select your printer, use the 'Send to Print' button. Click the 'Send to Queue' button to send to the printer.

6. 3D print

Tools

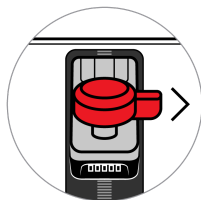


SprintRay 3D Printer

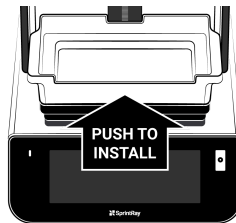


OnX Tough 2

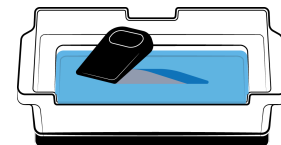
4.1 Prepare and start the print job



Locked
Ready to print



B) Install the resin tank and make sure it's fully seated



C) Fill the tank with OnX Tough 2 resin, then stir

A) Check that the platform is clean, locked, and ready

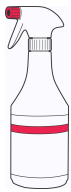
D) Go to the queue and press 'Start Print.'

You can monitor the progress on the printer touchscreen or SprintRay Cloud.



7. Wash

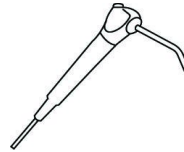
Tools



Spray bottle with IPA
91%



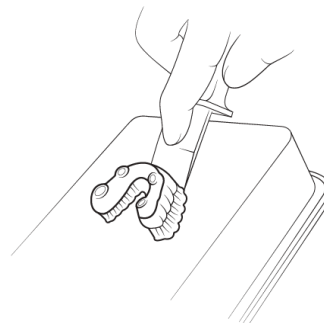
Micro applicator



Compressed air

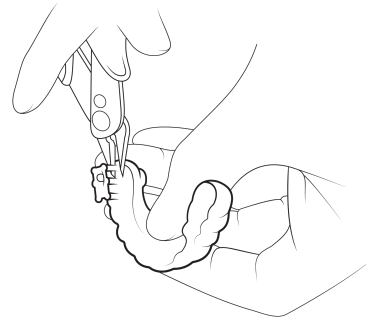
7.1 Remove part & trim Supports

Unlock and remove the build platform from the printer, then use the scraper to remove the hybrid from the platform.



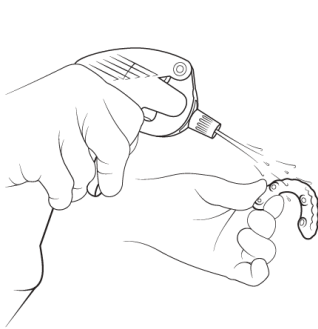
Use flush cutters to clip supports off. If you printed with a T-bar, remove it using cutters or a lab handpiece with a cutting disc.

Don't worry if small stubs remain on the model; you'll remove those later.



7.2. Handwipe with IPA

This method produces parts with 40% better mechanical properties and is recommended for all hybrid dentures.



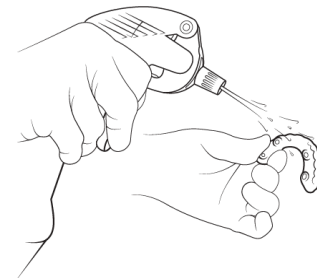
A) Spray with IPA 91% and wipe with a dry towel

15 seconds



B) Blow Dry using compressed air until fully dry

30 seconds

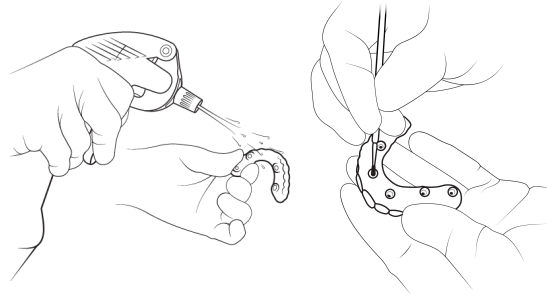


C) Spray with IPA 91% and wipe with a dry towel

15 seconds

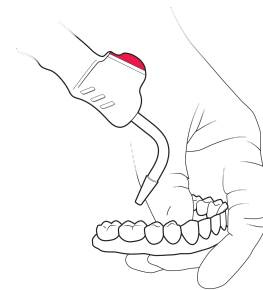
7.3 Clean screw channels

Spray each screw channel with IPA. Dip the micro applicator in IPA and use it to clean the screw channels to remove resin thoroughly.



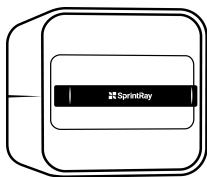
Use compressed air to remove final debris and evaporate any IPA that is trapped in the screw channels.

Repeat as needed until the channels are clean.



8. Post cure

Tools



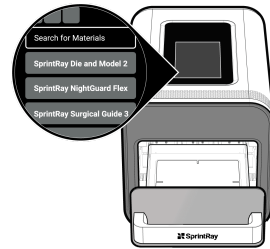
NanoCure (Preferred)

8.1 Cure

Place the prosthetic in your curing device and select the profile indicated below.

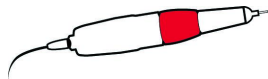
NanoCure (Preferred) - OnX Tough 2 - Max Strength

ProCure 2 - OnX Tough 2



9. Prepare for placement

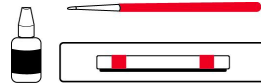
Tools



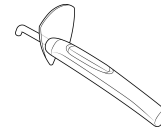
Lab handpiece



Abrasive fiber wheel



Vita Akzent LC kit
(Optional)

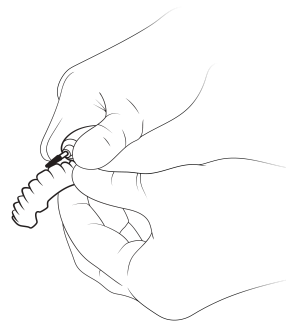


Handheld curing light
(Optional)

9.1 Smooth the prosthetic

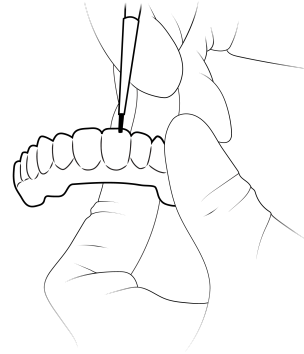
Use a fine lab carbide bur or an abrasive fiber wheel attachment to remove remaining stubs leftover by the support structures until the surface is smooth and uniform.

Use a lab handpiece and cutting disc to remove the T-bar.



9.2 Characterize (Optional)

This step is optional, but we recommend it for the best patient experience and aesthetics. We recommend Vita Akzent LC™ for the best cosmetic effect, which you can layer and light cure to your desired aesthetics.



For a natural-looking 3D printed restoration, we recommend the following:

1. Use pink composite or create pink Vita Akzent LC with 1 drop of red and 1 drop of pink - you can experiment using your own mix to get the desired shade of pink
2. Use a fine brush to stain the gingiva with pink stain to add more depth and character
3. Use a blue stain at the incisal edges to create a translucent effect
4. Use other stains (like cream, brown, and orange) to create a more natural look
5. Paint the entire surface (except the intaglio) with a thin layer of clear glaze

Tack cure in between steps using a handheld curing light. Final cure for 5 minutes.



Always check the manufacturer's IFU and recommendations before using a handheld curing light to cure glaze

9.3 Disinfect

Disinfect the prosthetic, then brush lightly with dish soap. Make sure it's completely dry.

9.4 Cement TiBase to hybrid (If using)

If you're using the direct screw delivery method, skip to step 9.5 - Sequence Torque Bolts.

Apply primer to the screw channels

Apply Clearfil Ceramic Primer Plus to the inner surface of the screw channels. Dry the adherent surface with compressed air.

Clean and prepare tooth or TiBase

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

Apply cement

Apply to the intaglio surface of the inner surface of the screw channels, distributing evenly. Press the TiBase into the screw channels and hold firmly. Apply gentle pressure until seated.

Initial polymerization

Remove excess cement from the margins of the TiBase and light cure for 5 seconds. Remove the remaining excess cement with a dental hand instrument.

Final check

Perform a final check to ensure that the TiBase is fully seated and there is no excess cement.

9.5 Sequence torque bolts

Turn each screw gently until you feel contact with the screw channel collar, then stop. Do not tighten until you've seated all the screws. Once seated, begin tightening each screw in an alternating pattern.



Failure to follow proper torque bolt sequencing may result in a poor fitting appliance; always follow the sequencing method provided for passive fit