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## The effect of implant diameter on osseointegration utilizing simplified drilling protocols.

Jimbo R, et al. Clin Oral Implants Res. 2014.

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### Abstract

**OBJECTIVES:** To observe and to compare histologically and histomorphometrically, the combined effect of drilling sequence and implant diameter in vivo.

**MATERIAL AND METHODS:** A total of 72 alumina-blasted and acid-etched Ti-6Al-4V implants with three different diameters (3.75, 4.2, and 5 mm, n = 24 for each group) were placed in the right and left tibiae of 12 beagle dogs. Within the same diameter group, half of the implants were inserted after a simplified drilling procedure (pilot drill + final diameter drill) on one tibia and the other half were placed using the conventional drilling procedure on the other tibia. After 1 week, half of the animals (n = 6) were sacrificed, and the other half was sacrificed after 5 weeks (n = 6). The retrieved bone-implant samples were subjected to non-decalcified histologic sectioning, and the bone-to-implant contact (BIC) and the bone area fraction occupancy (BAFO) were analyzed. Primary statistical analysis used a mixed model analysis of variance with significance level set at  $P < 0.05$ .

**RESULTS:** Histologic observation showed that at 1 week, immature woven bone formed in vicinity of the implant, whereas at 5 weeks, the woven bone was replaced by lamellar bone, which formed in proximity with the implant. Histomorphometrically, the simplified technique was associated with significantly greater BIC and BAFO after 1 week. Differences between techniques were not longer apparent after 5 weeks, but BAFO was inversely and significantly associated with implant diameter at that time.

**CONCLUSIONS:** The simplified technique did not impair either early or late bone formation for any tested implant diameter; however, wider diameters were associated with less bone formation at longer healing times for both techniques.

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