

Digital Workflow for Anterior Implant Rehabilitation

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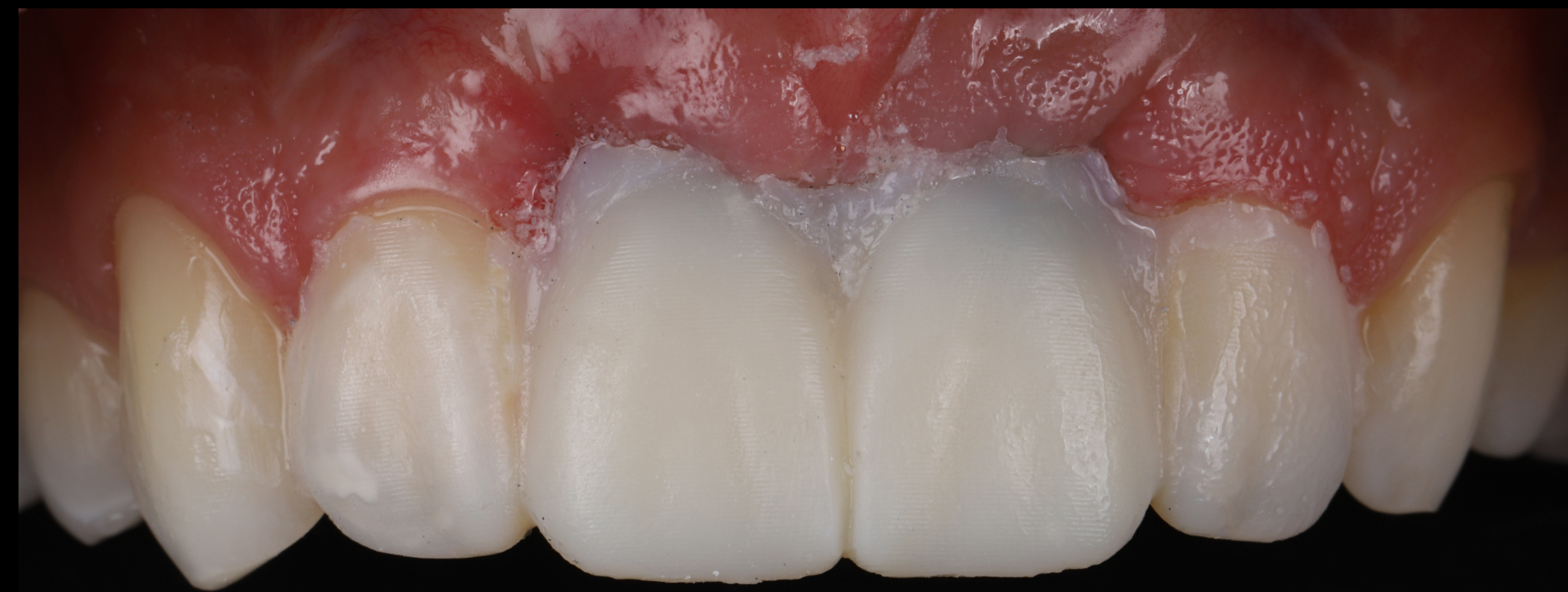
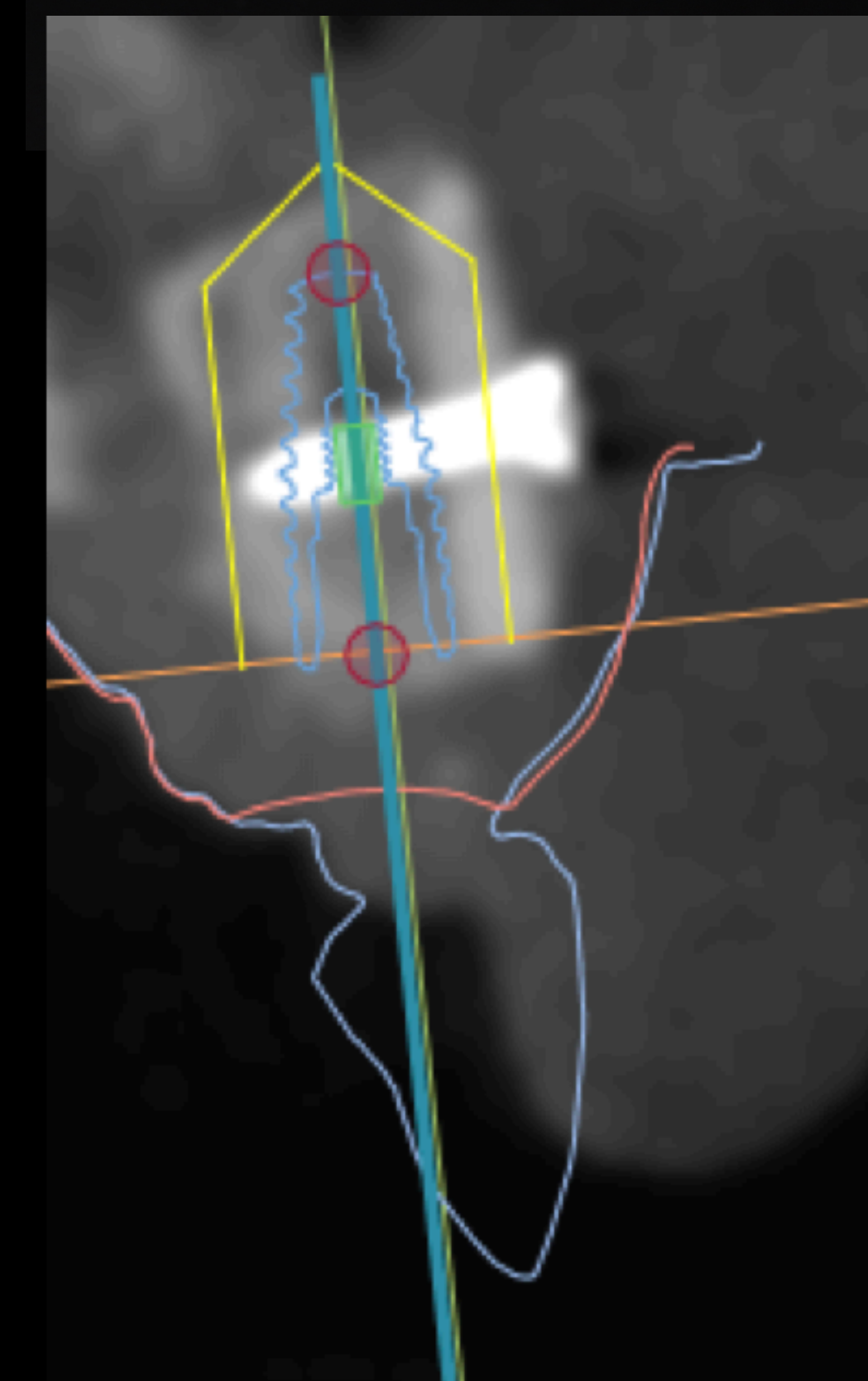
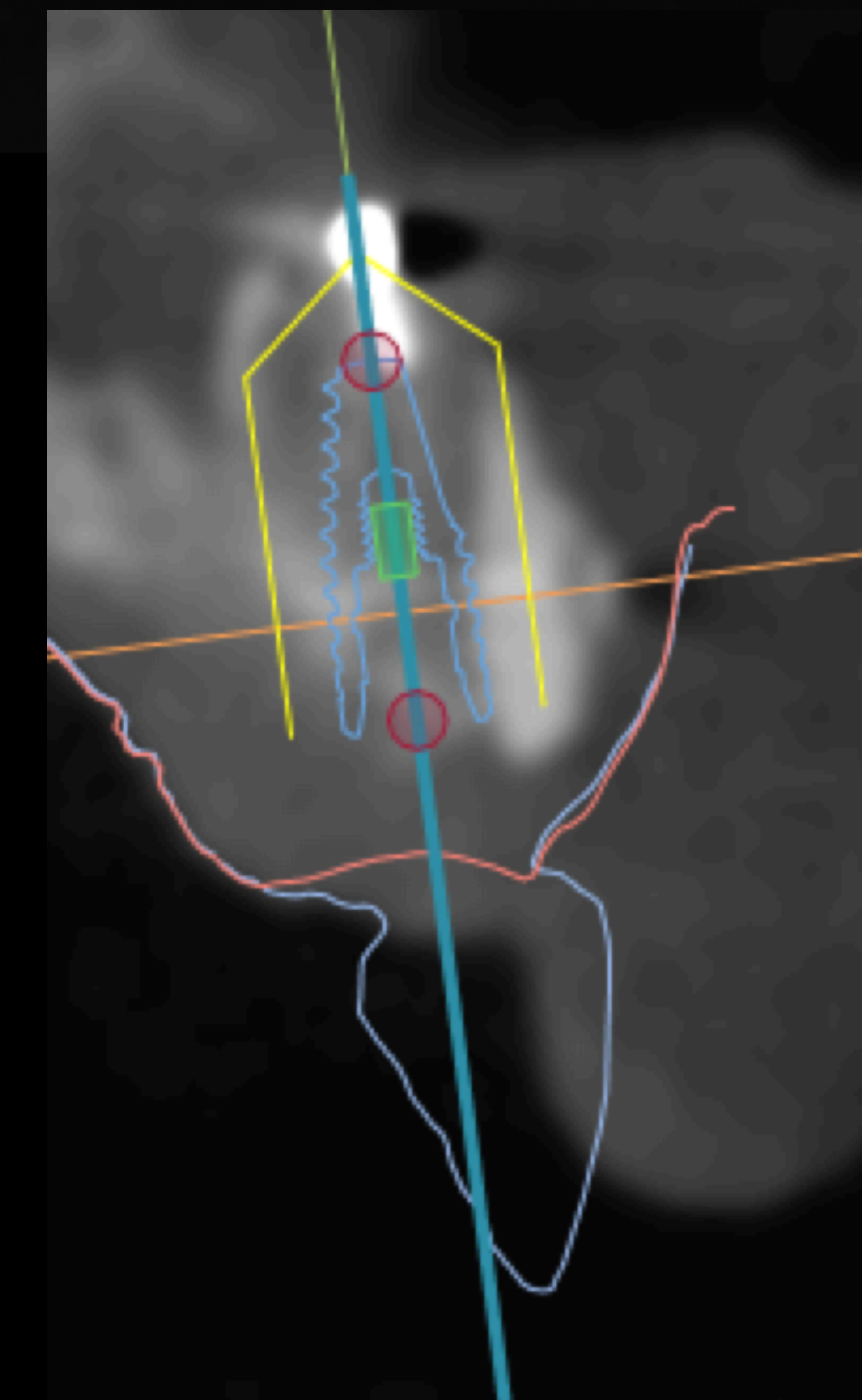
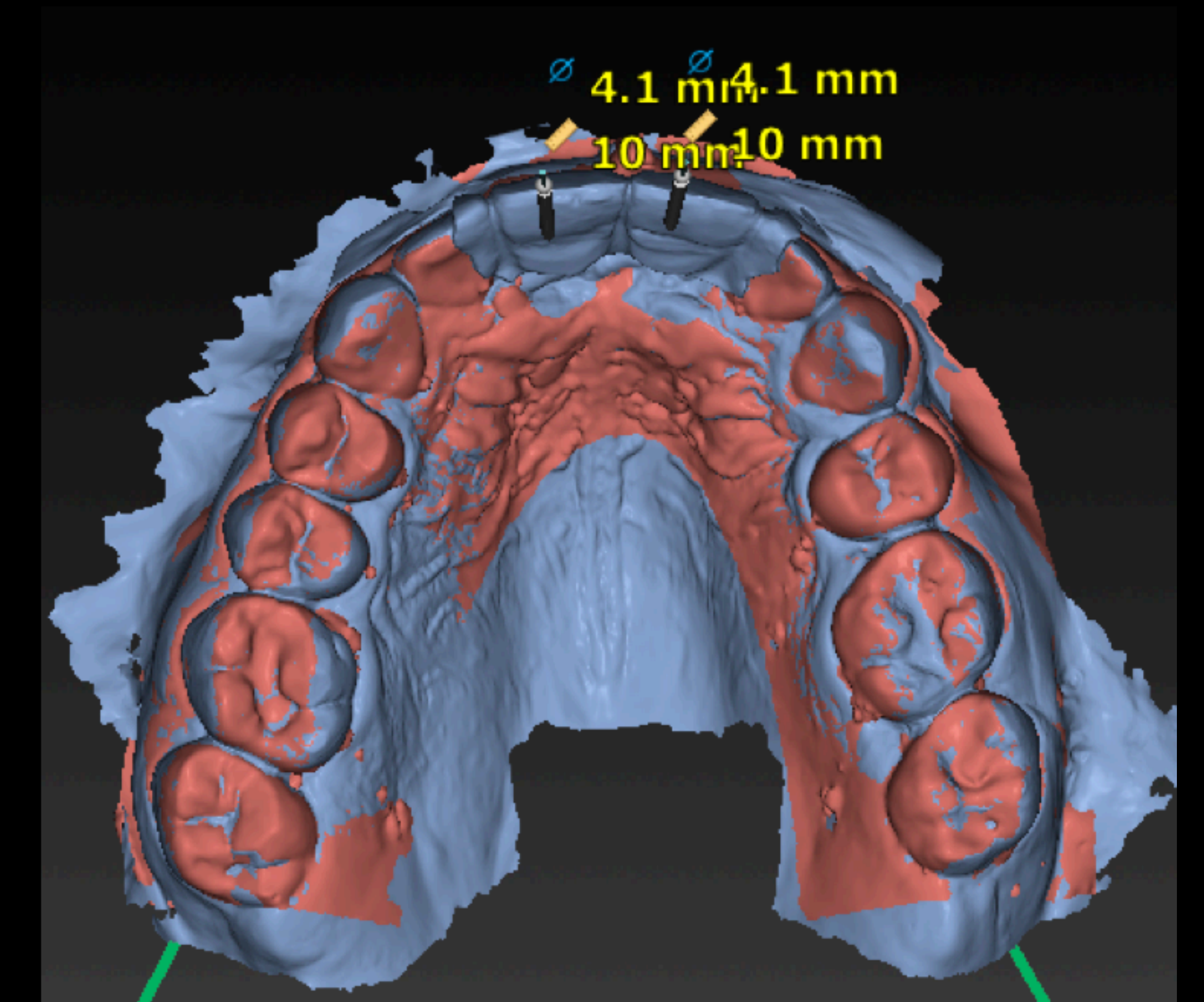
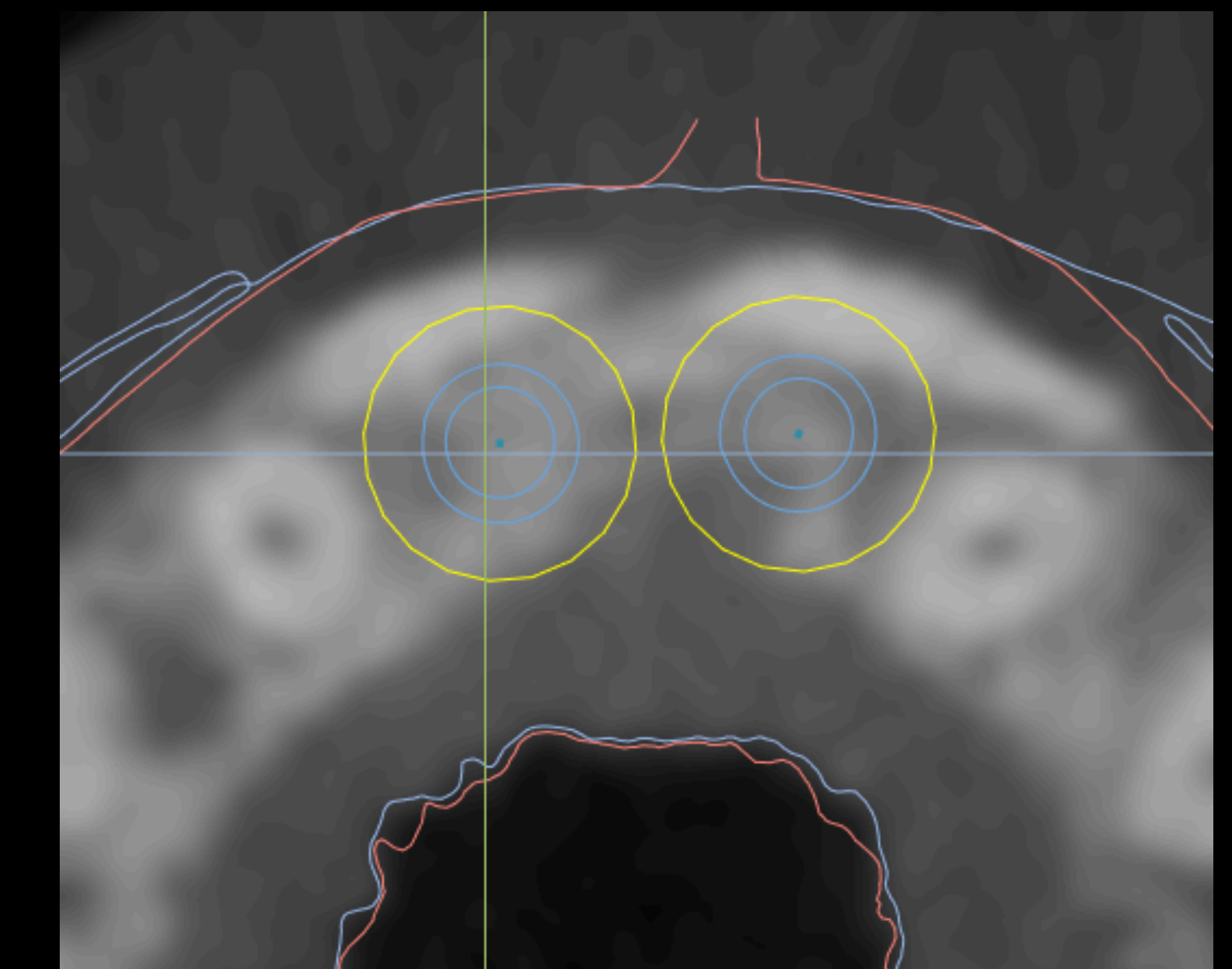


Introduction: The purpose of this case-report is to present a digital workflow that aided in the rehabilitation of two missing maxillary central incisors. The digital workflow was applied from the implant placement, through the provisional and definitive implant prosthesis design and fabrication.

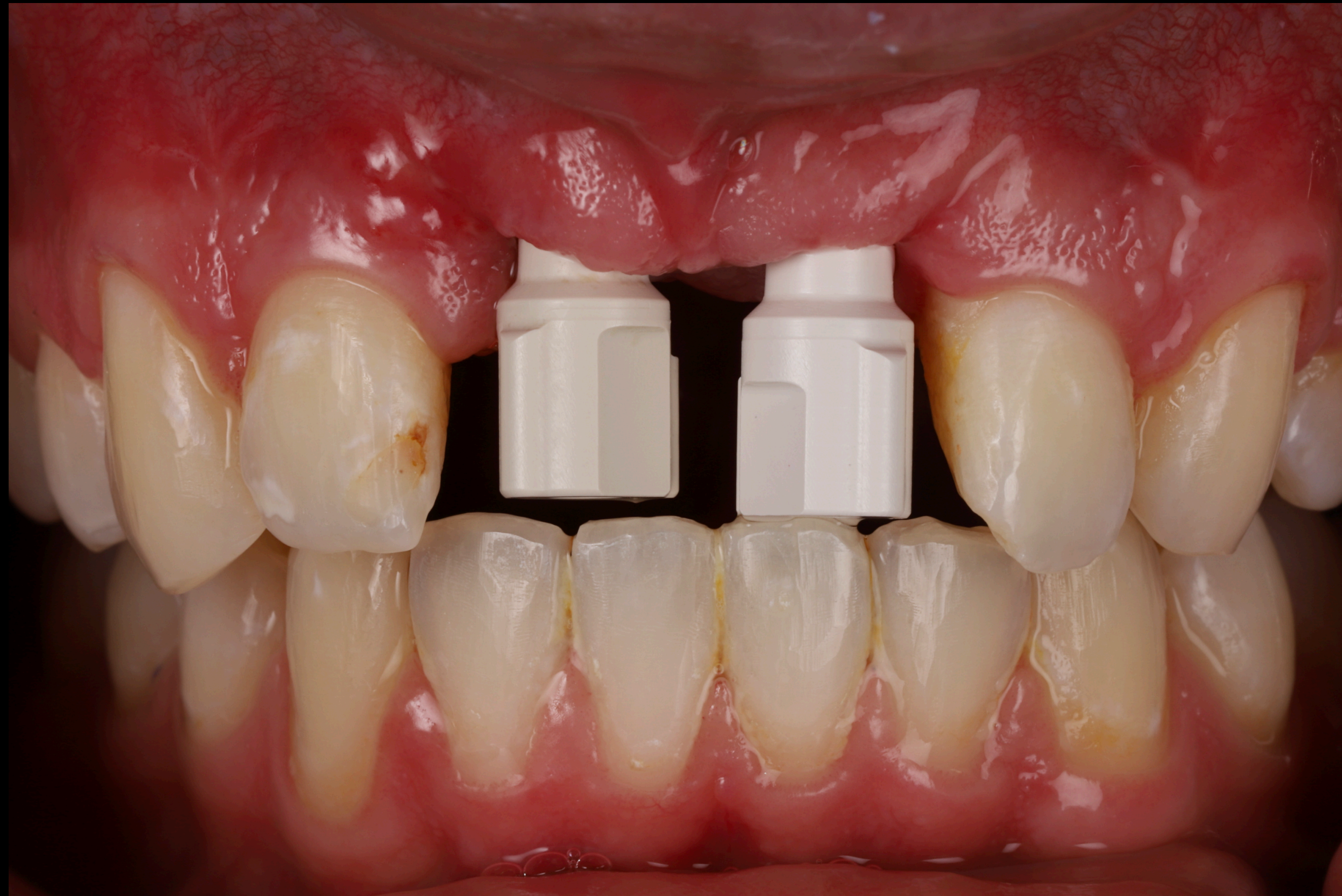
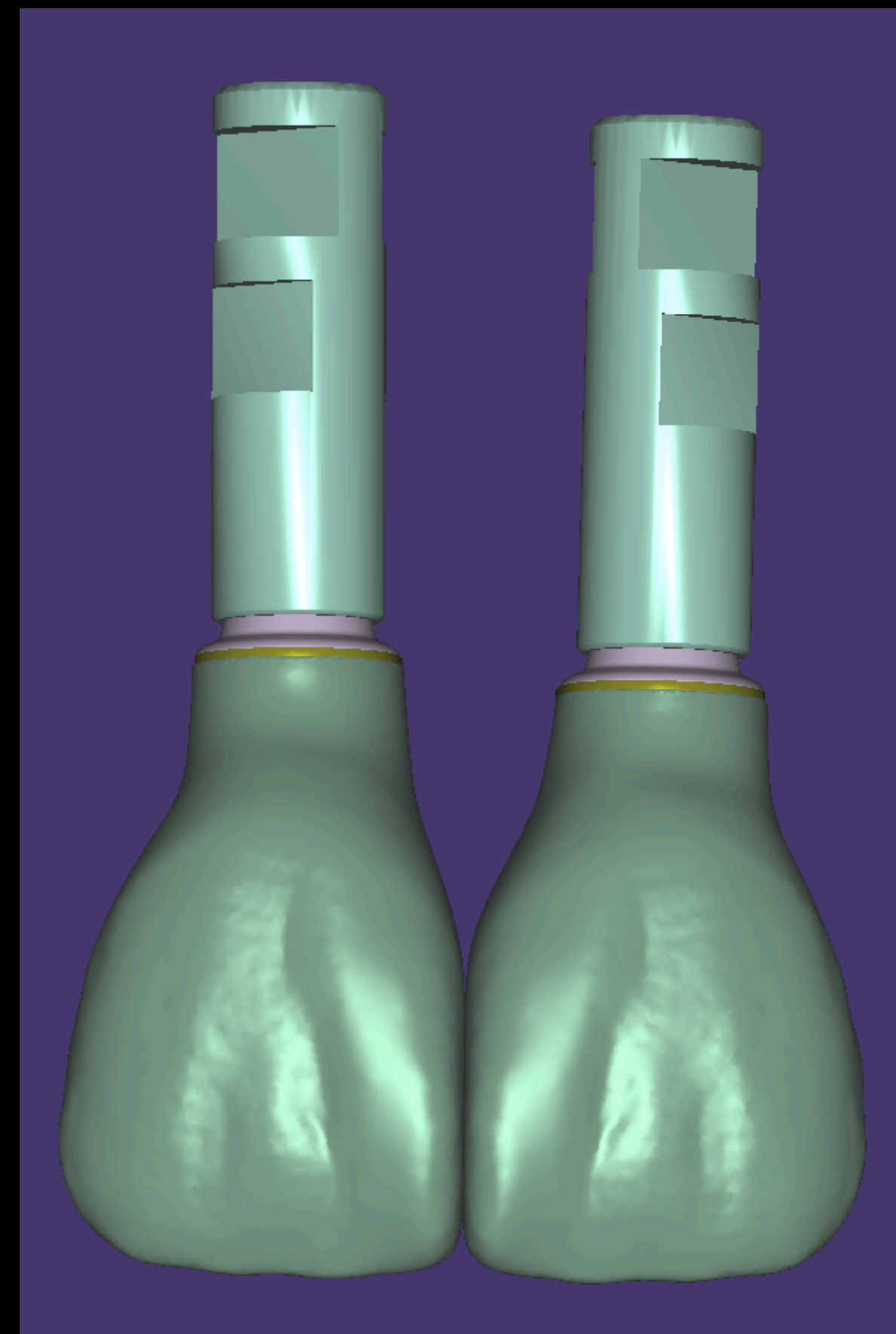
Methods: A 25-year-old male presented for evaluation of his missing maxillary central incisors. Horizontal and vertical ridge deficiency was present (Siebert Class 3) and small incisal fractures on his lateral incisors. A treatment plan was conducted and accepted by the patient that included implant supported crowns on #8 and #9 and porcelain veneers on # 7 and #10.



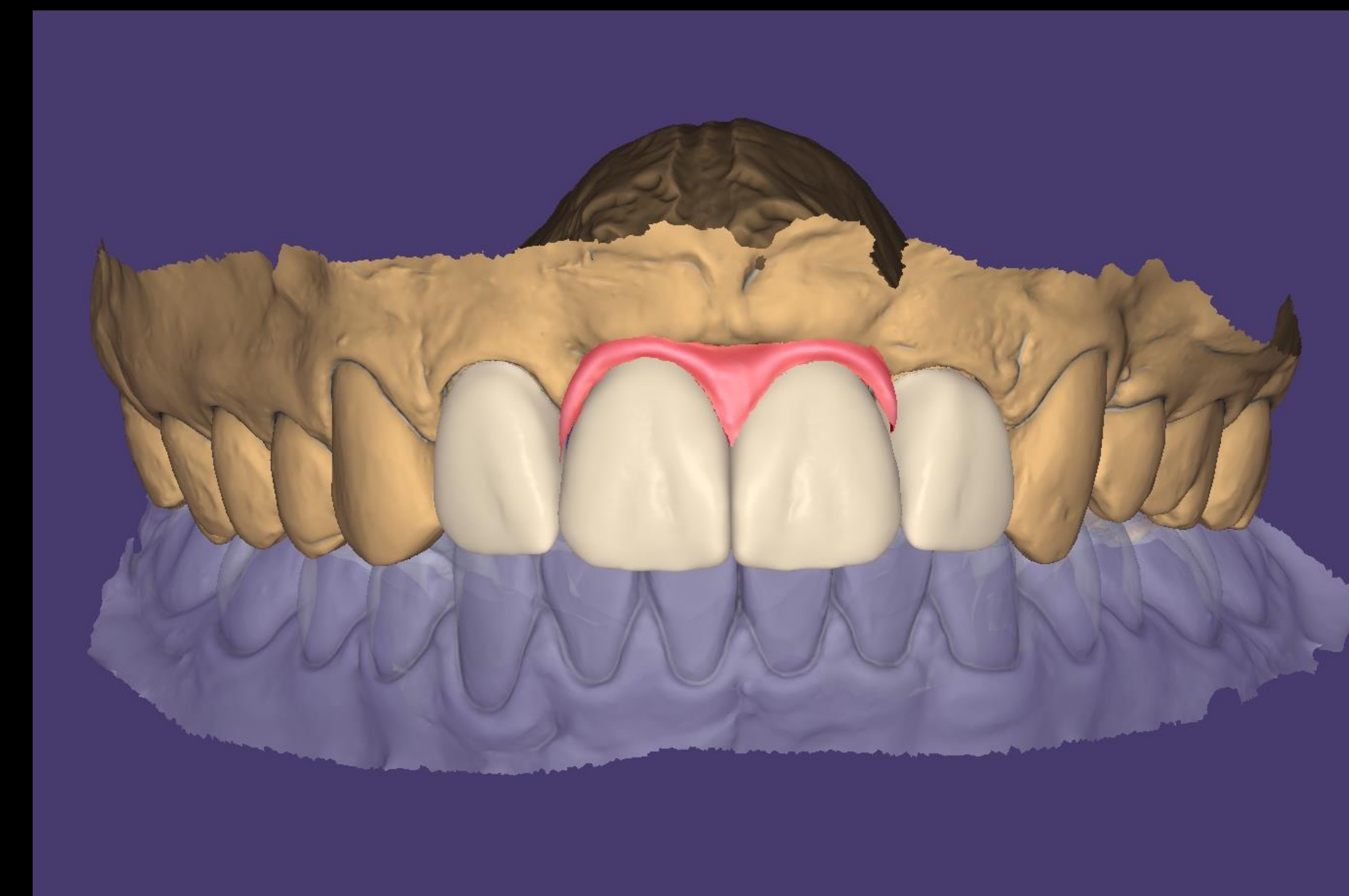
For the digital workflow, a Standard Tessellation Language (STL) file of the patient's existing condition was acquired with an Intra-Oral Scanner (IOS). This STL file was used to design a digital set-up from #7-10 and to print a 3D model. After the mock-up was approved, another intra-oral scan was obtained which was superimposed with the patient's initial condition to develop a surgical guide. A CBCT followed and a digital implant planning software was utilized to fabricate the stereolithographic surgical template.⁽¹⁾ An autogenous ramus graft was placed on the the edentulous side for an ideal implant side development. Following a 6-month healing period, bone level implants on #8 and #9 were placed. Primary stability was not adequate for immediate provisionalization, thus a 2nd stage surgery was performed 3 months later.

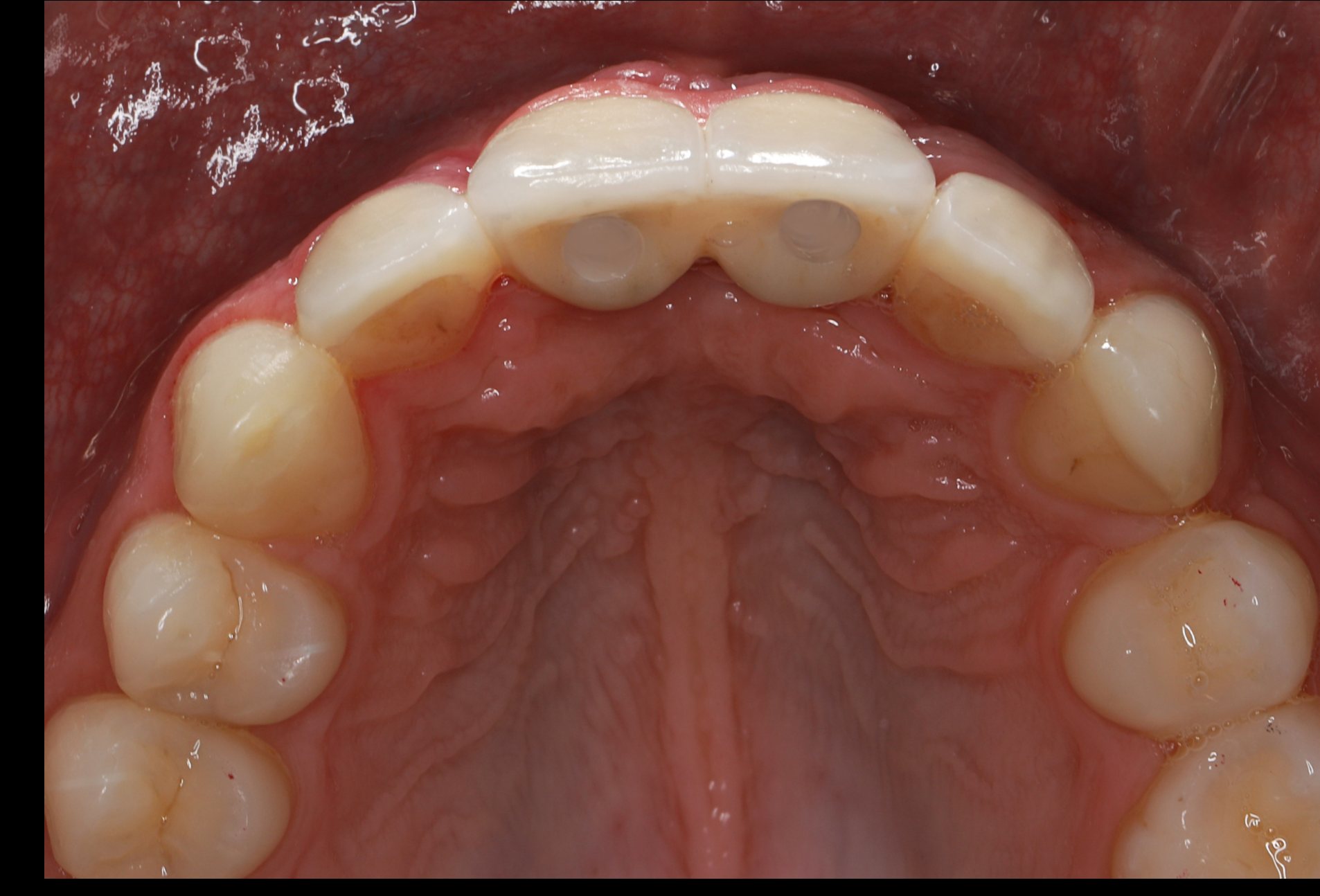


After soft tissue healing was established, an implant-level digital impression was taken using scan bodies. The acquired STL file was imported in a CAD/CAM software, where a screw-retained PMMA interim prosthesis was designed and milled. Due to the presence of vertical soft tissue deficiency, pink composite was added to the design to achieve ideal tooth proportions. Therefore, implant crowns were splinted.⁽²⁾ Following a 3-month trial period,⁽³⁾ the patient returned for the final impression. A minimal invasive preparation through the mock-up was performed for the porcelain veneers on #7 and #10.⁽⁴⁾



In order to capture the implant position and also transfer the design of the provisional prosthesis with the emergence profile, 3 scans were acquired. During the first, scan bodies were placed, and an implant-level digital impression was created. Afterwards, 2 scans were obtained of the provisional prosthesis, one intraorally and one extraorally.⁽⁵⁾ The 3 STL files were imported in a CAD/CAM design software and superimposed in one file that contained all the critical information: the implant 3-D position, prosthesis contour and the transmucosal part of the peri-implant soft tissues. To confirm the accuracy of the digital impression, a prototype screw-retained implant prosthesis was milled as well as 2 veneers from PMMA. Esthetics, phonetics and prosthesis fit were verified at the try-in appointment.





Finally, a monolithic 4Y-TZP zirconia screw-retained fixed partial denture with porcelain micro-layered on the facial, was fabricated for #8 and #9 and e.max veneers for #7 and #10.⁽⁶⁾

Conclusion: Through the digital workflow, ideal 3-D implant position was achieved and contours of the interim implant prosthesis were predictably reproduced. High esthetic results were reached and patient's expectations were met.

References:

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