

# 3D PRO ZIR MATERIAL INFORMATION

INSTRUCTIONS FOR USE - 3D pro Zir (Single Anterior teeth)

**3Dpro·zir**®  
— More than nature —  


CE 0197

Aidite



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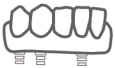


**1 Advantages**

- Coloration with perfect balance of Hue, Value and Chroma to resemble natural dentition
- Ideal formulation and manufacturing for milling
- Compared with traditional aesthetic zirconia, 3D pro Zir homogeneous blended colored zirconia has higher strength, greater translucency
- Homogenous coloration with no demarcation, keyed to 17 Vita shade guide colors
- Recommended for all restorations, single, bridges and full arch
- Wear capability as natural enamel
- Ideal opacity at gingival, ideal translucency at incisal

**2 Material Properties**

<b>Aesthetic</b>	57%
<b>Sintered density</b>	$\geq 6.0\text{g/cm}^3$
<b>Bending strength</b>	Cervical part 1050MPa
<b>Fracture toughness</b>	$5\text{Mpa}\cdot\text{m}^{0.5}$
<b>Hardness(Hv10)</b>	(Hv10) 1250

**3 Indications for Use**

Veneer	Posterior crown	Full crown bridge	Anterior crown	Inlay
				
Full contour screw retained bridge		Full arch crown bridge	Implant	
				

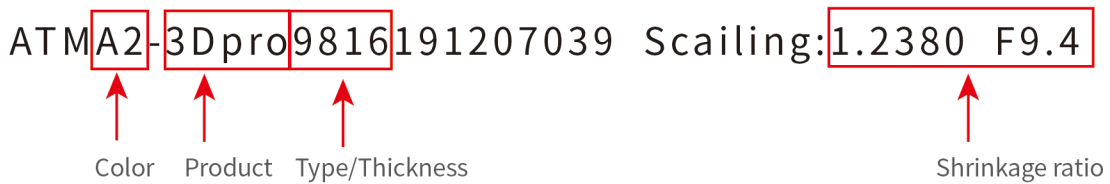
**4 Colors**

17 Colors, keyed to VITA 16 and bleach shade ( 0M2)

5 Introduction to Zirconia disc



ATMA2-3Dpro9816191207039 Scailing:1.2380 F9.4



Teeth Preparation

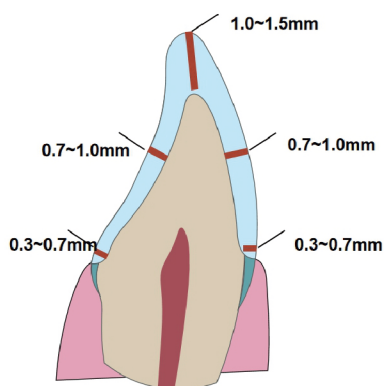
Minimum requirements for 3D pro Zir high-translucent zirconia.

	Anterior crown	
	Single crown	Below 3units bridge
Incisal/Occlusal surface(mm)	1.0-1.5	1.0-1.5
Lip side/Buccal(mm)	0.7-1.0	0.8-1.0
Adjacent(mm)	0.6-0.8	0.6-0.8
Lingual/Palatal(mm)	0.7-1.0	0.8-1.0
Shoulder(mm)	0.3-0.7	0.3-0.7

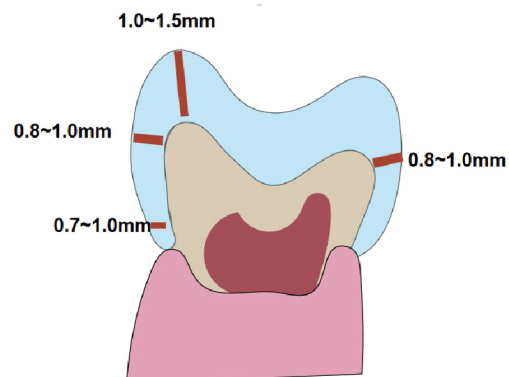
	Posterior crown	
	Single crown	Below 3units bridge
Occlusal surface(mm)	1.0-1.5	1.0-1.5
Buccal(mm)	0.8-1.0	1.0-1.5
Adjacent(mm)	0.6-0.8	1.0-1.5
Palatal(mm)	0.8-1.0	1.0-1.5
Shoulder(mm)	0.7-1.0	0.7-1.0

Remarks:

The preparation should be designed by dentist according to the requirements for esthetics and function. The data in the above table are the minimum values to maintain strength of the material.



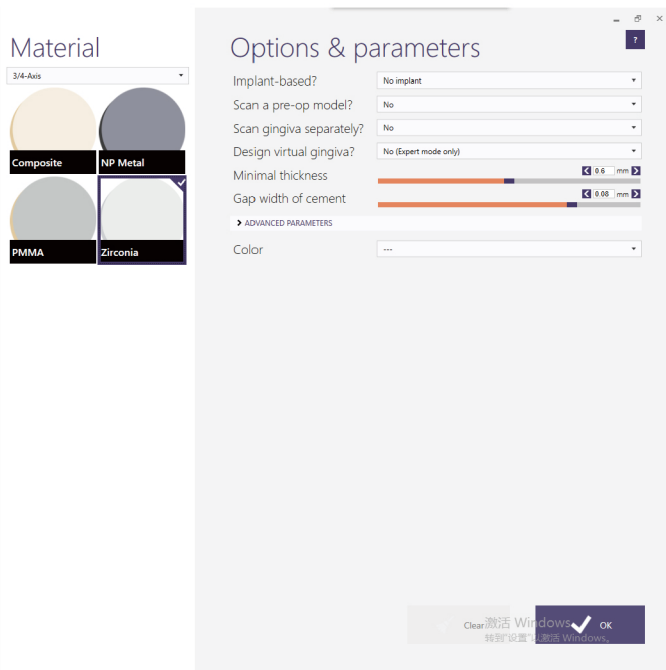
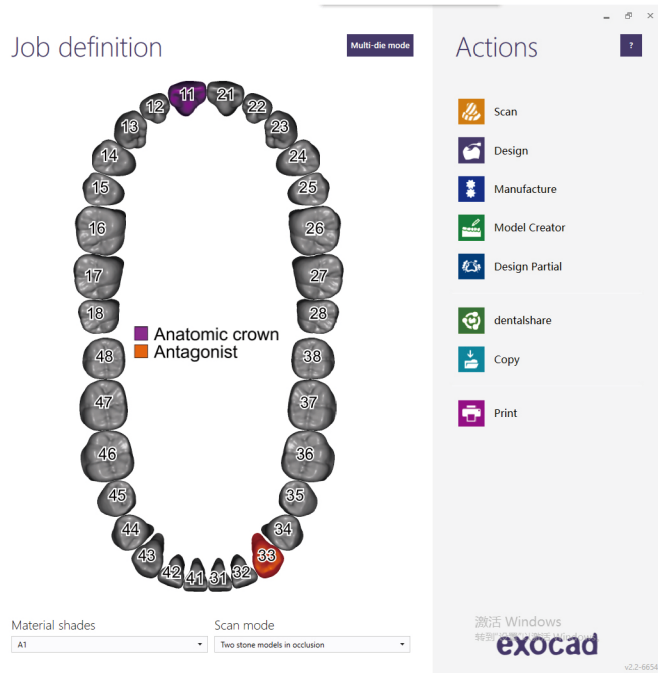
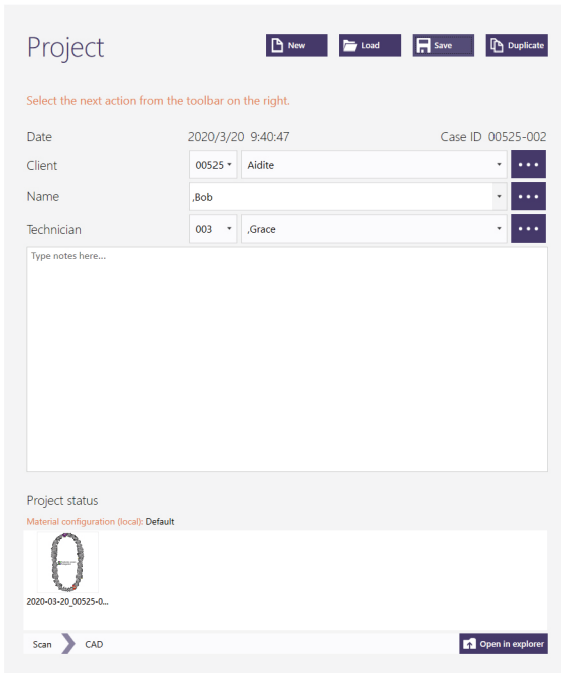
Minimum preparation guidelines for single anterior crown



Minimum preparation guidelines for single posterior crown

Opening order digitally

Input name of client, patient and technician and other pertinent information. Click targeted teeth and choose the information such as like type of the restoration, then save it.



## Scanning

Check scanner accuracy:

Calibrate the scanner periodically for accuracy.

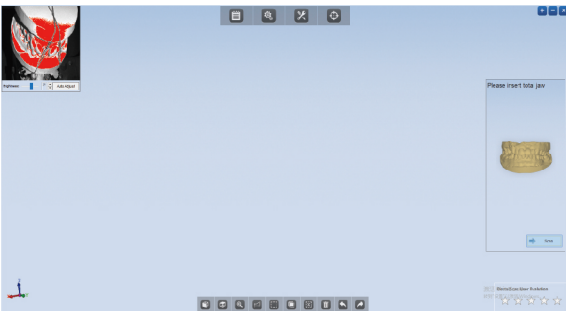
Scanning process:

1. Click scan

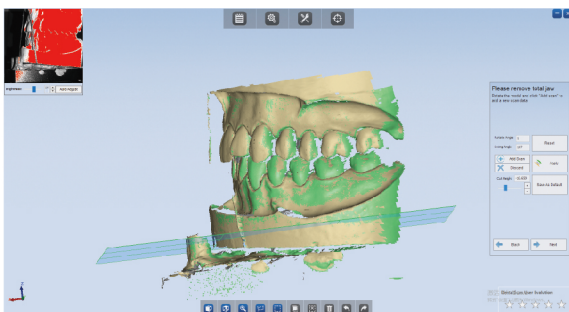
Choose the type of model (separate or integrated) and click ok.



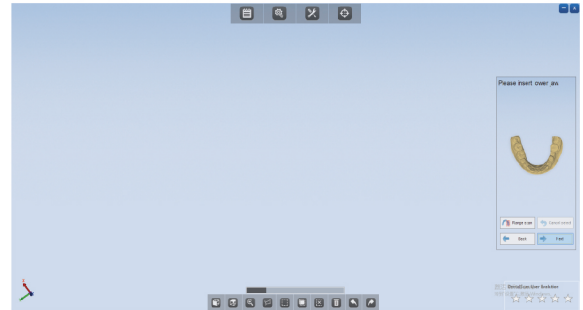
2. Place the model to the scanner following the indications on the right side and click scanning button.



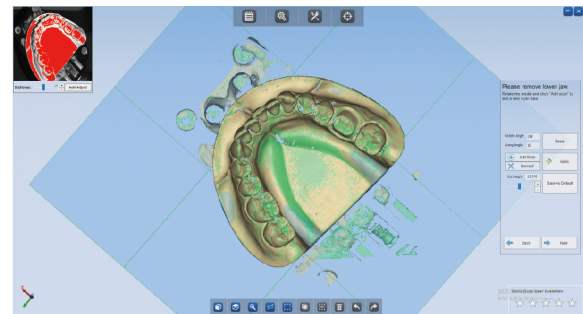
3. This process is to confirm the occlusal relationship. After the full-occlusion scan is finished, remove the model according to the indication on the right side.



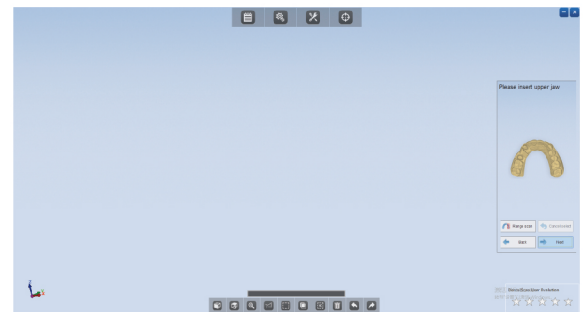
4. Place the lower model on the scanner and click next step.



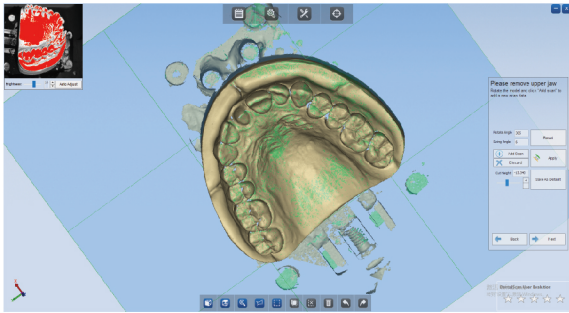
5. Focus on key positions like occlusal surface and cusps. Additional scanning may be necessary if the picture is not perfect. Click next if scanning is done.



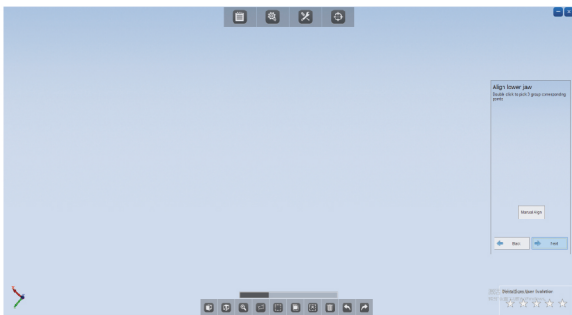
6. Place the upper model on the scanner and click next step.



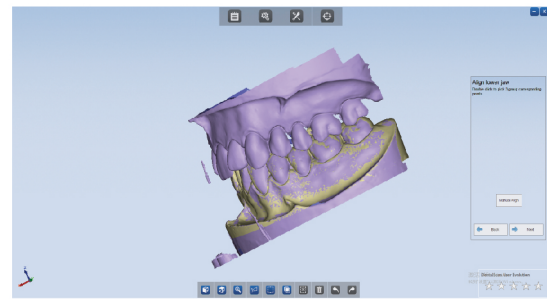
7.Object to be scanned in this case is anterior 11, so the abutment must be scanned clearly at this step. Click the right-key of mouse. Holding it will rotate the model and conduct additional scanning to add the missing data at the accurate position.



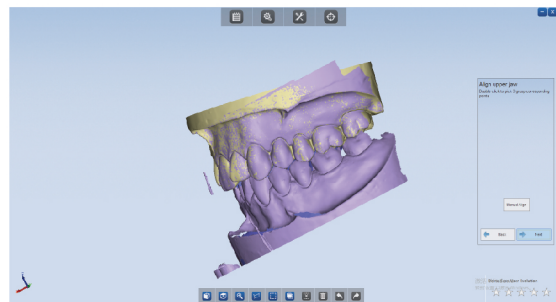
8.The software starts to splice the model of lower Jaw automatically.



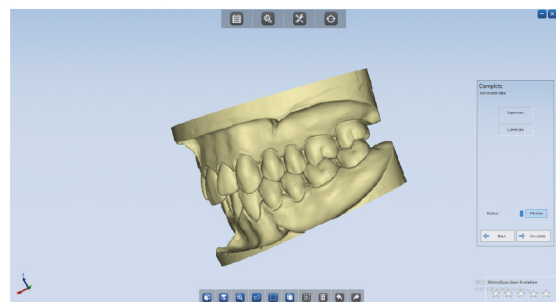
9.Once the purple and yellow color shows uniformly with an overlap distribution, the split joint is done. Click next step.



10.Split joint of Upper jaw is done. Click next step.



11.Adjust the radius of filling hole to the maximums,and click finish button.



### Scanning notes

- ✓After, is scanning finished, the data must be checked for accuracy to avoid deviation from model. Be sure the split joint is done accurately.
- ✓Be sure the model is placed accurately and solidly on the base of the scanner every time before scanning of partial model.
- ✓The main mode and the reference mode (secondary mode) must be the same.

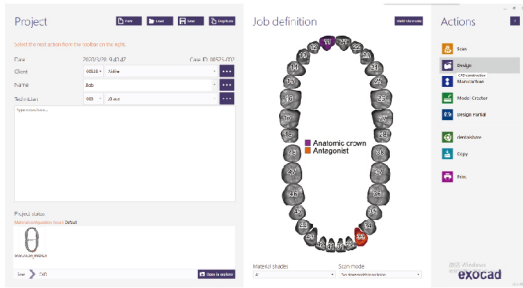
✗The abutment must not be rotated or loose on the model.



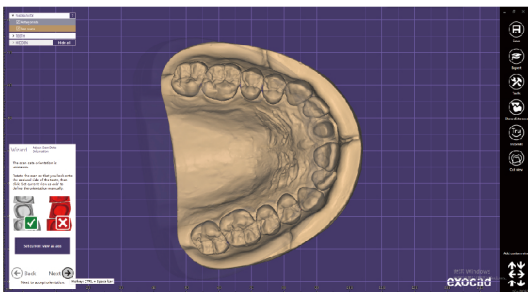
Designing

Designing process:

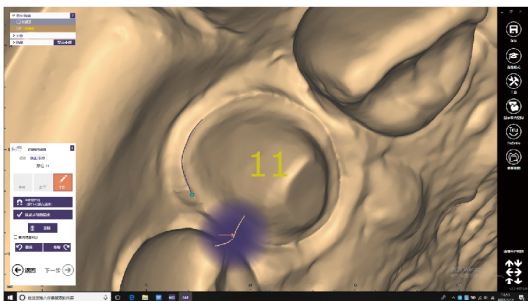
1. After scanning, return to the interface of designing and click design.



2. Set the guide of view



3. Draw the marginal line: It can be corrected by detecting or/and manual drawing.

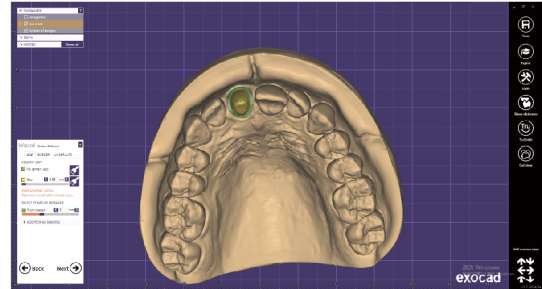


4. Set the orientation:



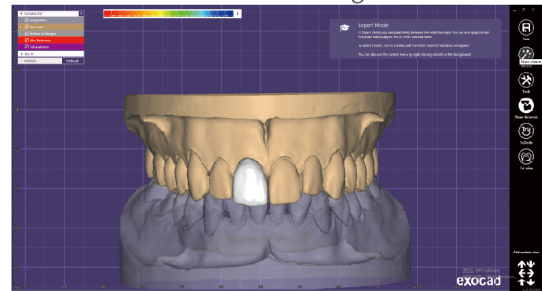
Adjust the parameter of bottom of crown:

The conditions of model and equipment like milling machines should be considered.



Advanced mode:

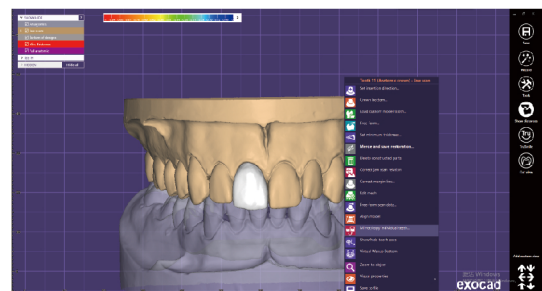
After the tooth and model are attached, use the mirror method to start the design.



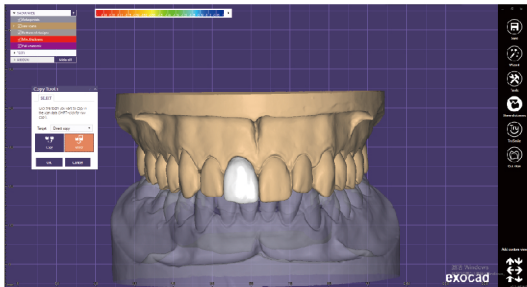
Mirror method:

Step 1: Mirror the opposite tooth as the preoperative model.

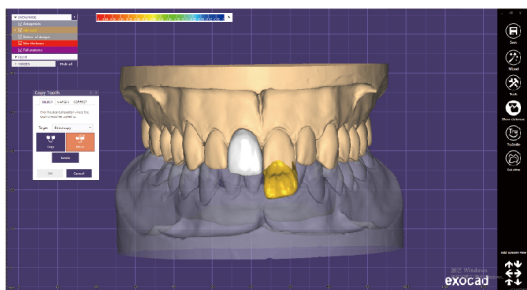
1. Right-click in the blank space and click the "Mirror / Copy Individual Teeth" option.



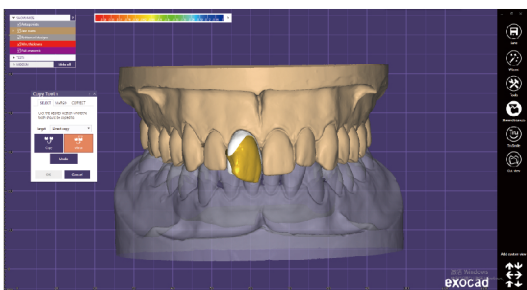
2. A mirror copy prompt box appears on the left side of the interface. Click Mirror.



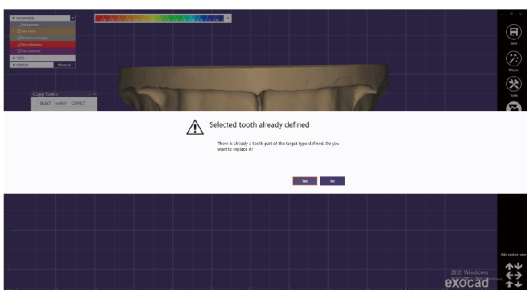
3. Click on the opposite tooth and the mirrored tooth appears.



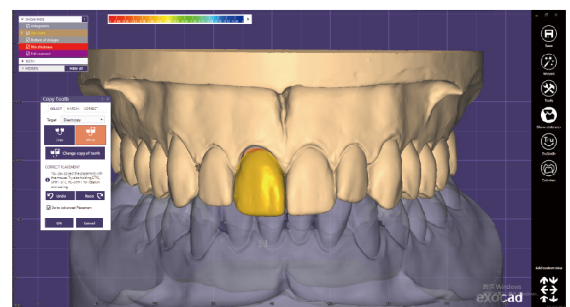
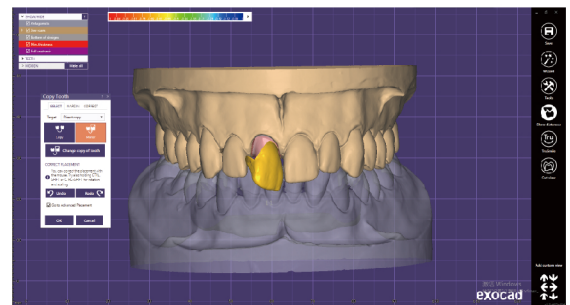
4. Move the mouse, place the mirrored tooth on the target tooth position, and click the left button.



5. After confirming the error, click "Yes".

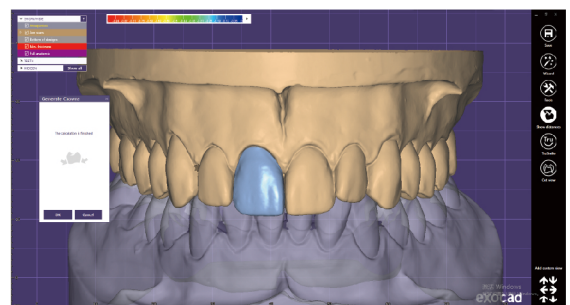
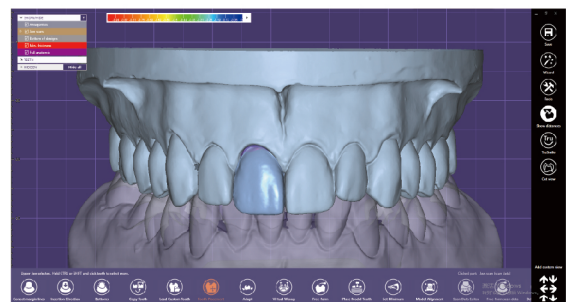


## Step 2: Arrange the teeth.



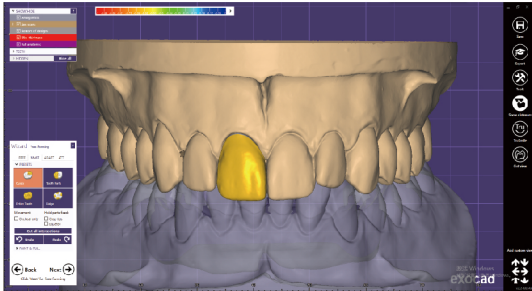
## Step 3: Adapt to pre-operative model adjustments.

Click the target tooth, and an option bar appears at the bottom of the interface. Click "Adapt to model adjustment"

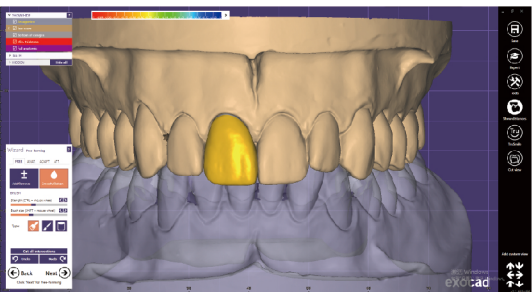
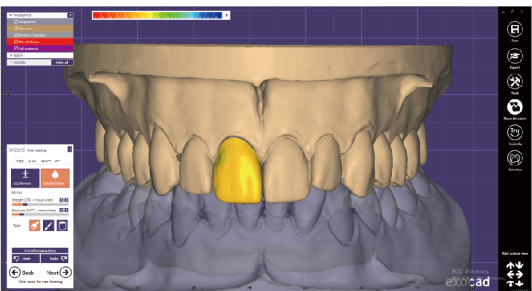


### Step 4: Smooth

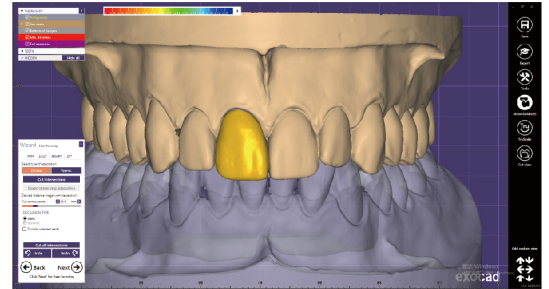
1. First click the wizard to return to the design interface.



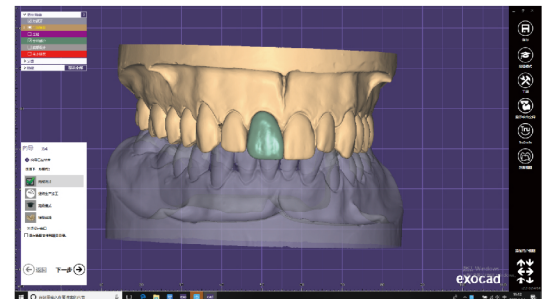
2. Use the smoothing tool to easily trim details such as edges.



3. Adjust abutment and occlusion.



4. Design finished.



### Designing notes

- ★ ✓ Designment shall conform with the requirement of minimum thickness and bridge design parameters.

Type of restoration	Anterior		Posterior	
	Thickness	Cross-sectional area of bridge	Thickness	Cross-sectional area of bridge
Single crown	0.6mm		0.8mm	
Three-unit bridge	0.8mm	9mm <sup>2</sup>	1.0mm	12mm <sup>2</sup>
Long bridge (>4unit)	1.2mm	12mm <sup>2</sup>	1.2mm	12mm <sup>2</sup>

- ★ ✓ Follow the operation below if the incisal areas of abutment have sharp edges. Fill with wax at the sharp edges before scanning, or increase the compensation value of burs.

The screenshot shows the CAD software interface. On the left is a 3D model of a crown. The main panel is divided into 'Settings' and 'Wizard Crown Bottoms'.

**Settings:**

- Name: Crown Zircon
- Remove undercuts
- Drill compensation

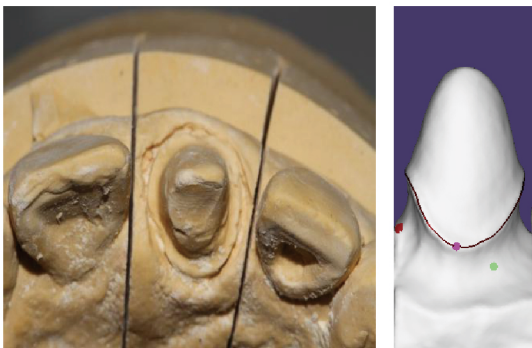
**Advanced settings:**

- Cement gap: 0.010 mm
- Extra cement gap: 0.030 mm
- Dist. to margin line: 1.00 mm
- Smooth dist.: 0.20 mm
- Drill radius: 0.50 mm** (circled in red)
- Drill Comp. Offset: 0.60 mm** (circled in red)
- New drill compensation
- Smooth surface noise

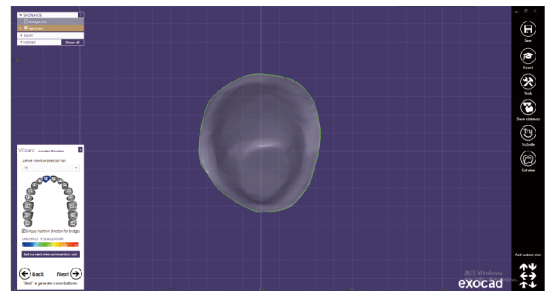
**Wizard Crown Bottoms:**

- Tabs: GAP, BORDER, **UNDERCUTS**
- UNDERCUTS:**
  - Don't block out undercuts
  - Angle: 0°
  - Protected zone near margin line: Size 0 mm
- MILLING:**
  - Anticipate milling (circled in red)
  - Diameter: 1.2 mm** (circled in red)
  - Bullnose/flat tool
  - Tool tip flat percentage: 80%
- Buttons: Show undercuts, Apply, Apply

- ★ ✓ If the automatically recognized margin line does not conform to the model, technician must check carefully and draw it by hand.



- ★ ✓ The common seating path of the dental bridge must be checked to avoid irregular seating.

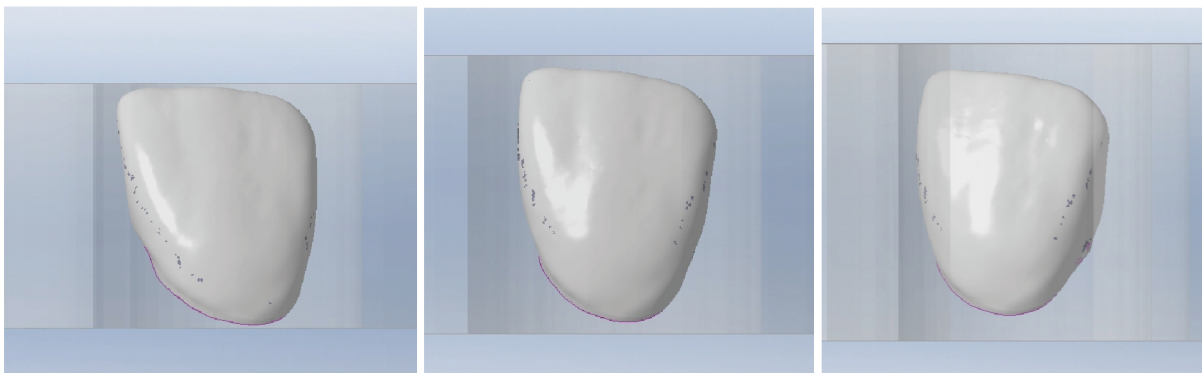


Nesting

Notes:

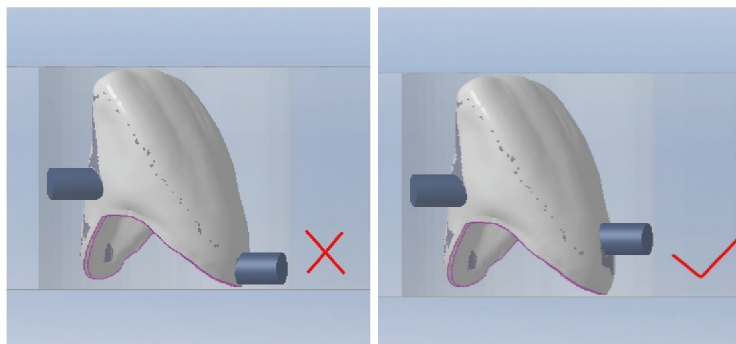
- ★ ✓ Be sure to choose a zirconium puck with a thickness that is basically the same as the height of the teeth to ensure the gradual effect of tooth color and translucency. The thickness left at the top and bottom surface should be more than 0.5mm, to assure correct milling space for tools. Position for desired incisal and gingival coloration

For example: If the designed height is 13.8mm. You need to choose a zirconium puck with a thickness of 16mm . Do not choose 14mm,18mm or more.

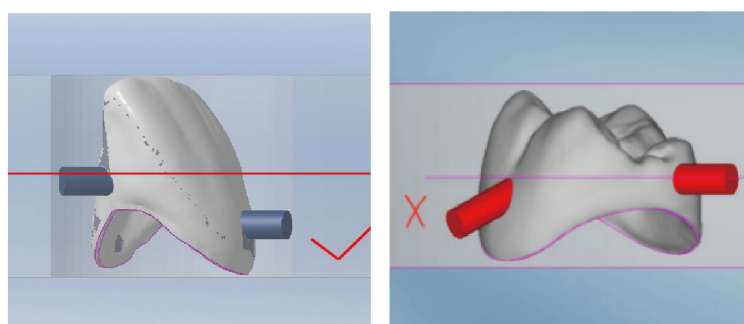


- ★ × puck 14mm                      ✓puck 16mm                      × puck 18mm

- ★ × The distance between the connecting rod and the margin should not be too close, which may easily cause chipping when removing teeth from the disc. Add the connecting rod to the raised position of the tooth.



- × The connecting rod cannot be tilted, it must be parallel to the zirconium disc



**Milling**

Check milling machine:

- ★ ✓ The maintenance of equipment should include regular calibration, cleaning and lubrication. No vibrations abnormal noise during milling should be present. If there is a problem with the accessory, replace it in time.
- ★ ✓ Be sure to record the number of restorations being milled. Examine the milling tools for wear according to usage per sets of milled restorations. Replace accordingly.
- ★ ✓ 3D pro Zir puck needs to be milled with 5axis equipment.
- ★ ✗ Do not place the mill on an unstable table or shelf.
- ★ ✗ Do not use wet milling method, otherwise the shade and translucency may be affected.
- ★ ✗ Do not mill without vacuum.

**Milling:**



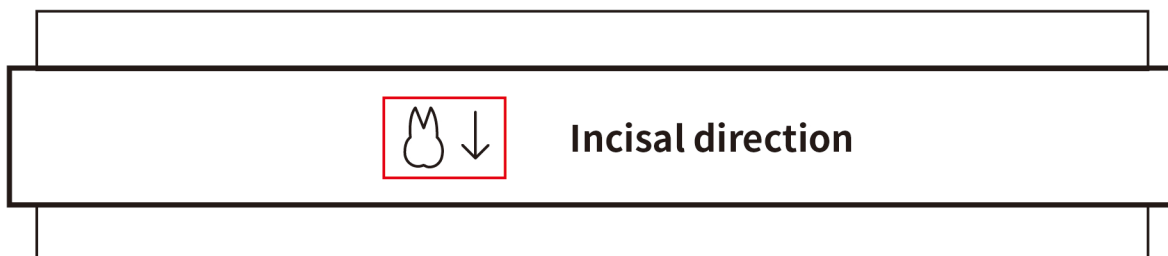
1. When securing the puck in the holder, tighten the screws in a diagonal order, after the first turn is fixed, then reinforce in the second turn. Finally, check by hand if the zirconium puck is positioned correctly. It should be firmly secured, but not over tightened. Check to be sure that the incisal of disc is at the correct position and not backwards.

2. Confirm that all requirements are met before processing can begin.

3. Milling finished.

★ **Milling notes:**

✓ **Loading requirement:** The side of the puck is marked with an arrow, and the arrow points to the incisal.

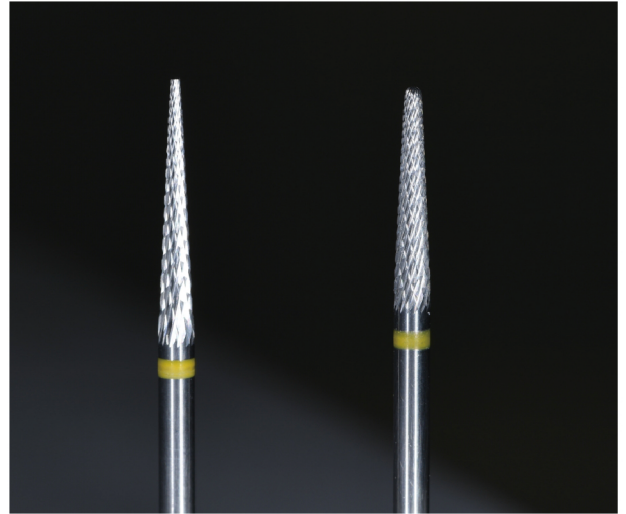


- ★ ✗ Do not use too much force when loading the puck. Do not overtighten the screws. Otherwise, the zirconium puck will be pinched or the milled restoration may crack.

### Separating and cleaning

#### Check tools:

- ★ ✓ Hand piece is stable and vibration-free.
- ★ ✓ A soft towel or sponge pad needs to be placed on the table to prevent the teeth being damaged.
- ★ ✓ Use fluted tungsten steel burs to separate the connecting rod.
- ★ ✗ The grinding environment must be clean of debris. Burrs, table tops, and the surrounding environment should be clean. Adequate ventilation and dust vacuum is required. Do not breath dust particles, use a qualified mask while performing any grinding
- ★ ✗ The brush must not be contaminated by water, oil or metal debris.
- ★ ✗ The burs should not be bent, otherwise it will cause vibration.



#### Process:

##### Step 1: Remove teeth

Grind the connecting rod with medium pressure.. As shown in the figure, move the bur clockwise to slowly grind the connecting rod horizontally.

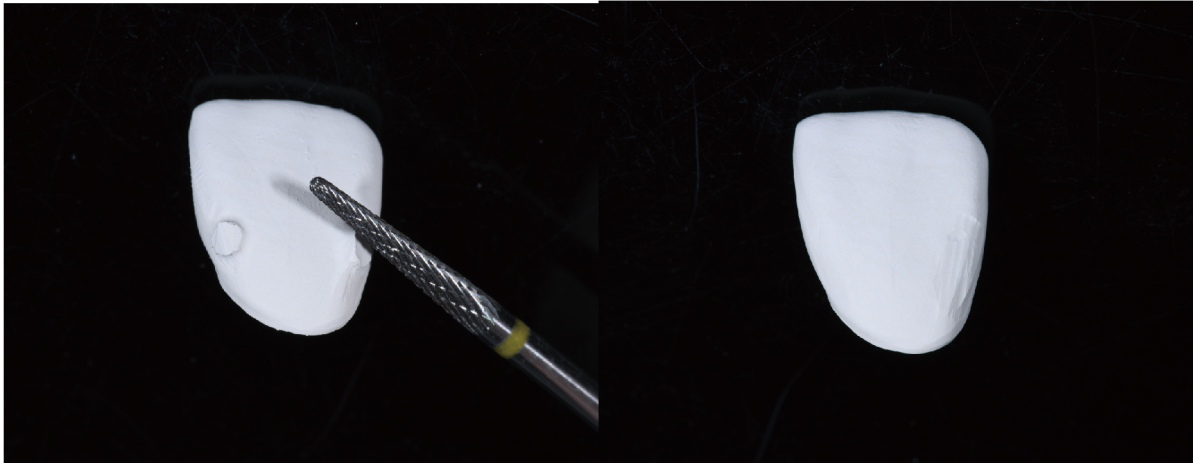


Grind out the connecting rod of the outer ring in half, and then polish the remaining connecting rods one by one to avoid the last connecting rod breaking directly, which may cause cracking or damage.



### Step 2: Remove excess connecting rods

After separating the restoration from the zirconia puck, continue to use a thicker tungsten steel bur or rubber wheel to remove the excess connecting rod.



### Step 3: Clean up the powder

Use a brush or porcelain brush to thoroughly clean the powder on the surface of the restoration and inside the crown. If the cleaning is not complete, the powder will adhere to the surface of the restoration and the crown after sintering at high temperature, forming white spots and cause fit issues. This will affect the quality of restoration.



#### ★ Notes for tooth removal:

- ✓ The speed of grinding the connecting rod is 15000r / min-20000r / min.
- ✓ The speed of removing the excess connecting rod is 15000r / min-20000r / min.
- ✓ You can use an oil-free and water-free air gun to gently spray the powder off the surface of the restoration. The air gun should not be set at high pressure.
- ✗ It is not recommended to remove the connecting using sharp discs. Use gentle pressure when working with green-state zirconia.



Sintering

Check the Sintering equipment and tools:

**Sintering furnace:**

- ★ ✓The sintering furnace must use a voltage regulator to ensure stable operating voltage.
- ★ ✓The sintering furnace must be cleaned regularly(once a week) and kept dry. Cleaning method: scrape off the impurities in the furnace.  
Place green-state scrap zirconia scraps into the furnace and sinter them according to the normal zirconia sintering curve.
- ★ ✓If furnace has not been used for more than a week, it must be decontaminated before used.
- ★ ✓When the equipment is not in use, the furnace should be closed to ensure a dry environment inside the furnace. Please keep the operation room of the sintering equipment clean and free of dust and debris. Do not place sintering furnace in a dusty environment. Metal shavings or dust, can adversely affect the heating elements.
- ★ ✓The heating elements of the sintering furnace must not show damage. If there is a small amount of peeling on the surface of the heating rod (silicon-molybdenum rod), the leftover material can be burned and the sintering furnace will back to normal.
- ★ ✓Check the furnace temperature regularly (every 3 months) to ensure the stability of the furnace temperature.
- ★ ✓Be sure to sinter in strict accordance with Aidite standard curve.

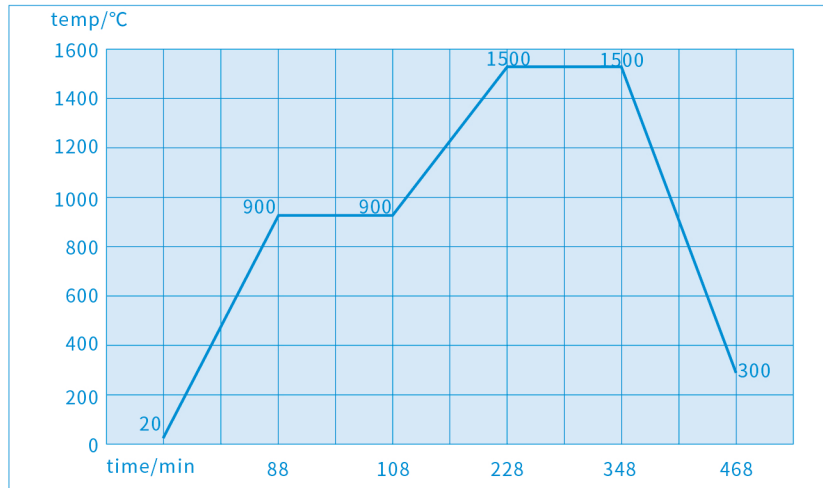


3D pro Zir Sintering Program:

Below 3 units bridge (7h) :

start temp	phase 1 heating rate	phase 1 Maximum temp	Holding time	phase 2 Maximum temp	phase 2 Maximum temp	Holding time	cooling rate	cooling to
20°C	10°C/min	900°C	20min	5°C/min	1500°C	120min	10°C/min	300°C

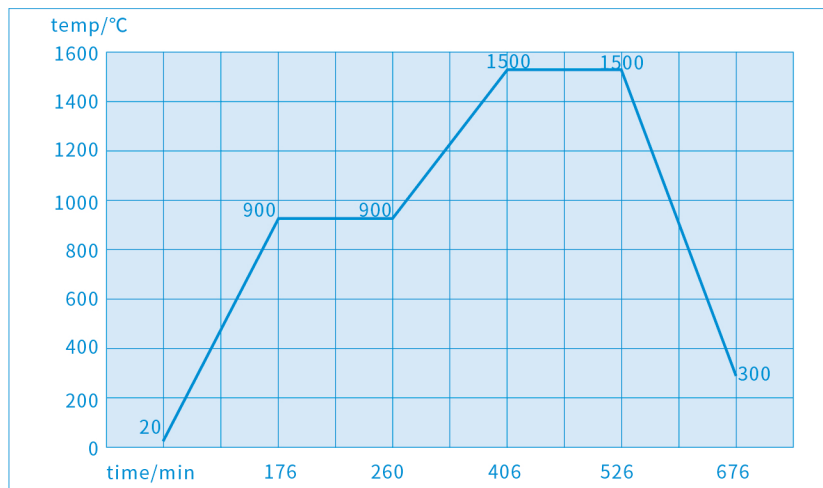
phase	temp/°C	time/min
1	20	88
2	900	20
3	900	120
4	1500	120
5	1500	120
6	300	



From 4 to 6 units bridge(10h):

start temp	phase 1 heating rate	phase 1 Maximum temp	Holding time	phase 2 Maximum temp	phase 2 Maximum temp	Holding time	cooling rate	cooling to
20°C	5°C/min	900°C	30min	3°C/min	1500°C	120min	8°C/min	300°C

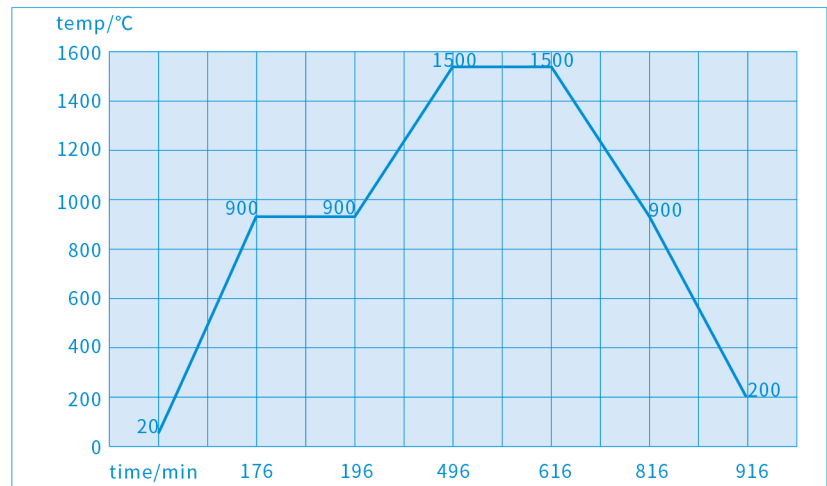
phase	temp/°C	time/min
1	20	176
2	900	30
3	900	200
4	1500	120
5	1500	150
6	300	



Above 7 units bridge (15h) :

start temp	phase 1 heating rate	phase 1 Maximum temp	Holding time	phase 2 Maximum temp	phase 2 Maximum temp	Holding time	cooling rate	cooling to	cooling rate	cooling to
20°C	5°C/min	900°C	20min	2°C/min	1500°C	120min	3°C/min	900°C	7°C/min	200°C

phase	temp/°C	time/min
1	20	176
2	900	20
3	900	300
4	1500	120
5	1500	200
6	900	100
7	200	



### Zirconium beads:

- ★ ✓ When the zirconium beads are severely discolored, the shape is broken or damaged, it must be replaced immediately.
- ★ ✓ If the zirconium beads are stuck together, be sure to break them apart to ensure proper bead function.
- ★ ✓ The amount of zirconium beads should completely cover the bottom of the box (2 - 3 layers).
- ★ ✓ When replacing zirconium beads, first sinter the zirconium beads with remnants of green state zirconia and conduct a normal sintering cycle.
- ★ ✓ It is recommended that Aidite Zirconium Beads be used and it is recommended to use zirconium beads with a diameter less than or equal to 1.0mm to sinter long bridges. Use zirconium beads with a diameter greater than 1.2mm to sinter single crown.



Zirconium beads

### Sintering sagger:

- ★ ✓ Be sure to use a perforated sintering sagger to heat the restoration more evenly.

### Sintering:

- ★ ✓ Put the lingual or occlusal side down into the sagger and sinter.



Sintering finished.

### Sintering notes:

- ★ ✓ A single crown or a bridge below 3 units can be sintered using the fast firing curve in an Aidite fast firing furnace.
- ★ ✗ Do not sinter 3D pro Zir together with restoration dipped or brushed with coloring liquids.
- ★ ✗ Furnace opening temperature shall be not more than 200°C after sintering.
- ★ ✗ Avoid direct air conditioner or fans to prevent potential fracture or cracking due to fast cooling. Take the restorations out after have cooled naturally.
- ★ ✗ Do not use quench cooling tools such as metal to contact high temperature restorations.

### Grinding

- ★ Check the grinding tools:
  - ✓ Using special zirconia grinding tools, Aidite special zirconia grinding tools are recommended.
  - ✗ Do not use diamond burs to adjust mass areas of restorations, otherwise that will cause potential fracture, cracking or white spots during glazing.



### Grinding process:

#### Step 1: Rough grinding

This process is used for fitting and, adjusting the adjacent, occlusal surface, entire surface. As well for grinding connecting rods to remove materials. Grind in the same direction, to make the lines fine and smooth. It is effective to grind in the right direction, wrong direction grinding will lead to low efficiency and increase wear of grinding head. Using rotation speed of grinding head and point grinding to remove, be sure to avoid overheating or stress by concentrating in one position. Grind with minimum pressure by continuously changing positions.

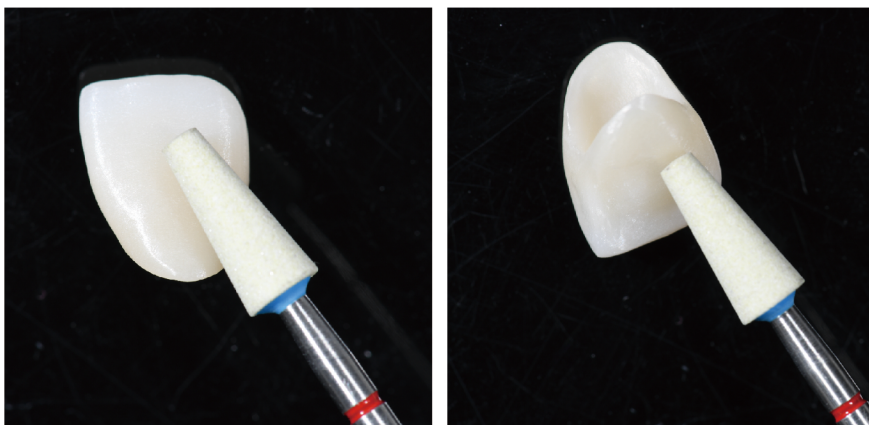


#### Notes of rough grinding:

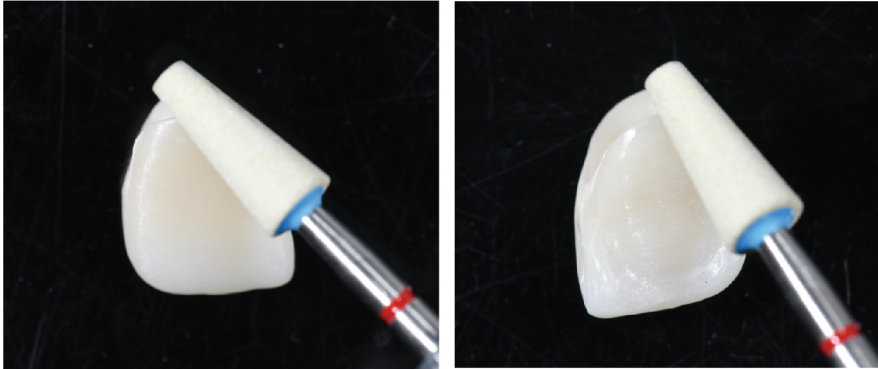
- ★ ✓ Revolving speed of rough grinding: 20000-35000r/min.
- ★ ✗ Don't grind the restoration with high pressure.
- ★ ✗ Don't grind continuously at the same position, to avoid potential fracture or cracking caused by overheating.
- ★ ✗ Don't use rough grinding tools to grind cervical margin of restoration.

#### Step 2: Fine grinding

Following the rough grinding step, make the surfaces smooth, uniform and delicate. It is the same as rough grinding, grinding the surface of restoration from right to left in the same direction.



Use fine grinding head to adjust the cervical margin.



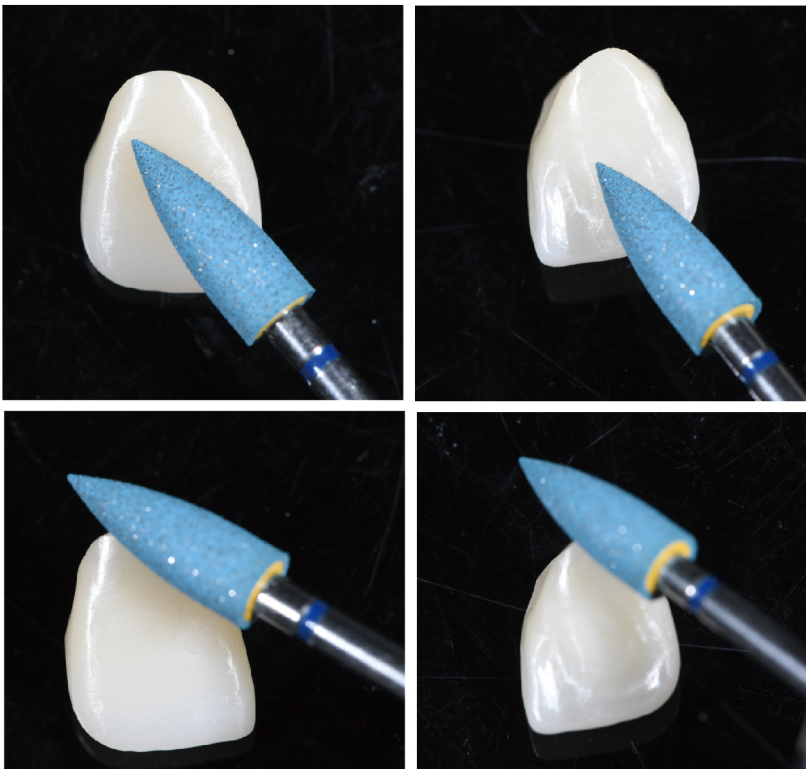
### Notes of fine grinding:

- ★ ✓ Revolving speed of fine grinding: 20000-35000r/min.
- ★ ✓ Use fine grinding head to grind after rough grinding.
- ★ ✗ Do not grind the restoration with high pressure.
- ★ ✗ Do not grind continuously at the same position, to avoid potential fracture or cracking caused by overheating.
- ★ ✗ Do not use rough grinding tools to grind cervical margin of restoration.

### Step 3: Rough polishing

Make the surface fine and smooth to enhance the overall effect, and reduce wear to opposing teeth.

Polish slightly from right to left in the same direction.



Rough polishing tools also can be used for cervical margin adjustment to prevent chipping problems. Cake-shaped, columnar and cone shaped tools are available in three shapes.



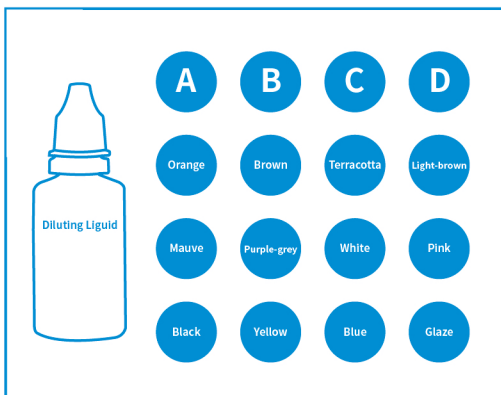
### Notes of rough polishing:

- ✓ Revolving speed of rough polishing: 10000-16000r/min
- ✓ After fine grinding, use a rough polishing head to polish the neck edge
- ✗ Don't use too much pressure during rough polishing. Roughly polishing matt polish is preferred.

## 外染

Staining and Glazing:

- ★ ✓ Aidite stain & glaze kit is recommended to help achieve better esthetics and effects.



### Advantages:

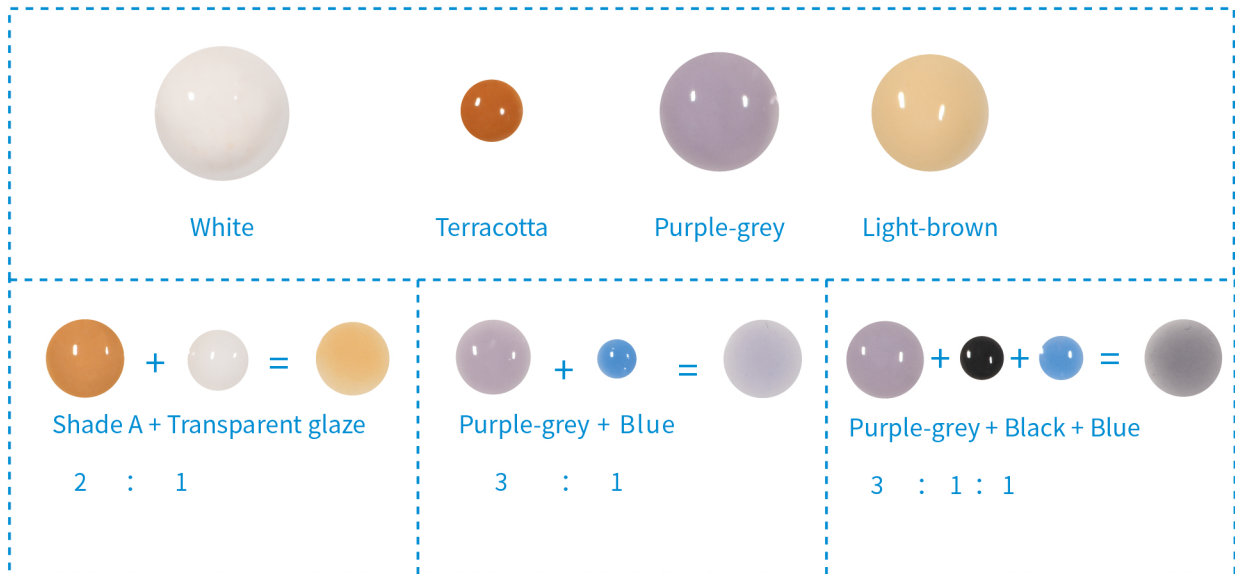
1. Easy operation
2. Multiple colors
3. Only bake technique to achieve perfect luster
4. Fluorescence effect
5. Perfect matched shades for zirconia

### Preliminary preparation:

- ✓ After contouring and smoothing, the surface of the restoration does not be sandblasted.
- ✓ Sandblasting is not required inside the crown of a prosthesis with good mechanical retention, and sandblasting is required in the crown of a prosthesis with poor mechanical retention.
- ✓ If sandblasting is required inside the crown, use 50um white alumina oxide, sandblasting pressure of 2bars , and sandblasting distance of 10cm.
- ✓ Clean the surface of restoration by steam or ultrasonic cleaning machine before staining.



Staining process:  
Color matching reference



Apply terracotta at cervical.



Apply shade A+ transparent glaze 2:1 at the main body.



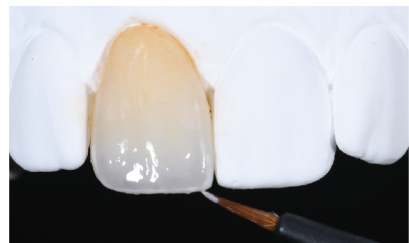
Apply purple-grey at the ridges.



Apply purple-grey+blue 3:1 at 1/3 incisal.



Apply purple-grey+blue+black 3:1:1 at transparent area of incisal part, development grooves, and ridges.



Apply white at margin of incisals.



Simulate potential fracture with white color.

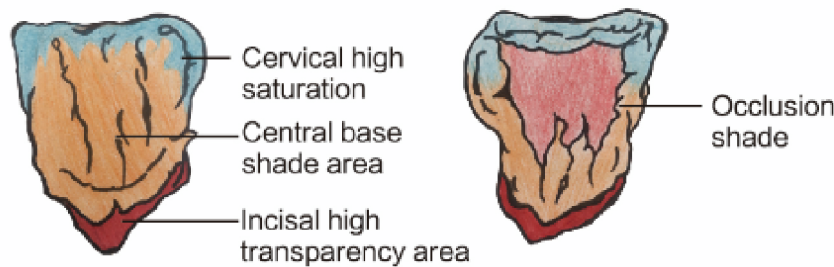


Close to the white simulated fracture, use differentiating effect with terracotta and light brown.

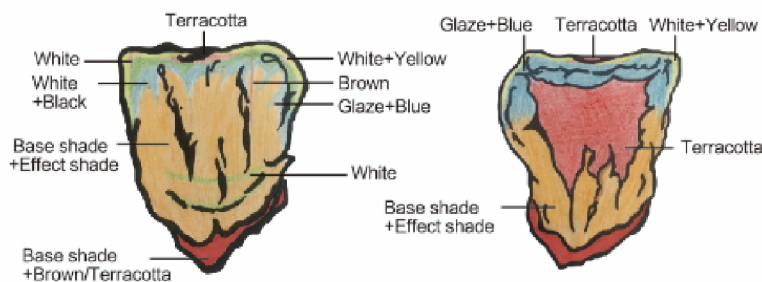


Final effect.

Simple staining of anterior teeth:



Personalized staining of anterior teeth:



Sintering program of Aidite staining and glazing kit:

Sintering program of single crown, bridge of three-unit or less

Start temp	Drying time	Heating ration	Highest temp	Time kept	Final temp
500°C	4min	50°C/min	820°C	2min	300°C

Sintering program of bridge above three-unit

Start temp	Drying time	Heating ration	Highest temp	Time kept	Final temp
500°C	4min	30°C/min	820°C	2min	300°C

Notes:

- ✓ The highest temperature of Aidite stain & glaze kit is between 740°C to 900°C, temperature should be adjusted according to customers' requirement for texture and glaze.
- ✗ The lowered platform temperature for zirconia is 300 °C. Do not open the furnace when the temperature is very high, otherwise it will cause potential fracture and cracking due to the temperature difference between furnace temperature and the environment.





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