Subcrestal Positioning of Implants with a Convergent Hyperbolic Collar Profile: An Experimental Study in Dogs

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Abstract

Purpose: To evaluate the influence on peri-implant soft and hard tissues of one-piece implants with a convergent hyperbolic profile collar placed at different depths with respect to the bone crest.

Material and methods: Six dogs were included in the experiment. Three months after mandibular tooth extractions, two one-piece implants carrying a 2.8-mm-high convergent hyperbolic profile collar were placed in the alveolar crest with the coronal margin of the rough surface either 0.8 mm (test-1) or 1.8 mm (test-2) deeper with respect to the bone crest (Ct0). Two similar implants were instead placed flush to Ct0 as controls (control-1 and control-2, respectively). Healing screws were connected, and nonsubmerged healing was allowed. After 4 months, block sections were harvested, and histologic slides were prepared in a buccolingual plane.

Results: In the histologic analyses, both the buccal crest and coronal level of osseointegration were located more coronally at the test compared to the control implants concerning the implant. However, the buccal bone crest with respect to Ct0 presented a loss of 0.8 ± 0.4 mm at the test-1 and 0.5 ± 0.4 mm at the control-1 implants (P = .028), and a loss of 2.0 ± 1.0 mm and 0.7 ± 0.4 mm at the test-2 and control-2 implants (P = .028), respectively. At the control implants, the collars were exposed above the peri-implant mucosa, while those of the test implants were not. However, the coronal level of the peri-implant mucosa with respect to Ct0 was located more apically at the test compared to the control implants.

Conclusions: The placement of implants with a hyperbolic convergent profile collar in the subcrestal position resulted in higher buccal bone resorption and more soft tissue recession compared to the crestal implants with respect to the level of the bone crest at placement.

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