

# IMPORTANT NOTES (CZR PRESS Instruction Manual addition)

## About Zirconia Frame Design

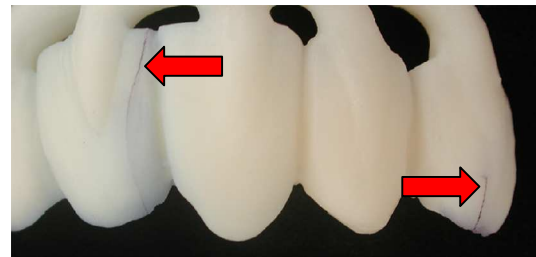
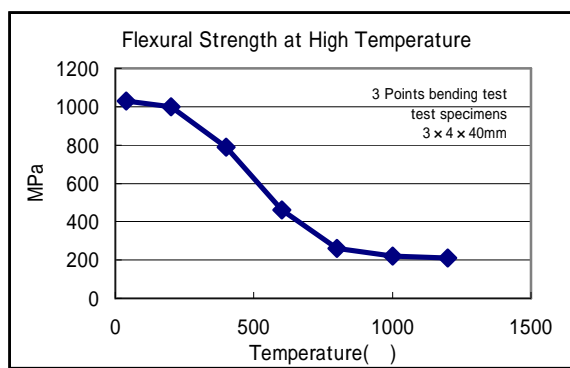
CZR PRESS is an entirely new technique that employs pressing of ceramic ingots on a zirconia framework. If you design a zirconia framework in the same way you design a metal frame, serious troubles such as cracks in the framework may occur. In order to prevent such troubles, following are the features of zirconia that you need to be acquainted with.

### 1. Zirconia Materials used for CZR PRESS

Dental zirconia materials available on the market as of July, 2004 is of the type “3YTZP”. This is made by a minute amount of Yttria( $Y_2O_3$ ) being dispersed and solid-soluted in Zirconia ( $ZrO_2$ ). CZR PRESS has been manufactured to match this type of Zirconia. Zirconia, which is of very high strength, has the characteristic that is shown in 2. as a ceramic material.

### 2. Flexural strength is greatly lowered at a high temperature

Although it is a high-strength ceramic material, this strength is at a room temperature and it is greatly lowered at around 1,000 °C, which is the temperature whereby CZR PRESS is pressed. The relationship between the flexural strength and temperature is shown in the graph. In zirconia, the strength will return to the original high strength when it is cooled to the room temperature again. In the pressable technique, ceramic ingots are pressed at a high temperature on a zirconia framework. If the framework design is not proper, the zirconia framework may crack when the ceramic ingots are pressed at a high temperature.



Cracks that are made during pressing

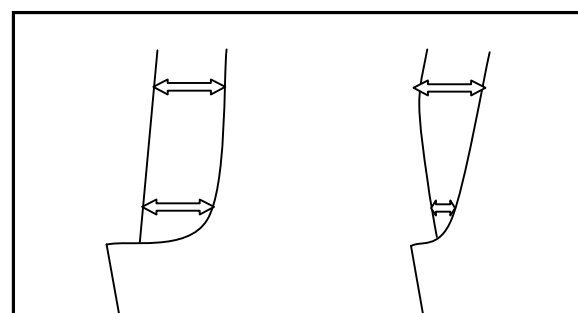
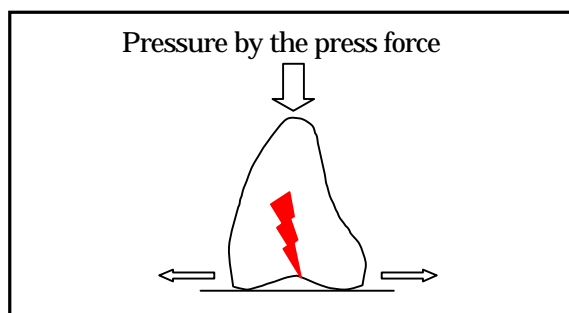
### 3. Frame design

Due to the characteristic of zirconia, lower flexural strength at a high temperature zone is unavoidable. However, in the press technique, pressure is required at a high temperature zone. In order to avoid troubles such as cracks, the frame needs to be designed properly as shown below.

- 1) Secure more than 0.4mm thickness in all parts of the zirconia framework

If the thickness is less than 0.4mm in any parts, there is a greater chance of cracks that will grow longer and wider.

- 2) Secure at least more than 0.4mm thickness evenly with a rounded shoulder in margin area. (Refer to the illustration) Knife-edge design toward the margin end is not acceptable as the thickness will gradually be less than 0.4mm.



Correct

Wrong

#### 4. Grinding of a zirconia framework

There are two kinds of cracks:

- 1) Cracks that are made during pressing.
- 2) Cracks that are made during framework fabrication and grinding, and grow bigger after pressing

In order to avoid the 2) cracks, carefully grind the zirconia framework according to the instruction of the manufacturer. Use of a not-so-good grinding tool may cause cracks by heat generation. Be sure to use grinding burs/discs with minute diamond particles. Noritake Meister Points SD61 and SC51 are ideal. Cooling with water is necessary to avoid heat generation during grinding.



Meister Points SD61 and SC51

#### 5. Checking of cracks in zirconia framework

Be sure to check if there are any cracks in the zirconia framework after grinding.

Apply crack-checking liquid or water ink all over the inside and the outside of a zirconia framework, and after one minute, wipe off the extra liquid or ink on the surface. If there are cracks, the liquid or ink penetrates into the cracks, making it easy to find them.



Crack that is made during grinding

#### 6. Never use the cracked zirconia framework

From the characteristic of zirconia, even a very minute crack in the zirconia framework may be a cause for more cracks that grow bigger and wider after pressing. And then, the framework strength will be greatly lowered. Naturally, it does not have the strength that can be fit in the mouth. If even a crack can be found, never use the cracked framework.

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