

The mechanical reliability of ceramic dental implants

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Abstract

An increasing number of metal-free implants is being introduced in dentistry, due to the fear of adverse reactions of titanium causing implant failure. Among those, ceramic implants are often considered as a replacement for metallic ones for their aesthetic properties and better soft tissue integration with respect to metals. Yet, there is no systematic comparison evaluating the mechanical reliability of ceramic implants that would guide clinicians and manufacturers in their choice for implant material selection.

Typically, mechanical fatigue is known to be the main cause of implant fracture (mechanical failure). This talk will discuss the fatigue properties of zirconia dental implants compared to those of titanium implants.

The mechanical reliability of zirconia dental implants was studied using a novel in-vitro approach, where fatigue functional performance of dental implants were tested based on random spectrum loading, as an alternative to conventional fatigue testing. Using this functional approach, the time to failure of a group of zirconia implant was assessed and compared to that of a metallic one, using statistical analysis methods.

This study is the first of its kind to systematically compare the mechanical reliability and fatigue performance of ceramic dental implants. Early results will be reported and discussed, that include fatigue life and fractographic analysis.