

## **Advantages and Disadvantages of E-MAX and Zirconia Crowns**

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### **Abstract**

The success of a dental restoration depends upon a number of factors such as the material chosen, its mechanical properties, anatomical form, surface texture, translucency and color. In order to overcome the unaesthetic metallic seen in PFM restorations, dental research began to be directed towards metal-free ceramic restorations to improve the aesthetic outcome. We will discuss the differences and make some suggestions relative to when and where Zircon dioxide and IPS E-max crowns are best suited and discuss about advantages and disadvantages of this two types of crowns.

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**Keywords:** Porcelain fused to metal (PFM); IPS E-max lithium disilicate crowns; Zircon dioxide.

### **Introduction:**

The success of a dental restoration depends upon a number of factors such as the material chosen, its mechanical properties, anatomical form, surface texture, translucency and color. The most common aesthetic restorative material used in day to day practice for crown and bridge work is porcelain fused to metal (PFM) because of its excellent mechanical properties (1). However, the much superior aesthetic outcome of metal-free ceramic restorations has led to their increasing popularity, especially in the anterior regions of the mouth. In order to overcome the unaesthetic metallic hue seen in PFM restorations, dental research began to be directed towards metal-free ceramic restorations to improve the aesthetic outcome (2). Research and development led to the creation of many metal-free ceramic systems. There's been an enormous amount of advertising on both full-zirconia crowns and IPS E-max lithium disilicate crowns (3).

The characteristics of each material make them ideal for different situations. Understanding the benefits and risks associated with both Zirconia and E-max will make it easier to create the perfect crown. Clinician opinion seems to be that they are both working much better than previous

ceramic restorations. Porcelain-fused-to-metal (PFM) appears to be slowly dying. Most dentists are reluctant to use any new or moderately proven restoration type for all of their restorations. Porcelain-fused-to-metal is well proven and has had over 50 years of successful use. Certainly, I am not saying that this type of crown does not have clinical requirements; it will always work in certain situations, but there is a question, which of the two modern types of ceramic crowns should I be doing most? Have they been used enough to trust them?

E-max crown is a type of all ceramic crown which is preferred for its long lasting, aesthetic qualities (6). Crown is made from a single block of lithium disilicate ceramic. This is top grade material which has been harvested for its toughness, durability and opaque qualities which makes it a highly prized crown. The crown is considered to be the best match with your own natural teeth.

#### E-max crown



Figure: 1



Figure: 2

There is no metal inside the crown so it means no gray line around the gum line. They are considered to be at less risk of chipping to zirconia crown. It is rare, but E-max crowns can fracture at the time of try-in or during adjustment of the occlusion. The most common reason for the ceramic to fracture is inadequate material thickness.

The manufacturers' stated strength of any ceramic material is totally dependent on the thickness of the material and the preparation design. Recommendation is very specific tooth preparation requirements for their materials in order to guarantee maximum strength and predictable longevity. Needless to say, anything less than following these recommendations will result in a weaker final restoration.

Ivoclar's recommended tooth reduction for E-max posterior crowns is:

1. At least 1.5 mm occlusal reduction for cusp tips and the central groove.
2. 1.5 mm on the axial walls circumferentially in the occlusal one-third.
3. At least 1.0 mm deep flat shoulder margin. Chamfer or feather edge finish lines are contraindicated.

Although similar in functionality with dioxide, the difference between E-max and Zirconia crowns is that E-max is more translucent than Zirconia. The translucency of E-max crowns allows in more light. This creates a more lifelike crown that requires no stain. However, for a dark tooth underneath, this characteristic makes Zirconia the better choice (5).

We will discuss the differences and make some suggestions relative to when and where the two types of restorations are best suited. Both full-zirconia and lithium disilicate restorations have proven themselves in situations requiring only single-tooth restorations, does not matter it will be anterior or posterior side. The idea that we cannot use E-max crown on molars is false. This type of crown is thin, but when it is cemented on the tooth and if the preparation of the tooth and thickness of the crown is proper, connection is very hard and with enamel it is getting like one tissue. We cannot say same about fixation of zircon dioxide crowns, especially problems with recementation we occur after cementing zircon dioxide bridges, single dioxide crowns prove themselves better. Zirconia or lithium disilicate crowns can be used in three-unit fixed prostheses replacing one missing tooth. Some laboratories are promoting longer span units of zirconia restorations. Additionally, a relatively large connector junction of about 4 mm in diameter is suggested to provide acceptable strength when connecting the abutments to the pontic areas. Multiple-unit lithium disilicate restorations are not advised at this time in posterior locations (7).

#### **E-max and zirconia restorations can help fix:**

- Discolored or stained teeth
- Crooked teeth
- Chipped or cracked teeth
- Decayed teeth
- Older dental work utilizing metal
- Shape or form of teeth

## Zircon Dioxide Bridge



Figure 3



Figure 4

### Conclusion:

Despite manufacturers' efforts to make zirconia significantly more translucent, the transmittance values of these materials still do not match conventional lithium disilicate. More research is required on zirconia towards making the material more translucent for its potential use as esthetic monolithic restoration. Within the limitations of the study, it can be concluded that high translucency lithium disilicate is the most translucent material amongst the materials studied lithium disilicate. Further research is needed on improving the microstructural features of zirconia materials in order to enhance their translucency.

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