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Submitted

on September 20, 02:30 PM

for osseo2014

Proof

CONTROL ID: 1842907

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Abstract Details

CURRENT CATEGORY: Scientific

PRESENTATION TYPE: Poster

Abstract

TITLE: An experimental study: Influences of Dynamic and Static loading to the Implants in rats.

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ABSTRACT BODY: The aim of this study is to investigate influences of dynamic loading on the osseointegrated titanium implants in rats.

Two pure titanium implants were placed into every 18 male SD (12 weeks old) rats. The distance between each implants were defined 5mm. Implant surface was cylindrical shape with diameter 1.5mm. All implant access holes were drilled 1.6mm diameter. Each implant was connected to a spring, which stimulate a total 3.92N continuous load for 28 days. Next rats were divided into three groups: dynamic loading group (DL), static loading group (SL) and unloaded control group (C). DL was stimulated continuously with same device for four more weeks. DL was stimulated with 3 Hz for 1800 cycles, five days of week for four weeks. C was stimulated no load for four weeks. After the experiment, they were sacrificed and tibial specimens were isolated. Pull-out tests and evaluated histological and histomorphological measurements. Of all two rats' implants didn't result good osseointegration, therefore excluded from the study. An important thing in this test is to confirm osseointegration first of all. We checked because implant design was cylinder type. Pull-out test: DL strength was significantly higher than the others. SL and C were similar. Histological results: Bone formation around all groups. Of all new bone formation was detected in DL group; found on both sides. Histomorphological measurements: Compared all groups rate of bone formation (BIC). There was no significant difference in this study.

Within the limitation of this study, our results indicate that appropriate static loading does not harm osseointegrated implant. Additionally dynamic loading amplifies mechanical strength of implant.