Ceramic implants offer a distinctive aesthetic solution for patients with specific needs, such as a thin gingiva biotype, or for those who request metal-free alternatives. There have been no reports thus far of metal reaction or allergy related to titanium dental implants; in comparison, approximately 5 percent of patients have reported allergic reaction to nickel. However, some patients are either allergic or sensitive to other metals, or express concern about having any metals inside their bodies.¹

To assuage these concerns and to provide implant options for these dental patients, many firms offer “metal-free” implants that use zirconium, a metal that’s one line below titanium in the periodic table. The zirconium oxide used for dental applications isn’t actually pure ZrO₂; there are traces of another element, hafnium (Hf), and its oxide is combined with yttrium to enhance its properties. This yields a white opaque product that is labeled as a ceramic, although there are metallic atoms in the material.² The material is hard and strong and is also used to make bridges and crowns. While searching for alternate implant materials, it was found that zirconia also bonded to bone just like titanium.

Here’s what you should know while deciding between zirconia and titanium dental implants:

Continued on p. 54
Titanium allergies

Perhaps the most common patient concern is whether they’d be allergic to titanium. This incidence is rare; studies have revealed that only about 6 percent of patients are allergic to titanium. Because of poor sensitivity, the use of patch tests is restricted, so sensitization is usually detected and confirmed through a memory lymphocyte immunostimulation assay, or MELISA test; however, that test is known to yield false positives.

Another method, Clifford Material Reactivity testing, reveals whether a blood serum sample reacts to well-known dental materials. This test can offer valuable information related to current allergies but outcomes cannot be as complete when it involves testing for materials the patient hasn’t been exposed to yet.

Zirconia implants usually can’t be left to heal under the gums

Usually the osseointegration procedure takes nearly six months to complete. Once dental implants have been surgically placed, they should have primary stability or a certain torque value. Implants that don’t possess good primary stability must be left to heal under the gums for 3–6 months, but because of their “one-piece” design, most zirconia dental implants can’t not heal under the gums—

their abutments are fixed to the implant, not removable.

When zirconia is adjusted, microcracks can form and cause fractures

Zirconia is a “strong” material under compressive stress, but research suggests that it does not have adequate flexures and will fracture. This is more obvious when the material is adjusted using a dental bur. When zirconia gets adjusted, it can form microcracks that ultimately result in fracture of crown and even of the implant.

Small-diameter zirconia implants are predisposed to fracture

As mentioned above, zirconia is quite strong in compressive forces, but rather brittle in elastic forces. Many a times in implant dentistry, a small-diameter implant ranging from 3.0–3.75 millimeters must be used by the dentist because of small spaces or thin bone between the teeth. One research study revealed that each implant having a diameter less than 3.75mm had a disastrous fracture. Another paper revealed that out of 18 total zirconia implants, seven implants fractured. It’s been reported that the general rate of zirconia implants representing cracks of the implant head was nearly 22 and 30 percent, respectively. In clinical implant dentistry, such level of failure is unacceptable.

Zirconia implant crowns may usually merely be cemented

In conventional implant dentistry, it’s possible to retain the dental crown by either screw or cement. The one-piece design of most FDA-approved zirconia suggests they should have cemented crowns; however, the tissue around the implants and the tissue around teeth are quite different, and cement may cause numerous problems for the tissues and bone around implants. Dental cement may get stuck in the tissues, harbor bacteria, and cause bone loss, inflammation, and maybe even dental implant failure.
Advantages of zirconia dental implants

There are some advantages to zirconia, as well:

1. No dark color from implants shows through gums.
2. Zirconia does not suffer corrosion like titanium.
3. There are no piezoelectric currents at dissimilar metal joints in the mouth.
4. The material is thermally nonconductive.

Conclusion on zirconia dental implants

Titanium and zirconia are both bioinert, and should not cause inflammation or be rejected by the body. Because of this, they’re the materials of choice for the abutment portion of the implant system. In my opinion, we don’t need to use zirconia implants to achieve safe, predictable and natural-looking restorations. Furthermore, placing titanium implants with 3-D guided surgery can help prevent many long-term complications associated with using zirconia implants. However, there are certain indications where zirconia implants can be used for patients who prefer that material over titanium.

References


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