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## Biological limits of the undersized surgical technique: a study in goats.

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#### Abstract

**OBJECTIVE:** The purpose of the present study was to investigate the influence of different implant placement techniques on the early bone healing response in an animal model.

**MATERIAL AND METHODS:** In the present study, 24 cylindrical-screw-type implants with a diameter of 4.2 mm (Dyna®) were installed, using three different surgical techniques; (1) 5% undersized, using a final drill diameter of 4 mm; (2) 15% undersized, using a final drill diameter of 3.6 mm; and (3) 25% undersized, using a final drill diameter of 3.2 mm. After 3 weeks of implantation period, the peri-implant bone response was histologically evaluated and the percentage of bone-implant contact (%BIC) calculated.

**RESULTS:** New bone formation was more pronounced for implants placed with the 5% undersized or 15% undersized technique, as compared with implants installed with the 25% undersized technique. Histomorphometrical data corroborates these findings as the %BIC was significantly higher for implants inserted with the 5% undersized ( $47.7 \pm 11.1$ ) or 15% undersized protocol ( $47.5 \pm 9.5$ ) as compared with implants inserted with the 25% undersized technique ( $32.1 \pm 9.7$ ). No significant difference in %BIC could be observed between the 5% undersized and 15% undersized installed implants.

**CONCLUSION:** Within the limitation of the present study, it was concluded that excessive compression of the host bone, when a discrepancy between implant and final drill diameter more than 15%, can result in an inferior tissue response in the early stage of healing. To compare research results in the future, it is advised to specify the term "undersized" by mentioning the real reduction in diameter.

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