



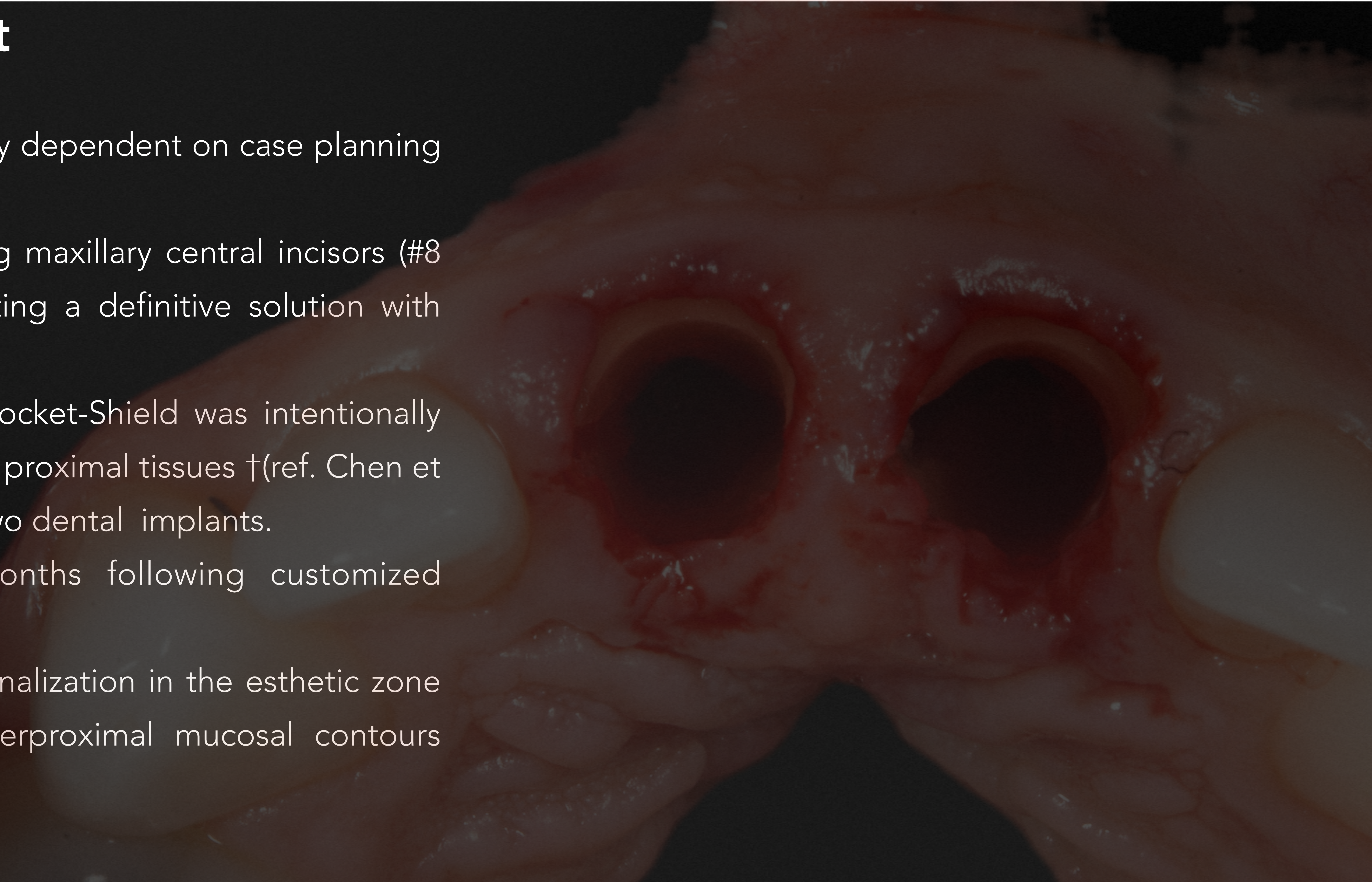
Volumetric Analysis of Inter-Implant Tissue Stability Using a Double C-shaped Interproximal Socket-Shield



Ham S. Kibuuka DMD, Hung-Chi Liao DDS, MSD, Joseph Kan DDS, MS, Brandon Kim DDS, Jaime Lozada DDS

Case Report

- Preservation of Inter Implant papilla is highly dependent on case planning and execution.
- A 52-year-old patient presented with failing maxillary central incisors (#8 and #9) and high esthetic demands, requesting a definitive solution with immediate treatment if possible.
- In this report, a C-shaped interproximal Socket-Shield was intentionally retained during IPP to stabilize both facial and proximal tissues †(ref. Chen et al. IJPRD 2023) while simultaneously placing two dental implants.
- Restorations were delivered after 6 months following customized abutments and provisionals.
- Immediate implant placement and provisionalization in the esthetic zone can trigger rapid collapse of facial and interproximal mucosal contours immediately after crown or abutment removal.

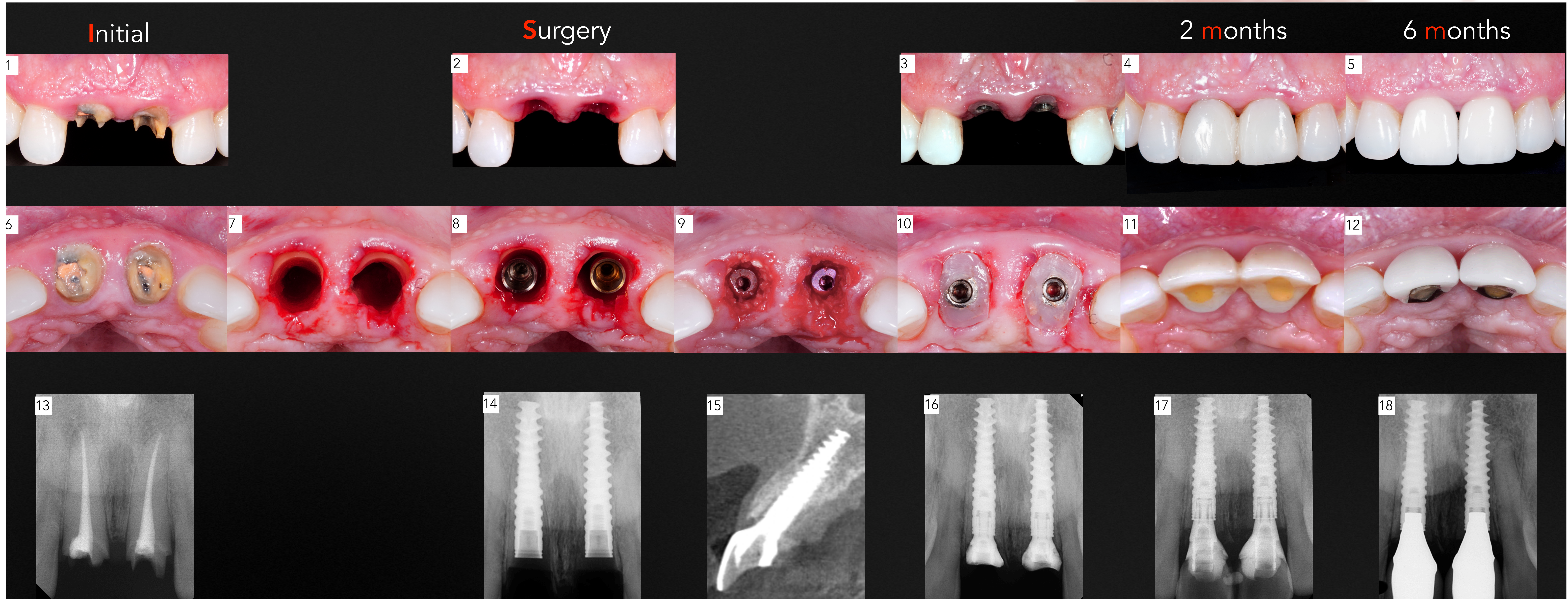




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Treatment Rationale: #8 & 9 were prepared as a double C-shaped Interproximal Socket-Shield[†](ref. Chen et al. IJPRD 2023) while simultaneously placed two dental implants. Implant restorations were delivered in 6 months following customized abutments and provisionals.



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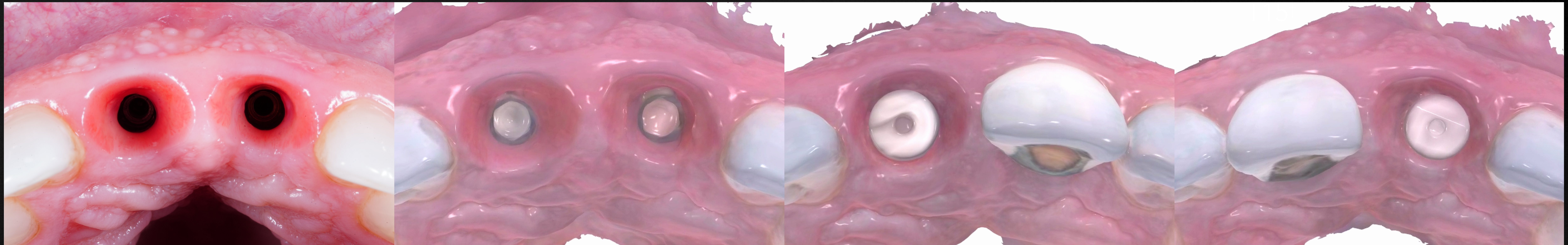
Null Hypothesis *Emergence Profile of the Crown has no significant effect on the Peri-implant Tissue Contour*

Emergence Profile

Intraoral Scan at T0†

Intraoral Scan at T15†

Intraoral Scan at



The intraoral scans immediately following crown removal (T0) and after a 15-minute interval (T15) were digitally captured. Scanning was done immediately after crown removal and then subsequently at 1, 2, 3, 5, 7, 10, and 15-minute intervals.

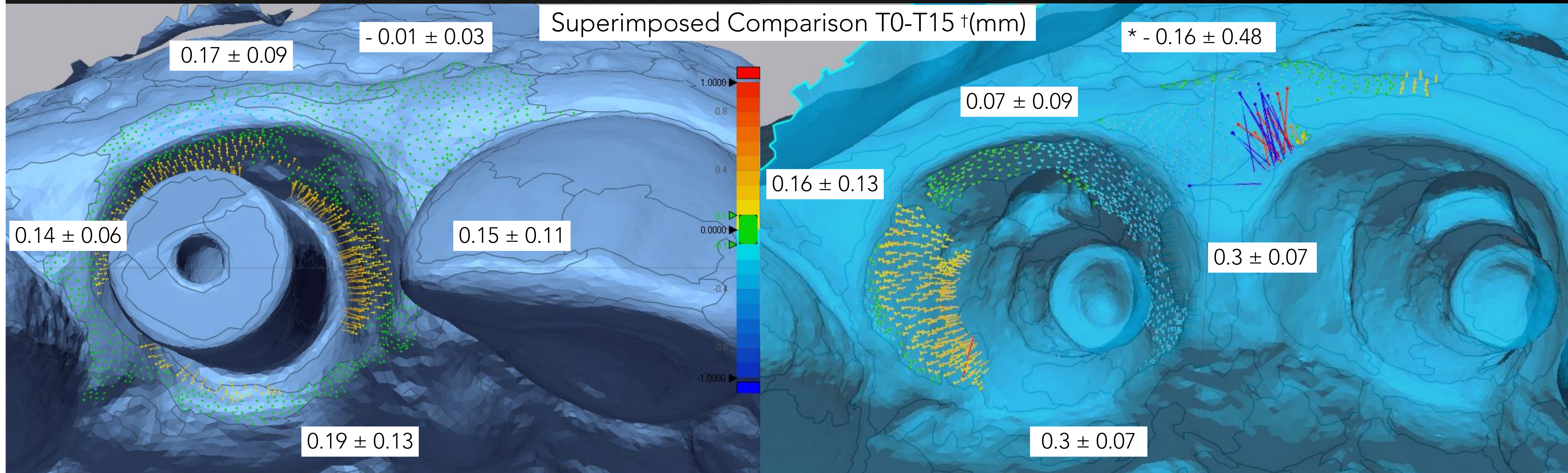


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Null Hypothesis *Emergence Profile of the Crown has no significant effect on the Peri-implant Tissue Contour*



The intraoral scans captured immediately following crown removal (T0) and after a 15-minute interval (T15) were digitally superimposed, and specific regions of interest (as shown in the diagrams) for each implant were identified for volumetric analysis using a computer software (Geomagic Control X 2020). Mean changes in the facial mucosal profile within each zone were calculated and presented as linear changes (Δd) using the formula: Δd (mm) = Δ volume (mm³)/area (mm²)



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Results Emergence Profile of the Crown has a **Significant Positive Effect** on the Peri-implant Tissue Contour

Discussion

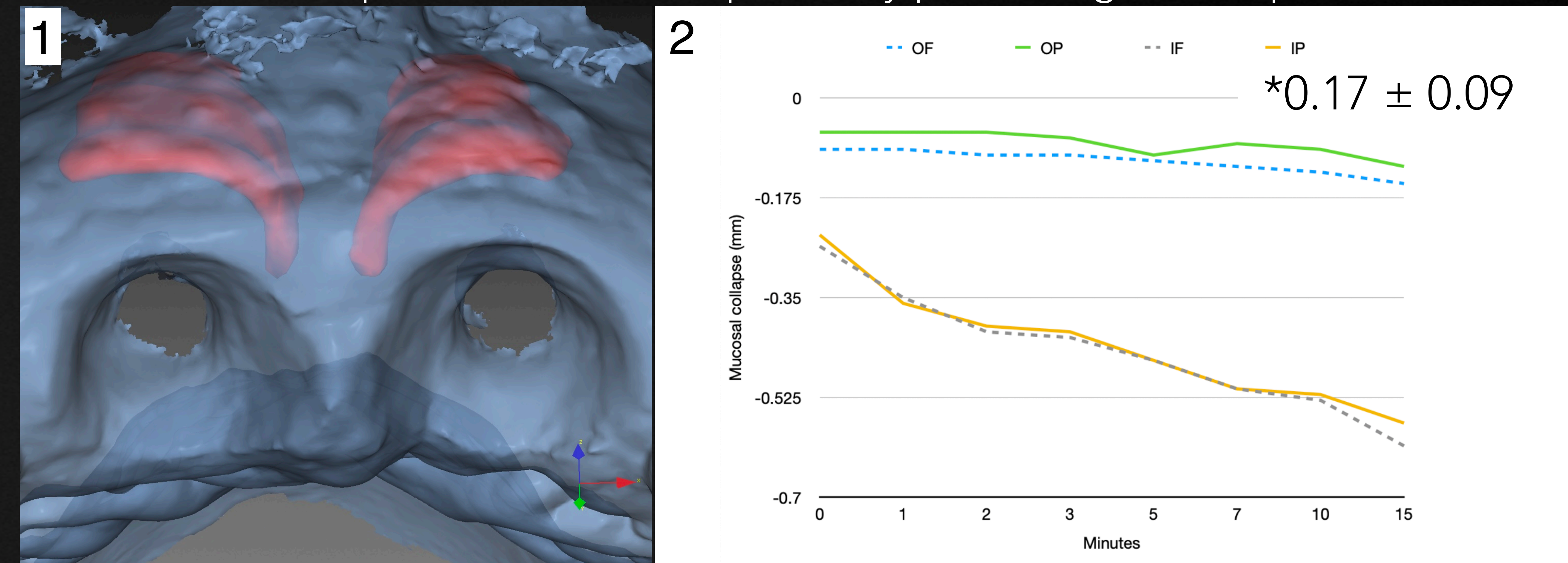
In 2010, Hürzeler et al ¹, first proposed retaining a facial root fragment (Socket-Shield, SS) of a failing tooth during Immediate Implant Placement and Provisionalization (IIPP) to preserve the facial bundle bone and maintain the facial mucosal profile. Since then, a couple of prospective and retrospective studies have been published and showed promising outcomes ². Furthermore, the Interproximal SS, which was first proposed by Kan et al. ³ in 2013, was an attempt to maintain inter-implant papillae by using the interproximal SS in conjunction with IIPP. A recent published 1 to 10- Year retrospective study ⁴ followed up 26 inter-implant sites and showed inter-implant papilla could be well maintained in 1 to 10- Year follow up.

In this case, interproximal SS was intentionally retained in order to maintain facial and inter proximal mucosal profile after IIPP (Fig 1). Due to the significant mucosal profile changes after crown removal, **the null hypothesis was rejected**. The emergence profile of the crown does help maintain the emergence profile, especially at interproximal area.

Additionally, the mucosal profile changes were compared to a recent study with 15 implants without SS ⁵. The implant sites were scanned immediately after crown removal at 1, 2, 3, 5, 7, 10, and 15-minute intervals. Interestingly, the facial & interproximal mucosal profile were better maintained with the present case at least within 15 minutes (Fig. 2).

Conclusion

Within the confines of this study, the emergence profile of the crown demonstrated positive effects on maintaining the facial and interproximal mucosal profiles. Additionally, the presence of the C-shaped Interproximal Socket-Shield further contributed to the preservation of the profile by preventing its collapse.



1. Hürzeler MB, Zuhr O, Schupbach P, Rebele SF, Emmanouilidis N, Fickl S. The socket-shield technique: A proof-of-principle report. J Clin Periodontol 2010
2. Liao HL, Kan J, Rungcharassaeng K, Lin GH, Zhur O, Hürzeler M, Chen J, Lozada J. Peri-implant Tissue Changes Around Maxillary Anterior Immediate Tooth Replacement With and Without Socket- Shield: 1-Year Randomized Controlled Clinical Trial. IJOMI 2025
3. Kan J, Rungcharassaeng K. Proximal socket shield for interimplant papilla preservation in the esthetic zone. IJPRD 2013
4. Chen J, Kan J, Rungcharassaeng K, Roe P, Liao HC, Limmeechokchai S, Lozada J. Inter-implant Papilla Changes Following Anterior Immediate Tooth Replacement with Socket Shields: A 1- to 10-Year Retrospective Study. IJPRD 2023
5. Chung E, Liao HC, Kan J. Peri-implant mucosal changes overtime following implant crown removal in the aesthetic zone (In preparation)