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Application Note

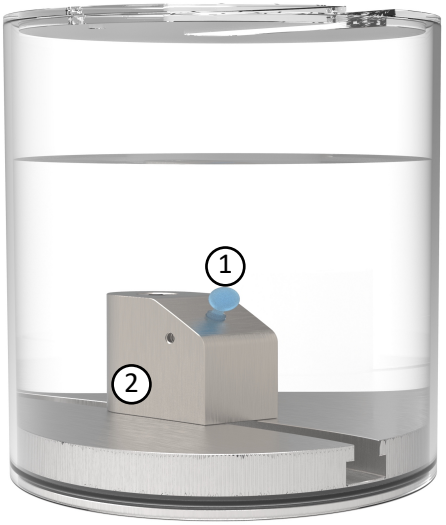
ISO 14801 – Dental Implant Fatigue

Background

The fatigue strength of endosseous implants must be tested for research and development and for product approval. This test can be performed in accordance with ISO 14801[1], a standard that defines the methodology and parameters for the mechanical testing of the fatigue properties of dental implants under laboratory conditions.

Test Setup

The endosseous implant (1) is screwed, glued or clamped into a specimen holder (2) at an angle of 30°. This angle simulates a clinical "worst case" scenario. A force is applied to the implant via a punch. This can move freely in the horizontal direction at the lower end to exclude any transverse forces.



A cyclic, sinusoidal load is applied to the implant until the sample breaks or until the maximum number of cycles is reached. Testing in a liquid bath (heated to body temperature) with Ringer's solution increases the physiological relevance of the test. Force and displacement signals - i.e. the deflection of the sample - must be recorded during the test.

Equipment

The fatigue test according to ISO 14801 can be performed easily, reliably and reproducibly with servo-dynamic test systems from THELKIN and the corresponding specimen holder:

- THELKIN Servo-Dynamic Load Frame SDL-M-010 - complies with the specifications of the standard and enables easy and safe specimen mounting, programming of the test as well as data acquisition and test execution.
- Liquid bath EN.FB - for physiologically relevant tests, the test can be performed in body environment. For this purpose, the sample is tested in a liquid bath which can be regulated to a temperature of 37°C.

The test system can also be equipped with an uninterruptible power supply in order to safely perform long-term tests in case of a power interruption.

[1] ISO 14801: Dentistry — Implants — Dynamic loading test for endosseous dental implants

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