

Digital occlusal analysis using Exocad and OccluSense, a new methodology of identifying occlusal trauma in dynamic movements

N. Zambrana^{1,2}, M. Saleh¹, N. Sesma², H.L. Wang¹

¹ Department of Periodontics and Oral Medicine, University of Michigan (Michigan, USA)

² Department of Prosthodontics, University of São Paulo (São Paulo, Brazil)

Introduction

The absence of periodontal ligament in dental implants makes their occlusal analysis clinically challenging as implants lack the ability to adapt to occlusal forces through movement. Fan & Caton (2017) proposed some clinical indications of occlusal trauma, as seen in the table below.

TABLE 1 Proposed clinical and radiographic indicators of occlusal trauma

1. Fremitus	7. Thermal sensitivity
2. Mobility	8. Discomfort/pain on chewing
3. Occlusal discrepancies	9. Widened PDL space
4. Wear facets	10. Root resorption
5. Tooth migration	11. Cemental tear
6. Fractured tooth	

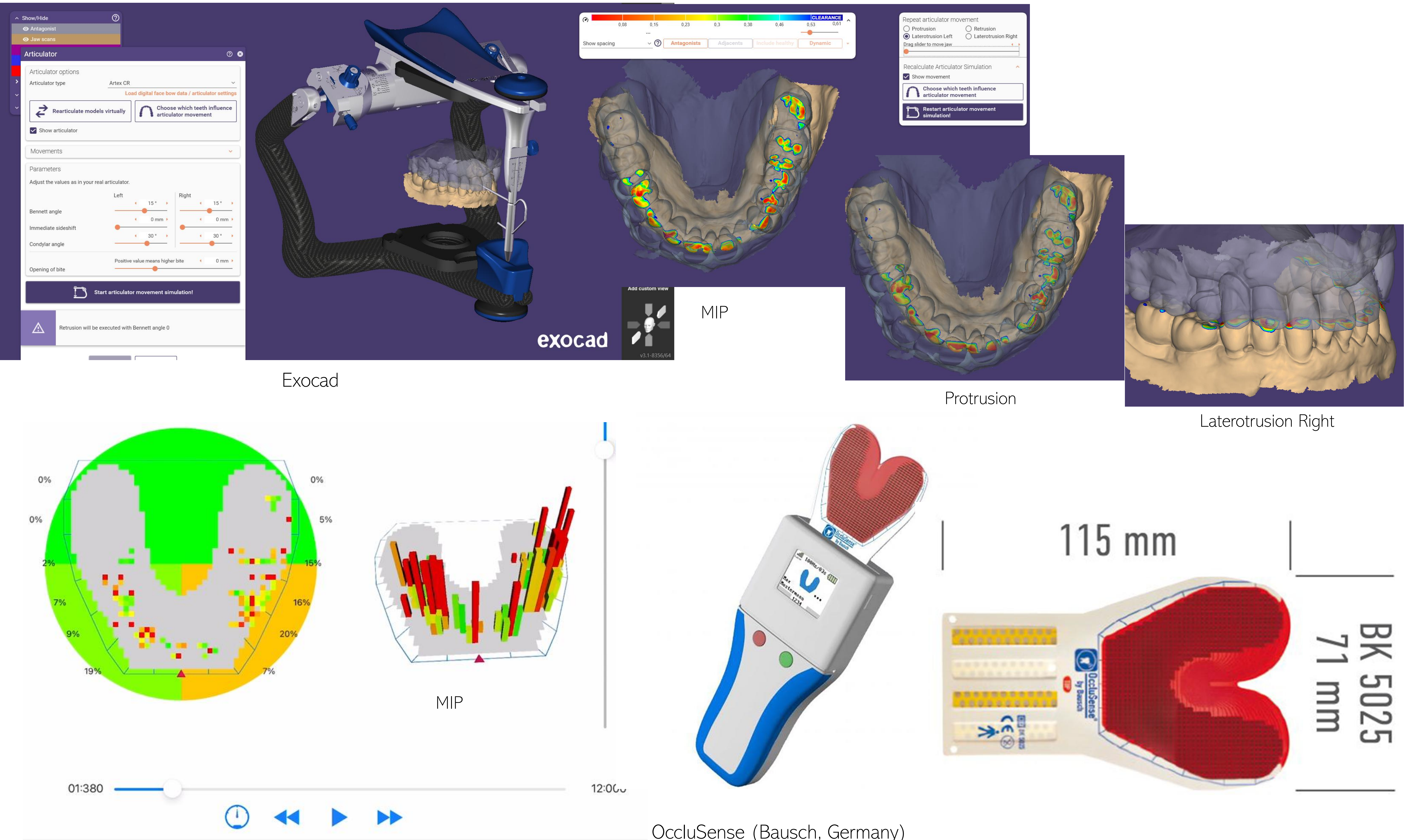
PDL., periodontal ligament.

Fan & Caton, 2017

Aim of the study

This case series aims to propose a new methodology of analyzing occlusal contacts of dental implants and teeth in maximal intercuspation position (MIP) or static and excursive or dynamic movements using a real-time pressure sensor equipment and dynamic virtual occlusion using a prosthetic design software.

Methodology

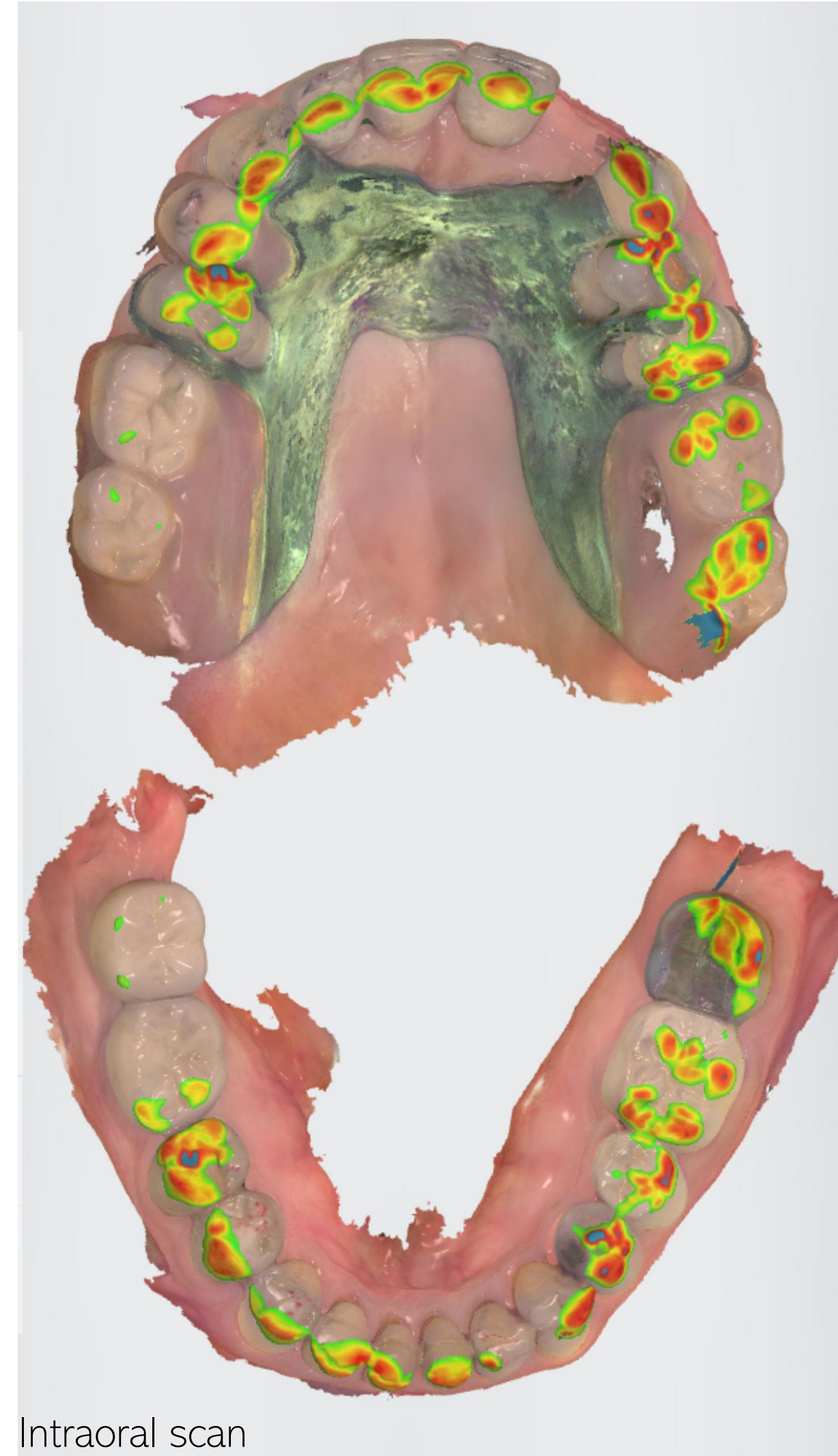


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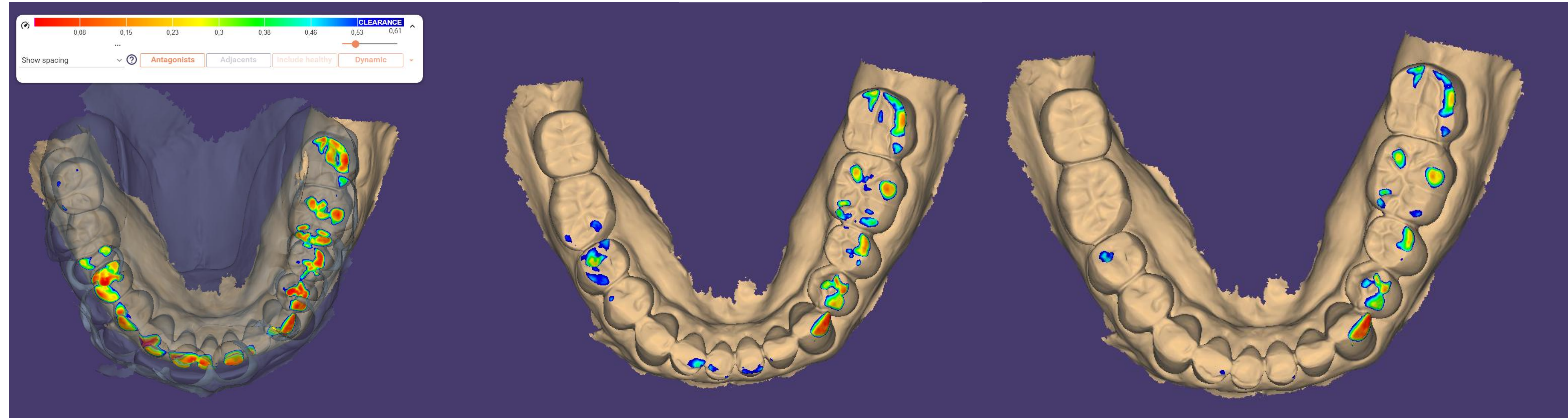
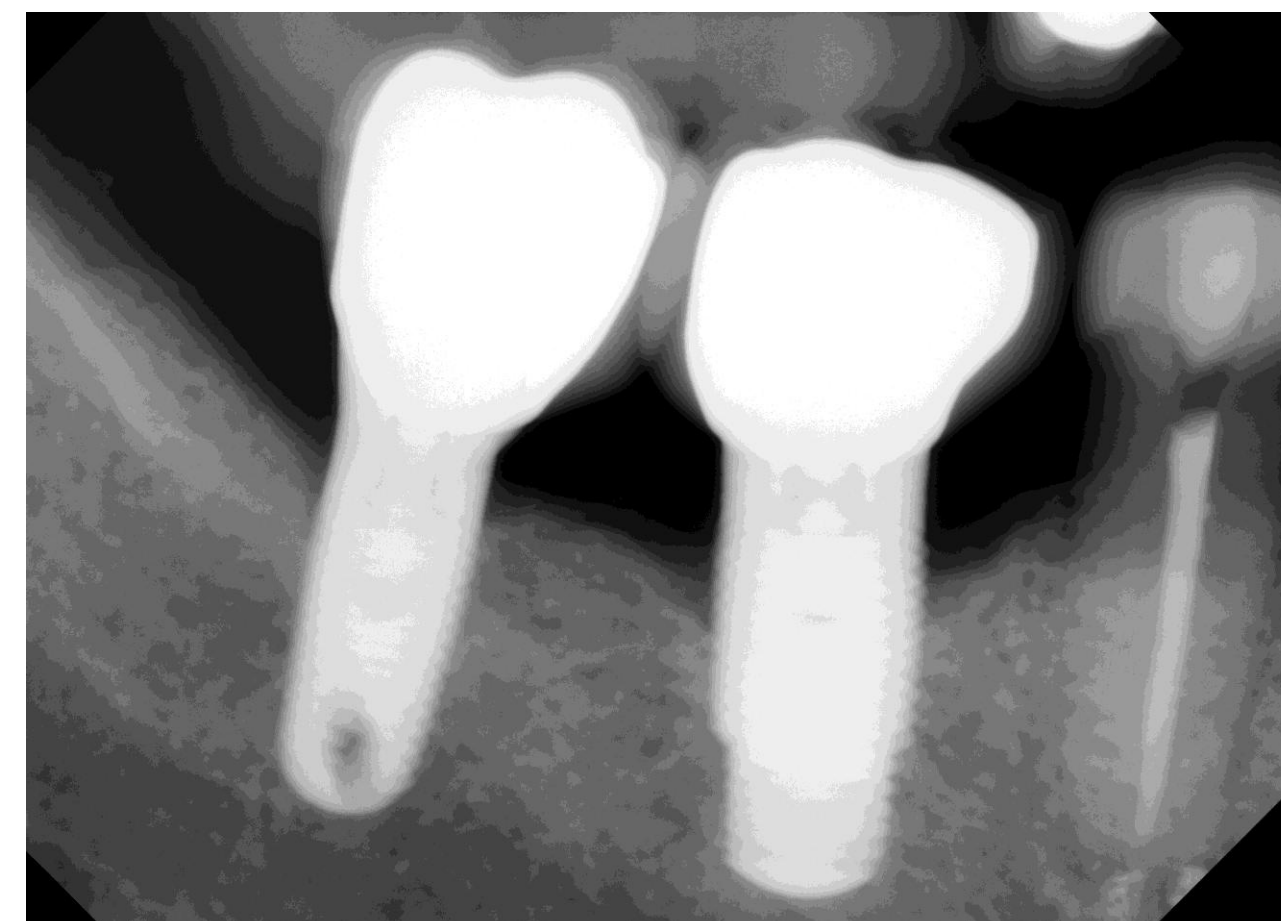
Methodology



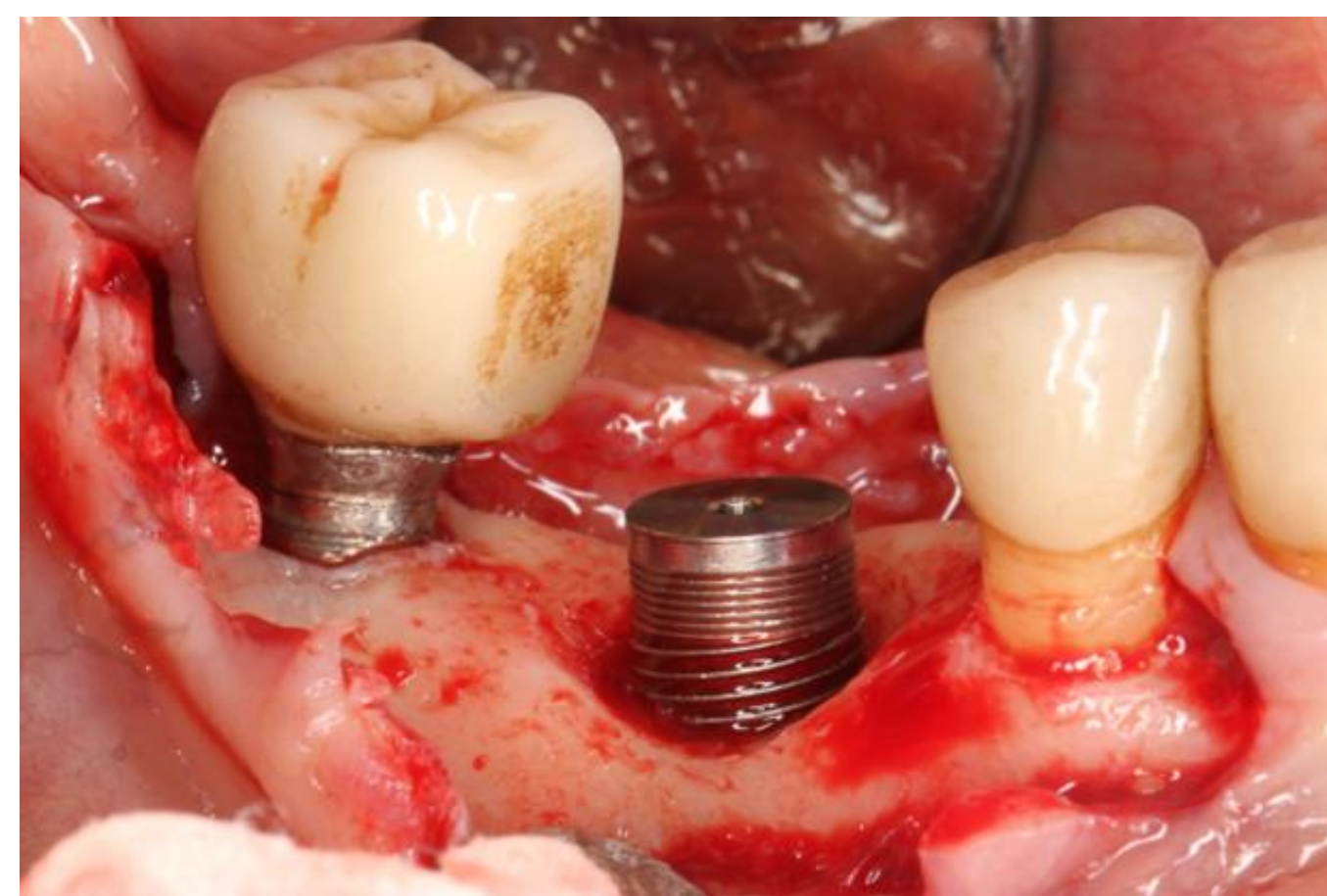
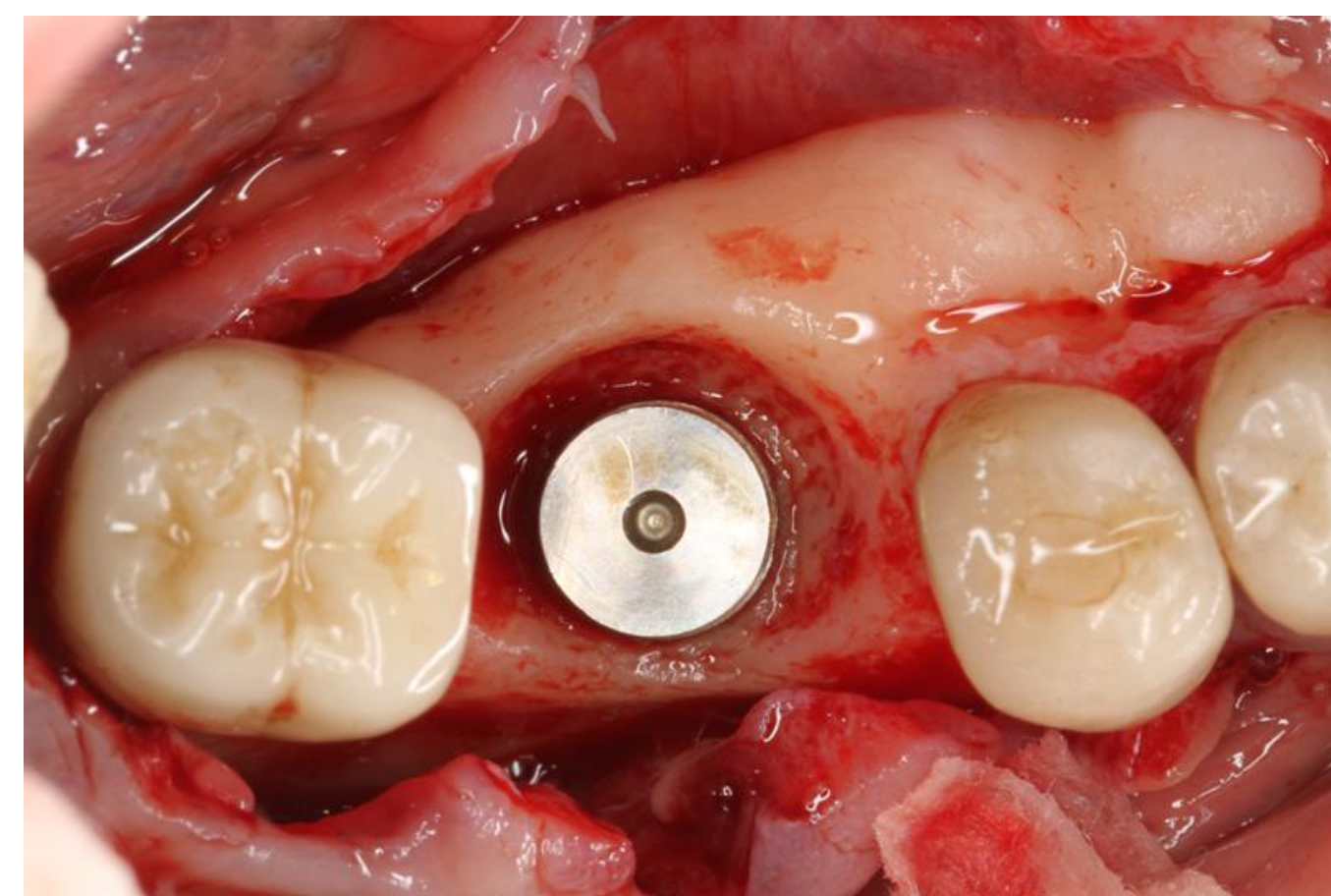
Intraoral scan



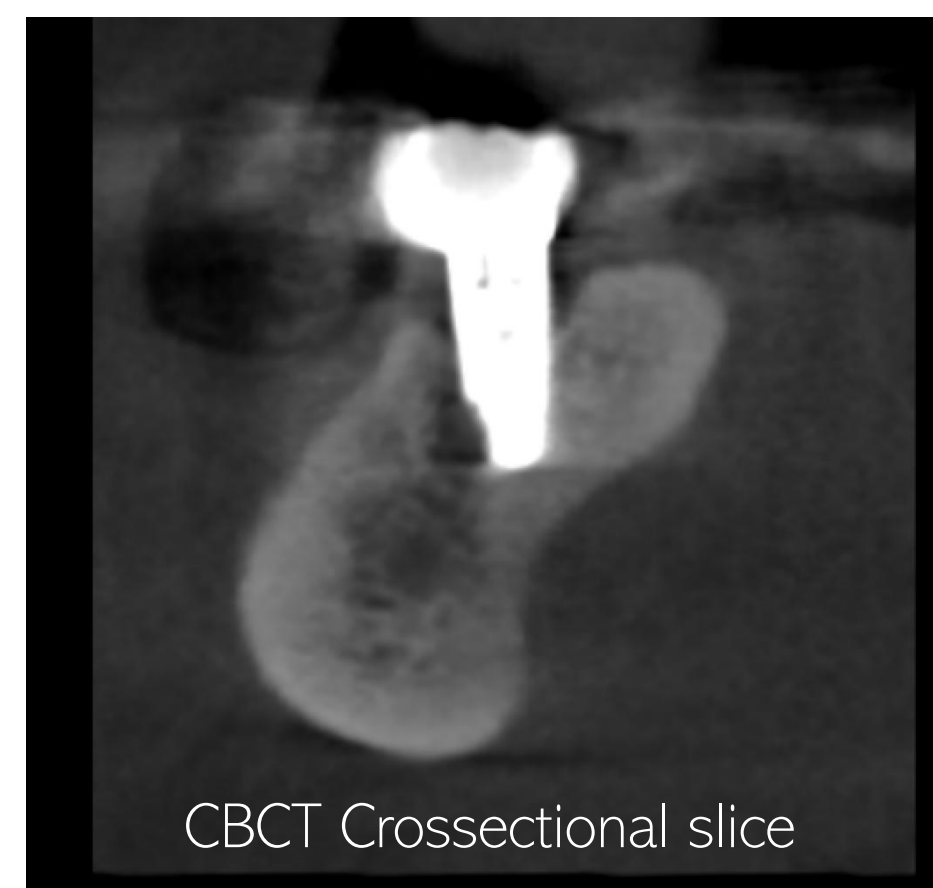
Intraoral photos



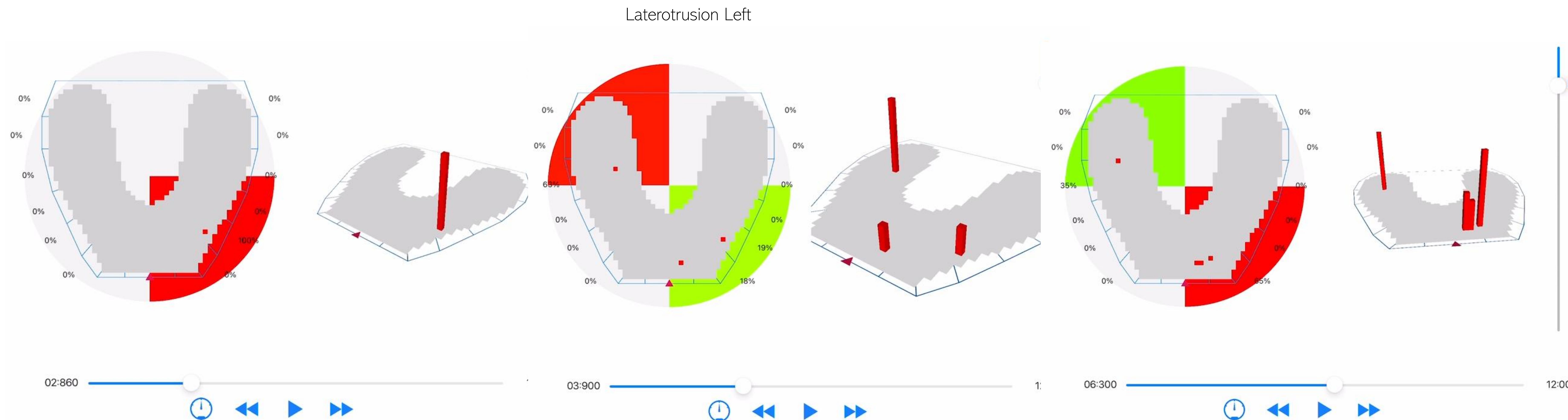
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Surgical photos



CBCT Crossectional slice



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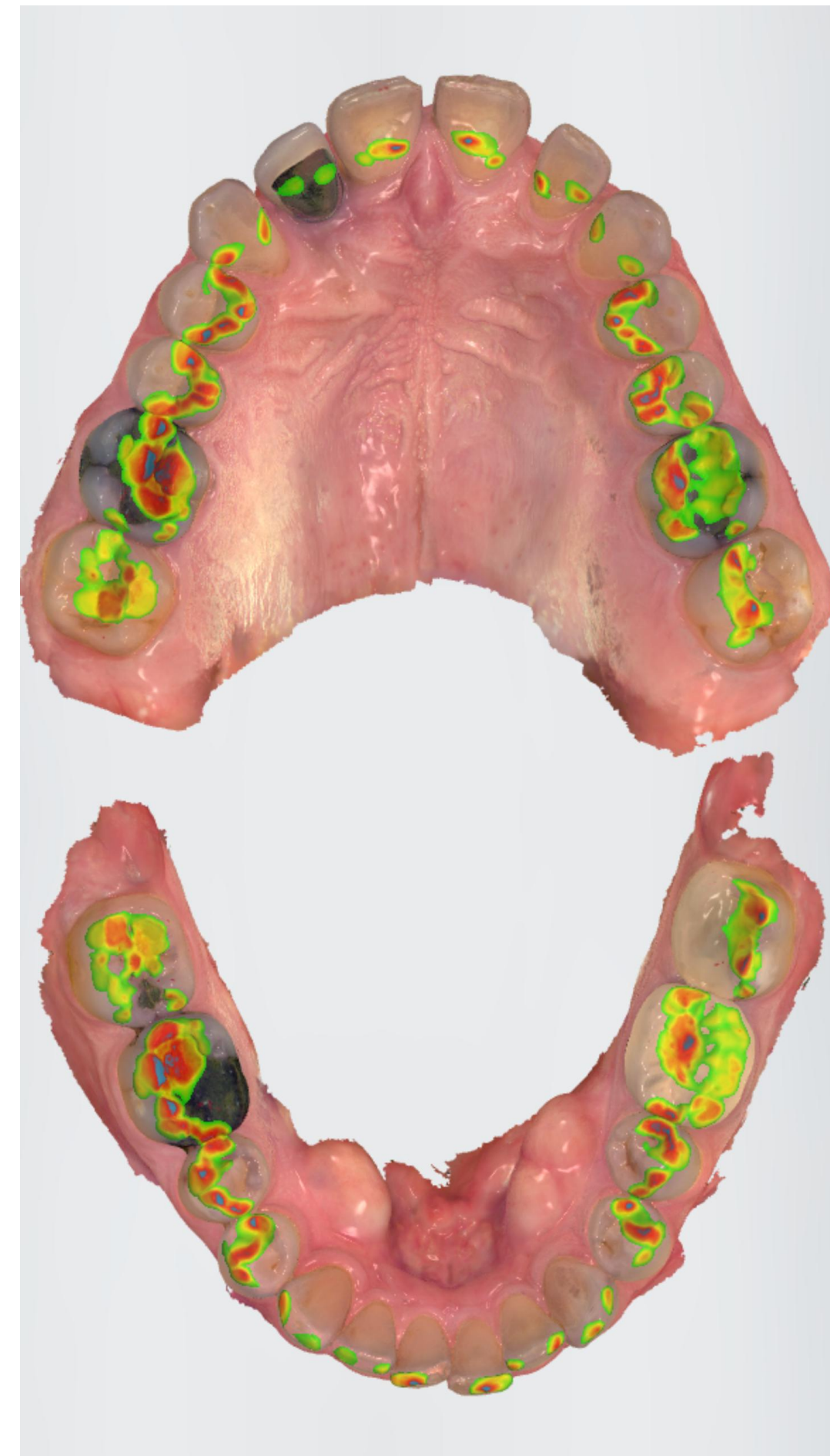
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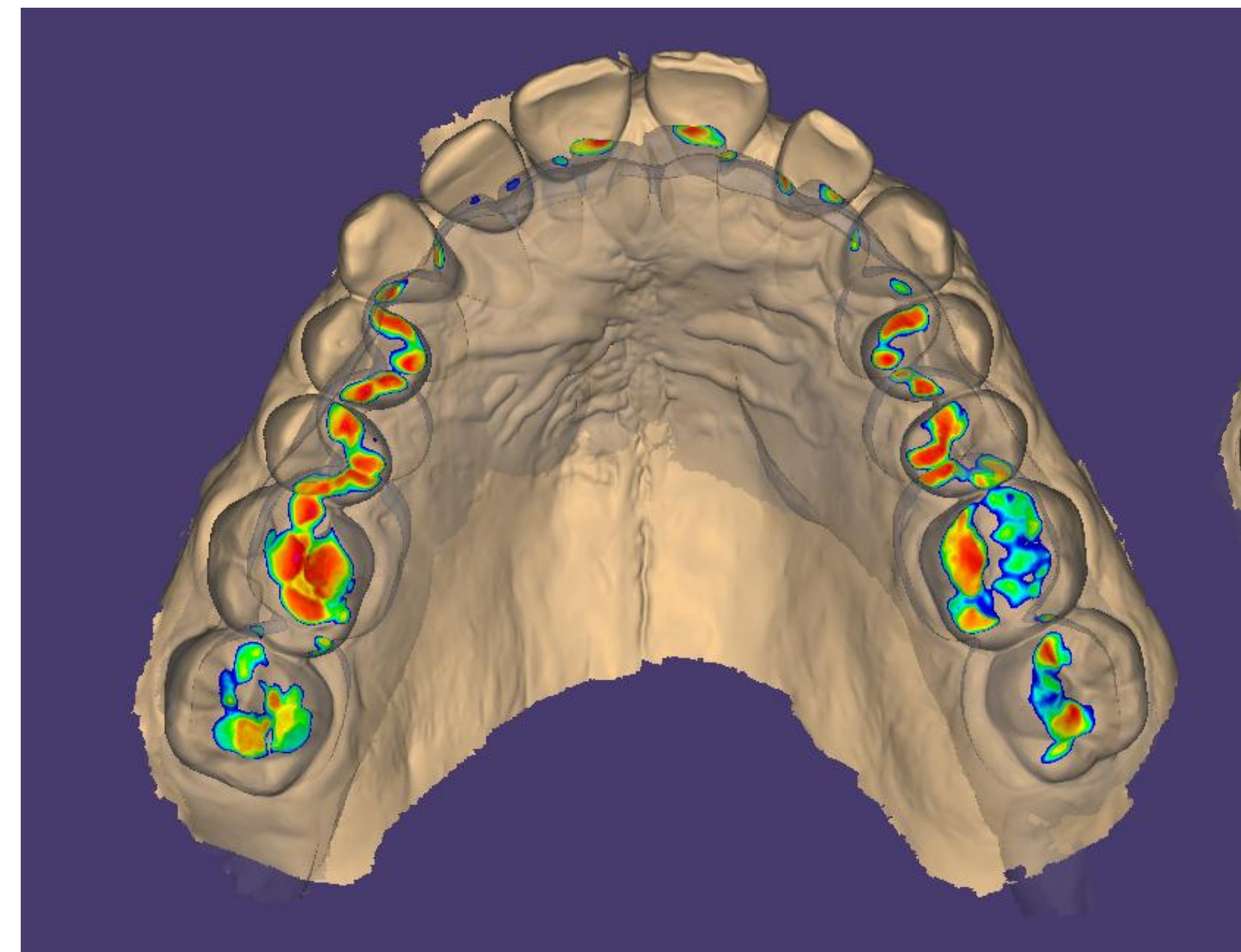
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Methodology

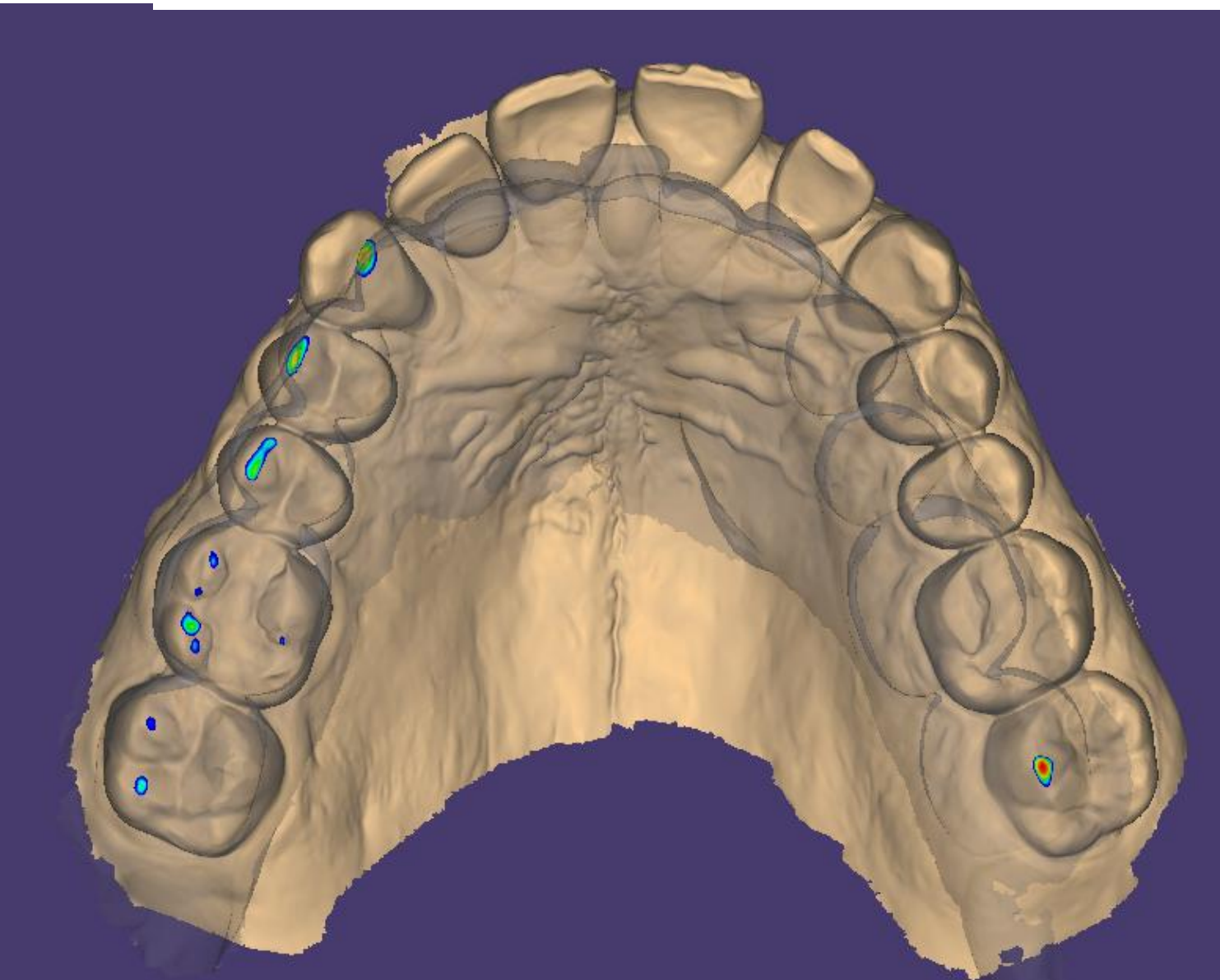
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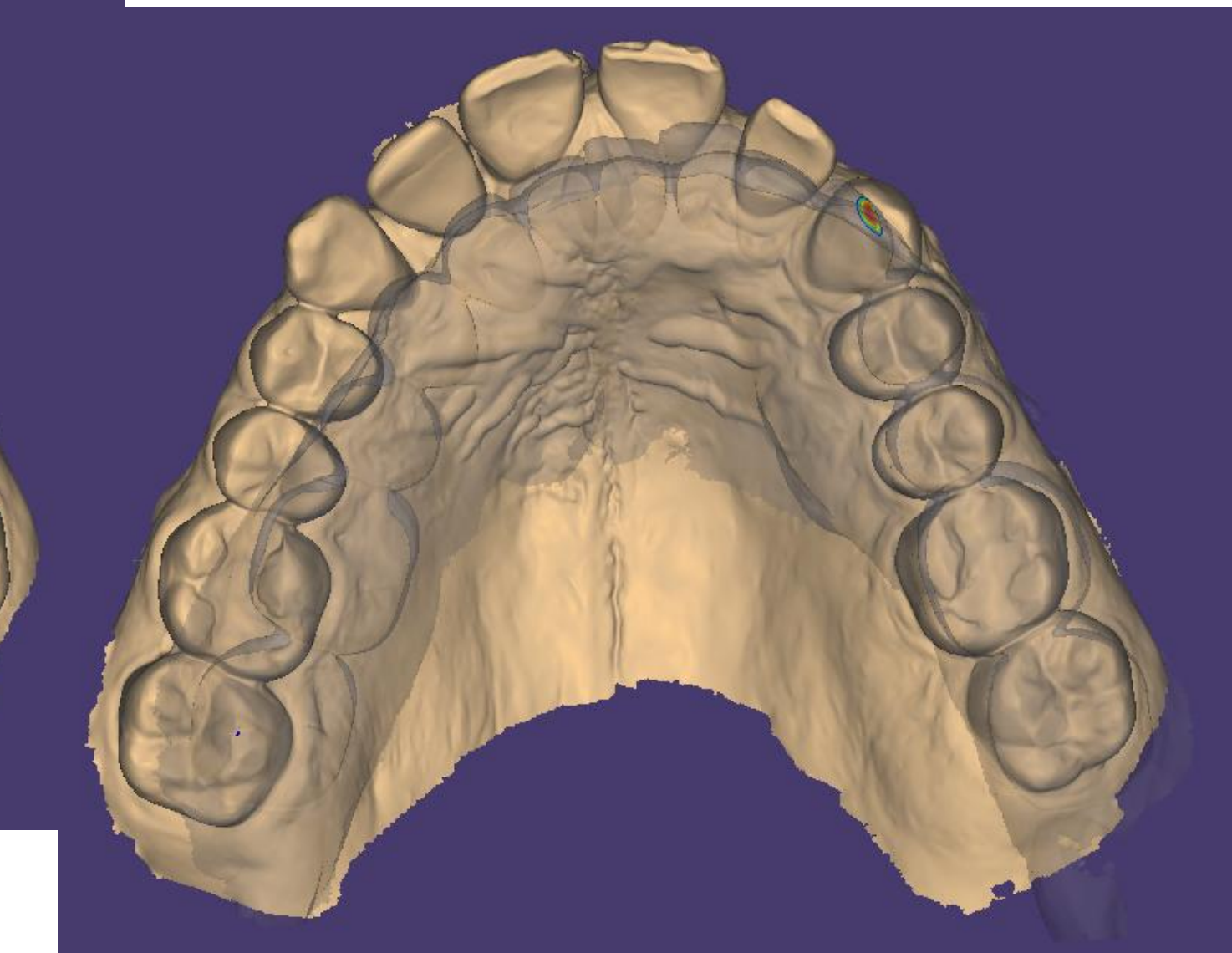
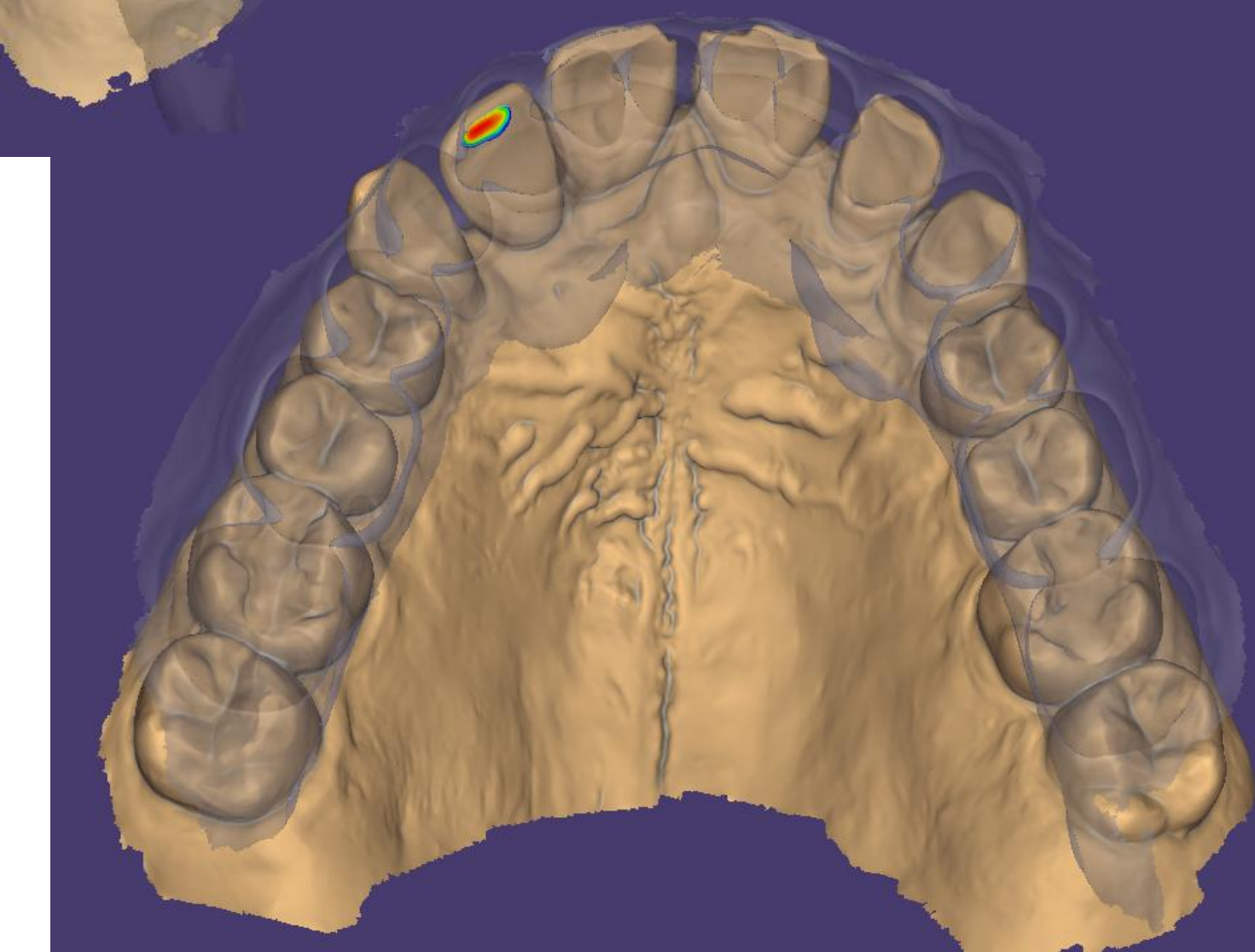
Intraoral photos



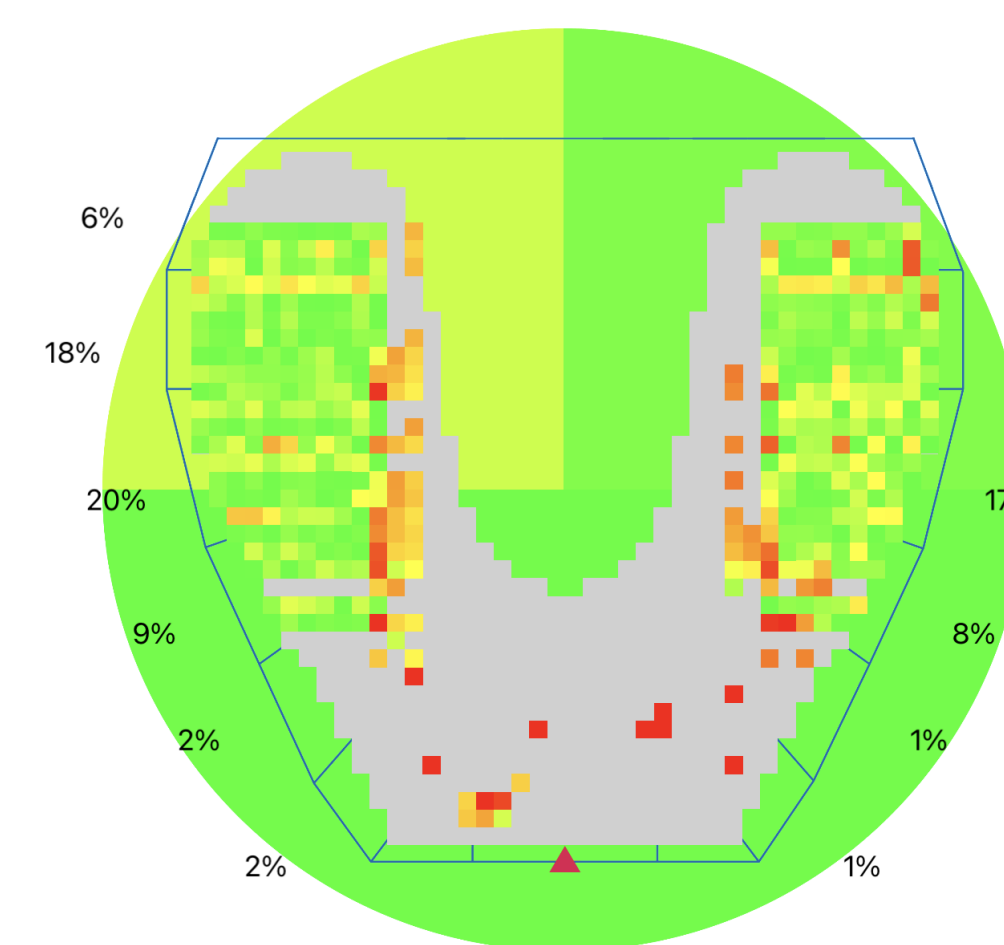
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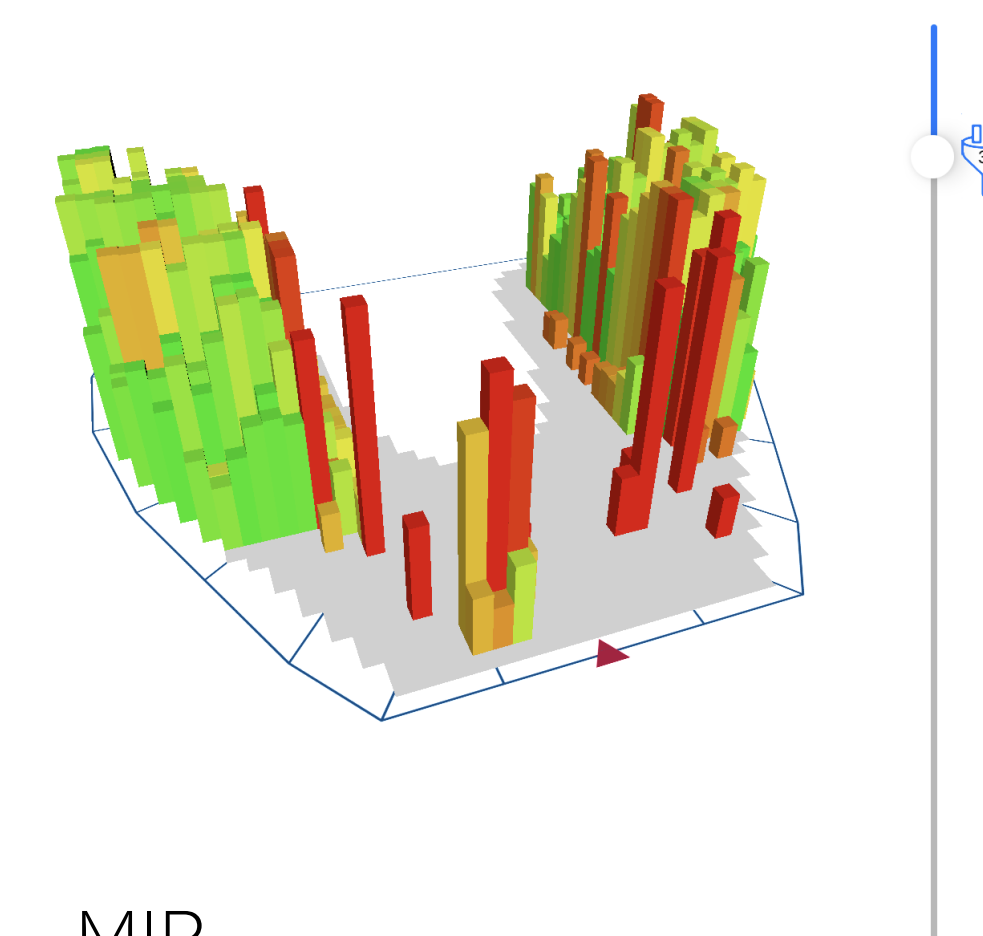
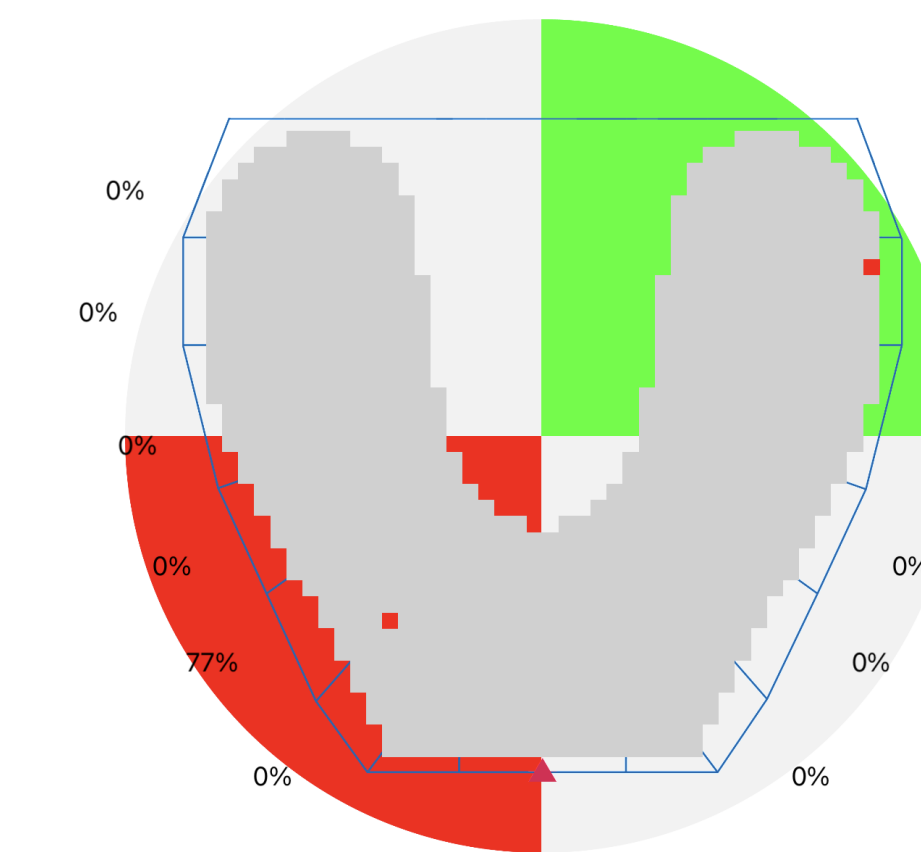
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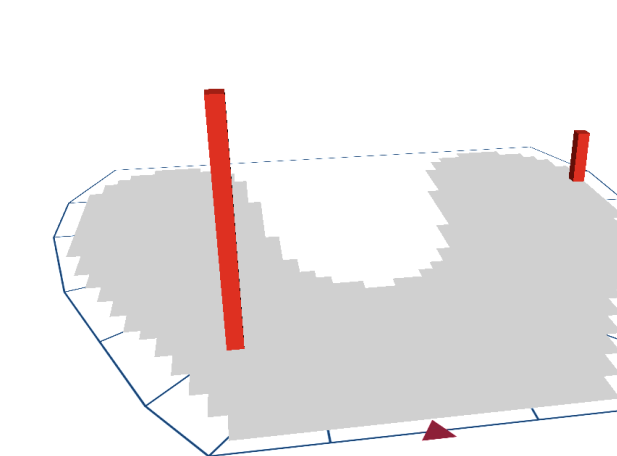
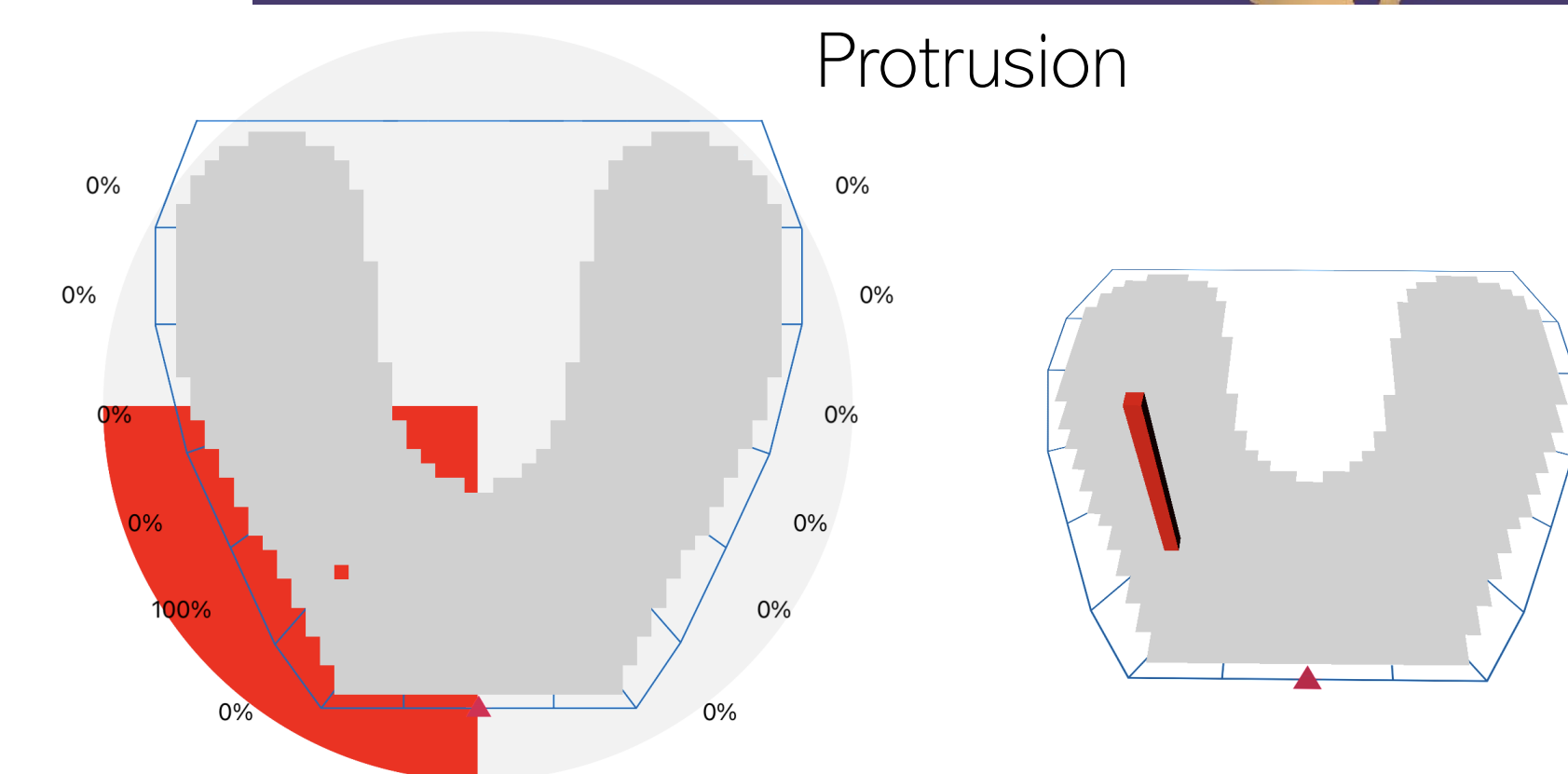
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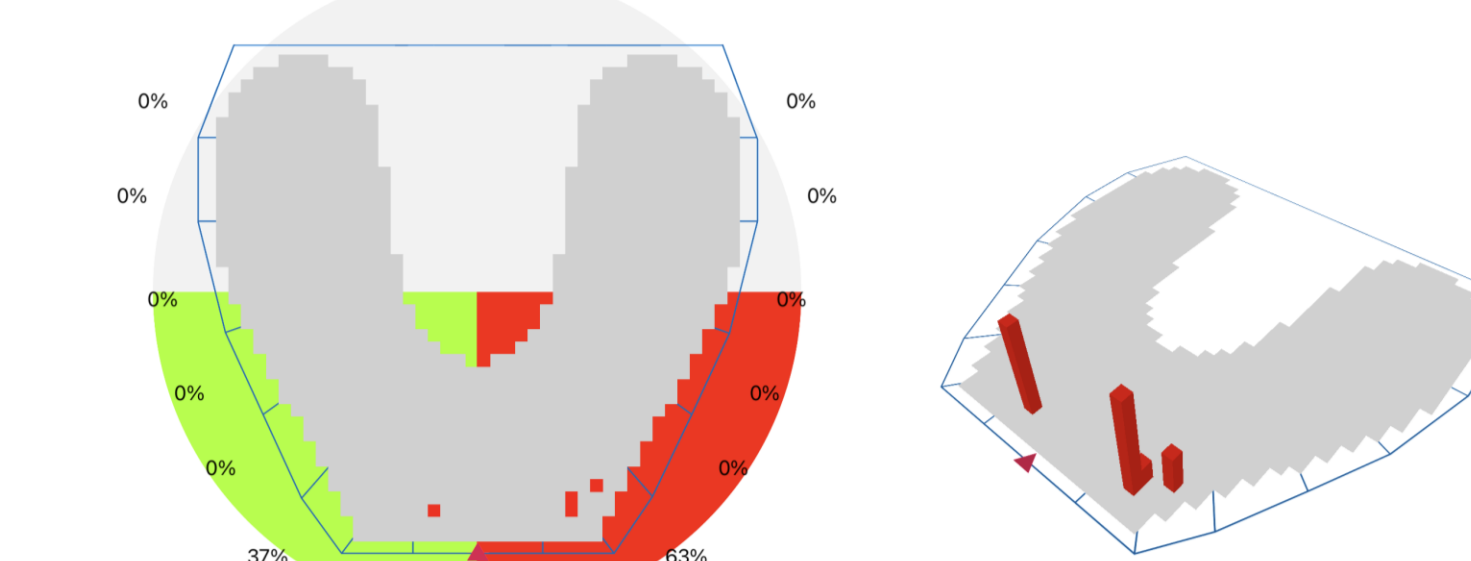
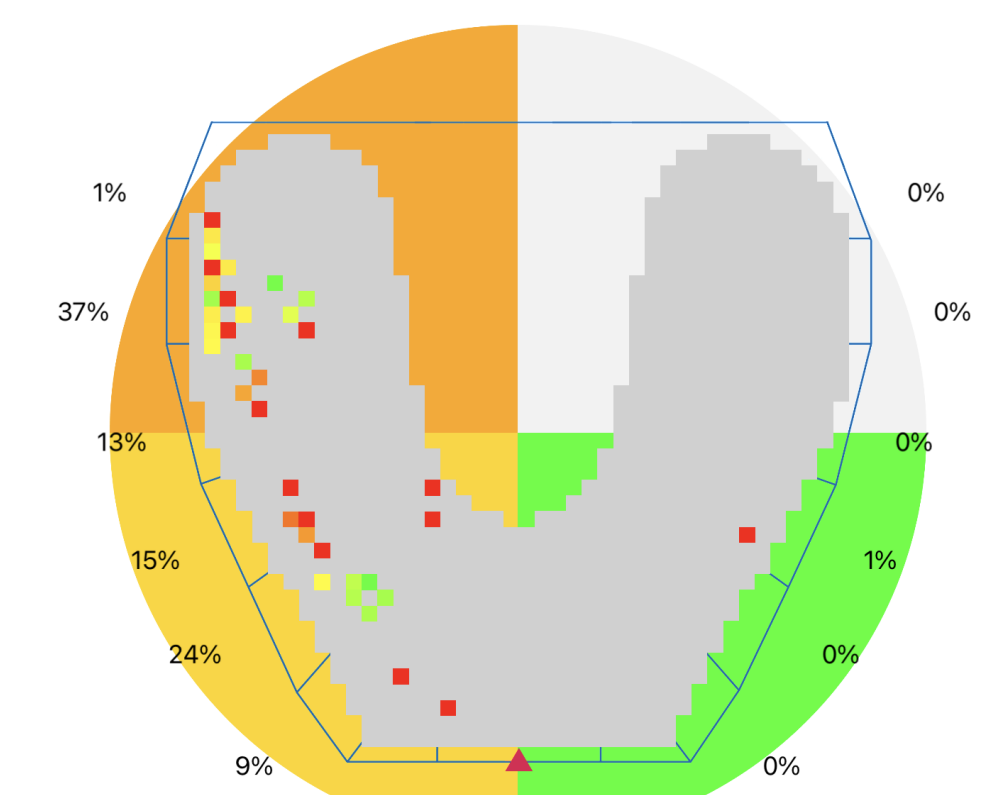
MIP



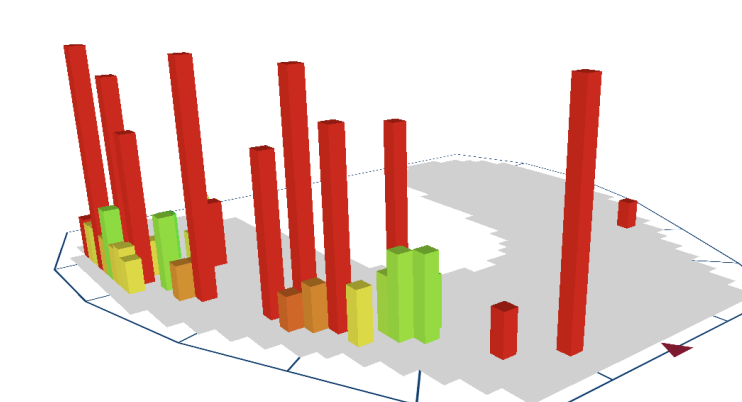
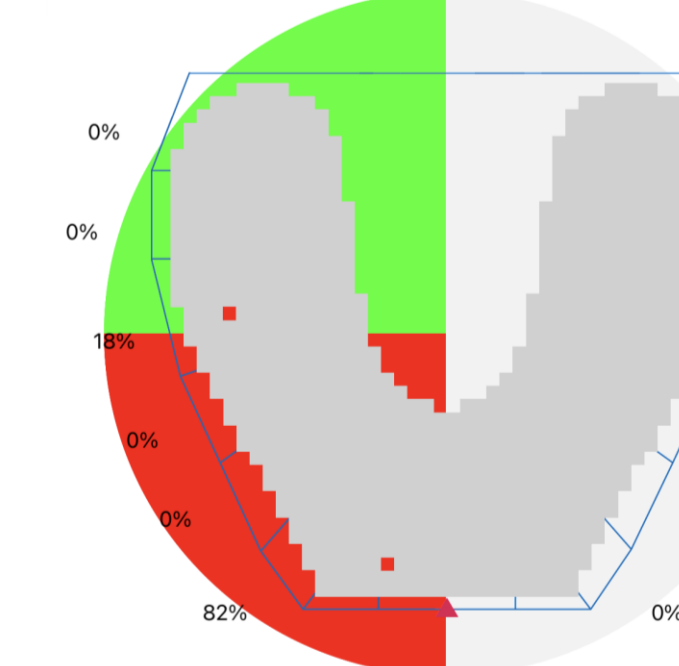
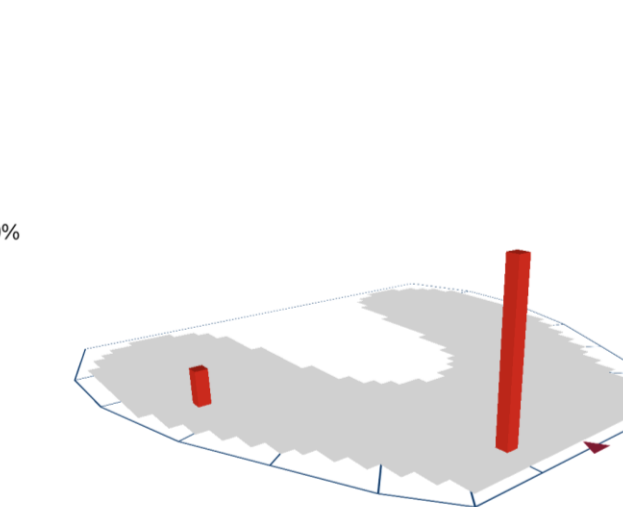
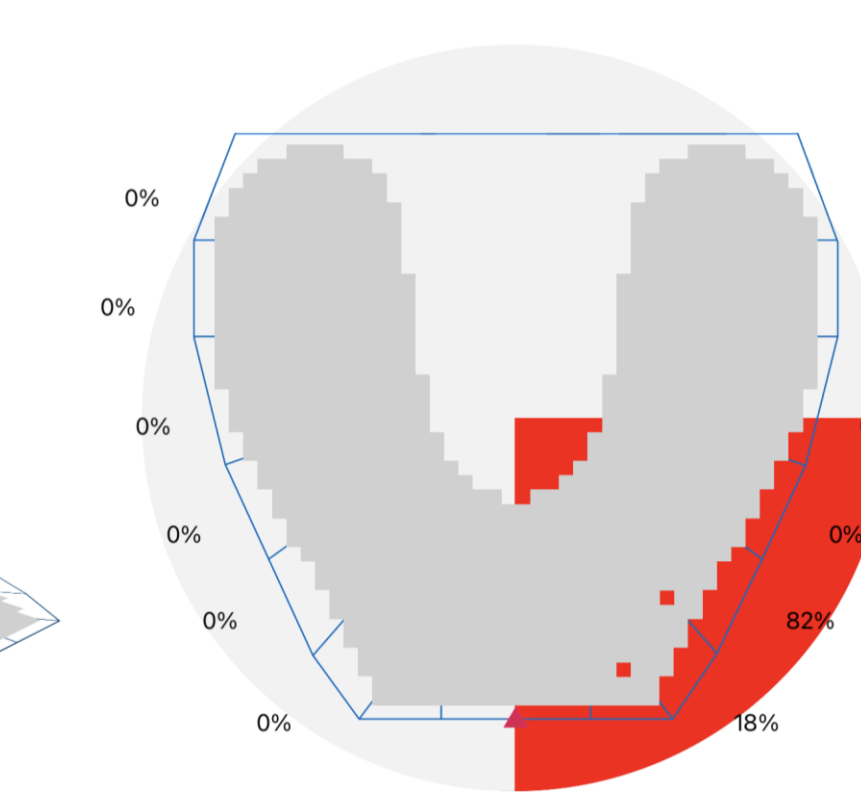
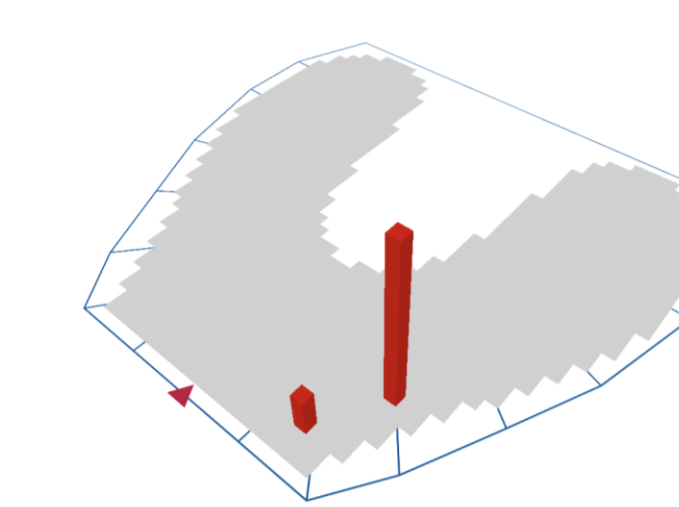
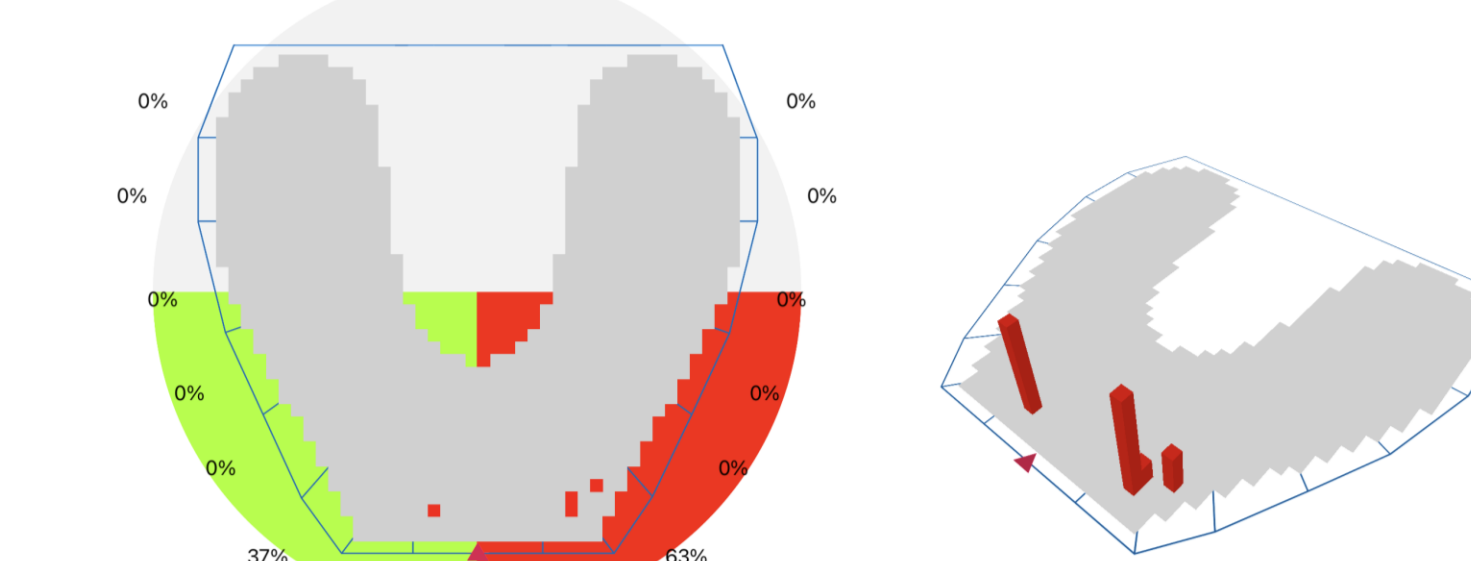
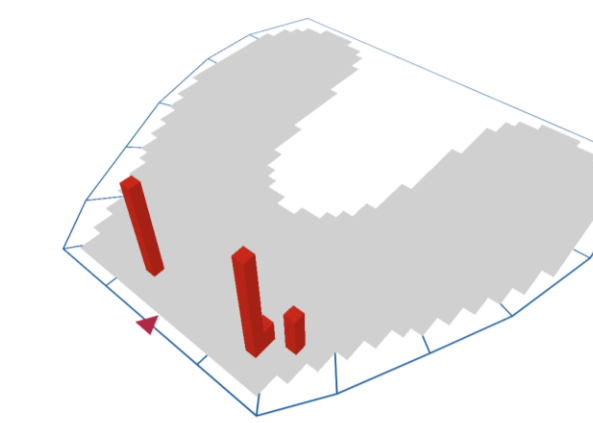
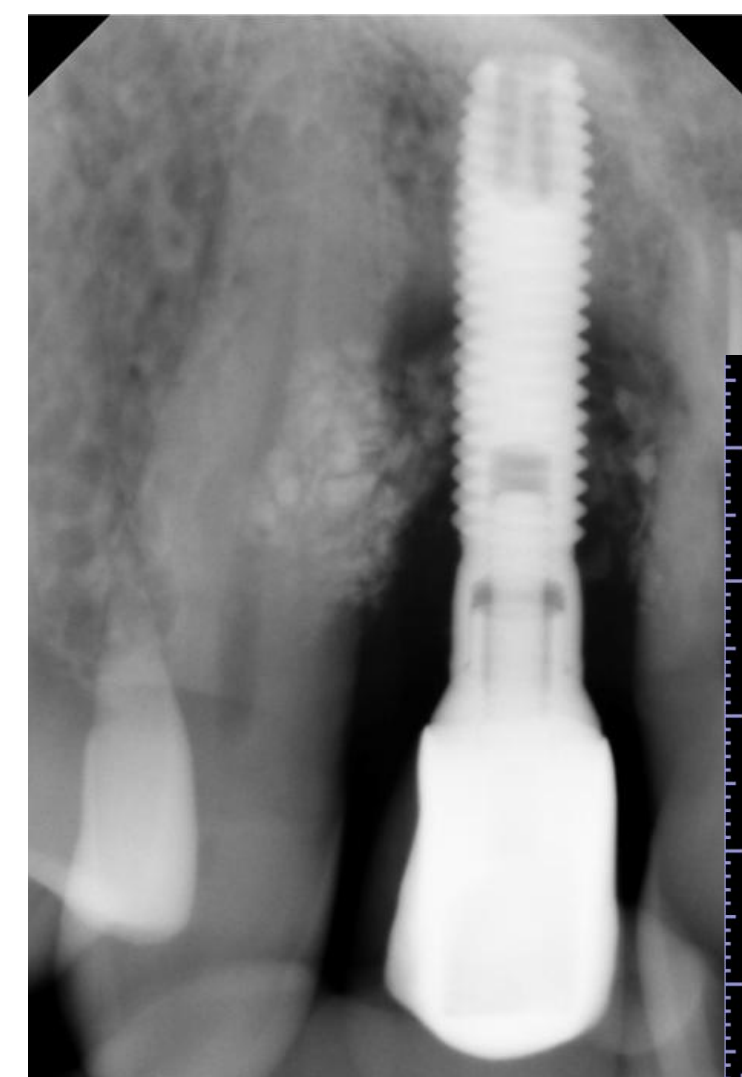
Protrusion



Laterotrusion Left



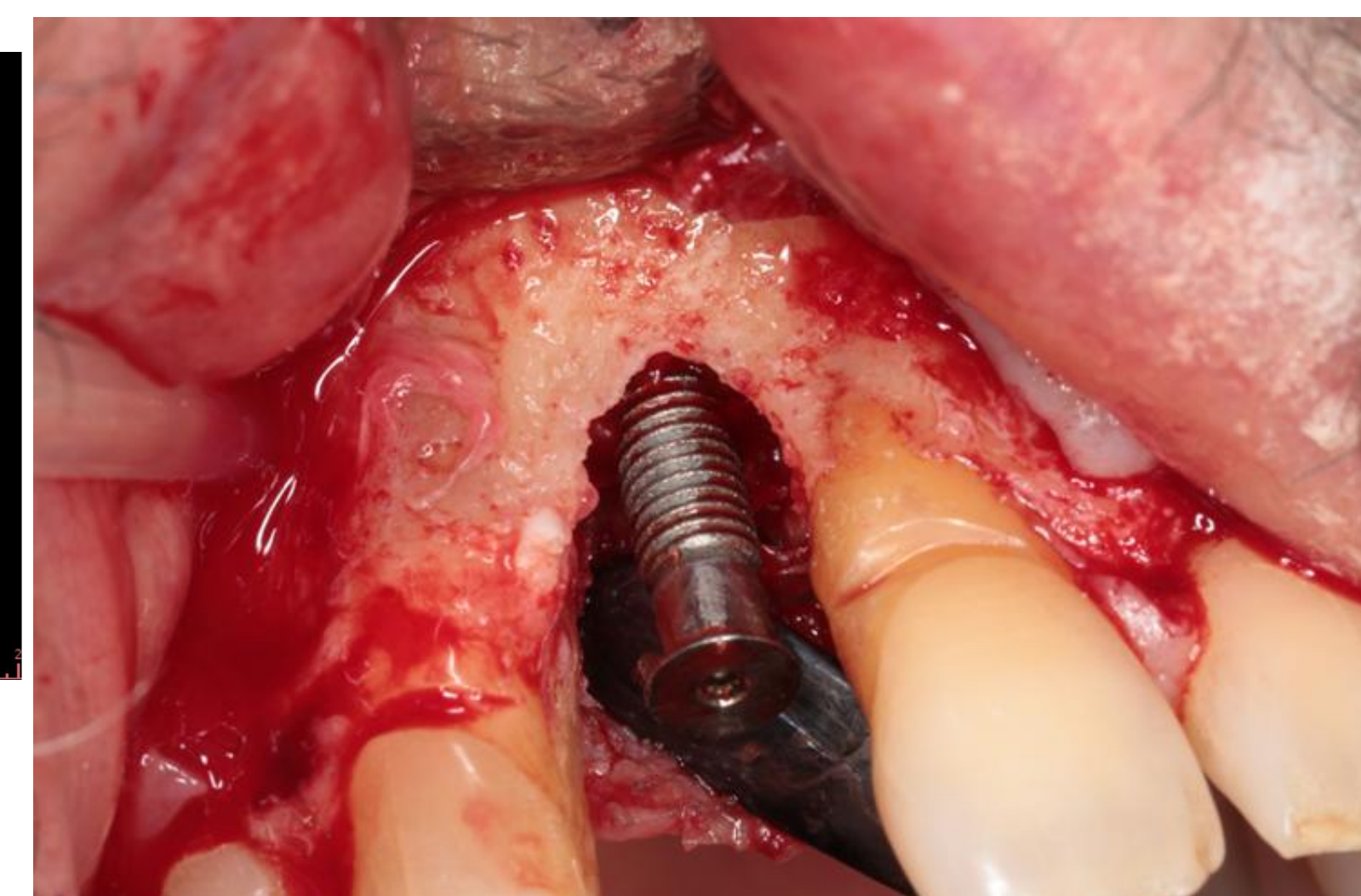
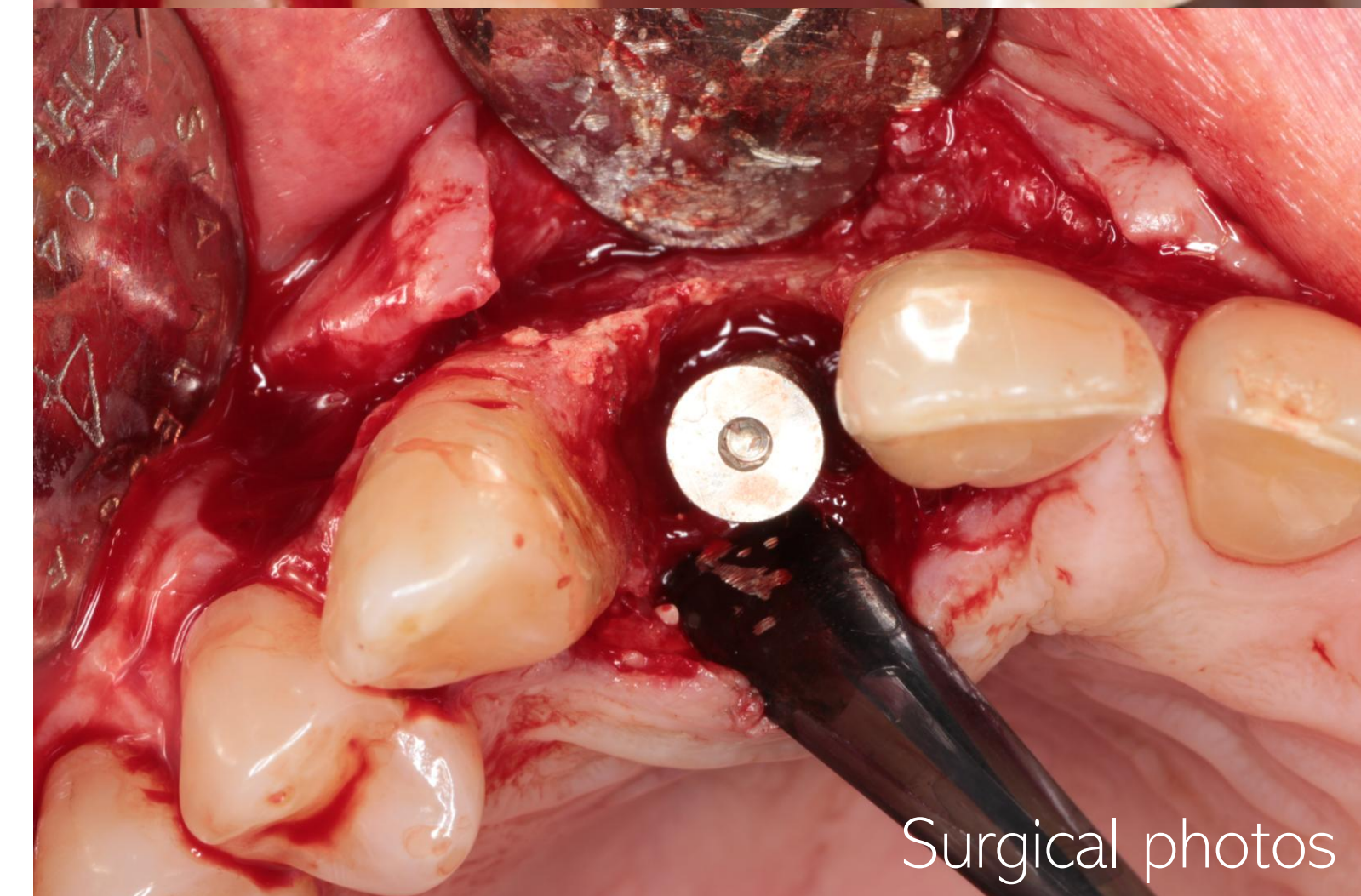
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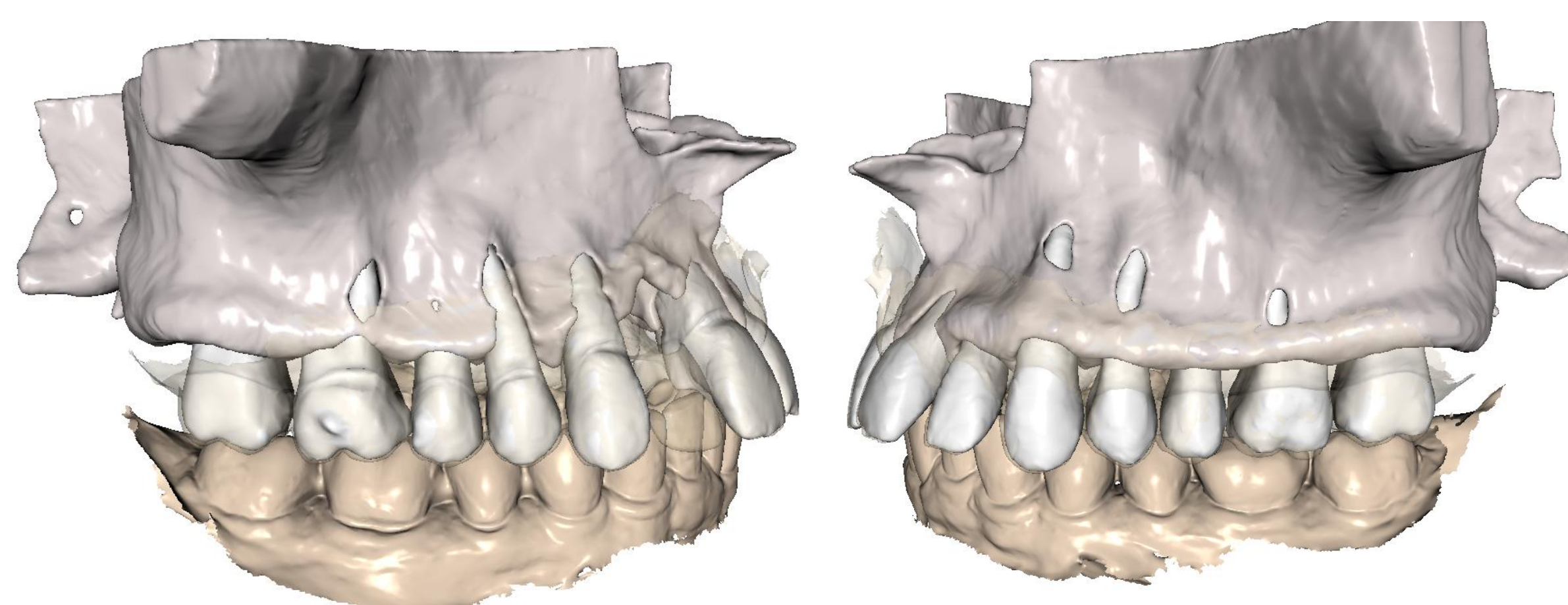
PA



CBCT Crosssectional slices



Surgical photos



CBCT 3D Reconstruction

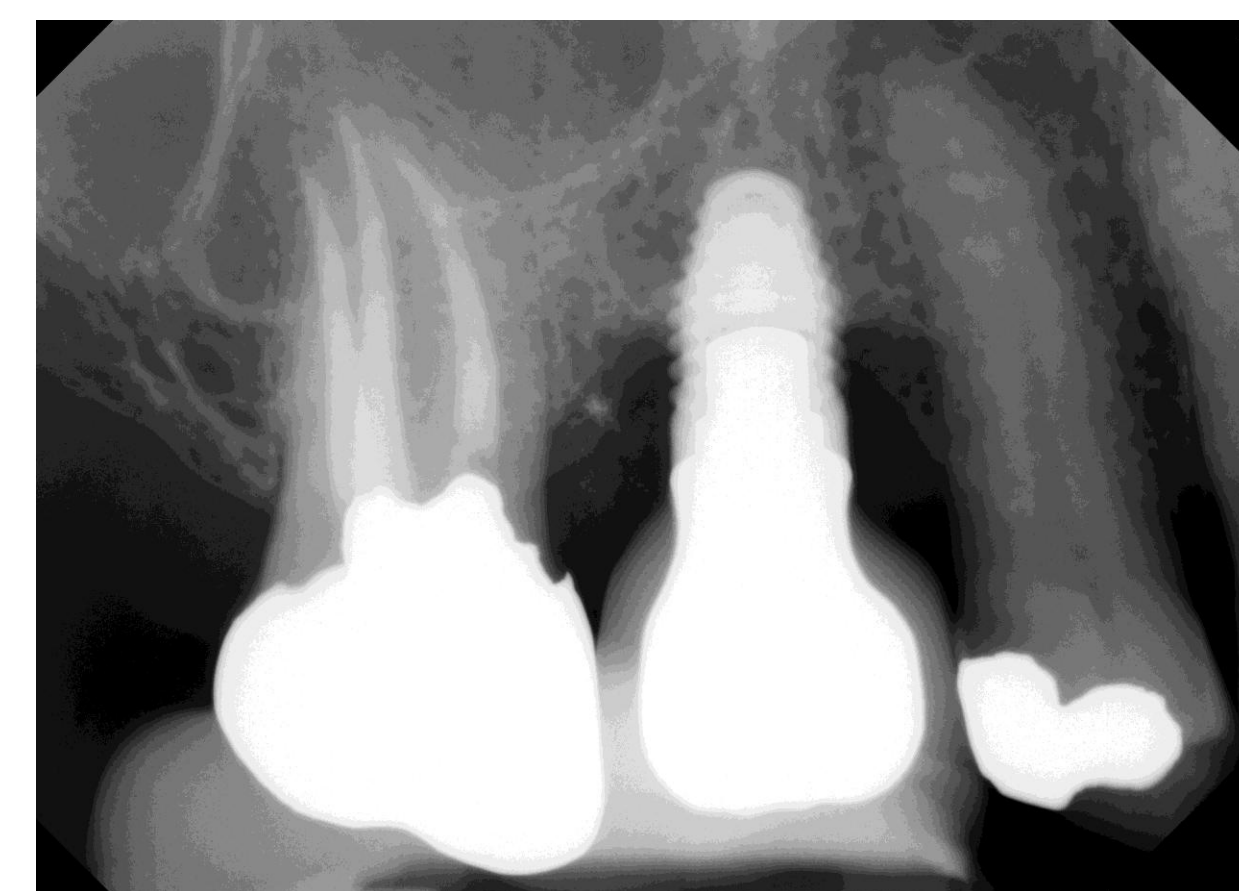
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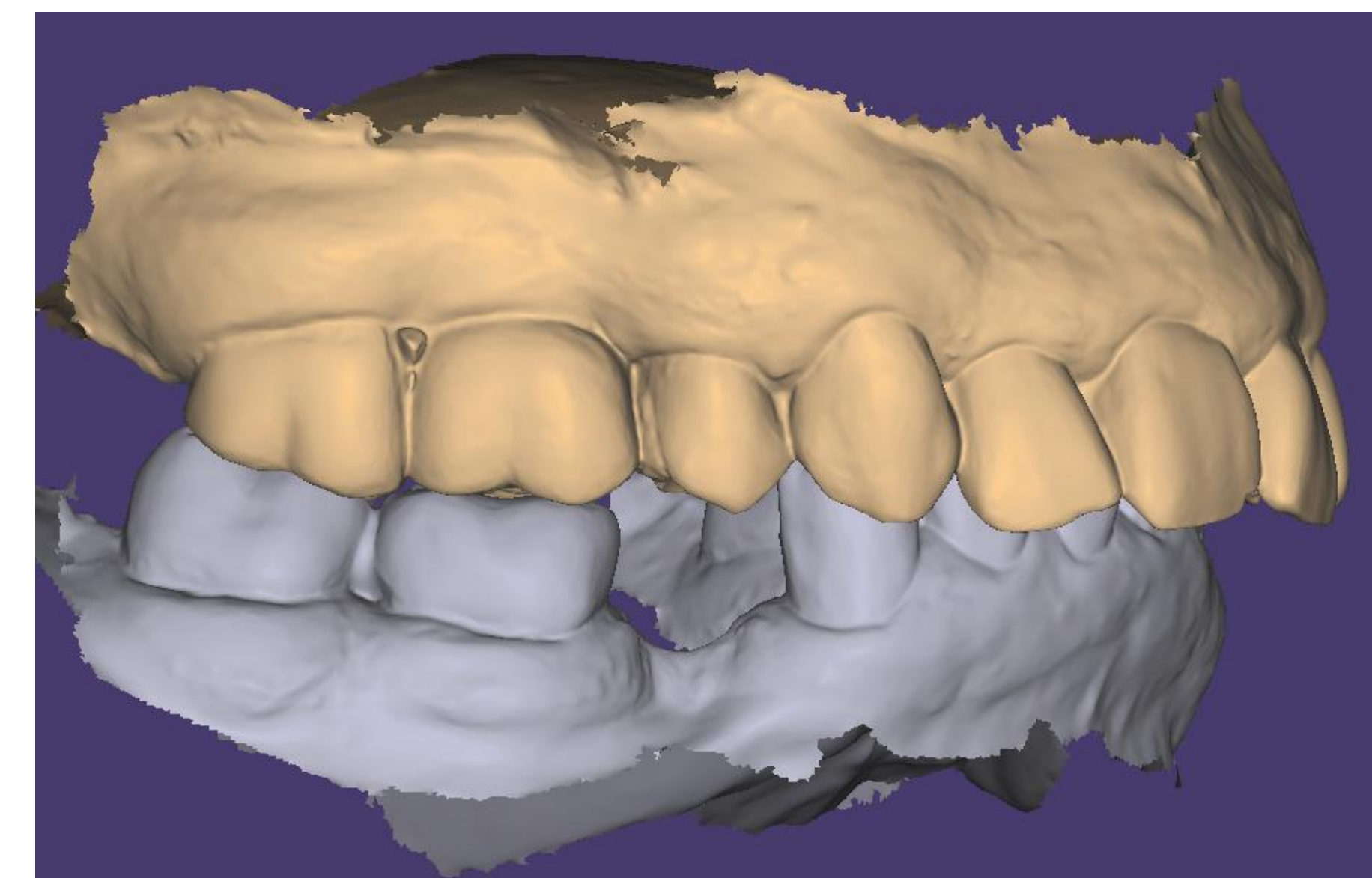
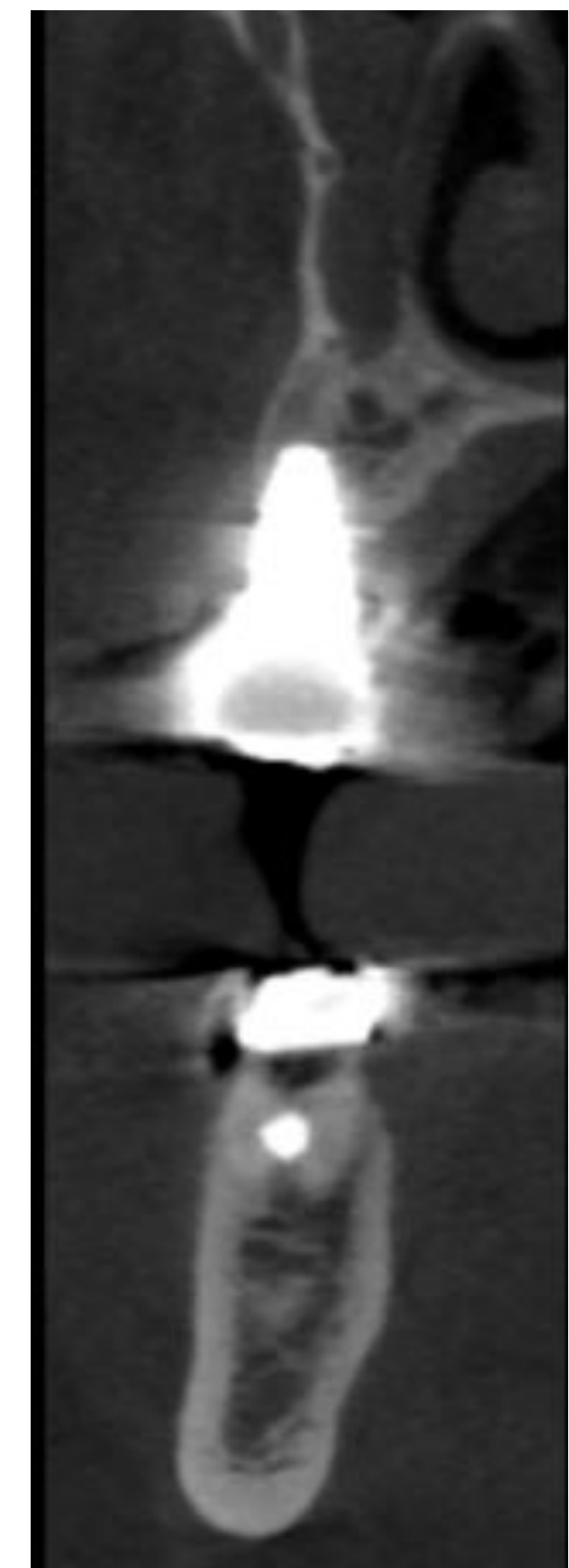
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Methodology

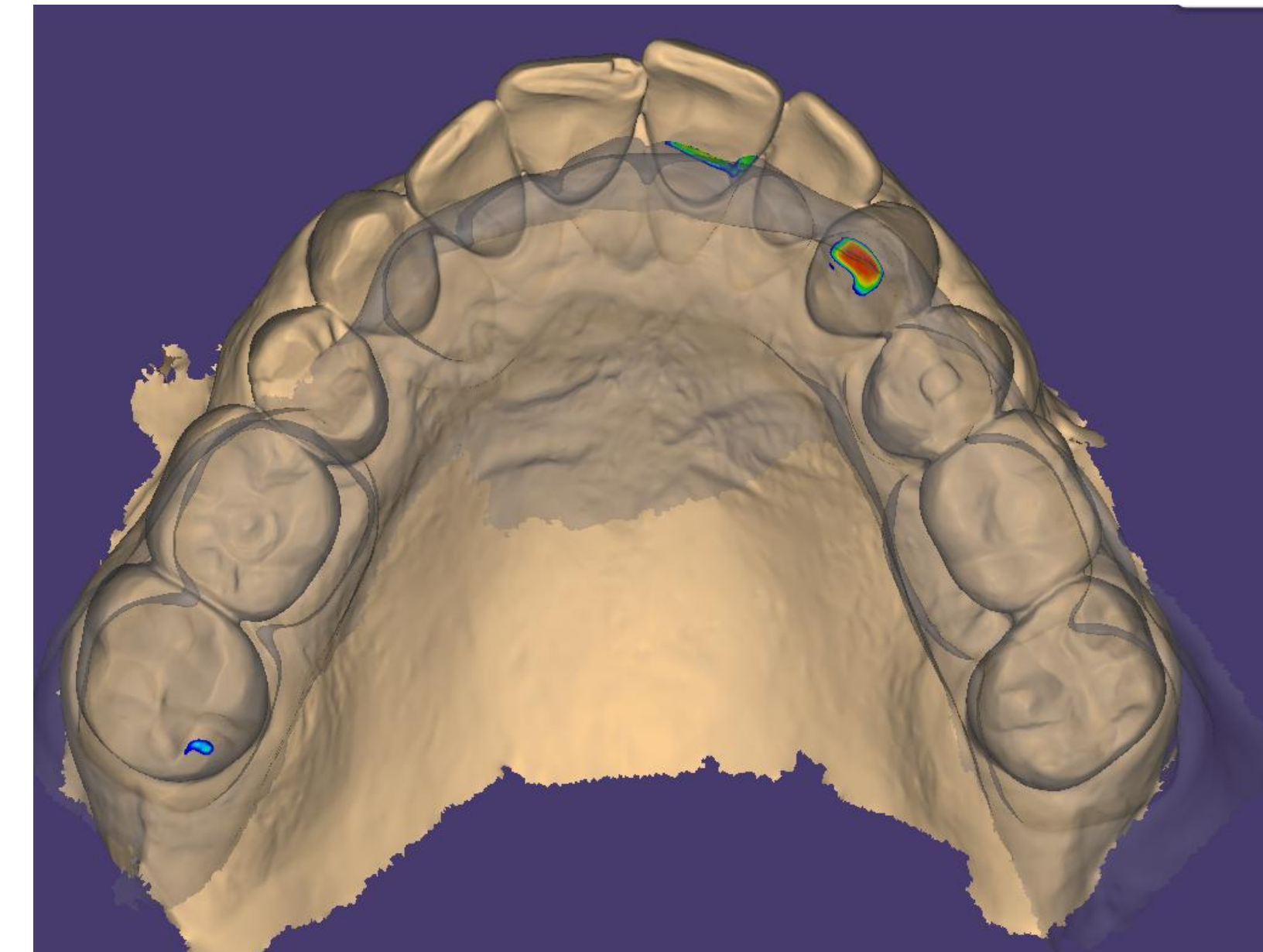


Intraoral photos

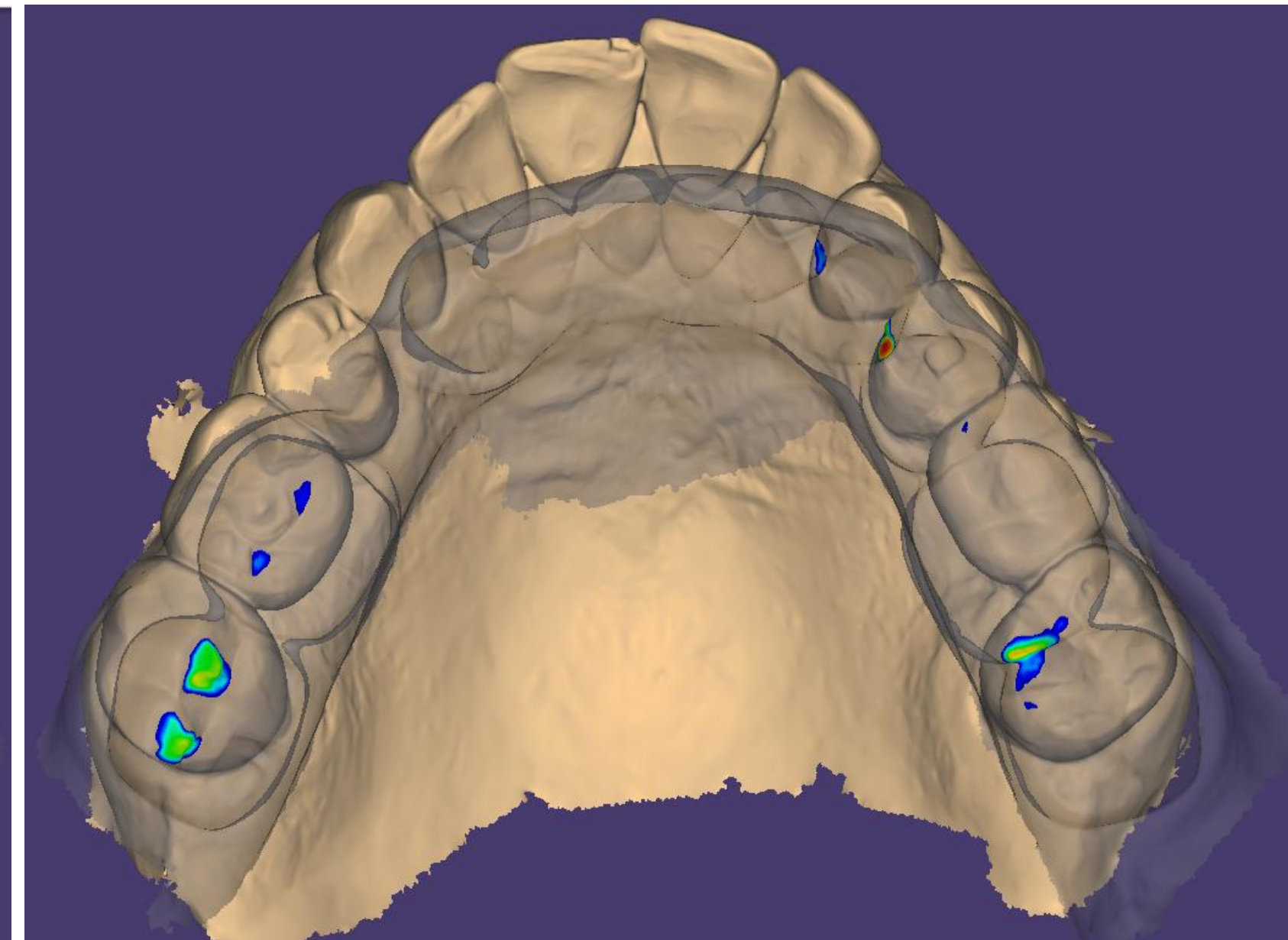
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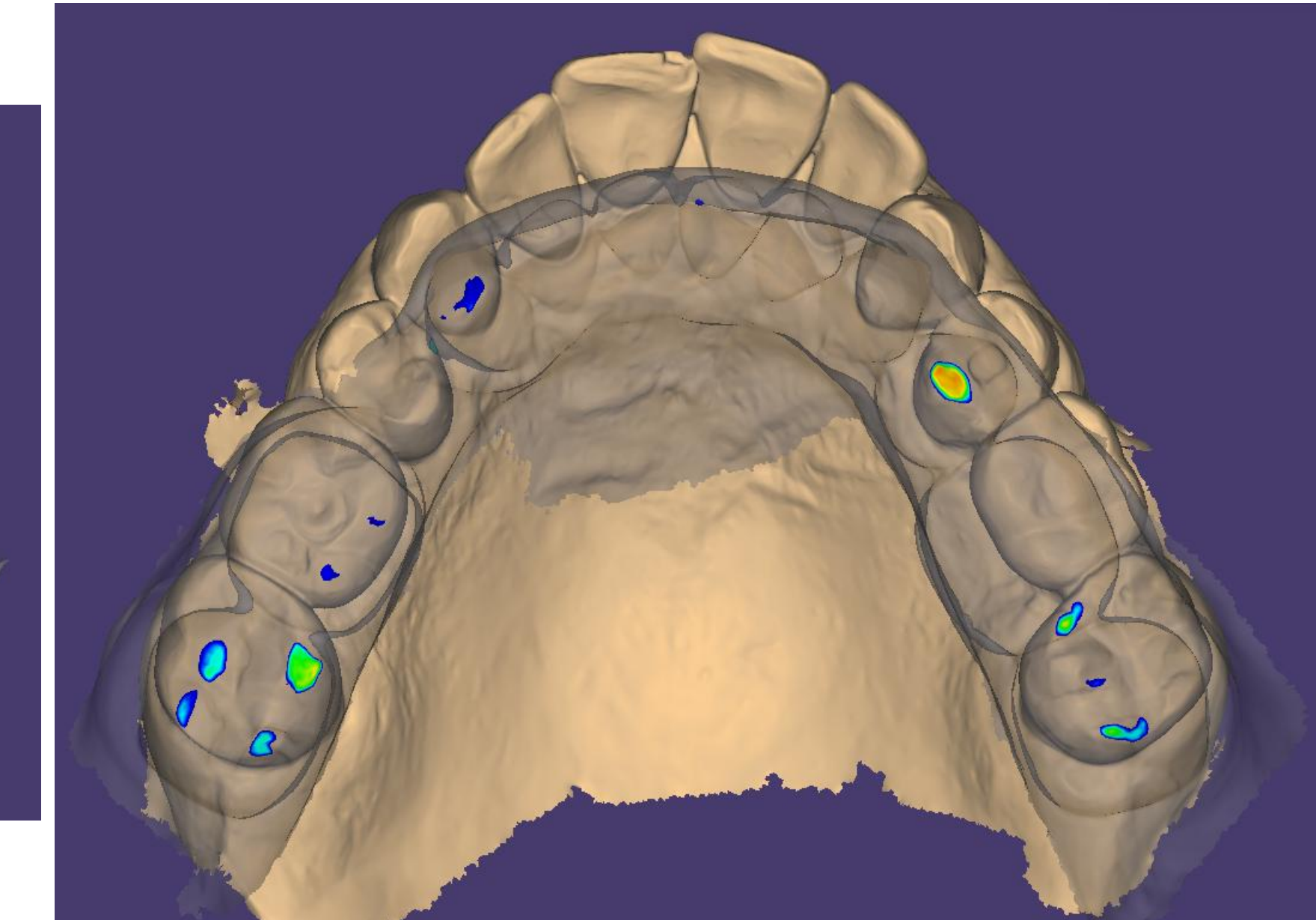
CBCT Crosssectional slice



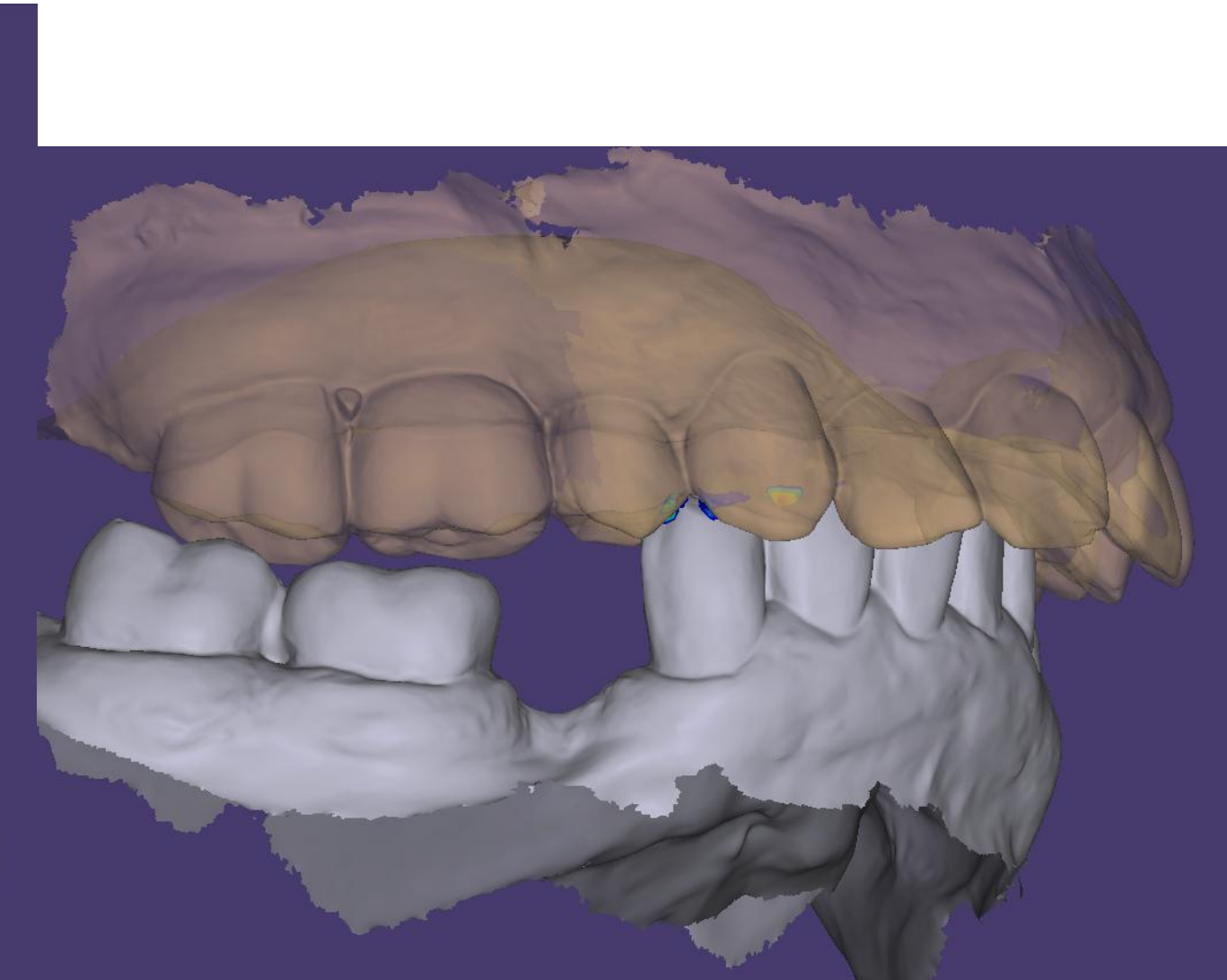
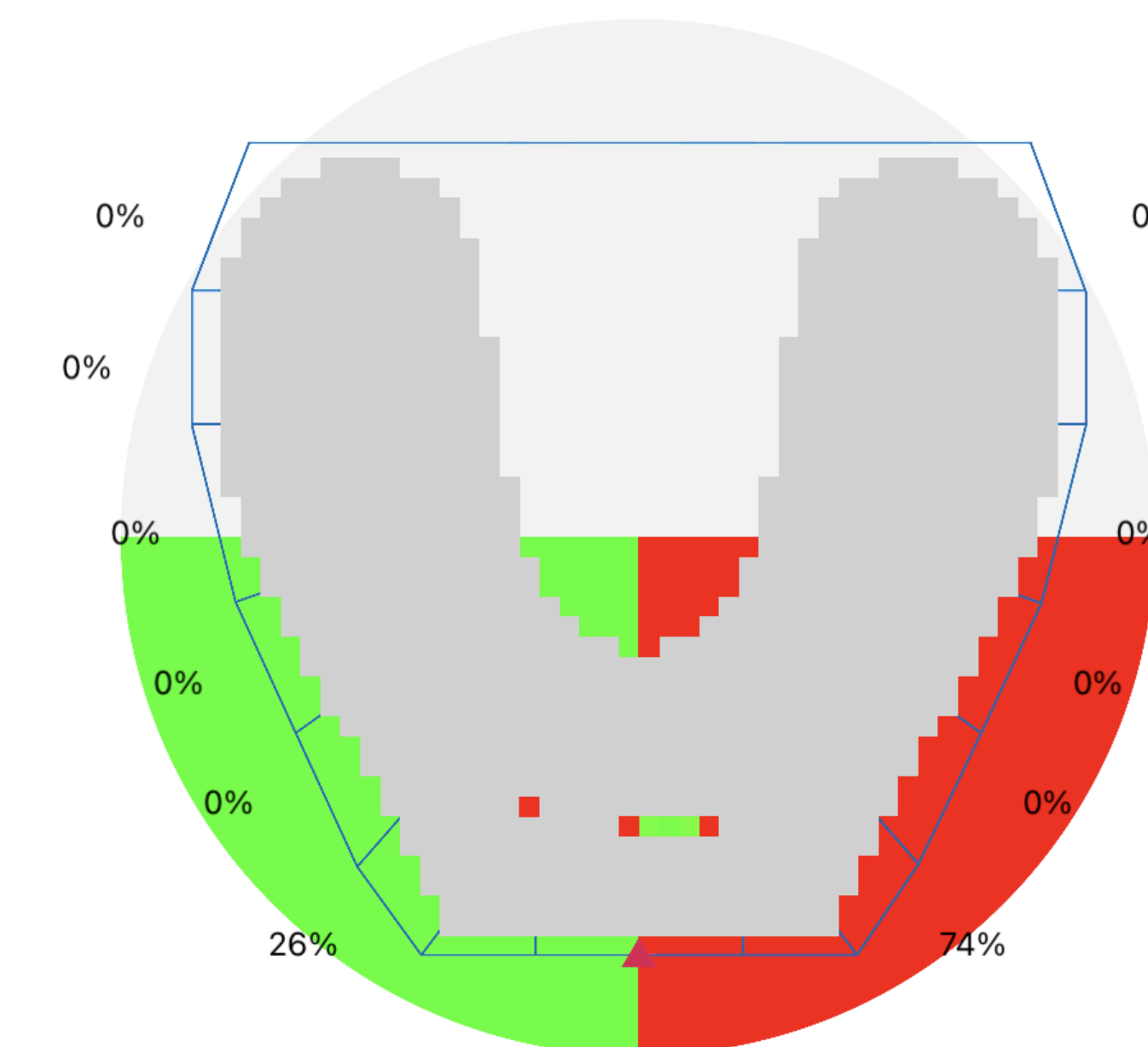
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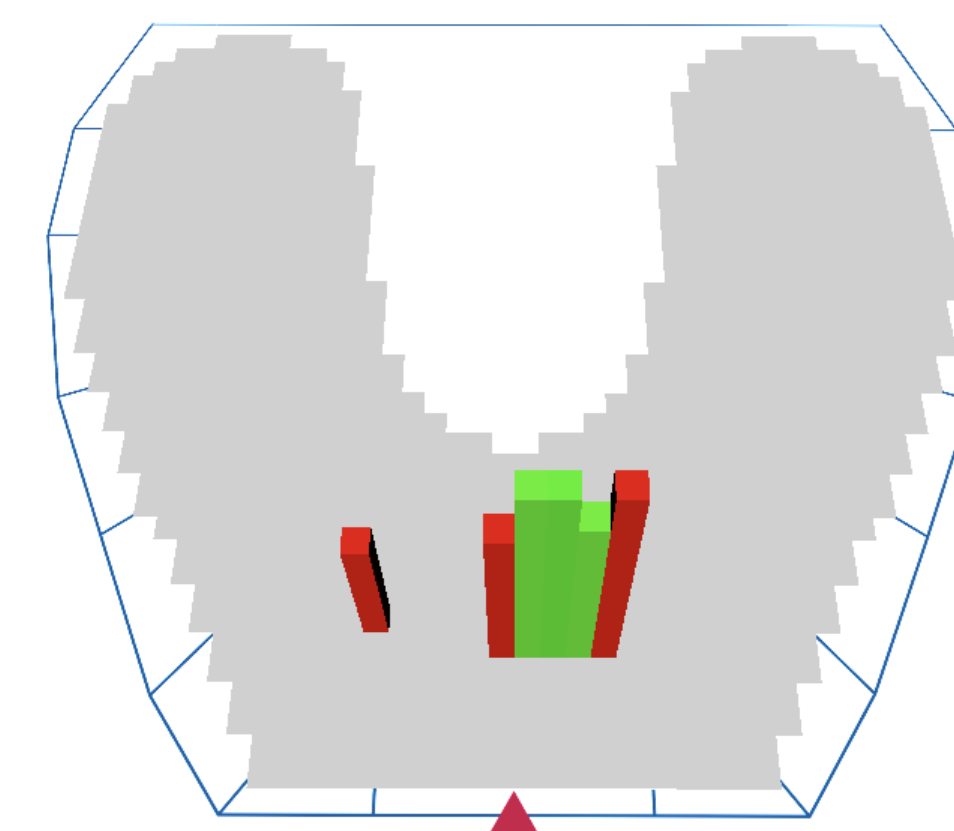
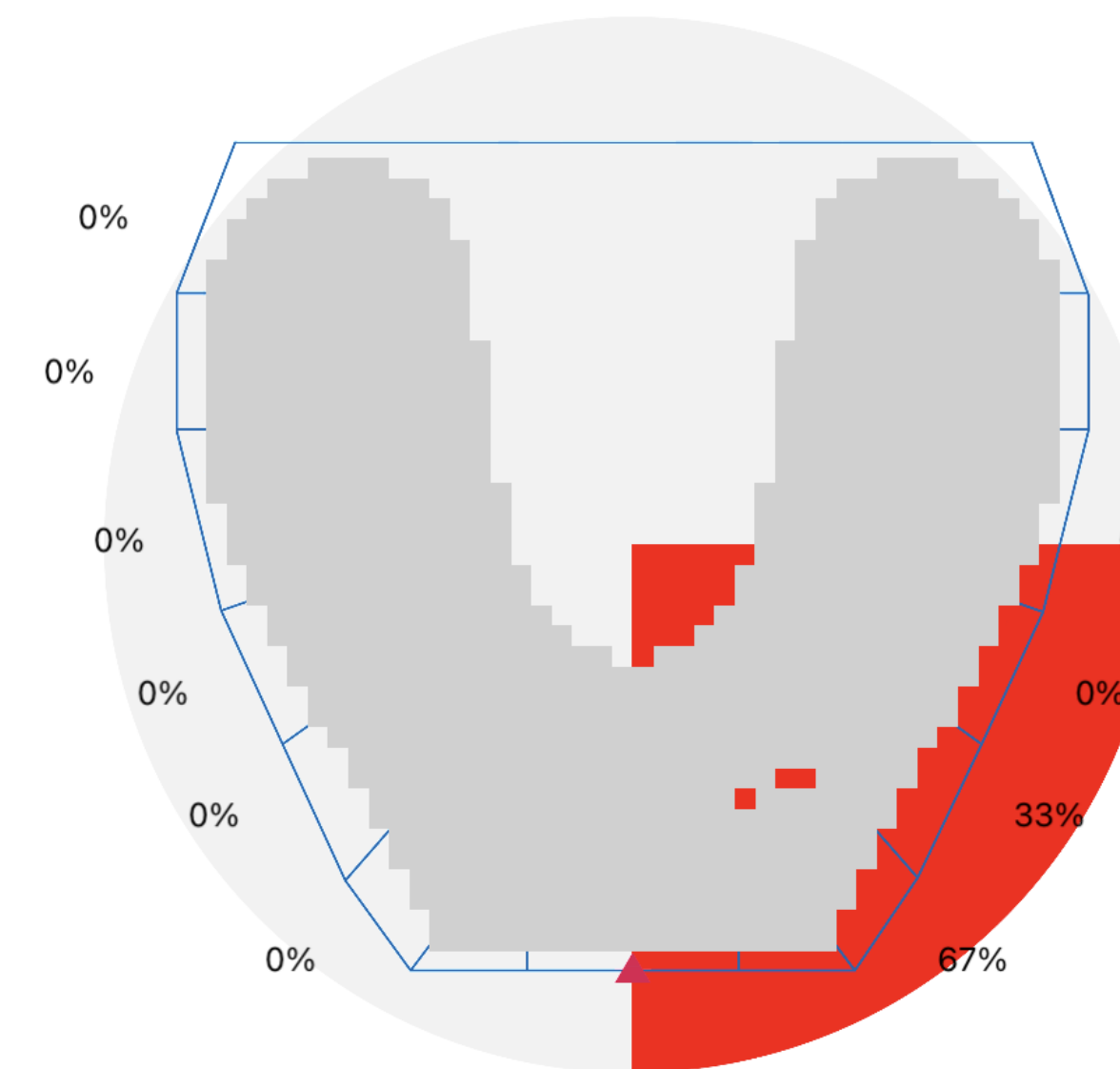
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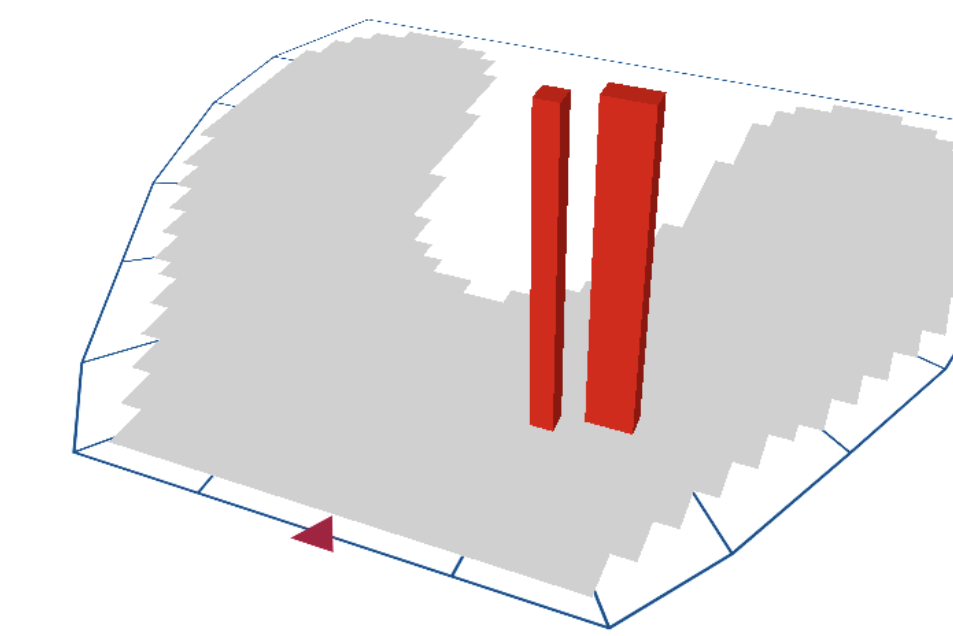
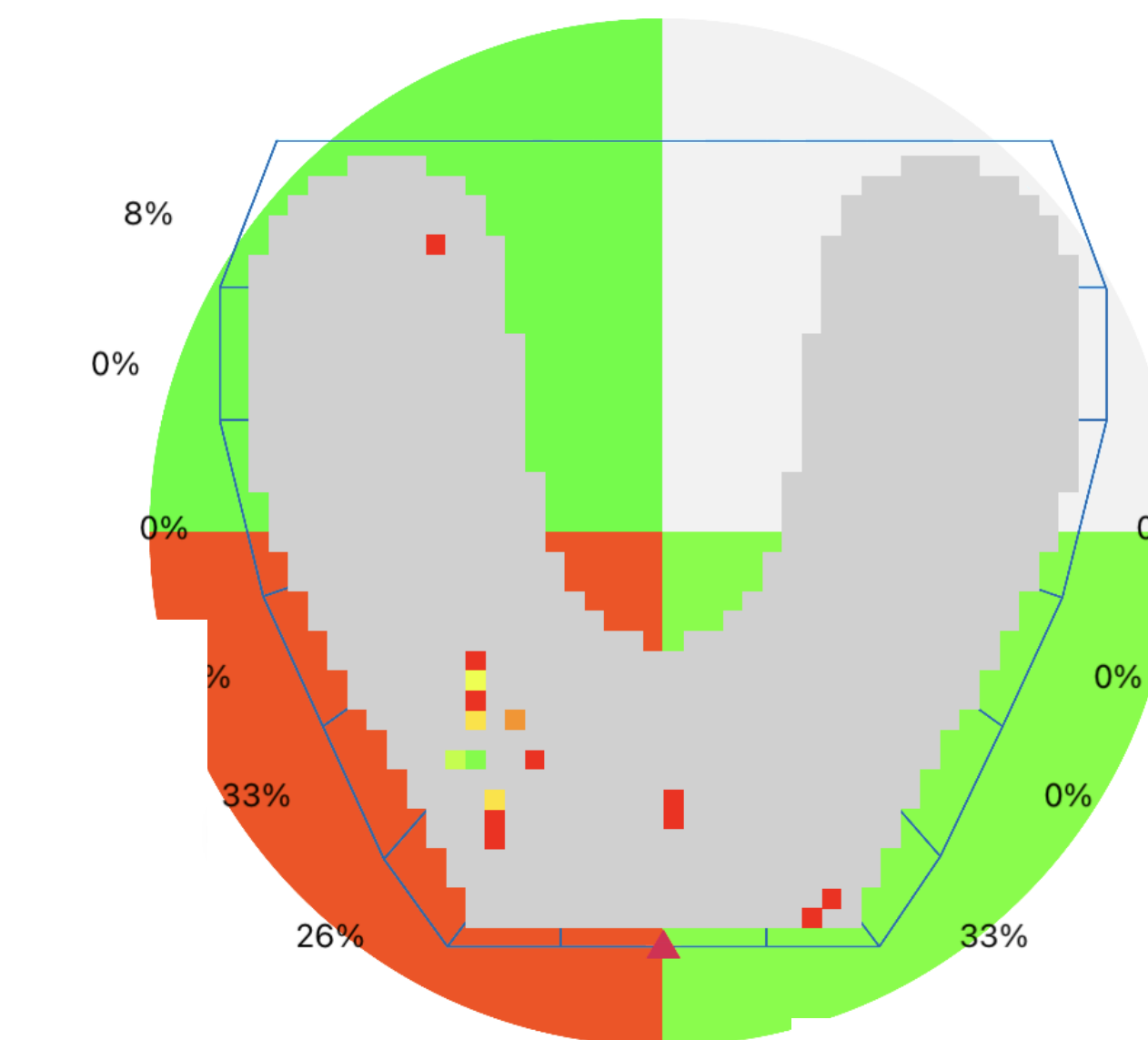
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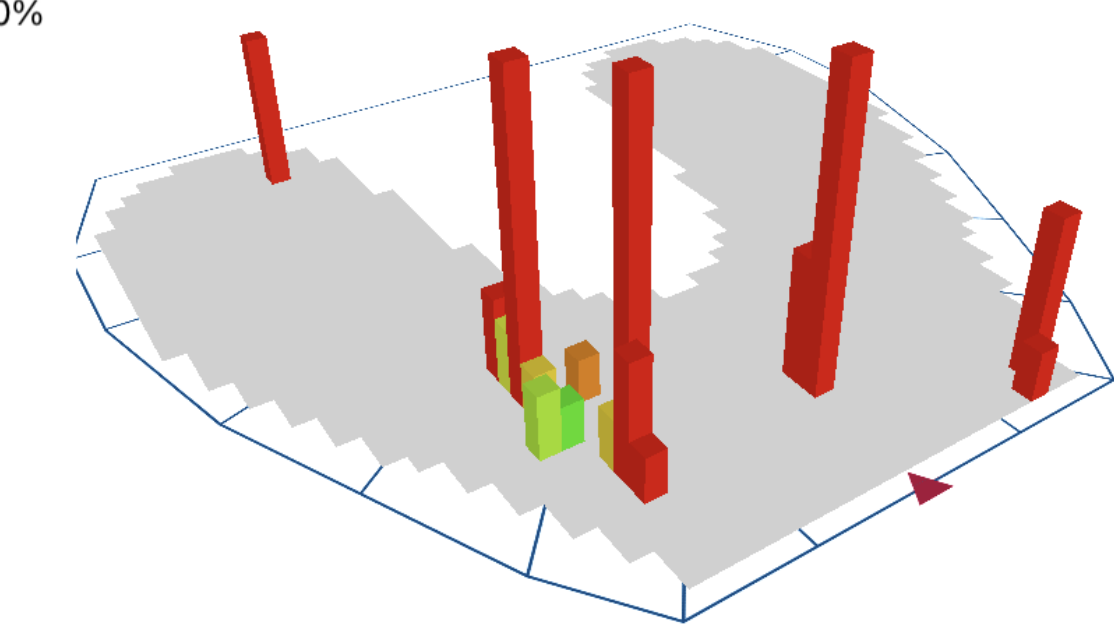
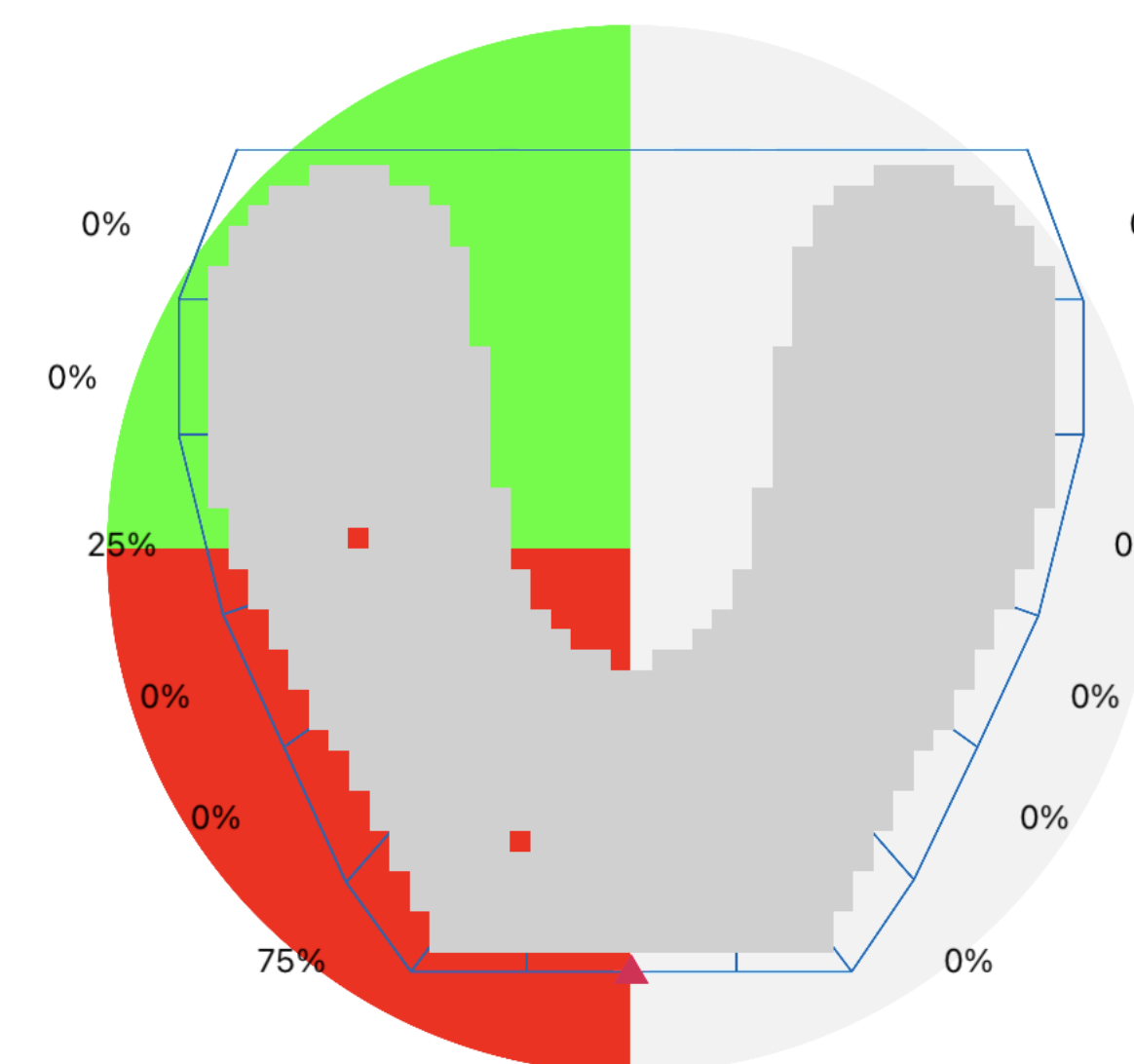
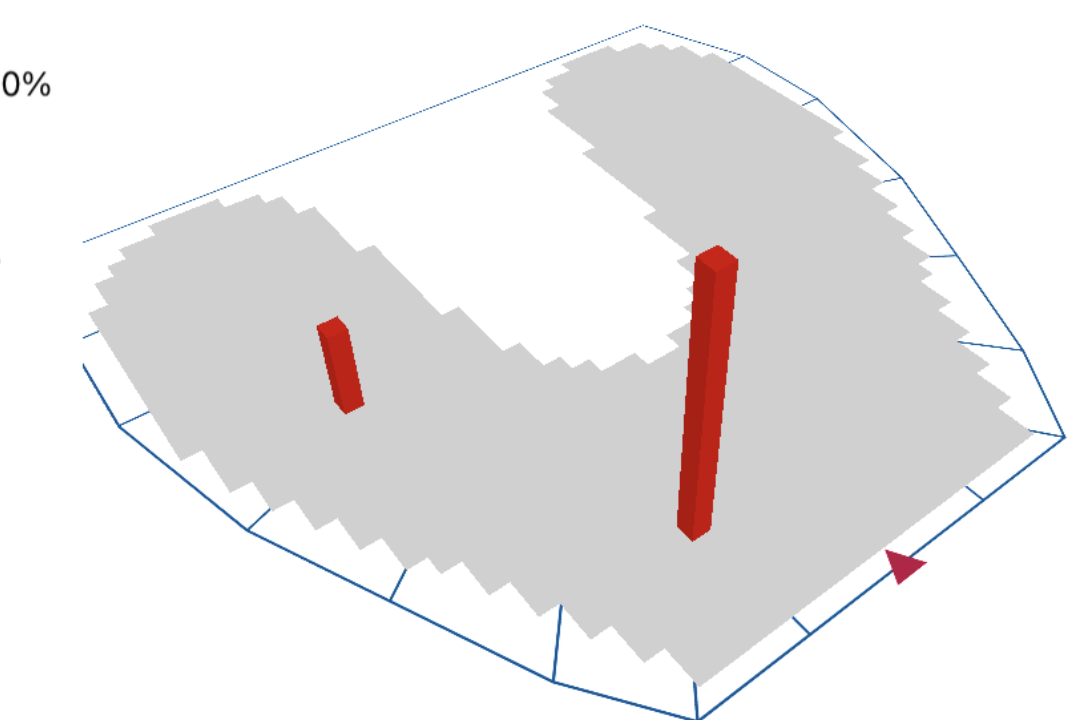
Protrusion



Laterotrusion Left



Laterotrusion Right



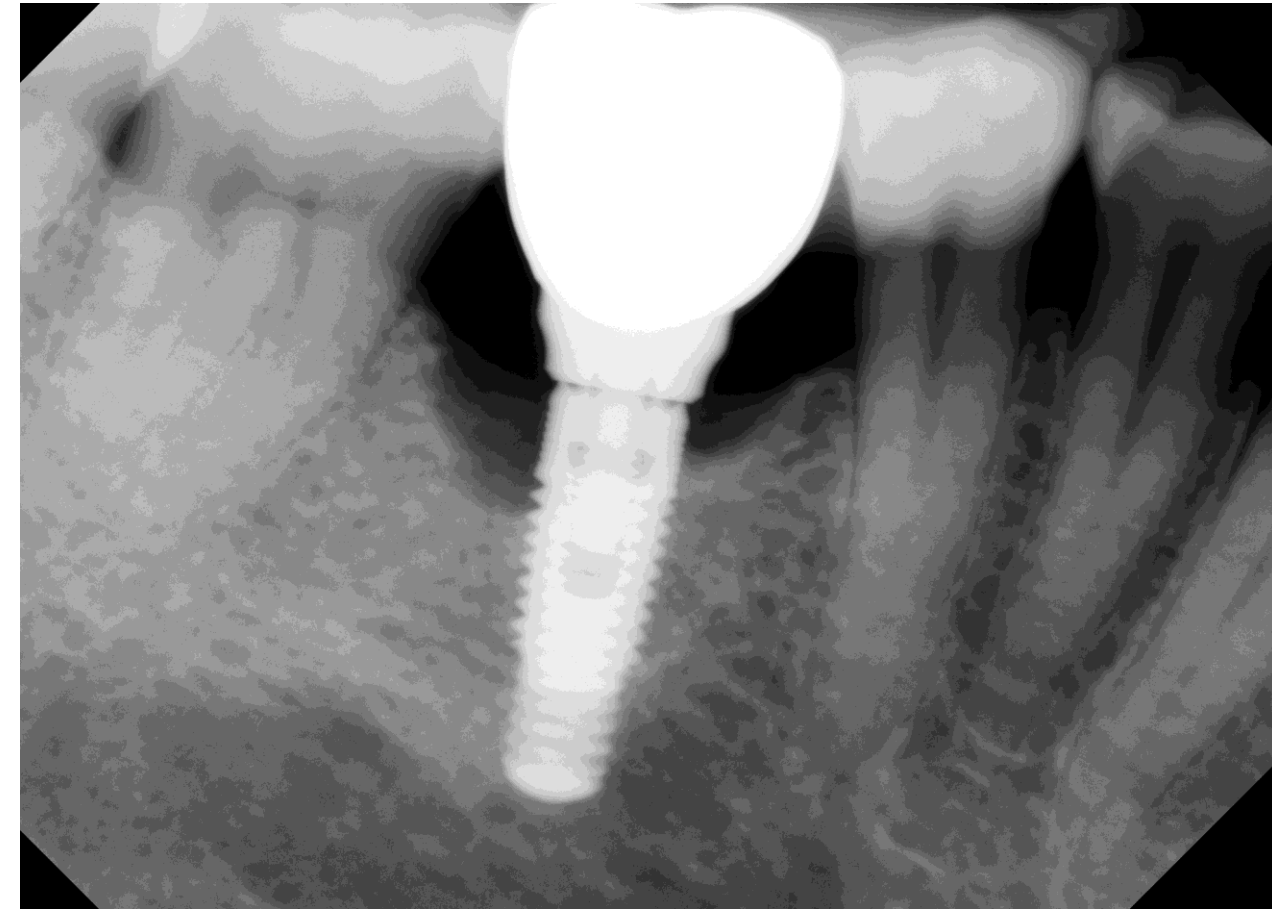
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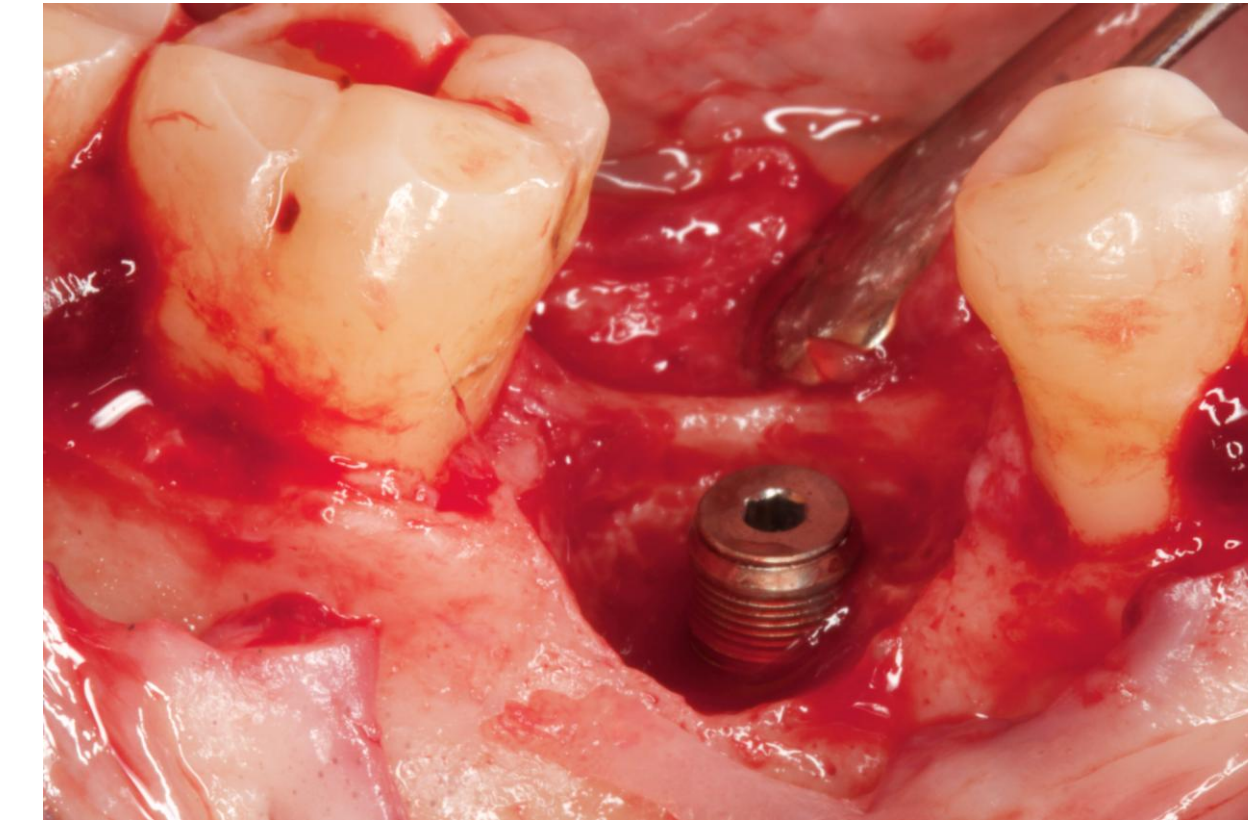
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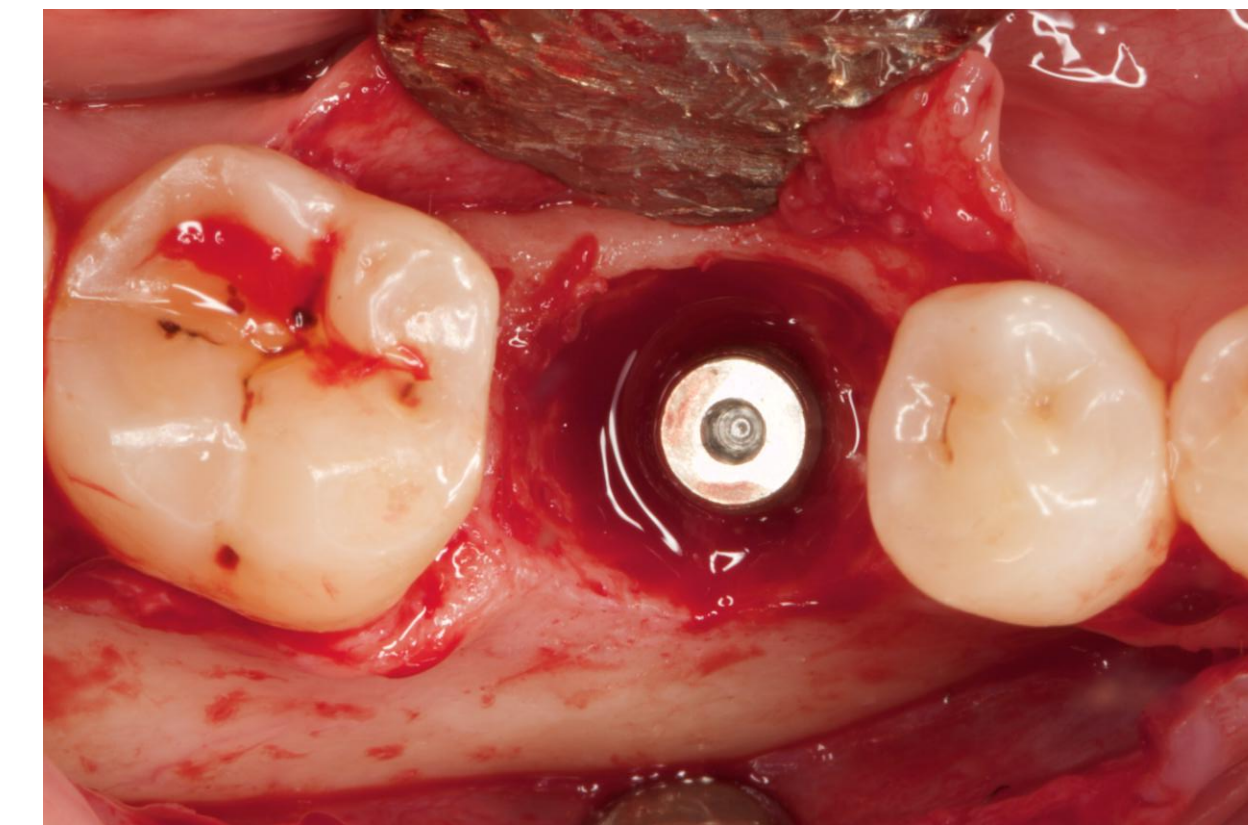
Methodology



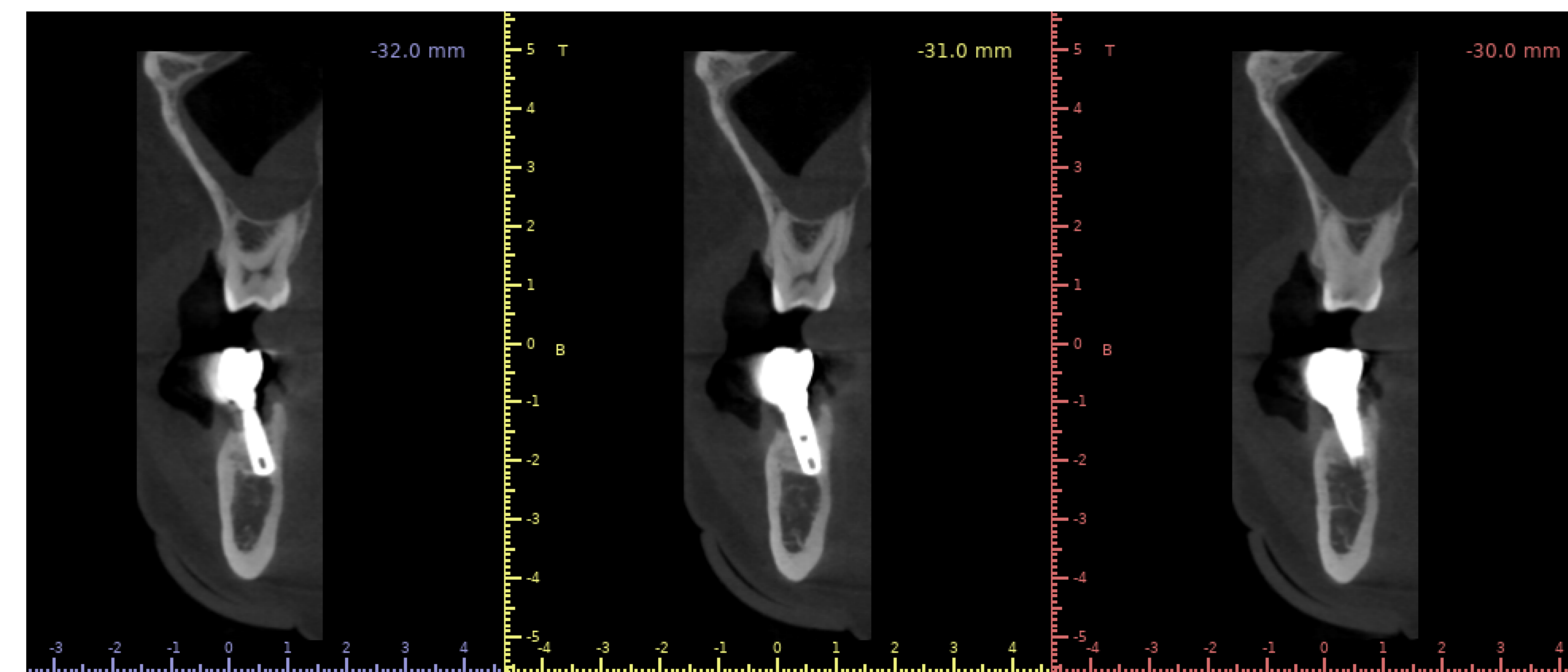
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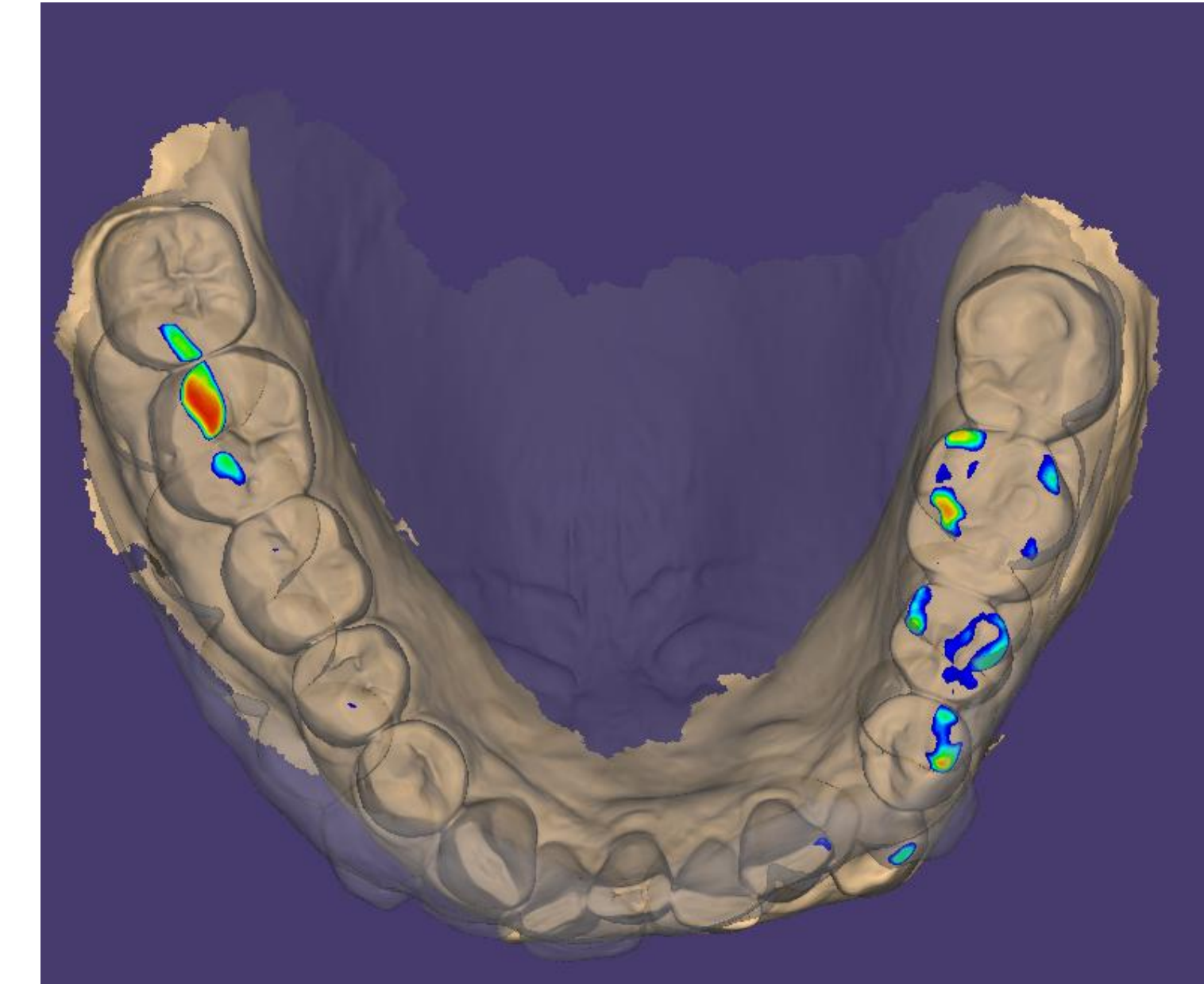
Intraoral photos



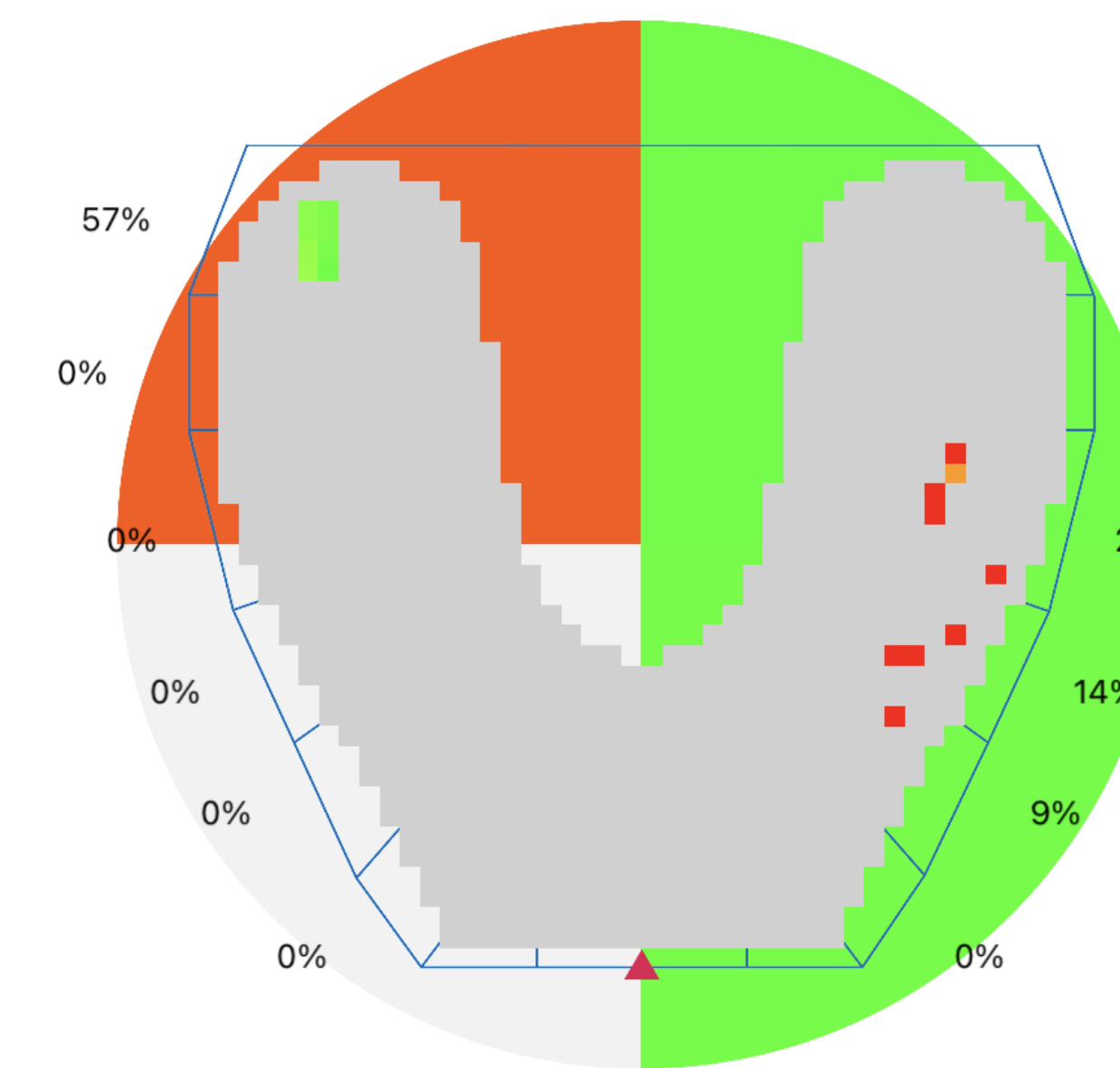
Surgical photos



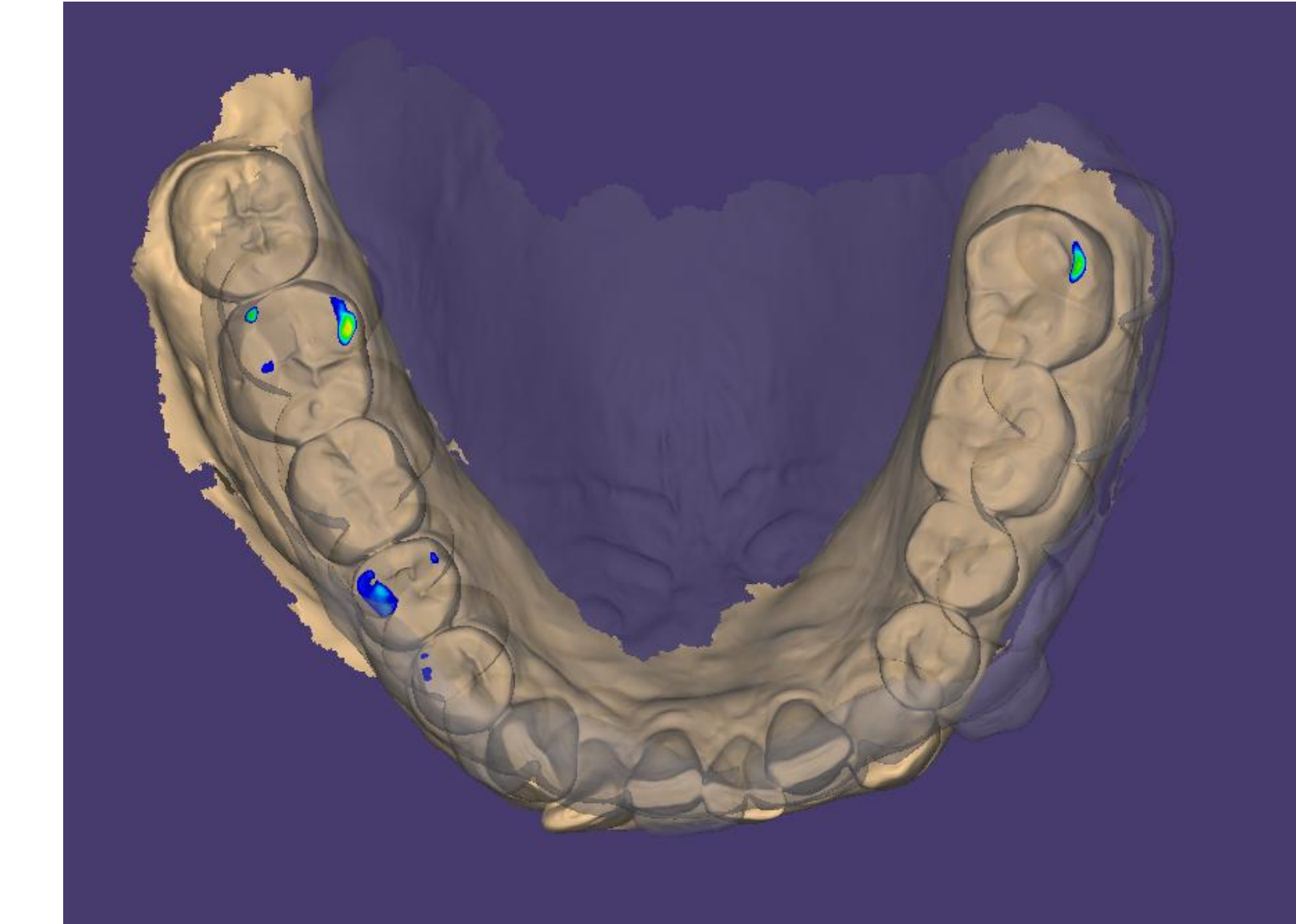
CBCT Crosssectional slice



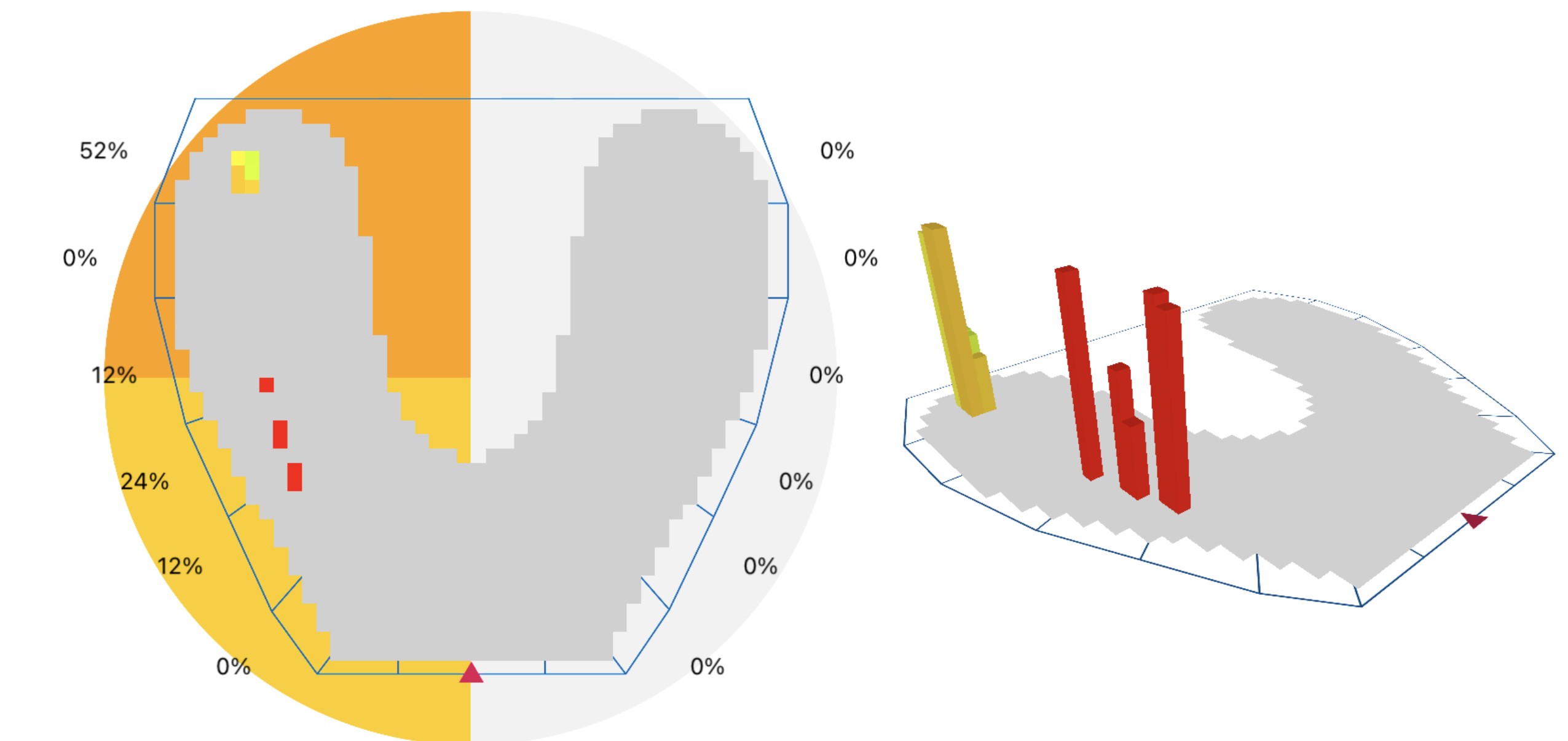
Laterotrusion Left



Laterotrusion Left



Laterotrusion Right



Laterotrusion Right

Conclusion

Combining digital tools like Exocad with real-time systems like Occlusense enhances the precision and personalization of occlusal analysis. Together, they provide a comprehensive approach to diagnosing and managing occlusal dynamics for improved treatment outcomes.