Effect of implant geometry and bone density on secondary stability and bone to implant contact (%BIC). Biomechanical and histological study

Marco Berardini DDS, Paolo Trisi DDS, PhD, Antonello Falco DDS, PhD

The value of the actual micromotion (VAM) of implant is introduced as a new parameter to evaluate the secondary stability using a previously published technique for directly implant micromotion evaluation. The present study evaluated the effect of two different thread design on the implant secondary micromotion and osseointegration rate in dense and cancellous bone. The purpose was to measure and compare the secondary value of implant micromotion, the %BIC and %BV of two different implant thread design in different bone densities (D1 and D4), large thread (LT) geometry versus classical thread design (SM).

Methods

- Condensing thread implants showed statistically higher %BV, %BIC and lesser micromotion than SM implant in D4 bone.
- VAM is a new parameter to measure directly the real implant micromobility
- Bone density is the main factor involved in implant stability: implants inserted in sheep mandible (D1) showed less %BIC than implants inserted in the sheep iliac crest (D4) but lower micromotion values.
- The more aggressive implant type seems to be preferable to the classical one especially in case of poor bone density or immediate loading protocols.

Conclusions and Clinical Implications