

CATER; A DIGITAL SINGLE TOOTH IMPLANT STUDY



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INTRODUCTION

Implant success requires both sufficient bone alveolar volume and sufficient mucosal tissue to protect against biofilm-mediated inflammation, assure functional comfort and contribute to dental implant esthetics.¹ Following dental implant placement, the alveolar ridge resorbs approximately 0.5 to 1.0 mm during the first year. Healed ridges are also often volumetrically deficient, losing up to 30% of their horizontal volume following tooth extraction.²

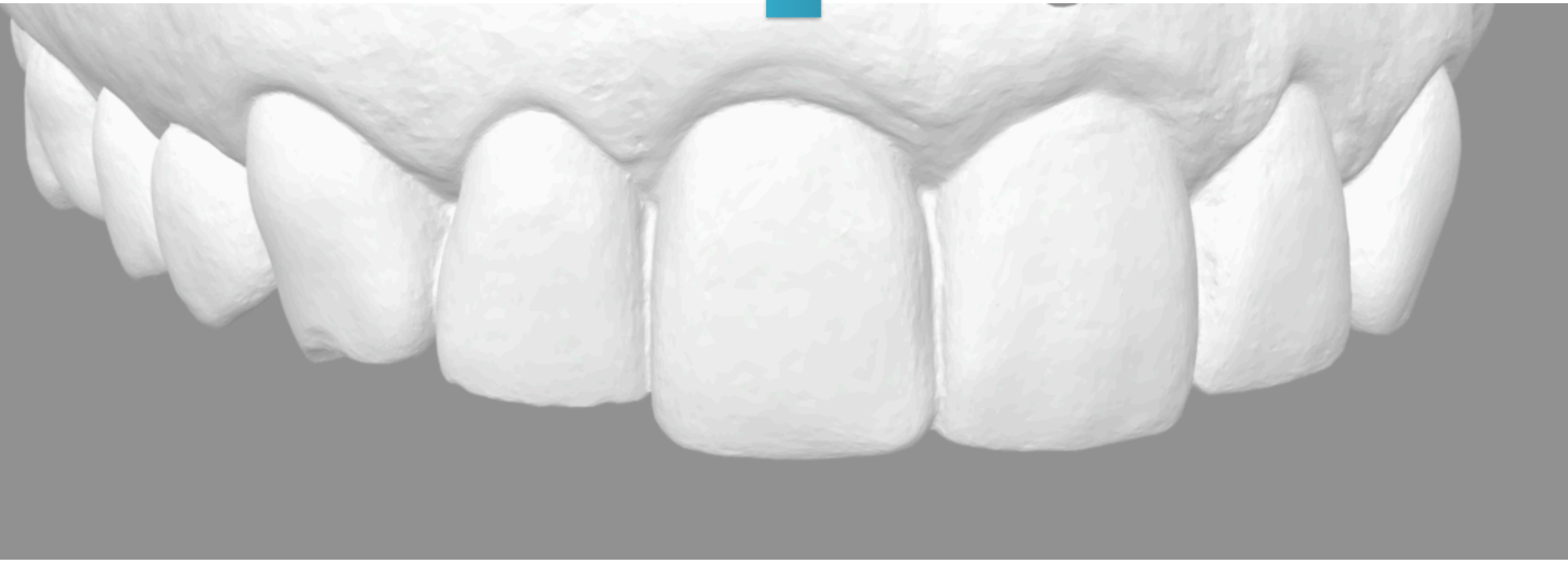
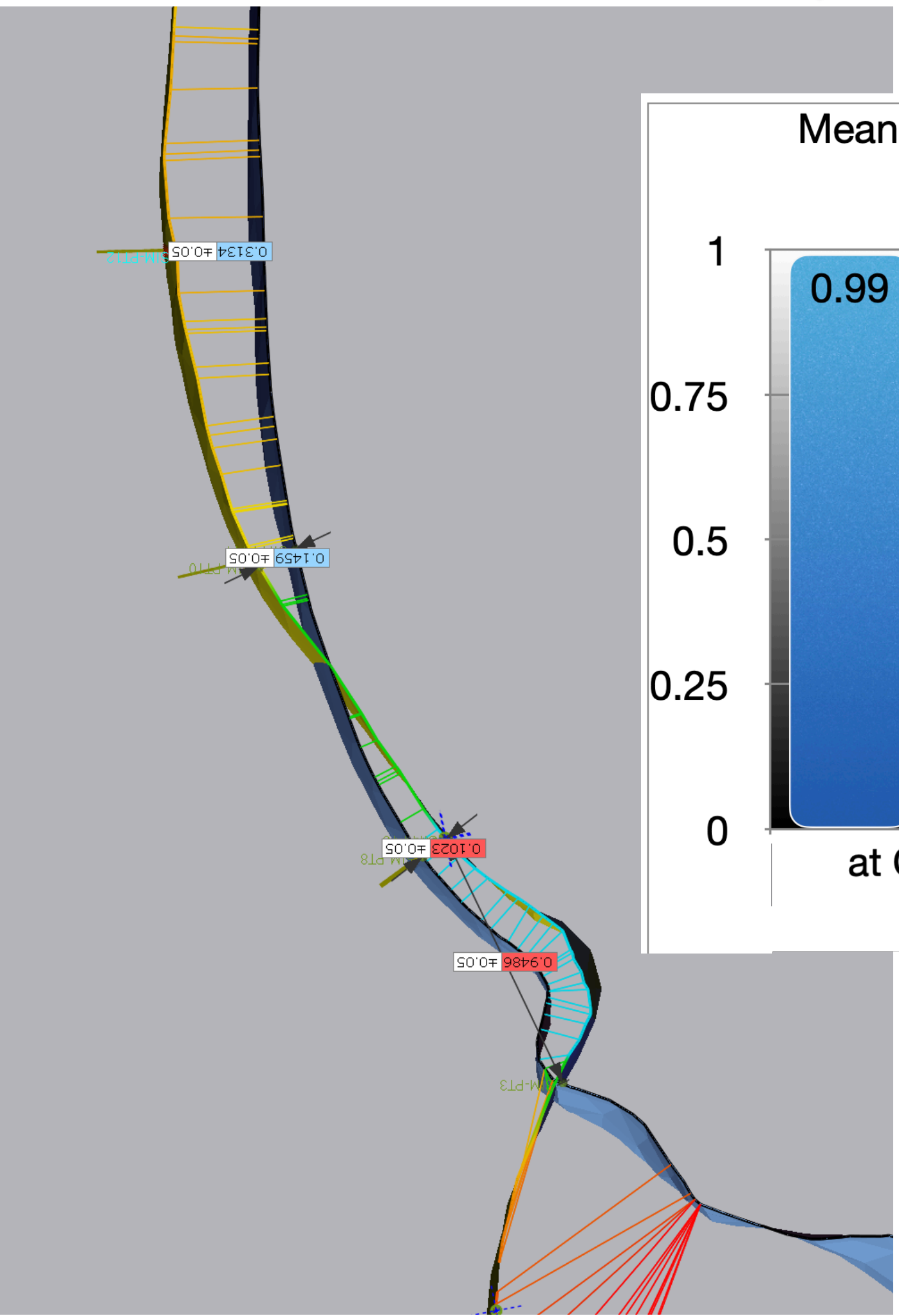
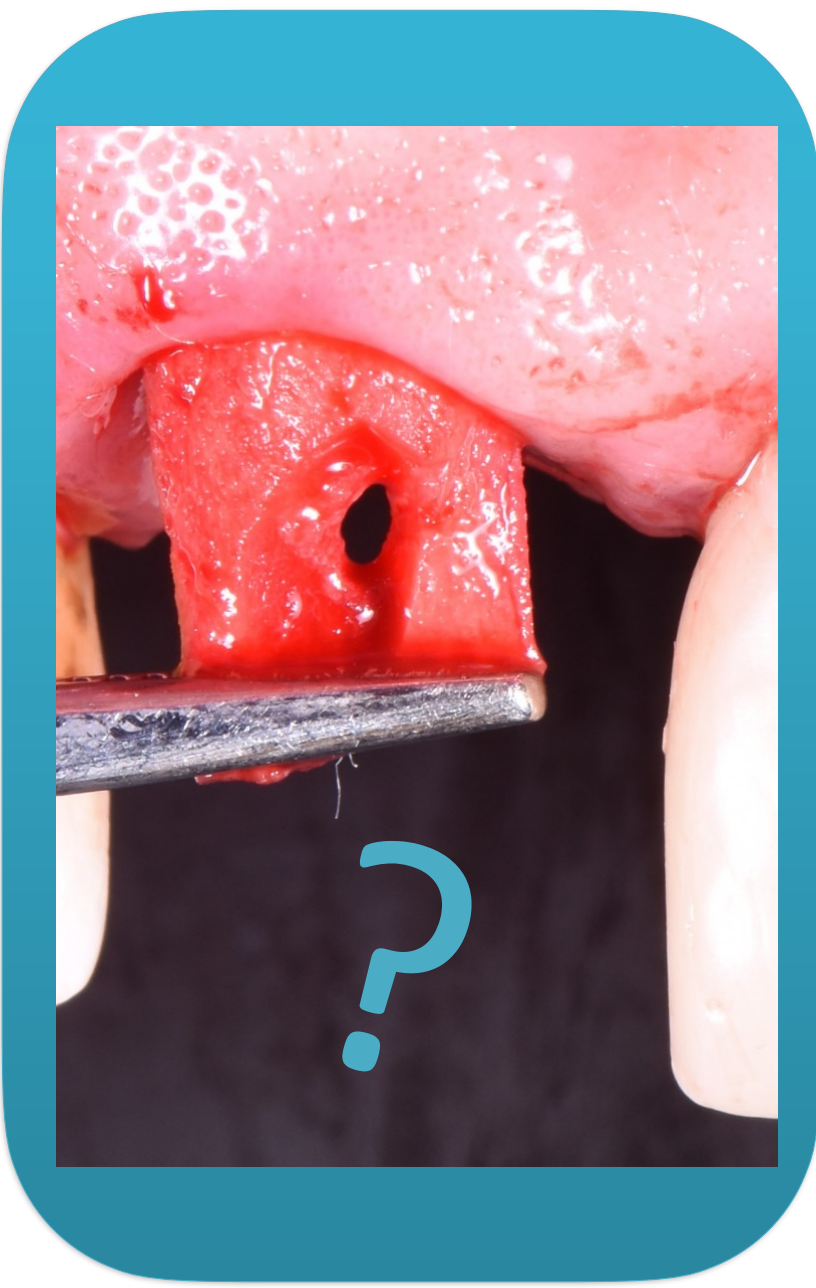
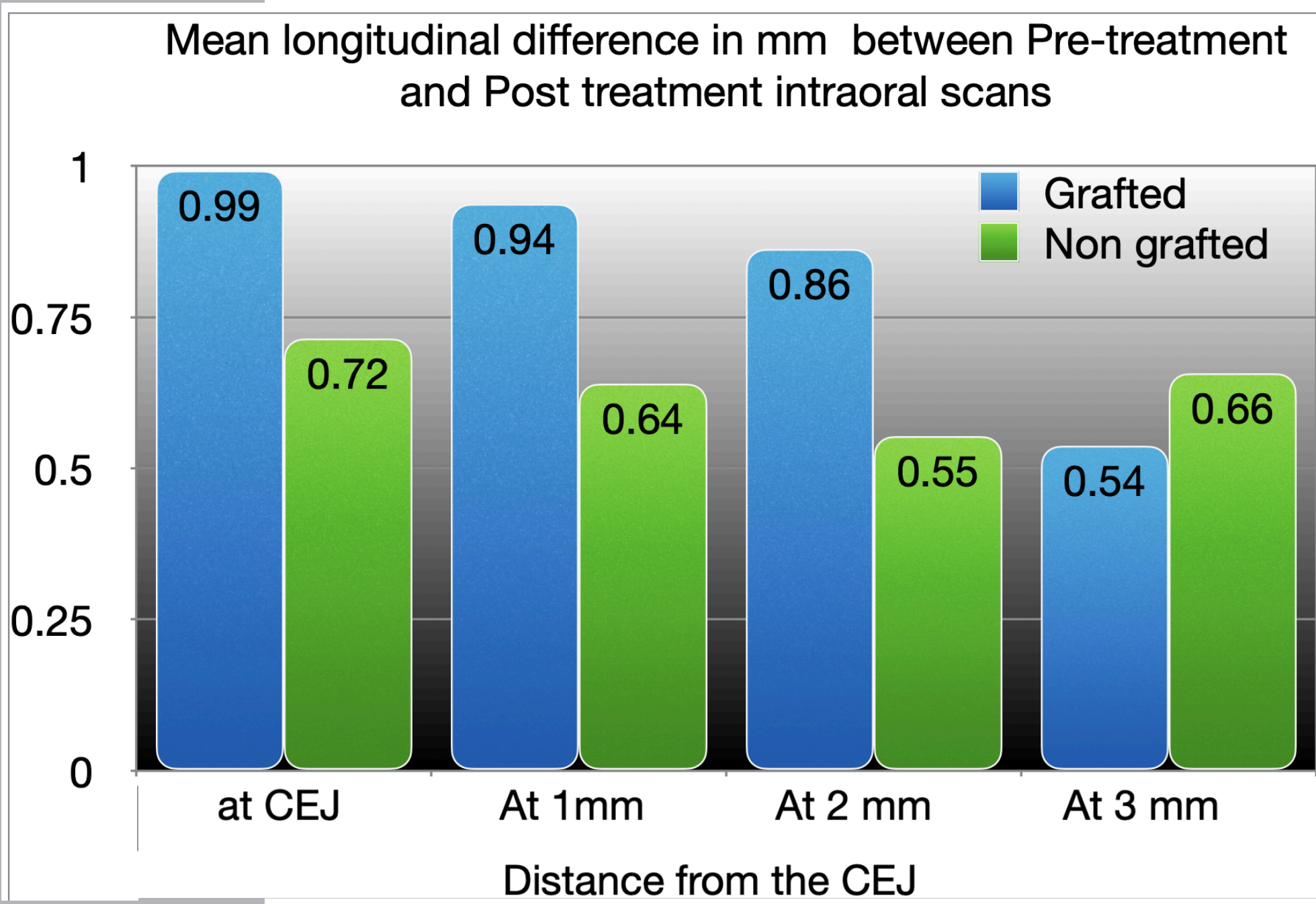
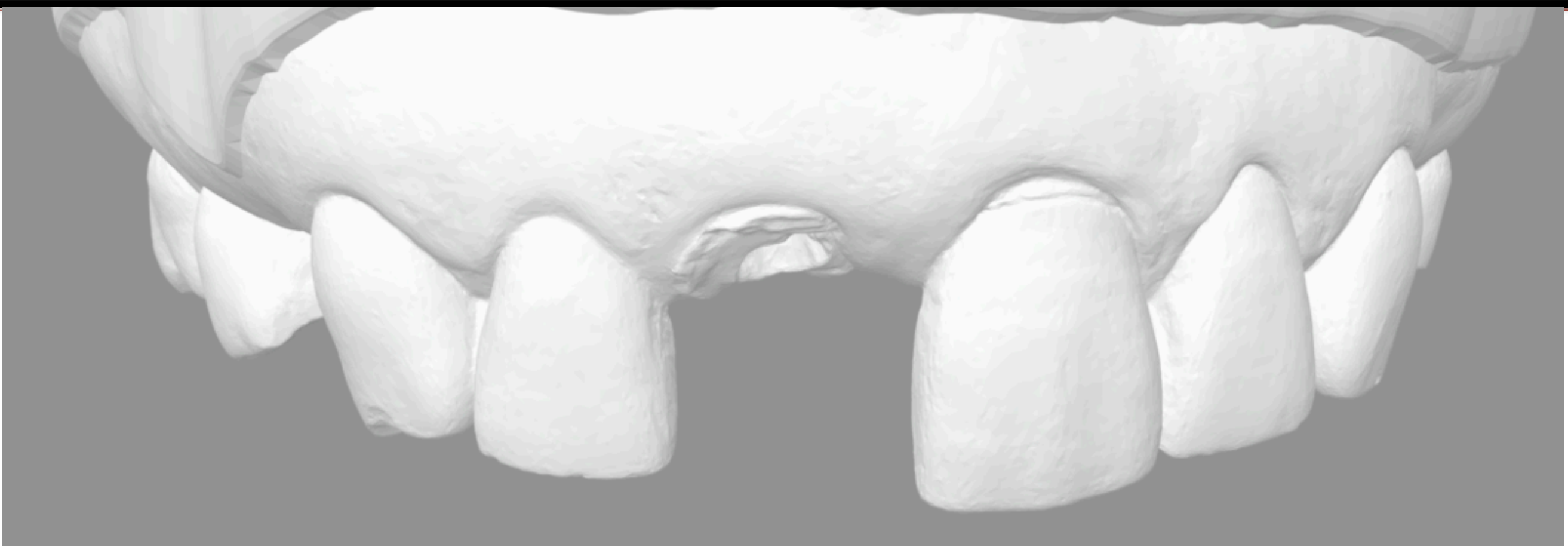
Peri-implant mucosal grafting has been proposed and is currently part of dental implant therapy.^{3,4} Both autogenous grafts (mucosal connective tissue from the roof of the patient's own mouth or "palate")⁵ and allogeneic grafts (collagen-rich grafts derived from a genetically non-identical human donor) are used for these purposes, but there is controversy regarding the effectiveness of supplemental graft use during implant treatment.⁶

HYPOTHESIS/OBJECTIVE

Comprehensive Alveolar Therapy and Esthetic Rehabilitation (CATER) for single tooth implant requires compensation for alveolar resorption. We hypothesize that an allogenic soft-tissue augmentation enhances peri-implant tissue contour and esthetics.

METHODS

In a prospective randomized clinical study requiring single tooth replacement enrolled and treated 40 participants using a fully digital surgical and restorative protocol. 19 participants received an allogenic dermal graft at the time of implant placement and provisionalization and 21 participants did not. Intraoral scans taken before implant placement and at definitive crown delivery (4 – 6 months) were used to compare (using Geomagic Control X 2020 software) longitudinal changes in buccal tissue contours at the implant site at the CEJ, 1 mm, 2 mm and 3 mm away from CEJ. Implant survival, probing depths, and complications were recorded.



RESULTS

40 participants completed surgery and restoration in incisor, canine, premolar and molar positions. Two early failures were recorded in central incisor positions (95% survival). Crown delivery without complication from the digital workflow (impressionless) was achieved for 36/40 of cases (90%) with implant depth control being implicated as the chief challenge. Soft tissue grafting was associated with minimal added morbidity. 3D longitudinal measurements of the alveolar contours were quantified.

Longitudinal changes, transformed to mean change in thickness was: 0.8 mm at CEJ, 0.7 mm at 1mm away from CEJ, 0.6 mm at 2 mm away from CEJ and 0.6 mm at 3 mm away from CEJ, with non significant difference between groups with a P value 0.5. However, It was observed that although there was not clinically significant increased buccal mucosal contour there was an increased in thickness using allograft at implant placement.

CONCLUSION

A complete digital workflow has been validated to permit crown delivery on CAD/CAM abutments without implant impressions. The augmentation of alveolar mucosa on the buccal aspect of single tooth implants is associated with clinically favorable outcomes.

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