GUSROM

NATURAL

SIMPLE

AESTHETIC

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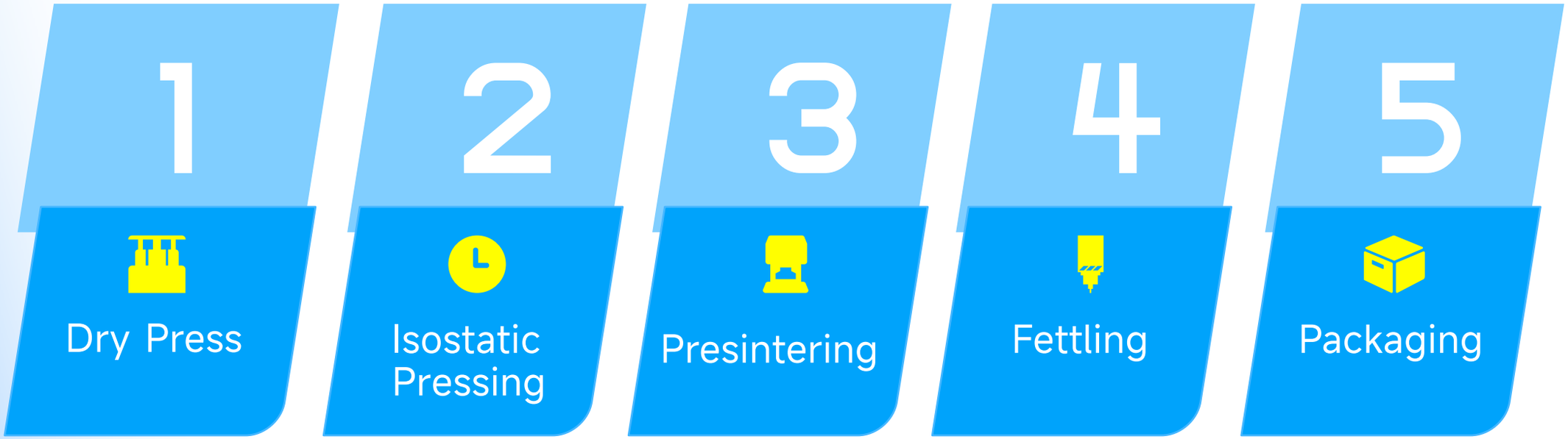
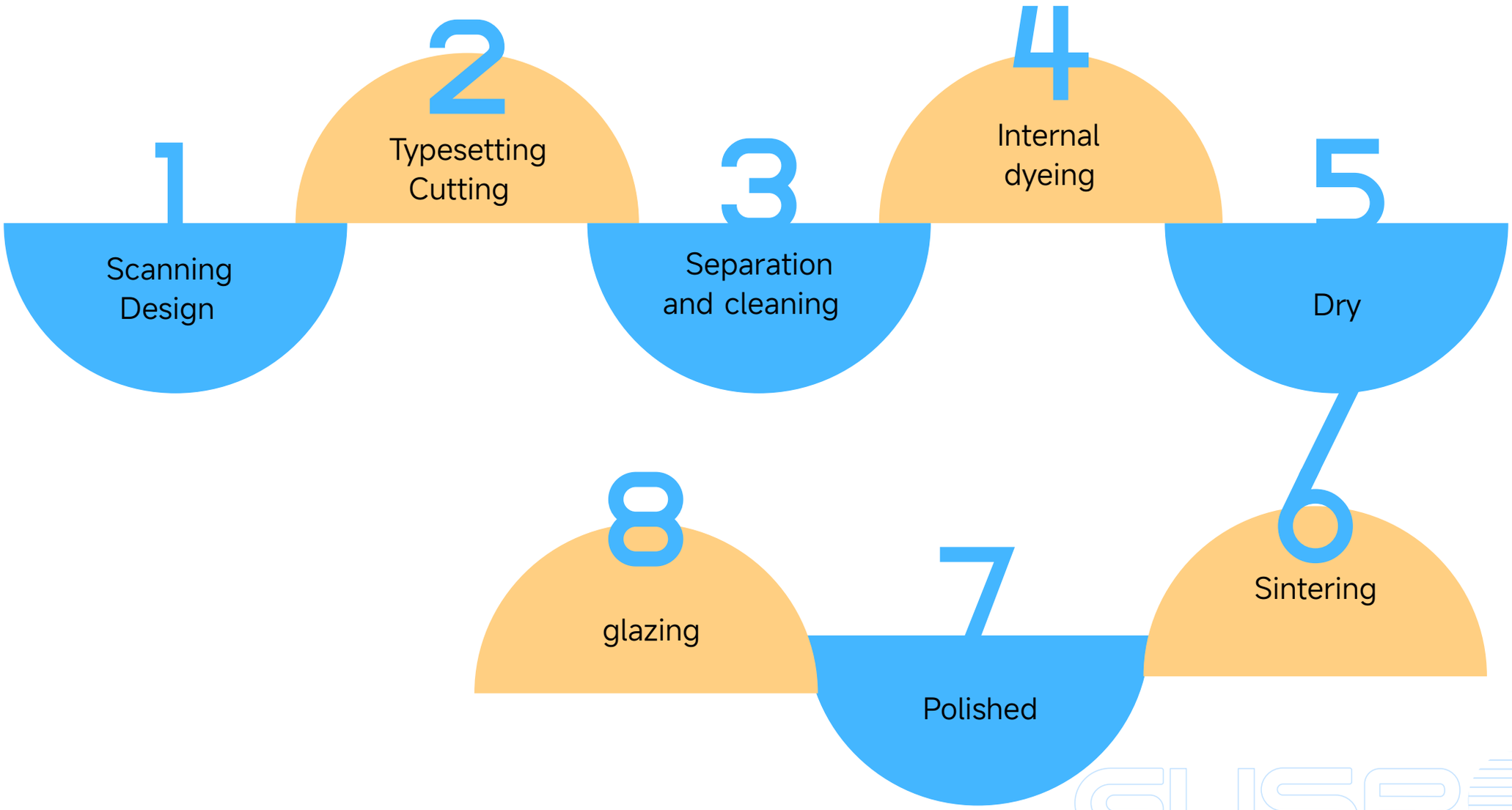
Zirconia Block Production Process



Operating Procedures



Precautions

1 SCANNING

01

Check the edges and abutments of the model before scanning to ensure the integrity of the model. Before scanning, check the impression and model for bubbles, plaster tumors, delamination, whether the abutment teeth, adjacent teeth, and contralateral teeth are complete, and check whether the occlusal space is suitable.

02

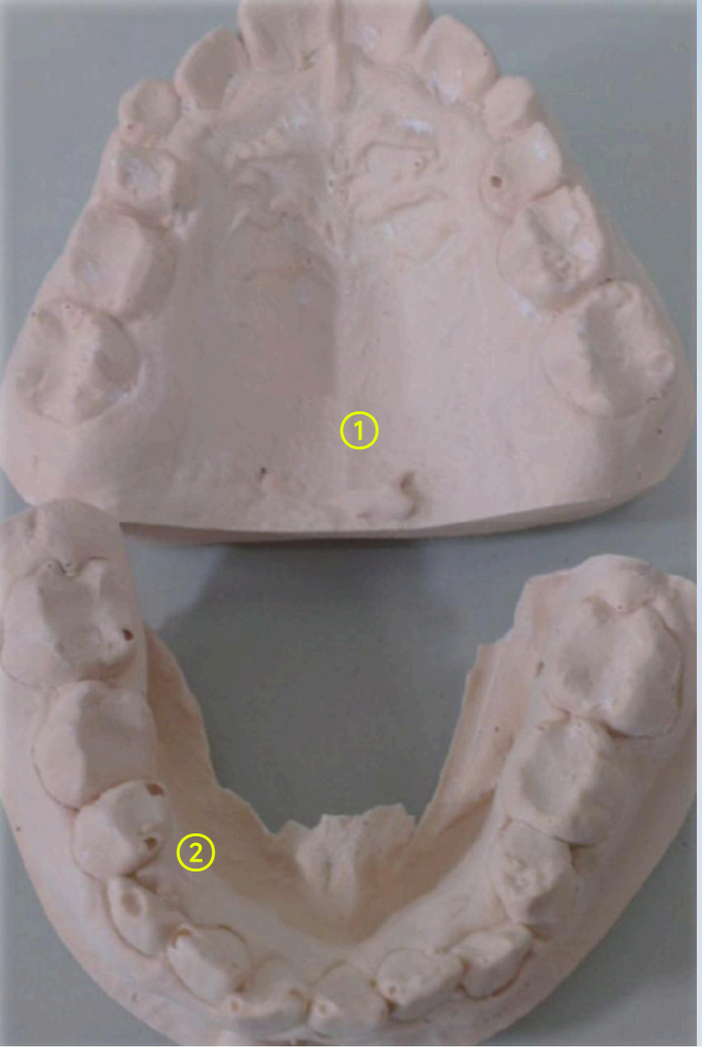
Make sure the abutment fits the model base perfectly. Make sure there are two die pins for each die to prevent errors caused by forced placement.
If there is not enough space, you can put one pin, but make a retention groove in the buccal and lingual direction.

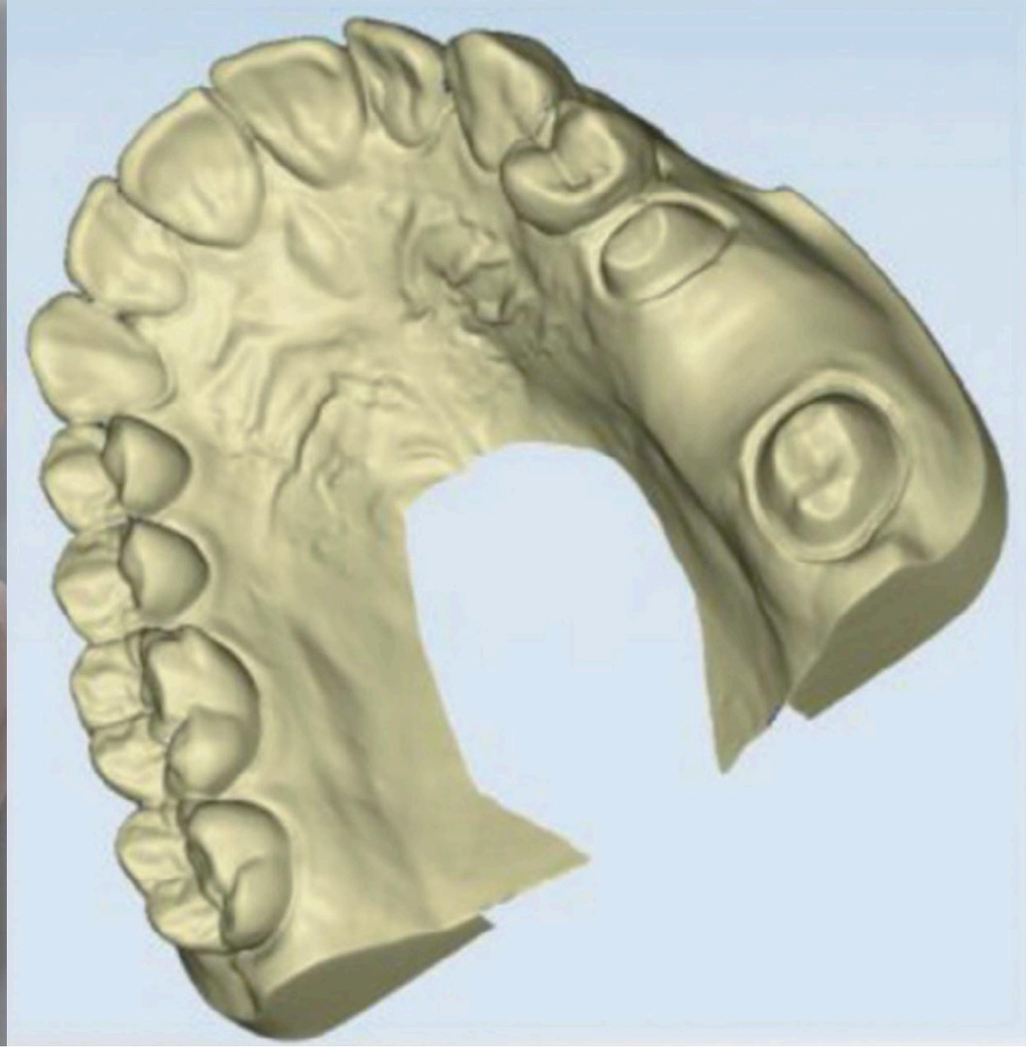
03

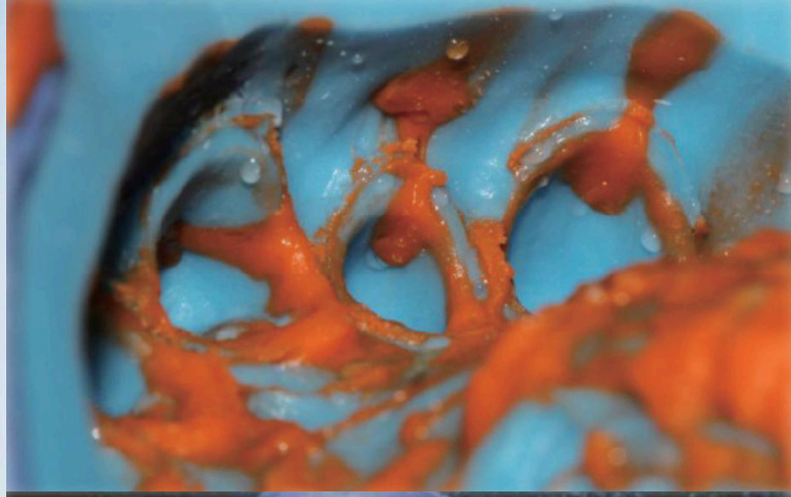
Check the model abutment undercuts. If there are undercuts, it will cause difficulty in seating.

04

Calibrate the scanner regularly to ensure scanning accuracy.







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① Plaster Tumor

② Bubbles

Porcelain is easy to chip because of insufficient occlusal space, insufficient thickness

The margin is small, becomes a bevel or there is no margin

Minimal tooth preparation, insufficient thickness, and inadequate space

If the margin is not smooth and rounded, there are bubbles, the convergence angle is too large and lacks retention, or the abutment tooth is damaged, it is not recommended to proceed with fabrication

2
DESIGN

Precautions

01 Cervical margin

02 Selecting a common path of insertion

04 Undercut

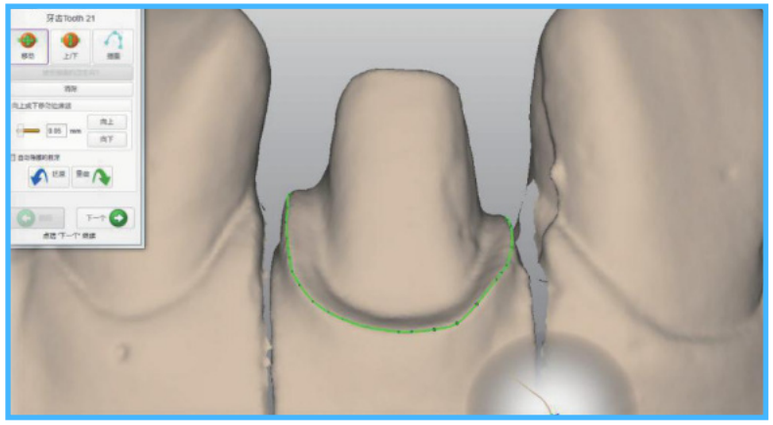
03 Cement space setting

05 Proper occlusal relationship

06 Thickness

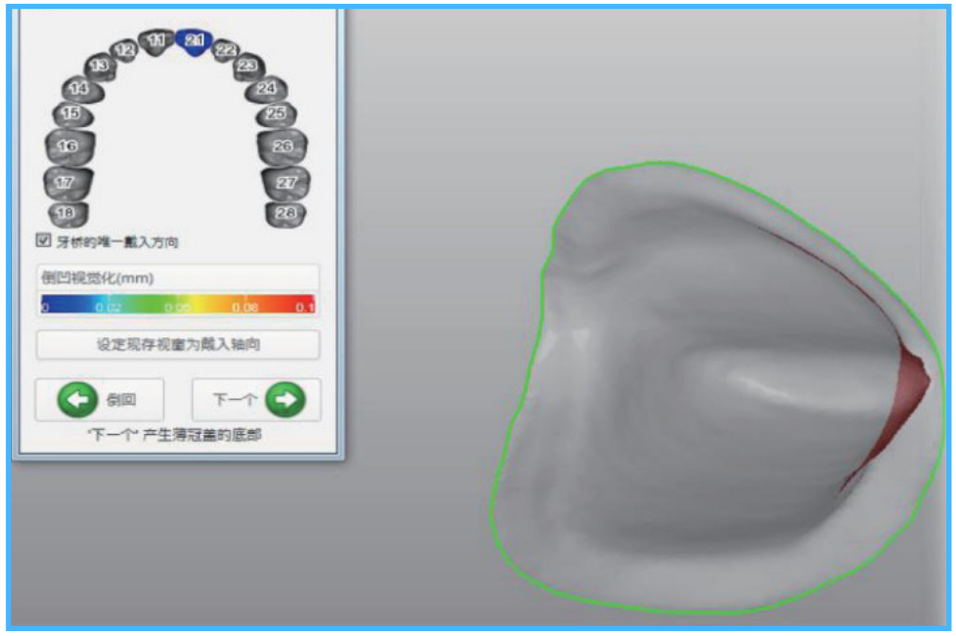
As an all-ceramic restoration, it needs to meet the following points

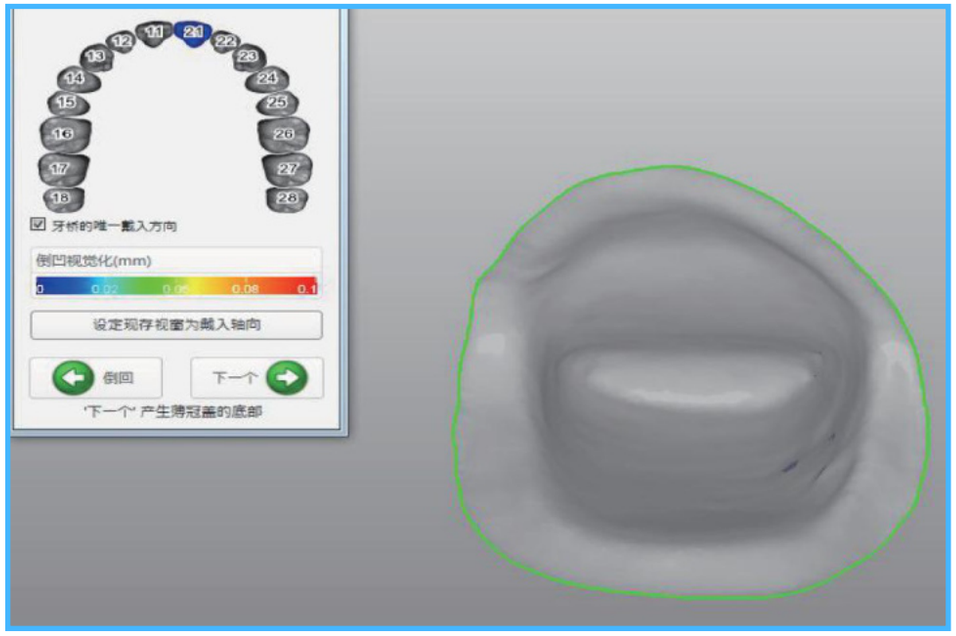
1. The thickness of the restoration should not be less than 0.6mm.
2. Since the geometric structure of the zirconia dental bridge is the key to the anti-fracture strength, the cross-section of the anterior tooth connector is 9mm^2, the cross-sectional area of the posterior tooth connector is 12mm^2.
3. No more than two units are missing in a row.
4. Avoid free loss.



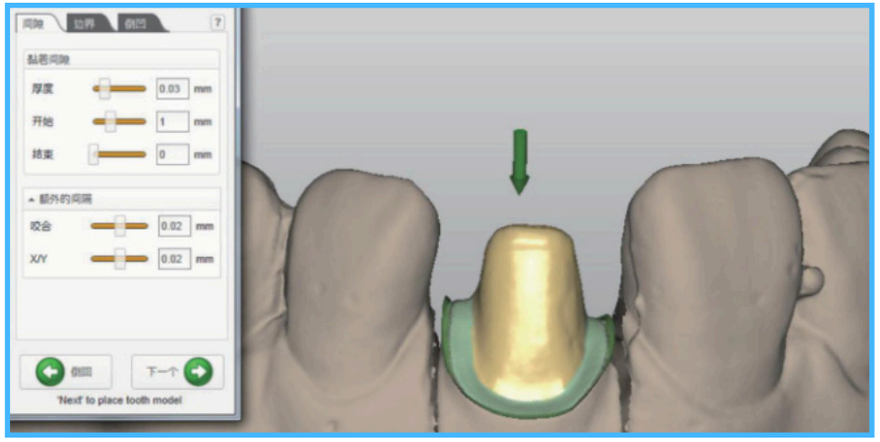
Cervical margin selection: If there is a significant discrepancy between the margin and the actual model, it is recommended to manually draw the margin.

If an optimal path of insertion cannot be achieved, increasing the amount of adhesive can facilitate the placement.

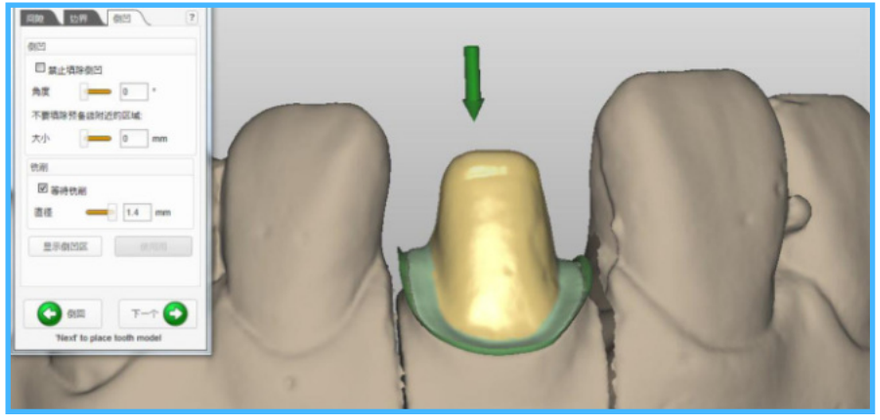




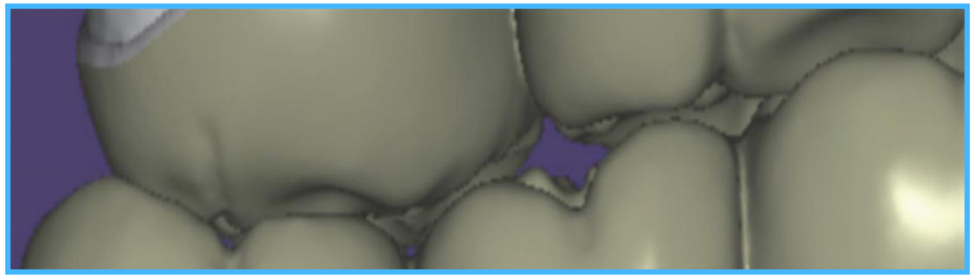
The red area indicates the undercut zone. Adjust the direction of insertion to minimize the undercut and select the best path of insertion.



Cement space setting: Set the value of the cement space according to the condition of the abutment tooth and the requirements



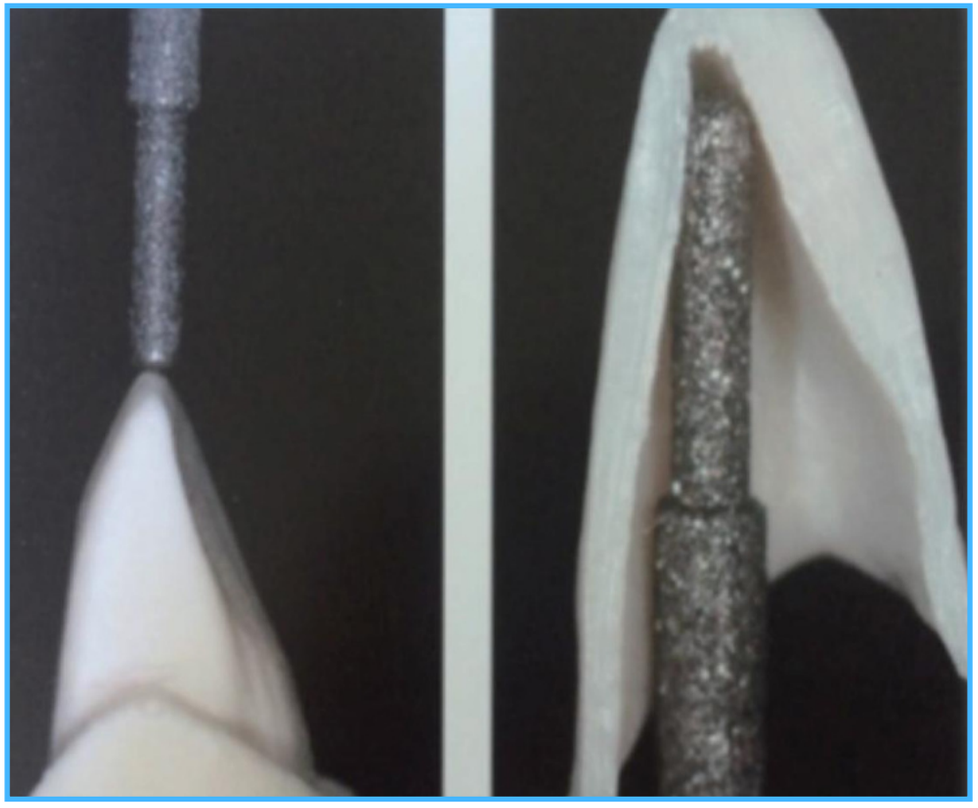
Undercut:It is generally preferred to remove the undercut to facilitate placement



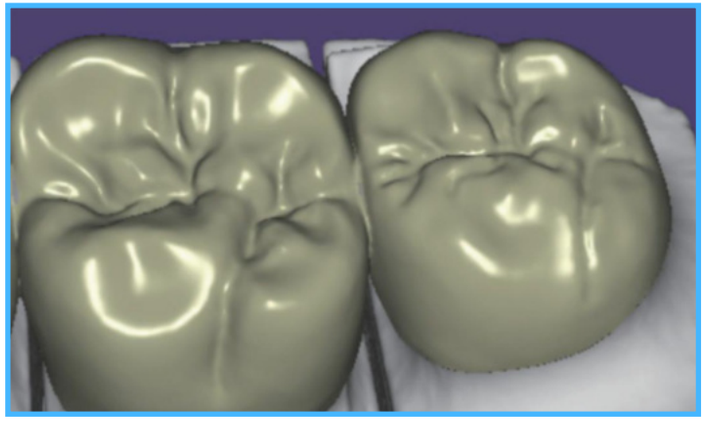
Occlusion:
There is contact with the opposing teeth.
Ensure normal design without high occlusion.

Light occlusion:
Opening 0.2mm-0.3mm

No occlusion:
Opening 0.5mm-0.7mm



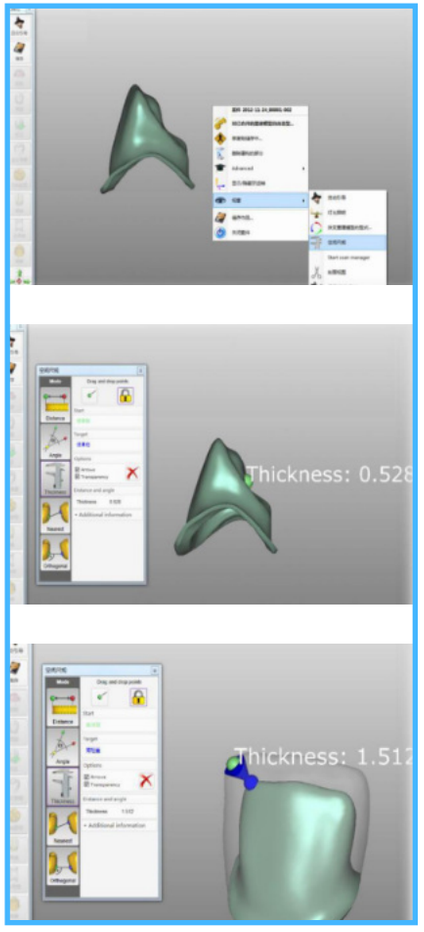
Leave compensation value for the milling bur



No point contact on the
occlusal surface

Proper support

Even distribution of occlusal force,
no single-point contact



Window-space gauge

Measure the thickness of the crown and the space reserved for the ceramic layer

Key points of bridge design

01

The thickness of the crown connected to the missing part should not be less than 1.0mm

02

When designing the inner crown, the anatomical shape must be made to ensure reasonable support for the porcelain layer.

03

The bridge design ensures that the area of the connector is above 9mm^2 and the vertical height of the connector is 4mm.

04

In order to enhance the strength, it is recommended that the anterior teeth be made into lingual back plates. It is recommended that the back teeth be crowned

Typesetting Requirements

3

TYPESETTING

01

The thickness of the selected porcelain block should be greater than the height of the teeth.

02

The processing area of the arranged teeth cannot exceed the boundary of the selected material.

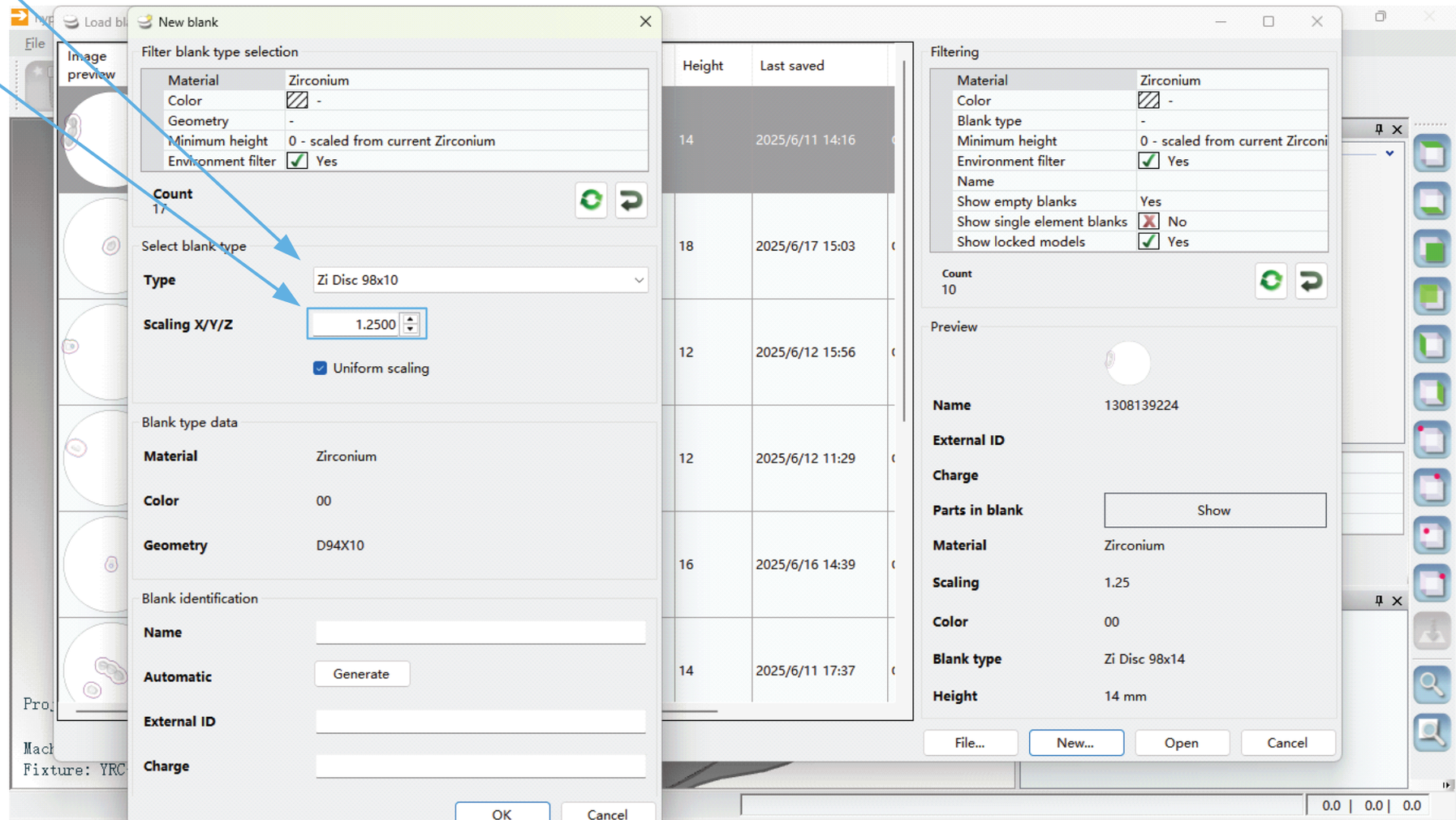
03

When multiple teeth or bridges need to be processed from one piece of processing material, a certain margin should be left between the teeth to facilitate the addition of connecting rods to fix the teeth.

OPERATION PROCESS

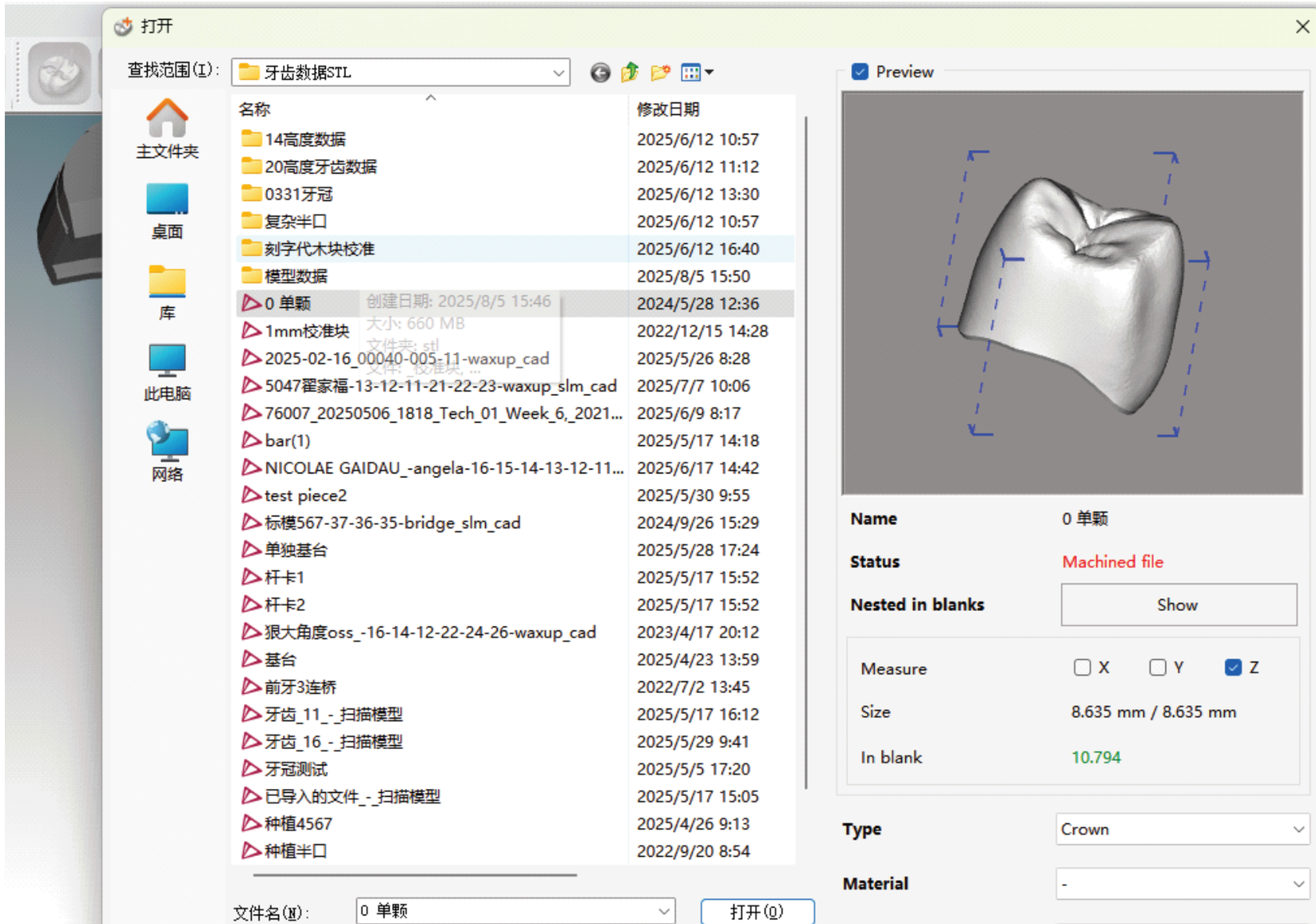
① Open the software. Click to add zirconia block and select material specifications.

② Fill in the shrinkage ratio.



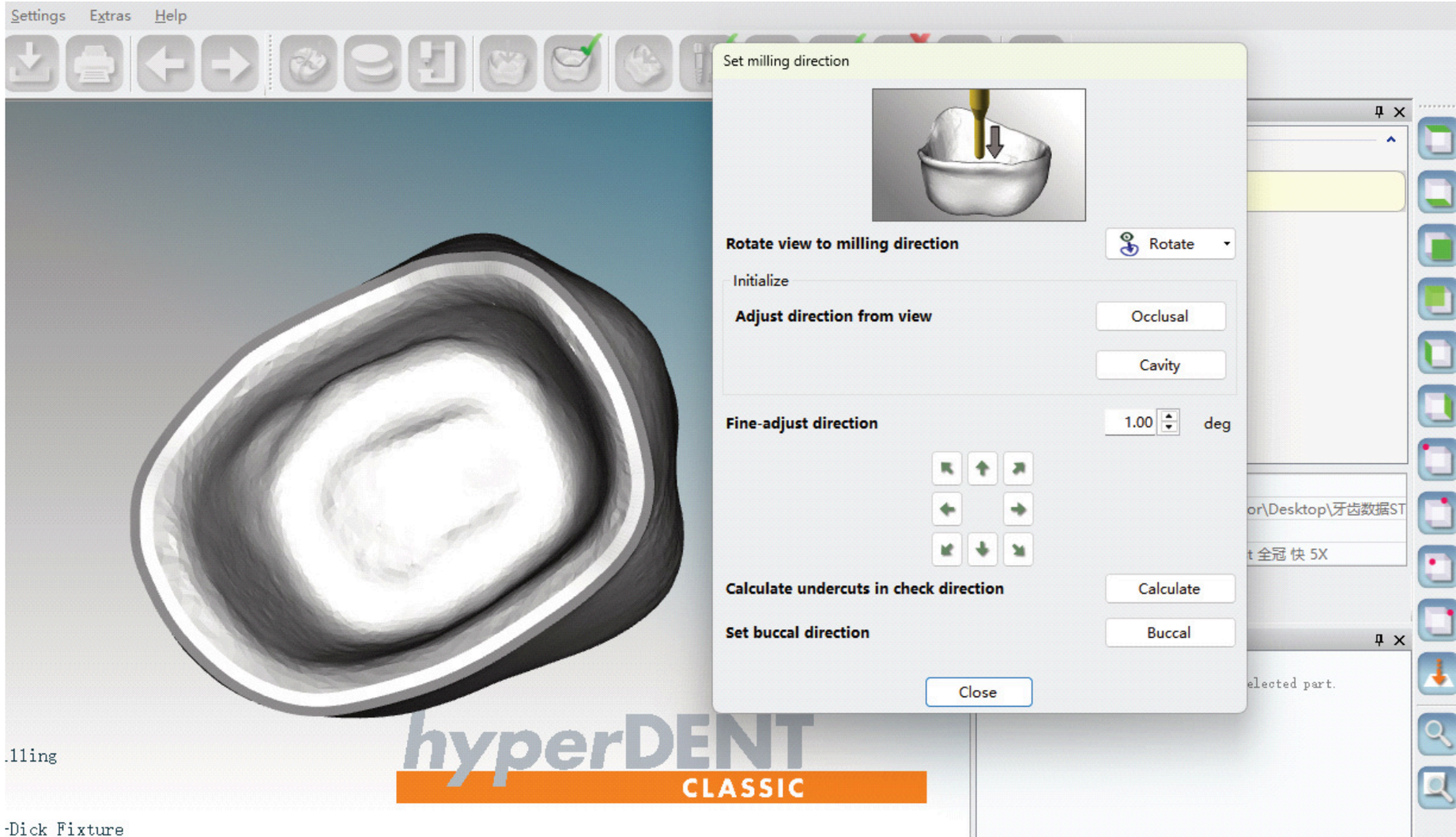
OPERATION PROCESS

③ Importing files

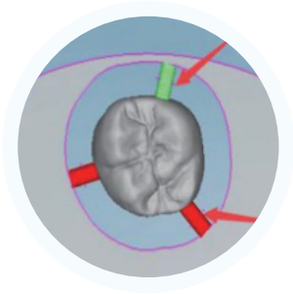


OPERATION PROCESS

④ Select edges - complete import



Placement of connecting rods

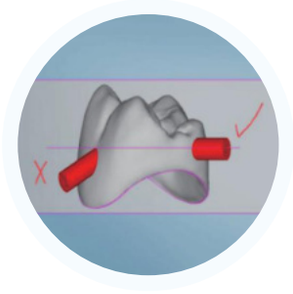


01

The connecting rod is added to the convex part of the tooth.

02

Keep the height of the connecting rod as consistent as possible.

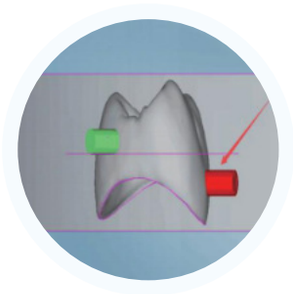


03

Do not add it in the near/far position.

04

Keep enough distance from the neck edge line.



05

The connecting rod is parallel to the plate, and there should not be too much angle.

Typesetting considerations

01

Determine the material model, size, shrinkage ratio and other parameters before typesetting

02

Select appropriate fixtures

03

If cutting on a used ceramic block, ensure the processed area of the block is properly positioned in the fixture and leave sufficient space.

4

CUTTING

Precautions

Place the zirconia block in the zirconia-specific milling machine for milling.

01

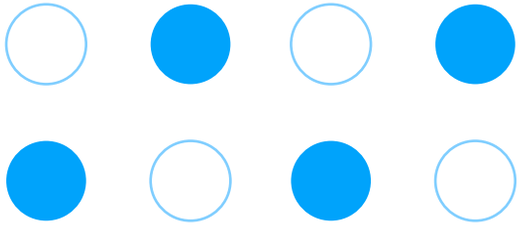
Before milling, check the bur and the milling machine.

02

During milling, do not use liquid cooling on the zirconia block.

03

After milling, inspect the restoration for cracks, contamination, or damage.



CAUSES OF EDGE CHIPPING, INCOMPLETE MILLING, OR MILLING OFF:

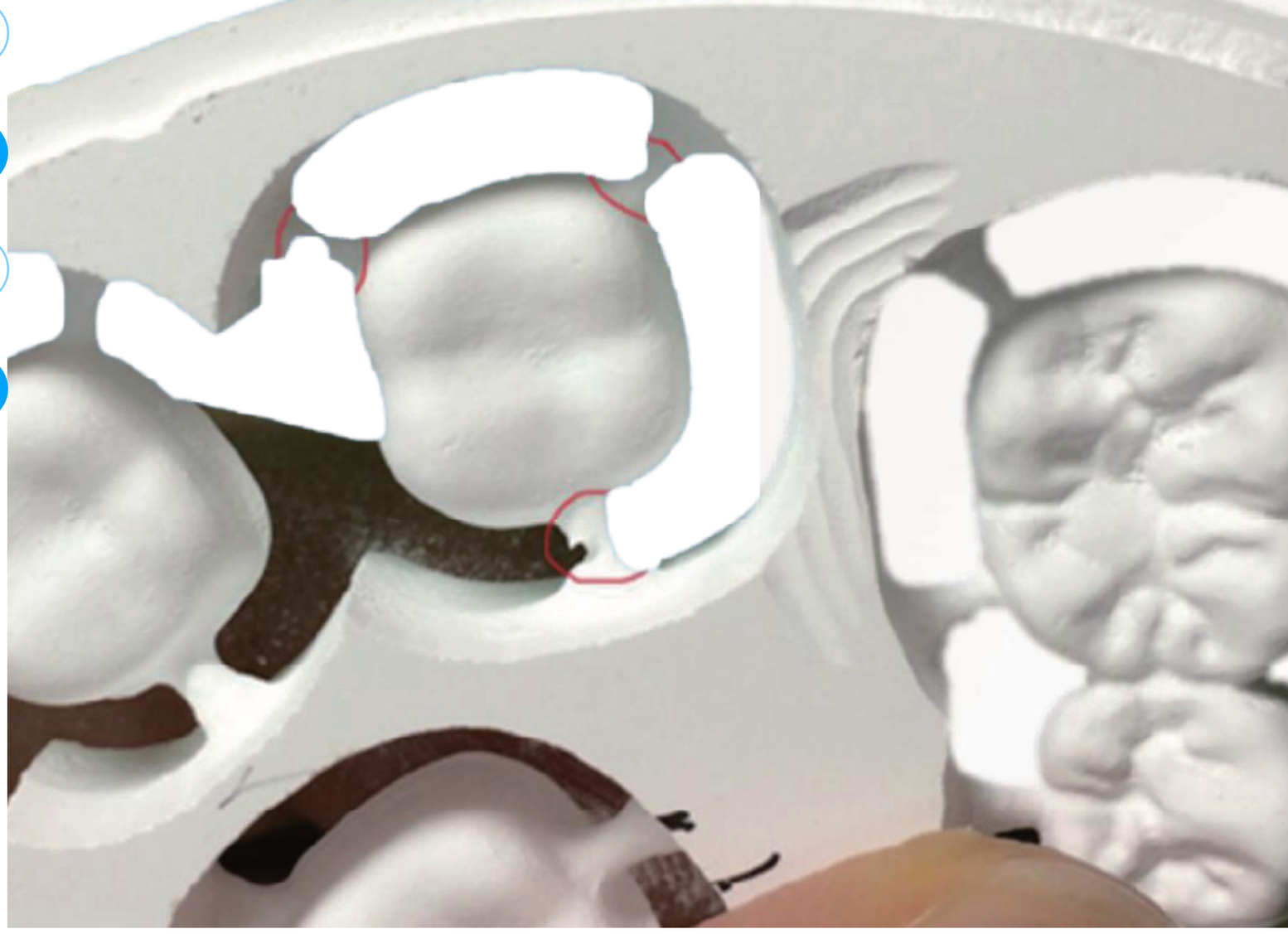
Connector
/
Milling bur

Tool alignment point or tool alignment sensor
/
Air pressure

Wet milling equipment
/
Accuracy of the equipment

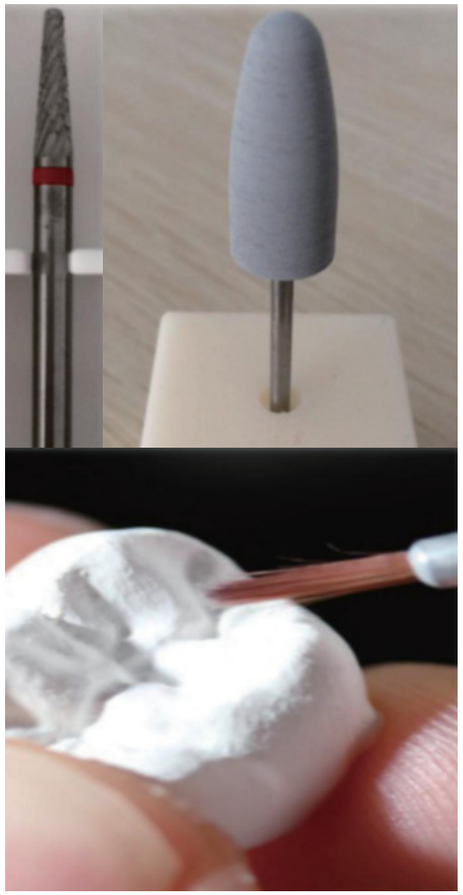
5

CLEANING



01 Tooth removal

Use a technician's handpiece to separate the restoration. The mobile phone speed does not exceed 10000rev/min. First cut off half of each connecting rod, and then cut off the remaining half. The order of removing the teeth from the entire plate is from the middle to the four sides.



02 Trim the connecting rod

Use a special bur to trim the remaining portion of the connecting rod. It is not recommended to make excessive adjustments to the restoration when it is soft.

03 Polish

When polishing, you can place a soft material such as a towel or sponge on the table to prevent the restoration from falling on the table and causing unnecessary losses.

04 Clean up

Use a brush to thoroughly clean the surface of the restoration and the powder in the cavity.

Consequences of incomplete cleaning

White spots are formed, affecting the appearance and accuracy of placement.

6

DYEING

Internal dyeing principle

There are many micropores inside the pre-sintered crown, due to capillary action, the staining liquid will be absorbed into the interior of the crown to color the crown as a whole, thereby achieving the internal staining process.

If you want the crown to remain consistent in color and maintain color stability after final firing, you need to strictly control the soaking time and standardize the operation.

HOW TO USE - INTERNAL DYEING

Incisal Hyaline

It makes the restoration show a natural gradient effect and solves the problem of darker color in the missing part of the zirconia bridge.

BAOT Indicator

Make the dyeing solution appear colorful and play the role of indication and marking. No impact on the final color result.

Brush Staining Method

Application Method for Incisal Transparent Liquid

01

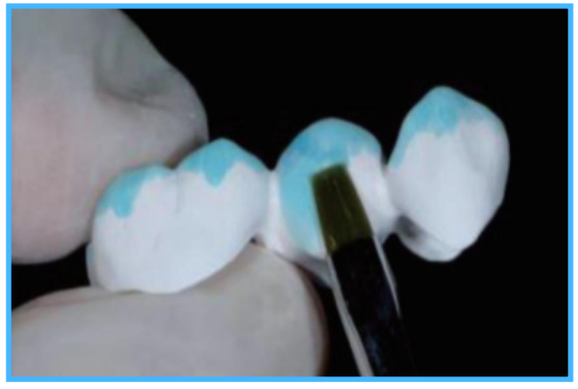
Use a No. 0 glazing brush to dip into the incisal transparent liquid. Apply two coats to the incisal third and the occlusal edge of the restoration.

02

Apply one coat to the prominent triangular ridges on the occlusal surface.

03

Use an OP brush to dip into the incisal transparent liquid and evenly apply to the missing areas.



04

Apply two coats to the entire surface.

Precautions

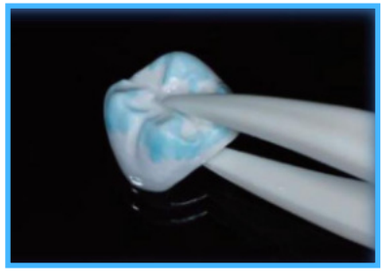
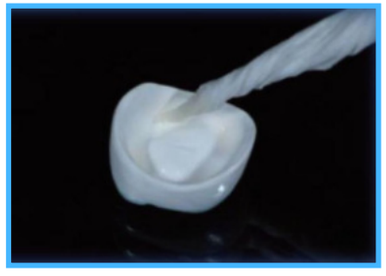
Do not dip too much liquid; avoid over-application.

After applying the incisal transparent liquid to the bridge, proceed with soaking treatment.

Dipping Method

1. Gently shake the staining liquid and pour it into a clean, dry plastic container, ensuring that the amount of liquid can completely cover the entire crown.
2. Use plastic tweezers to gently place the restoration in the container with the occlusal surface facing down. Soak for 180 seconds(HT),30seconds(ST).
3. During soaking, gently turn the restoration with plastic tweezers to break up surface bubbles and ensure the staining liquid is evenly absorbed.
4. After soaking, remove the restoration and place it on a clean glass plate, moving it to several different positions.
5. Use a paper towel to gently absorb the excess liquid from inside the crown and the grooves, while also cleaning up any excess staining liquid on the glass plate.



Precautions

01

Before internal dyeing operation, ensure that the dyeing solution is within the usable date range. It can be used normally within two months after opening; unopened dyeing solution can be used normally within six months if stored properly.

02

During the intraoral dyeing process, the utensils used must not be made of metal.

03

After intraoral dyeing is completed, it is prohibited to wipe any part of the restoration with paper towels, and it is not allowed to contact paper towels and other highly absorbent substances for a long time.

04

The oral dye must be kept sealed when not in use, and the storage temperature is: 5-25℃.

Drying Methods

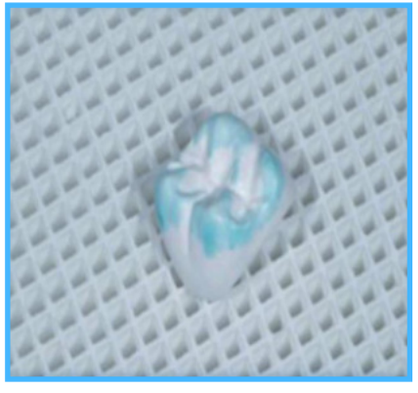
7
DRYING

① Air Drying

Place it on a clean glass plate or special porcelain sintering plate and let it dry naturally.
Drying time: 40 minutes.
Ensure the air drying environment is clean and free from drafts. Avoid direct exposure to natural wind and air conditioning. A cover can be placed on top.

② Oven Drying

Single crowns, inner crowns, and bridges without missing areas do not require oven drying. Only thicker restorations, such as implant crowns or bridges with missing areas, need to be oven-driedafter air drying. Use an infrared drying lamp to dry the restoration. During drying, the restoration must be placed with the occlusal surface facing up. Drying temperature: 40°C; Drying time: 20min; Drying distance: 100w, placed at a position of 8-15cm under the infrared drying lamp; 250w, placed at a position of 20-30cm under the infrared drying lamp.



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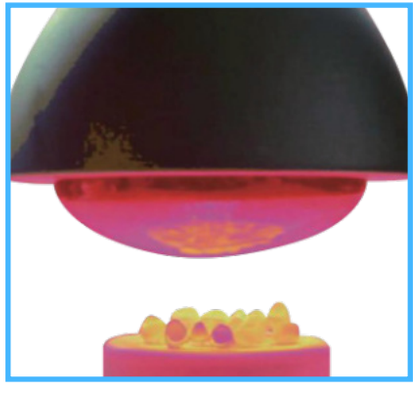

②

Drying Terperature	
crown thickness/mm	drying time/Min
< 1.0	10-15
1.0-3.0	30
3.0-5.0	60
> 5.0	> 60

8

SINTERING

Four Essential Elements of Sintering

01 Zirconia Beads

02 Crucible

03 Sintering Furnace

04 Sintering Curve

Zirconia Beads

Pre-Sintering Inspection

During sintering, zirconia beads ensure uniform heating of the restoration and reduce shrinkage resistance.

01 Bead Size

Diameter 0.6-1.8mm

02 Amount

Cover the entire crucible bottom with 2-3 layers.

03 Color & Shape

Replace beads if they appear yellowed or damaged.

04 Replacing new zirconium beads

When replacing with new beads, pre-fire them with waste material 1-2 times before using them for the restoration sintering.

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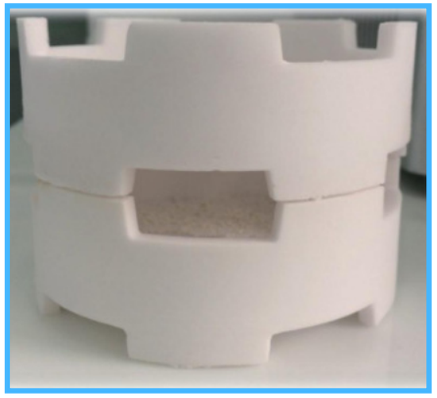

Preparation Before Sintering

Crucible

01 Select a crucible with ventilation holes

02 Cover the crucible with a lid during sintering

Silicon molybdenum rod

Main component: molybdenum disilicide, high heat generation temperature

Silicon carbide rod

Main component: silicon carbide, relatively low temperature.

R Thermocouple

Measuring sintering furnace temperature.

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Daily Maintenance of the Sintering Furnace

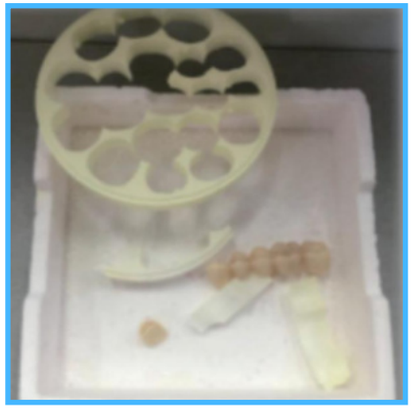
01 Before sintering, inspect the heating elements of the furnace. If the surface of the heating rods (silicon-molybdenum rods) is peeling, perform a test burn with scrap material.

02 When the equipment is not in use, close the furnace chamber.

03 Keep the sintering equipment operating area clean and tidy.

04 Properly dry the restoration before sintering, placing the restoration with the occlusalsurface facing down on the zirconia beads in the crucible. Sinter strictly according to the curve provided by the manufacturer.

05 Cleaning method: Scrape off impurities in the furnace chamber, then burn the discarded zirconia white plate scraps. It is recommended to clean once a week.



Why Sintering Temperatures Vary for Different Materials?

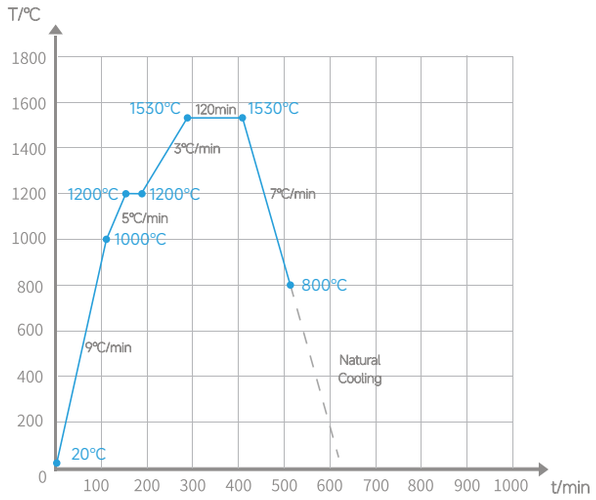
Different materials have varying porosity and compositions, which result in different temperatures required to achieve maximum density. Therefore, different materials use different sintering curves.

Crystallization Process

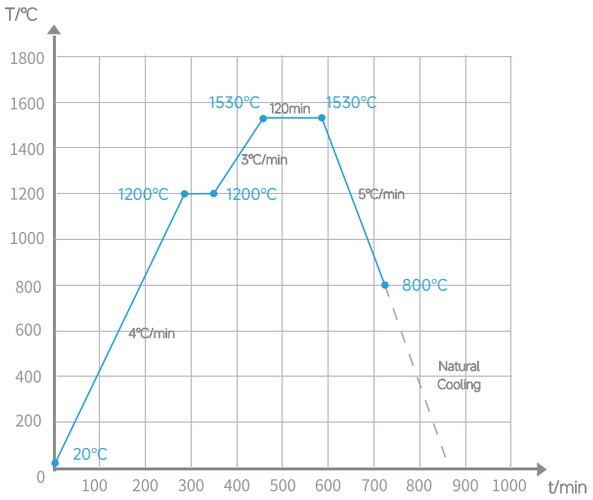
Sinter soft zirconia at high temperatures according to the specific sintering curve for the material. During sintering, heat provides enough energy for the atoms in the blank to migrate, forming a dense ceramic material. This process is known as crystallization.

- 3D PRO ML Premium / ST Shaded / ST White / ST ML / HT PLUS

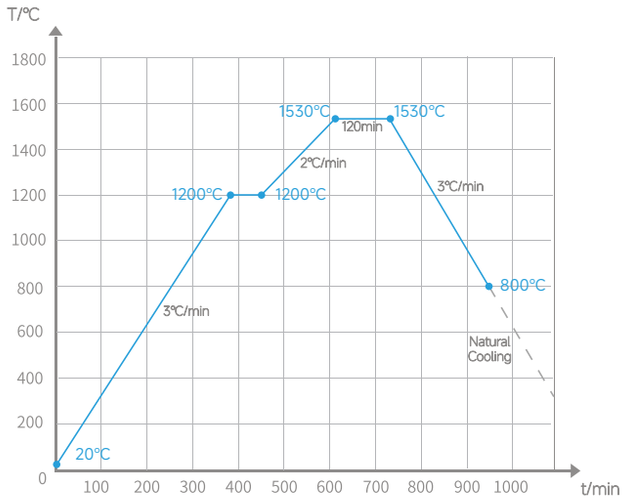
The sintering curve for 1 to 3 units (8h)



The sintering curve for 4 to 6 units (12h)



The sintering curve for more than 7 (15h)



Fractures After Sintering

01

Milling and Removing Teeth

02

Inadequate drying of the restoration and rapid heating can lead to fractures.

03

Fractures during bridge sintering may occur due to connectors being too thick or large, or improper placement during sintering.

04

Sintering Furnace

Polishing Methods

Use zirconia special polishing head to modify the surface of the restoration. After three steps of rough polishing-fine polishing-coarse polishing, the surface of the restoration is made smooth.

9

POLISHING

01 Rough Polishing

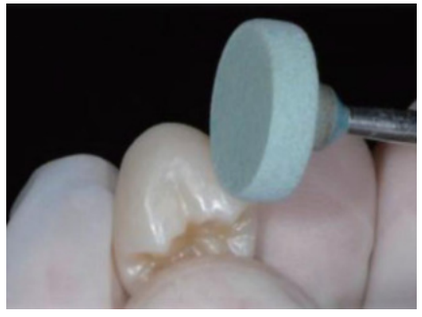
It is the first step of polishing after sintering zirconia. Its main function is to wear teeth, adjust the adjacency and occlusal surface, and modify the anatomical shape of the teeth.

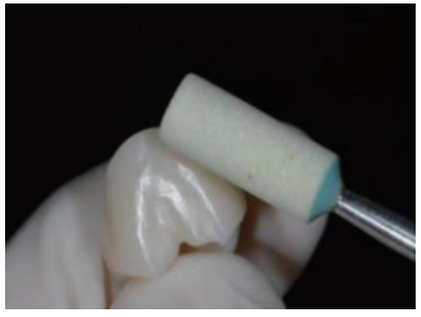
02 Fine Polishing

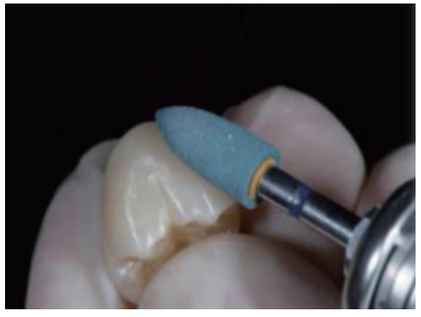
Follow the steps of coarse polishing to make the surface texture neat, even and delicate.

03 Coarse Polishing

Plays the role of polishing. Making the surface even, even and smooth can effectively improve the overall effect.







The role of polishing

01 Reduce surface roughness

02 Reduce plaque accumulation

03 Improve aesthetics

04 Reduce wear on opposing jaw teeth

10

Broken after porcelain or glazing

01

The temperature of the porcelain furnace is too high when it is opened and lowered. When the temperature is higher than 300 degrees, the teeth are easily cracked, especially those with thick missing teeth or implants.

02

When the porcelain powder is too thick or has too much moisture, it will shrink a lot during sintering and can easily crack the inner crown.

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Restoration Completed!

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