



ZIRCONIUM DIOXIDE CROWNS PROS AND CONS OF CROWNS

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Abstract

Zirconium dioxide is the material used to make aesthetic modern dental crowns. It has a lot of advantages and, thanks to them, is in widespread demand.

The material is in demand for precision and highly aesthetic restoration of any jaw defects. It allows you to create durable and harmless structures with a wide range of applications – dental crowns, zirconium abutments, a frame for a prosthesis.



What is zirconium dioxide?

The raw material is a zirconium derivative (chemical formula – ZrO_2). Zirconium is a natural mineral found in places where silicic acid salts occur, to which it actually belongs.

Zirconium dioxide is a durable and aesthetic material that has found application in many fields of medicine (it has long been used to create artificial joint heads). It has been used for orthopedic dentistry for more than 15 years.

Dentists are impressed by its rigidity, strength, and resistance to bending stresses. Therefore, as a prosthesis, it simply has no price. For greater durability, it is enriched and stabilized with additional components (aluminum, yttrium).





Why zirconium dioxide and not another material?

Zirconium crowns have absorbed the most spectacular advantages:

- It is a universal material from which both crowns of one and several teeth are made.
- Its aesthetic characteristics are so high that artificial teeth practically do not differ from ordinary teeth in terms of the degree of transparency of the enamel.
- The material lends itself well to processing, and any structures can be made from it.
- The strength and reliability of zirconium ensured its 10-20-year service life.
- Biocompatibility — zirconium dioxide does not cause allergies, galvanization, and is not rejected. It's a natural material that you're comfortable with.
- It is lightweight, which is important for large structures. For example, with prosthetics of the entire jaw.

These and other qualities have made zirconium dioxide very popular and in demand all over the world.



What are the advantages of the material?

Accuracy. The main advantage of a zirconium prosthesis is a fully automatic manufacturing principle that eliminates the notorious human factor. Zirconium dioxide prostheses are made using a 3D model by special automation and correspond exactly to the impression to the micron.

Bioinertness. The material has inert physico-chemical properties, does not reject, does not provoke allergic reactions and pathological processes. Hypoallergenic and is used even by those who are allergic to precious metals — gold, palladium, platinum.

Endurance. The prosthesis is resistant to damage and withstands chewing loads well. It is not prone to chipping.



Functionality. The material is used for the manufacture of crowns on living teeth, crowns on implants, artificial teeth as part of dentures, frames, stump inlays, abutments.

Thermal protection. Low thermal conductivity and a minimum thickness of 0.4 mm make it possible to produce the thinnest structures, which are excellent not only for implantation, but also for prosthetics of "living" teeth. When preparing them for the crown, you need to dissect a minimum of tissues, plus the teeth will not be thermosensitive.

Aesthetics. Excellent prosthetics quality is achieved due to the optical characteristics of the material (zirconium dioxide has the same reflective ability and transparency level as tooth enamel). When planning prosthetics, it is possible to choose the shade of the material to match the natural tone of the patient's tooth enamel and, due to the stability of the raw materials, the translucency and color option will remain for the entire duration of operation.

Also, when installing zirconium dentures (crowns with abutments), you do not need to insert their lower edge under the gum to hide the details of the metal abutment. Crowns are made flush with the gingival contour and do not damage soft tissues. When using them, there are no dark streaks on the gums from contact with metal, hyperemia and cyanosis caused by irritation.

Who can use zirconium crowns?

All-anatomical crowns made of a single material are suitable for prosthetics of any group of teeth – included, terminal, frontal and lateral defects of the dentition. They are recommended for patients with increased tooth wear, allergic reactions to metal, and loose gums.

The use of crowns on living teeth is indicated for significant damage, as it is possible to make a stump tab. When prosthetics on crowns require minimal turning of healthy teeth under a zirconium crown, which allows you to preserve more living tooth tissues. Zirconium dentures have proven themselves well:

- for the renewal of long-restored dental defects;
- when using other materials is not possible;
- on the frontal sections of the jaw, where there are special aesthetic requirements;
- on the side, when replacement of masticatory teeth is required, which are under significant stress.

The result of prosthetics, of course, depends not only on the quality of the material, but also on the skill of the dental technician. Zirconium dentures and crowns are installed in our clinic according to strict protocols. Our specialists are responsible for





making sure that the casts are taken correctly and that the final designs are given the required shape and color options.

How are crowns made from zirconium dioxide? How long does it take to make it? Zirconium crowns and dentures can be double-layered. Inside there is a durable base made of zirconium dioxide, lined with porcelain and fired before sintering both materials together.

The process of making crowns is laborious and takes from 1 to 2 weeks. At the first stage, the doctor at the clinic takes an impression from the patient's jaws and passes it to the dental technician. A three-dimensional model is made of plaster. The further process of creating prostheses from this material is computerized.

CAD/CAM technology is used. A laser scan of a plaster cast model is performed. The data is transferred to a special program that allows you to simulate the desired characteristics of a future crown or bridge and see how they fit into the dentition.

After the project is approved, the sharpening task is transferred to a milling machine, which manufactures a prosthesis from a zirconium dioxide billet in exact accordance with the plan. With the help of digital technologies, it is possible to create the thinnest lightweight material, which is especially convenient to use for prosthetics of the entire jaw.

The finished frame is covered with several layers of porcelain, firing it in layers in an oven at high temperature before sintering the material. This ensures high strength and indivisibility of the structure. Subsequently, the crown is painted with a special dye and acquires a finished look.

Who is contraindicated in zirconium dioxide prosthetics?

Due to the high inertia of the material, its use is practically not contraindicated, except in several cases:

- the presence of a deep bite;
- with low tooth height and bruxism;
- infectious diseases of mucous membranes and periodontal;
- decreased immunity and the presence of mental disorders.

How long will zirconium crowns last? What problems can arise during prosthetics?

The service life of prosthetics is estimated for decades. This result is achieved by automating the sharpening of the frame according to the laser scan data, the microscopic gap between the crown and the living tooth (30, not 100-300 microns, as usual) and a number of other technological features.

Most of the problems are related to the poor—quality work of the dentist and technician - non-compliance with dental tissue treatment protocols, incorrect removal





of casts. In our clinic, we have reduced the possible risks, and we achieve 99.9% effectiveness of prosthetics.

How to care for zirconium dioxide crowns? Are there any specific requirements?

The material is not affected from the outside. It does not change the shade and other characteristics during operation, but it is worth taking proper care of it. Be sure to brush your teeth twice a day with a brush and toothpaste.

After eating, if it is not possible to treat with an irrigator and clean the interdental spaces with dental floss, you need to rinse your mouth with water. Despite the fact that zirconium dioxide crowns are very durable, you should not check them and use your teeth for other purposes. For example, you should not try to crack a nutshell with your teeth. It is necessary to visit dentistry for preventive purposes 1-2 times a year. In this case, your teeth will last for decades to your delight!

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