

Titanium versus zirconia? Osteo-immunology in implantology

Titanium and zirconia are the two primary materials used in dental implantology. While both materials have been used successfully for many years, there is still a debate about which one is better. Titanium has been the traditional choice for dental implant surgery for over 40 years. However, there are some concerns with the use of titanium implants. One growing concern is that dissolved titanium particles induce inflammatory reactions not only in the superficial margin but also around the bony bed of the titanium implant. Specifically, the inflammatory cytokine tumour necrosis factor-alpha (TNF- β) is expressed in the adjacent bone. The transition from TNF- β -induced local inflammation after placement of titanium implants to a chronic stage of "silent inflammation", that is, low-grade chronic inflammation, could be a cause of apparently unexplained medical conditions, and this neglected area of consideration is investigated in osteo-immunology. Osteo-immunology, however, is an emerging field, but has already provided valuable insight into the mechanisms of bone growth, development and regeneration, as well as the role of the immune system in these processes. In the context of implantology, osteo-immunology is important because the success of dental implants depends on the ability of the implant to integrate with the surrounding bone tissue. When a foreign material such as a dental implant is introduced into the body, the immune system reacts to it. This immune response can be beneficial, as it can help to promote the integration of the implant with the surrounding bone tissue. However, if the immune response is too strong, it can lead to chronic inflammation and potentially contribute to implant failure. By understanding the interactions between the immune system and bone tissue, researchers can develop better implant materials and techniques that minimise the risk of inflammatory responses and improve the long-term success of dental implants.

Multiple studies have proved that zirconia implants induce little to no peri-implant tissue inflammation and allow for high levels of epithelial attachment. Thus, in recent years, these ceramic implants have gained significant traction as a viable alternative to traditional titanium implants. They offer numerous advantages, including superior biocompatibility, enhanced aesthetics and excellent mechanical properties.

In conclusion, the choice between titanium and zirconia implants ultimately depends on the individual patient. While titanium implants have been the traditional choice, zirconia implants are becoming increasingly popular.

Yours,
Dr Johann Lechner



Dr Johann Lechner, Germany
Integrative Oral Medicine and Osteoimmunology
Founder of the International College of Maxillo-mandibular Osteoimmunology

Author details

