

Straumann® PURE Ceramic Implants

A 100% proof test designed for reliable implant strength

Ceramic implants provide a number of benefits. In particular, the patient expectations for a metal-free alternative or an outstanding esthetic appearance can be fulfilled with ceramic implants. However, the mechanical stability of ceramic implants has been questioned after mechanical failures of such implants has been documented in a few studies^{1,2}. Keeping this in mind, Straumann has developed a ceramic implant with the goal to provide clinicians and patients with the peace of mind they deserve: the Straumann® PURE Ceramic Implant System, whose production process has been elevated to a new level of quality.

The Straumann® PURE Ceramic Implant System has undergone rigorous mechanical tests (ISO 14801³ standard) in order to identify the ultimate fracture resistance and fatigue strength. According to the ISO norm 14801, the implant-abutment system (1) is fixed in a block with the coronal aspect of the system exposed (2) in order to simulate a bone recession of 3 mm. A second block applies a cyclic load (3) acting with a specific force (F) defined by the test requirements of the implant-abutment system. The implant is positioned with an inclination of 30° towards the force axis with a distance of 11 mm to the embedded plane. This strength test is crucial in determining the long term mechanical reliability of the completed implant treatment and restoration.



Fig. 1: Test setup according to ISO 14801

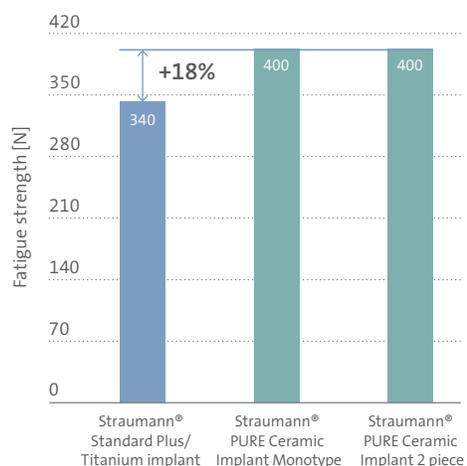


Fig. 2: Fatigue strength comparison of ceramic and titanium implants^{2,3}

THE STRAUMANN® PURE CERAMIC IMPLANT SYSTEM COMPARED TO THE STRAUMANN® STANDARD PLUS IMPLANT (TITANIUM)

The Straumann® PURE Ceramic Implant System was compared with the Straumann® Standard Plus titanium implant, according to the same test setup described above. In materials science, fatigue is defined as the weakening of a material caused by repeatedly applied loads. Accordingly, this test simulates continuous chewing forces on the implant.

When measuring the fatigue strength, a fixed force is acting repeatedly on the implant-abutment system. For this specific test, two soft tissue level implants with an endosteal diameter of $\varnothing 4.1$ mm were selected.

As shown in Fig. 2, the Straumann® PURE Ceramic Implant System shows a higher fatigue strength compared to a titanium implant with abutment^{4,5}.

STRAUMANN® PURE CERAMIC IMPLANT SYSTEM 100% PROOF TESTED

Every single Straumann® PURE Ceramic implant has to undergo a proof test before it leaves the Straumann® production facility. During this mechanical quality test procedure according to ISO 14801 setup, the implant is additionally rotated at least once 360° around its axis to test the implant in all directions. During this rotation a load is applied that assures that surviving implants are qualified for delivery to the customer.

Ceramic implants from Straumann® are designed to support loads above what is expected in actual use, demonstrating confidence and exceptional design integrity. The Straumann® PURE Ceramic Implant System's 100% proof test is a unique process in dental implant production and is designed to deliver a high level of quality and confidence to customers.



References

- 1 Osman RB, Swain MV, Atieh M, Ma S, Duncan W. Ceramic implants (Y-TZP): are they a viable alternative to titanium implants for the support of overdentures? A randomized clinical trial. Clin Oral Implants Res. 2014 Dec;25(12):1366-77.
- 2 Gahlert M, Burtscher D, Pfundstein G, Grunert I, Kniha H, Roehling S. Dental zirconia implants up to three years in function: a retrospective clinical study and evaluation of prosthetic restorations and failures. Int J Oral Maxillofac Implants. 2013 May-Jun;28(3):896-904.
- 3 ISO Standard 14801:2007
- 4 Data on file (internal data)
- 5 Data on file (comparison test)