

Narrow-Diameter versus Standard-Diameter Implants and Their Effect on the Need for Guided Bone Regeneration: A Virtual Three-Dimensional Study

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First published: 06 June 2014

<https://doi.org/10.1111/cid.12224>

Cited by: 8

Abstract

Purpose

Narrow-diameter implants (NDIs) are proven treatment options for completely edentulous patients with severely resorbed alveolar ridges. The aim of this study was to evaluate virtually whether or not the implant diameter affects the need for ridge augmentation in edentulous patients, using a 3D planning software program.

Materials and Methods

Existing cone beam CT scans of 200 outpatients (100 maxillae, 100 mandibles) were selected, and treatment was planned in a virtual 3D planning software program with either 3.3mm-diameter implants (test group) or 4.1 mm-diameter implants (control group). Statistical analysis was performed.

Results

A total of 1,760 implants were virtually planned (880 implants each for test and control groups). Overall, significantly associated with the absence or need for ridge augmentation as compared with need for ridge augmentation ($p < .0001$). Use of the 3.3mm-diameter implants increased the odds ratio for ridge augmentation being unnecessary by 2.2 (95% confidence interval) relative to the 4.1 mm-diameter implants.

Conclusions

Use of NDIs was able to provide a statistically significant reduction in need for bone grafting among completely edentulous patients. More clinical longitudinal studies are necessary to confirm the long-term success of their use.

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