
SOMETHING
NEW
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Objective

The objective of this study is to present a new device for the preparation and mixing of biomaterial for bone regeneration with autologous platelets concentrate.

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Sticky Bone regular protocol
Temmerman et al., 2016
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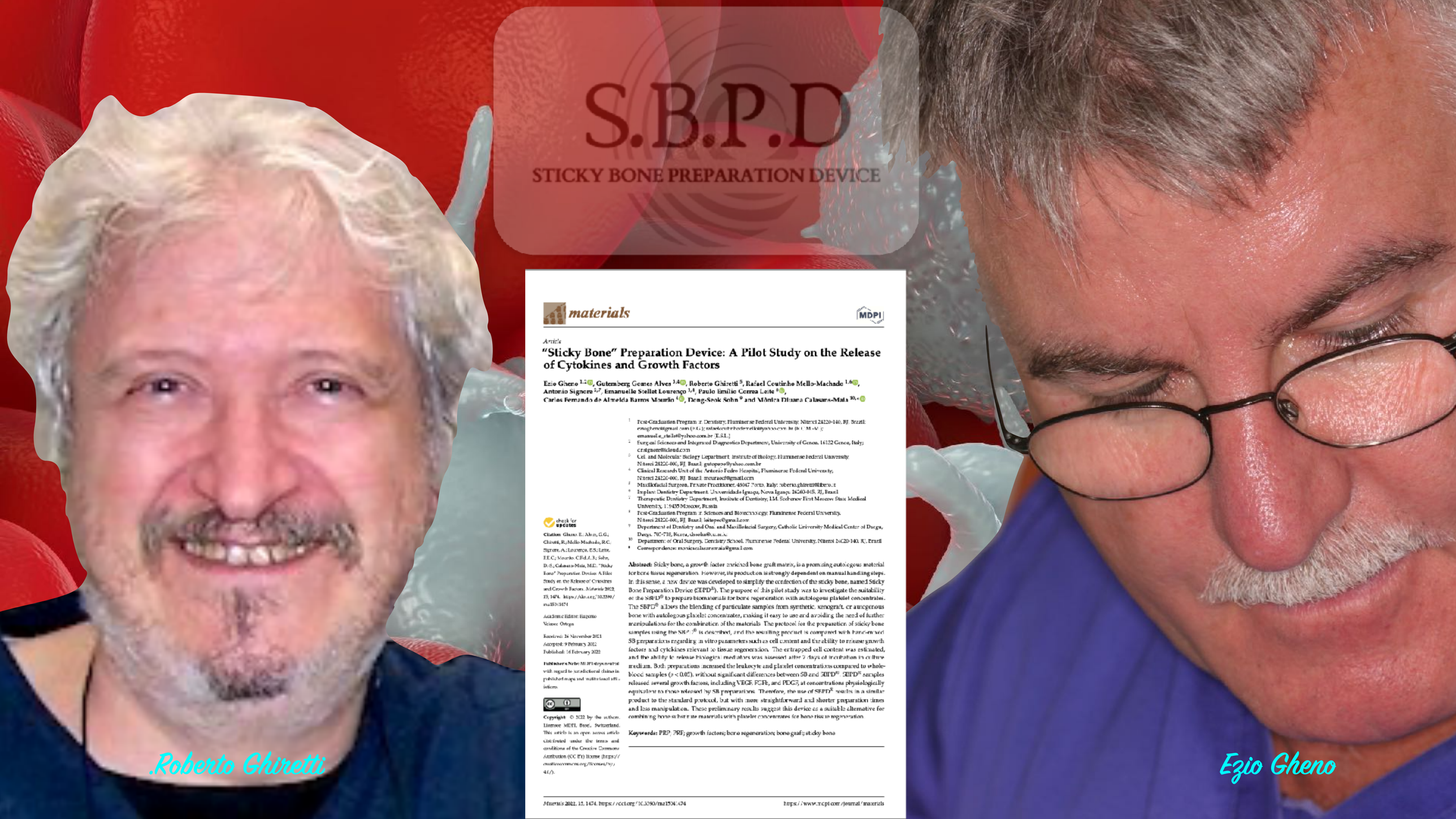
S.B.P.D

STICKY BONE PREPARATION DEVICE



materials

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Article

"Sticky Bone" Preparation Device: A Pilot Study on the Release of Cytokines and Growth Factors

Ezio Gheno [1,2], Gutemberg Gomes Alves [3,4], Roberto Ghiretti [5], Rafael Coutinho Mello-Machado [1,6], Antonio Signore [2,7], Emanuelle Stellet Lourenço [1,8], Paulo Emílio Correa Leite [9], Carlos Fernando de Almeida Barros Mourão [4], Dong-Seok Sohn [9] and Mônica Diuana Calasans-Maia [10,*]

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Citation: Gheno, E.; Alves, G.G.; Ghiretti, R.; Mello-Machado, R.C.; Signore, A.; Lourenço, E.S.; Leite, P.E.C.; Mourão, C.F.d.A.B.; Sohn, D.-S.; Calasans-Maia, M.D. "Sticky Bone" Preparation Device: A Pilot Study on the Release of Cytokines and Growth Factors. *Materials* 2022, *15*, 1474. https://doi.org/10.3390/ma15041474

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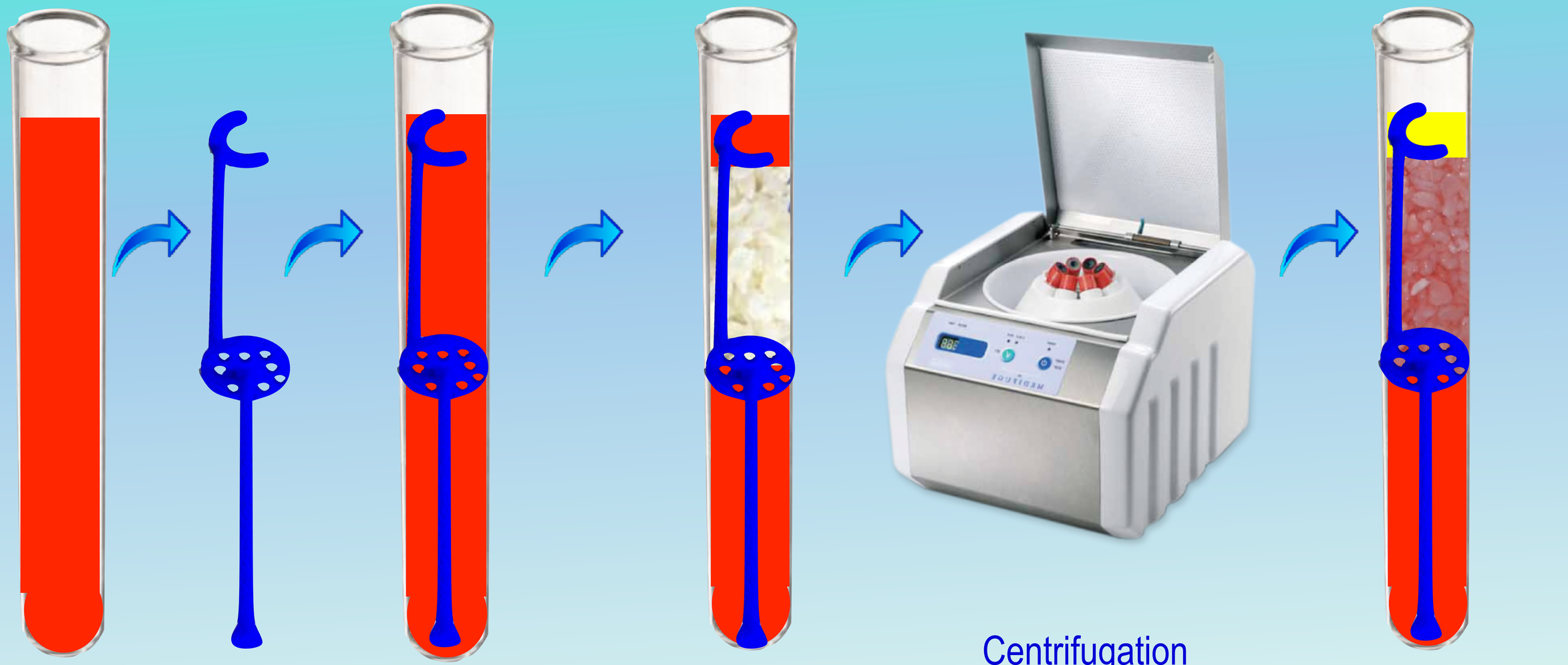
Abstract: Sticky bone, a growth factor enriched bone graft matrix, is a promising autologous material for bone tissue regeneration. However, its production is strongly dependent on manual handling steps. In this sense, a new device was developed to simplify the confection of the sticky bone, named Sticky Bone Preparation Device (SBPD®). The purpose of this pilot study was to investigate the suitability of the SBPD® to prepare biomaterials for bone regeneration with autologous platelet concentrates. The SBPD® allows the blending of particulate samples from synthetic, xenograft, or autogenous bone with autologous platelet concentrates, making it easy to use and avoiding the need of further manipulations for the combination of the materials. The protocol for the preparation of sticky bone samples using the SBPD® is described, and the resulting product is compared with hand-mixed SB preparations regarding in vitro parameters such as cell content and the ability to release growth factors and cytokines relevant to tissue regeneration. The entrapped cell content was estimated, and the ability to release biological mediators was assessed after 7 days of incubation in culture medium. Both preparations increased the leukocyte and platelet concentrations compared to whole-blood samples ($p < 0.05$), without significant differences between SB and SBPD®. SBPD® samples released several growth factors, including VEGF, FGFb, and PDGF, at concentrations physiologically equivalent to those released by SB preparations. Therefore, the use of SBPD® results in a similar product to the standard protocol, but with more straightforward and shorter preparation times and less manipulation. These preliminary results suggest this device as a suitable alternative for combining bone substitute materials with platelet concentrates for bone tissue regeneration.

Keywords: PRP; PRF; growth factors; bone regeneration; bone graft; sticky bone



Tubes after blood collection

Insertion of device

Insertion of granulate

Centrifugation

Sticky bone after centrifugation

Conclusion

The preparation did not present evidence of bacterial contamination even after 7days

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Conclusion

The SBPD is an easy-to-use, cost-effective and biologically high-performance product that can be used in various surgical branches.

The device does not impair the concentration of platelets and leukocytes on the formed fibrin matrix.

A significant difference were found for FGFb (Fibroblast growth factor), IL-5 and, MIP-1b (Macrophage inflammatory protein) ($p<0.05$).

It is possible to improve the preparation of sticky bone with this device more quickly and predictably.

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Conclusion

The SBPD® enables the mixing of both heterologous and autologous bone particles with autologous platelet concentrates, making the protocol easy and repeatable.

The SBPD® can be used with different types of certified centrifuges and different biomaterials.

The use of SBPD® results in a similar product to that obtained with the standard protocol, but with shorter preparation times and less manipulation.

The results obtained suggest this device as a valid alternative for mixing biomaterials with platelet concentrates.

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CERTIFICATE OF ACCEPTANCE

Certificate of acceptance for the manuscript (materials-1505102) titled:
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Authored by:
Ezio Gheno; Gutemberg Gomes Alves; Roberto Ghiretti; Rafael Coutinho de Mello Machado; Antonio Signore; Emanuelle Stellet Lourenco; Paulo Emilio C Leite; Carlos Fernando de Almeida Barros Mourao; Dong-Seok Sohn; Monica Diuana Calasans-Maia

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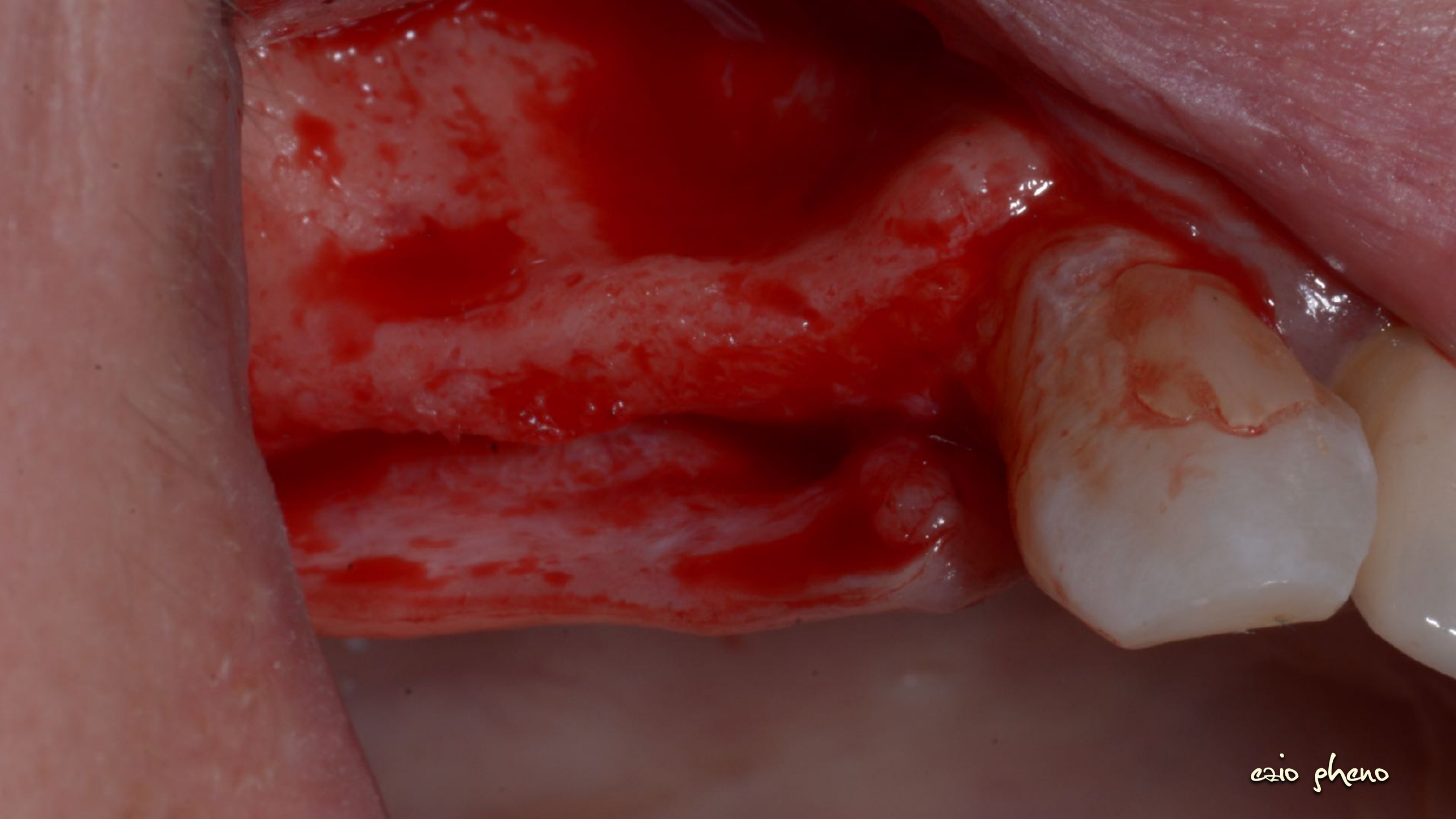
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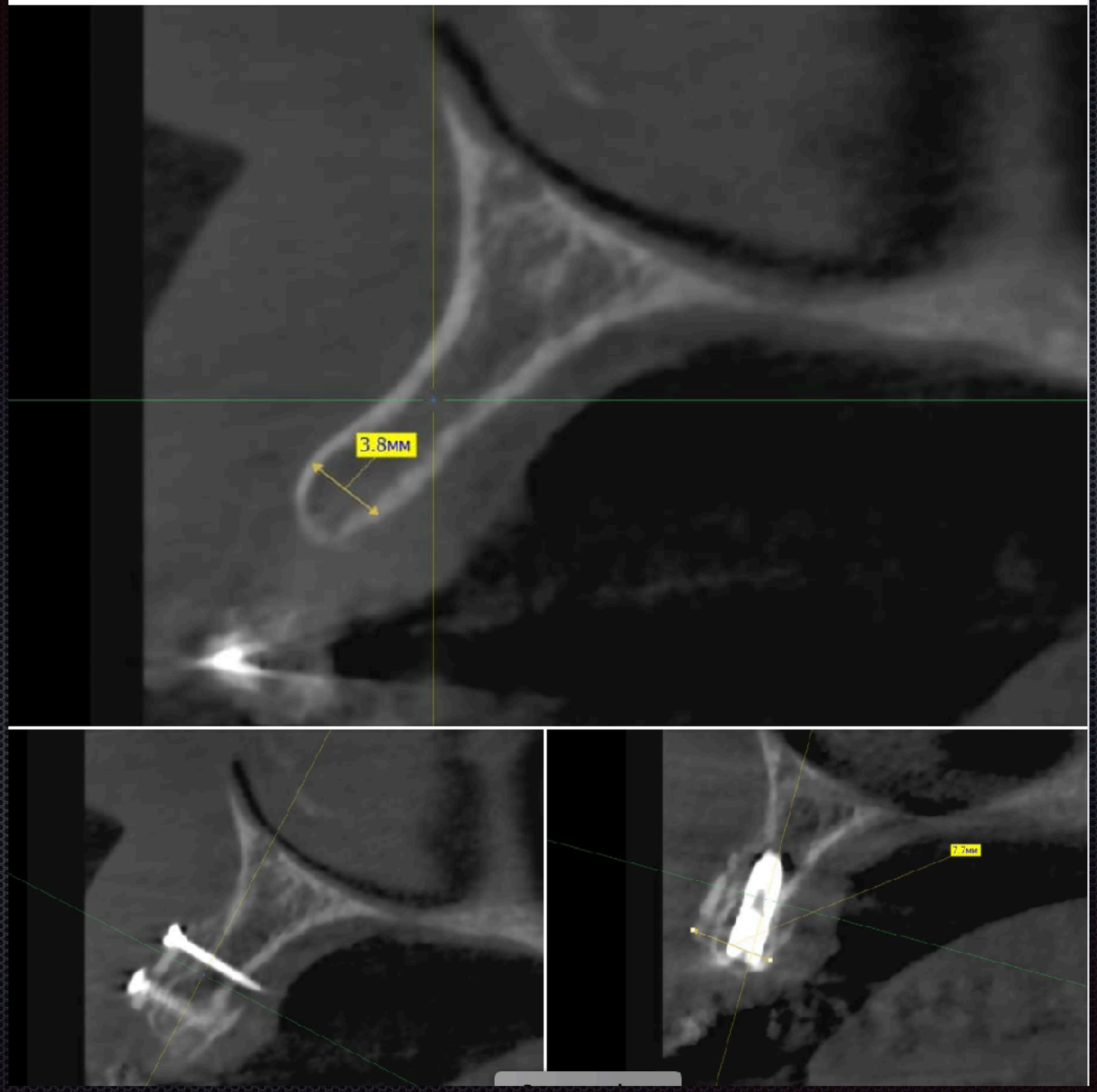

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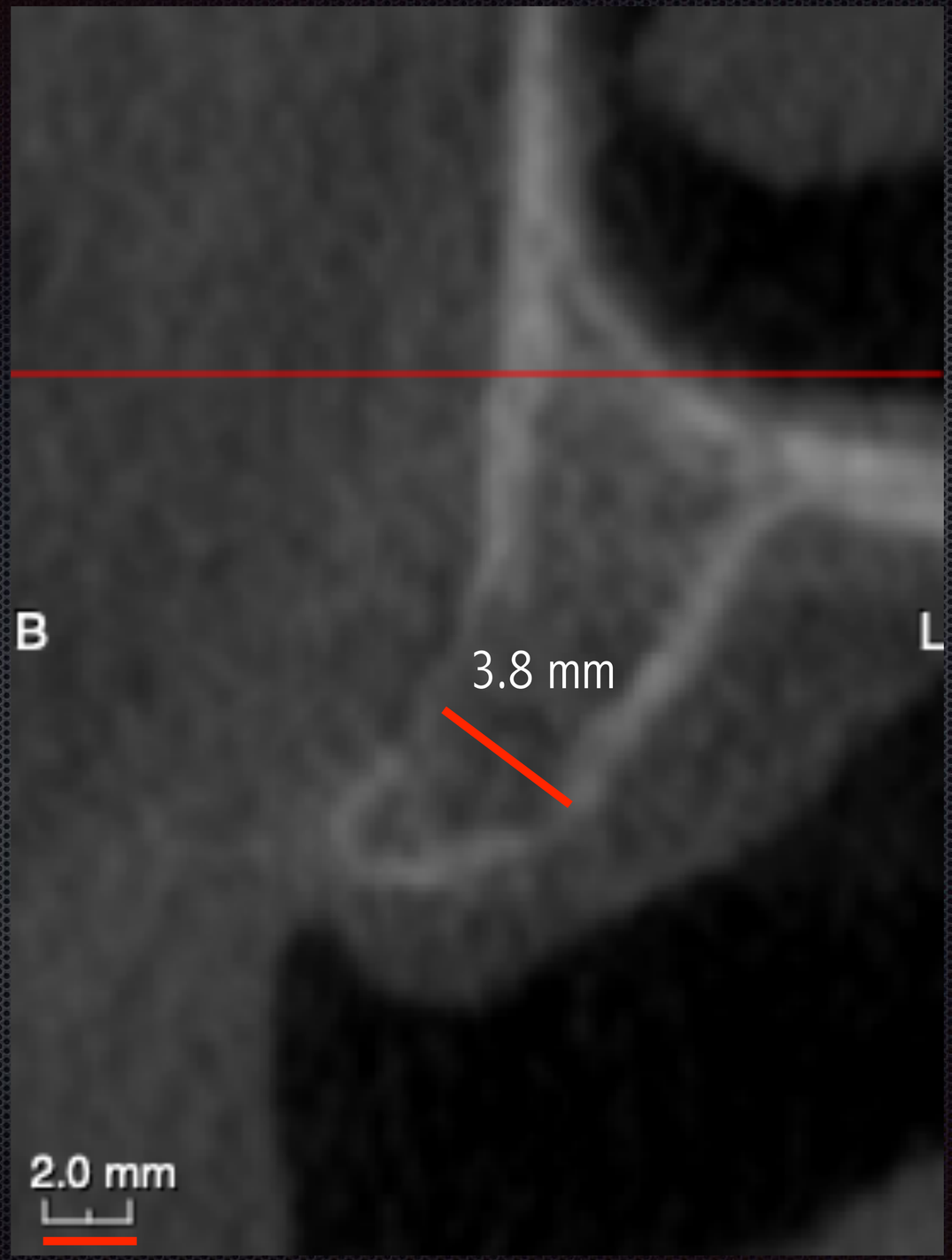

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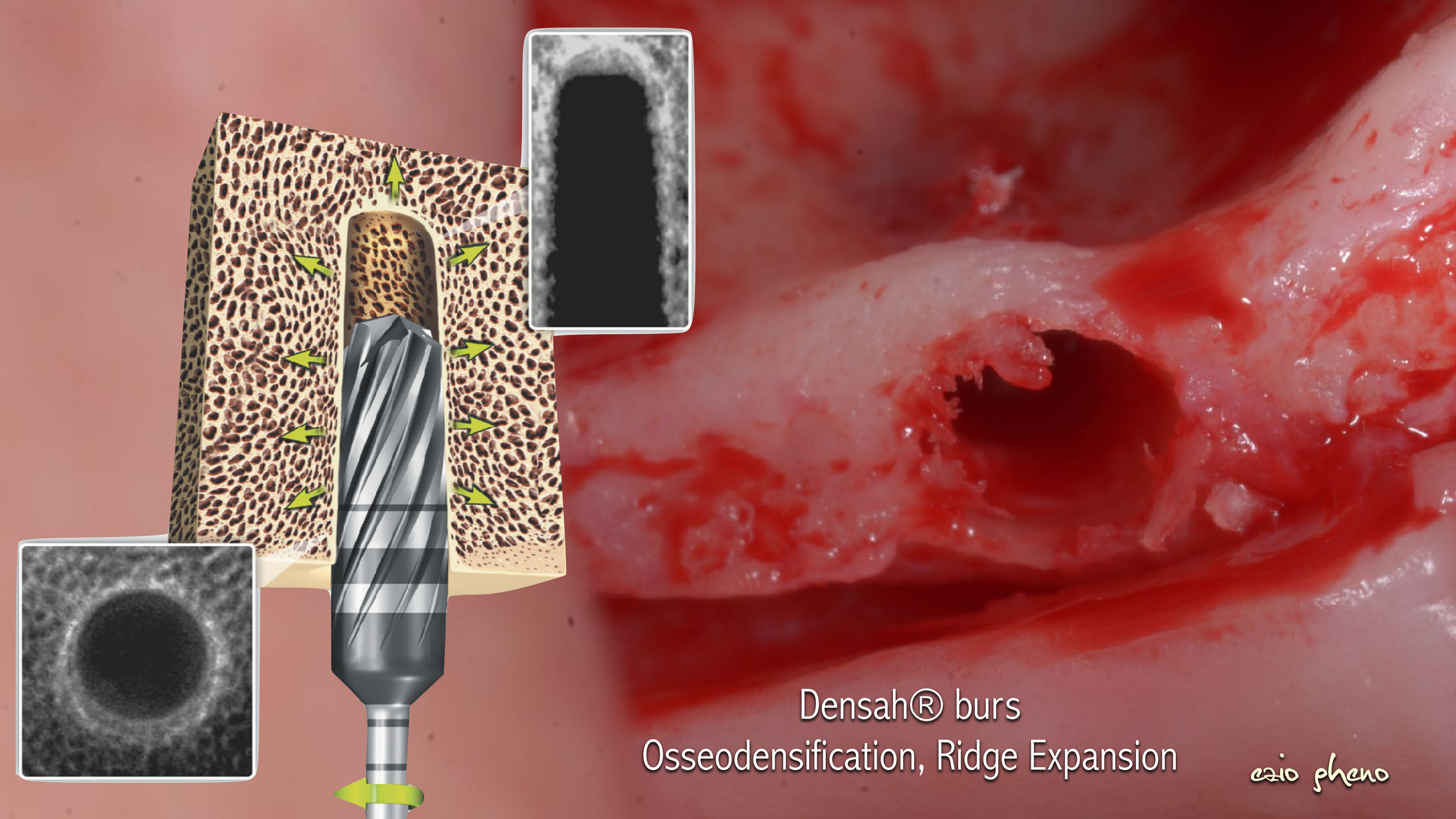
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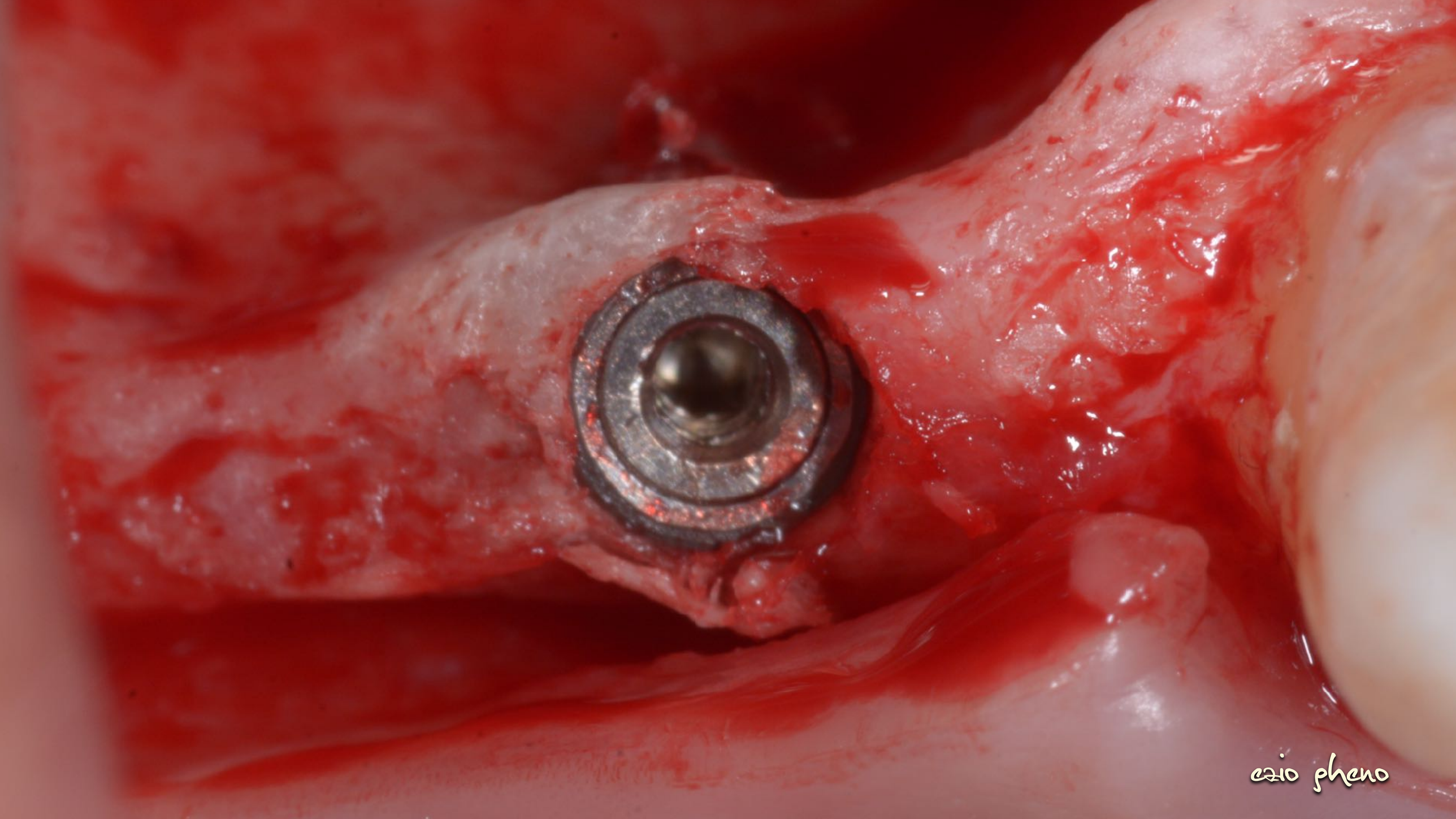
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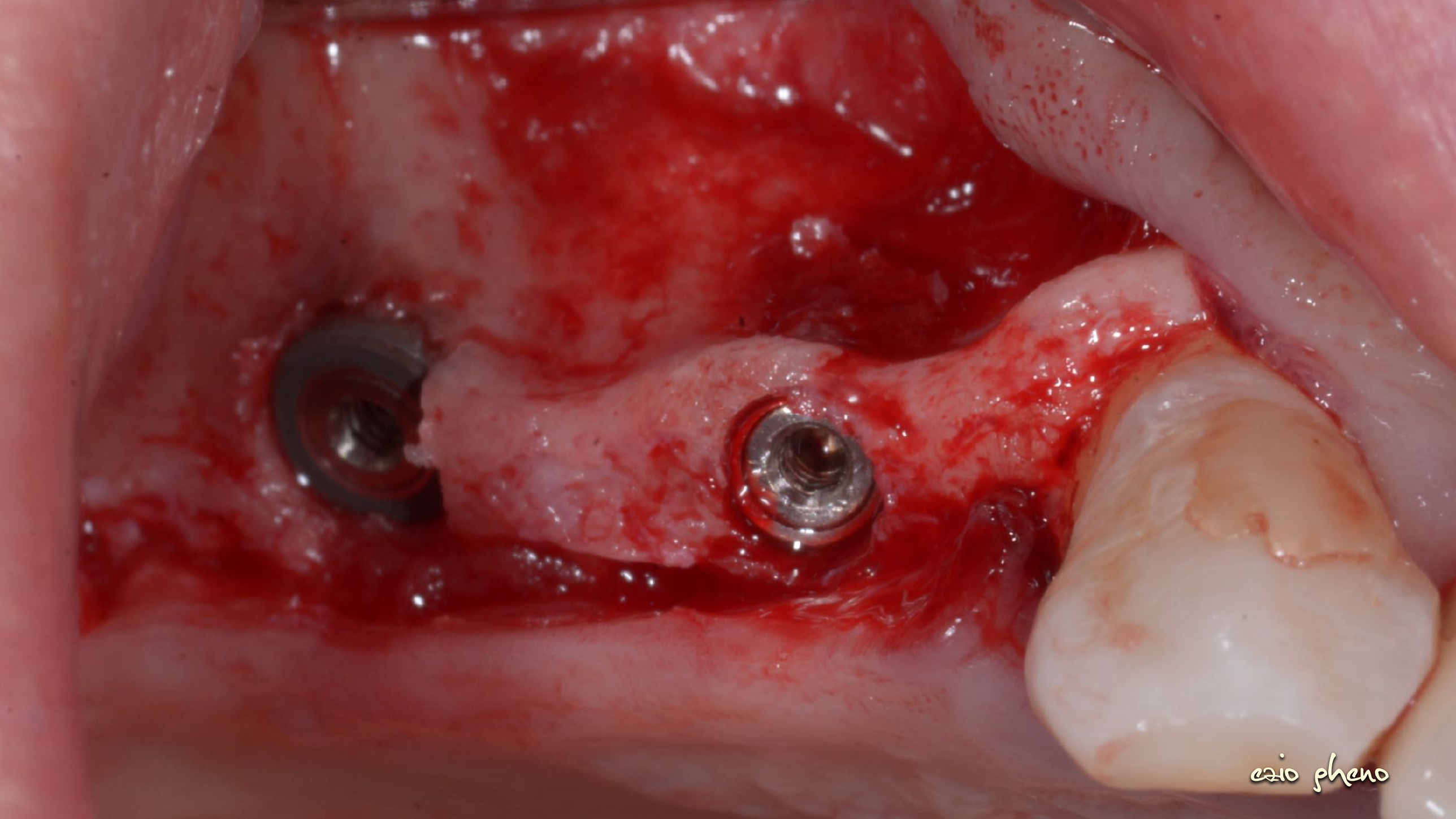
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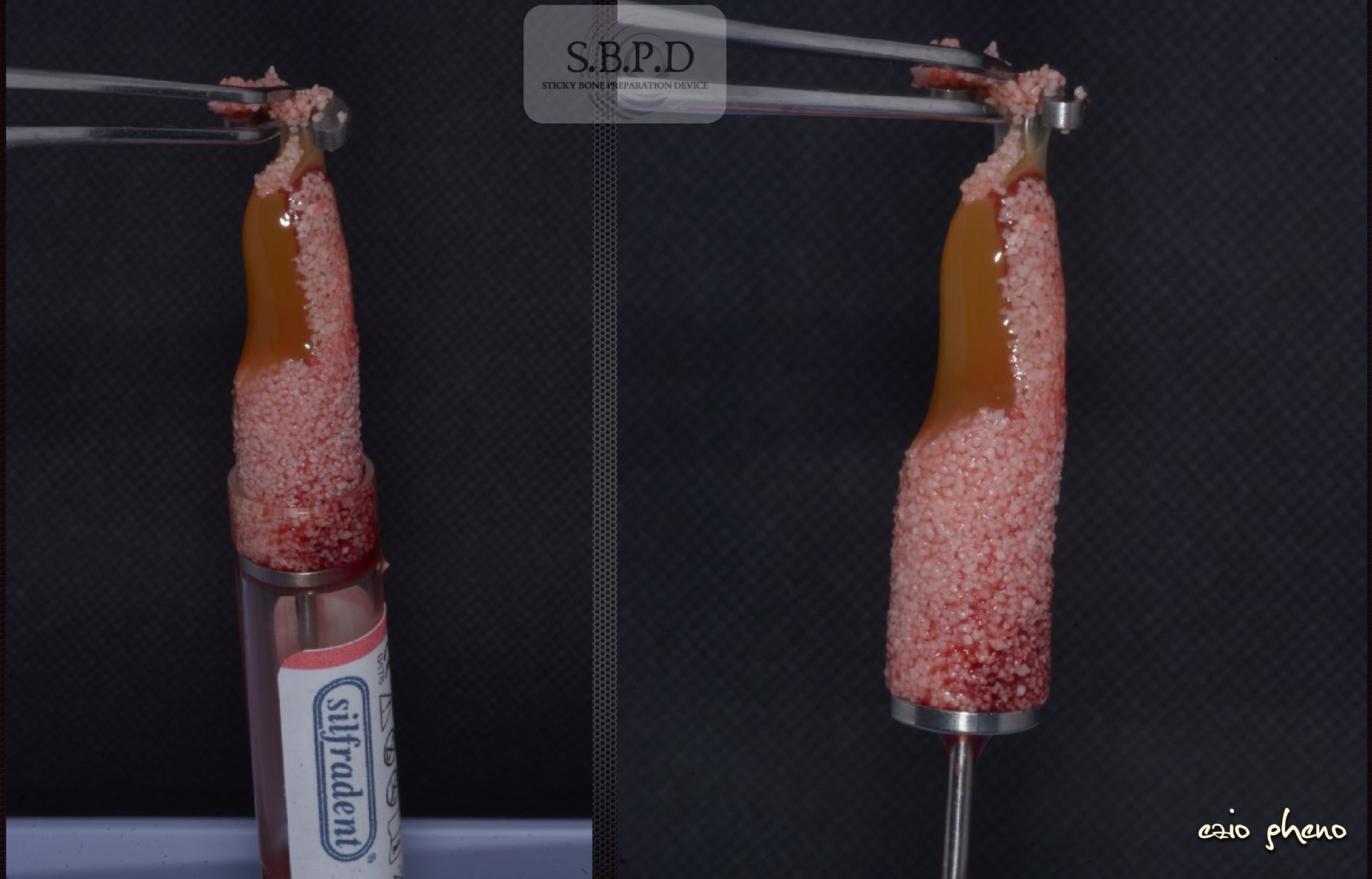
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STICKY BONE PREPARATION DEVICE
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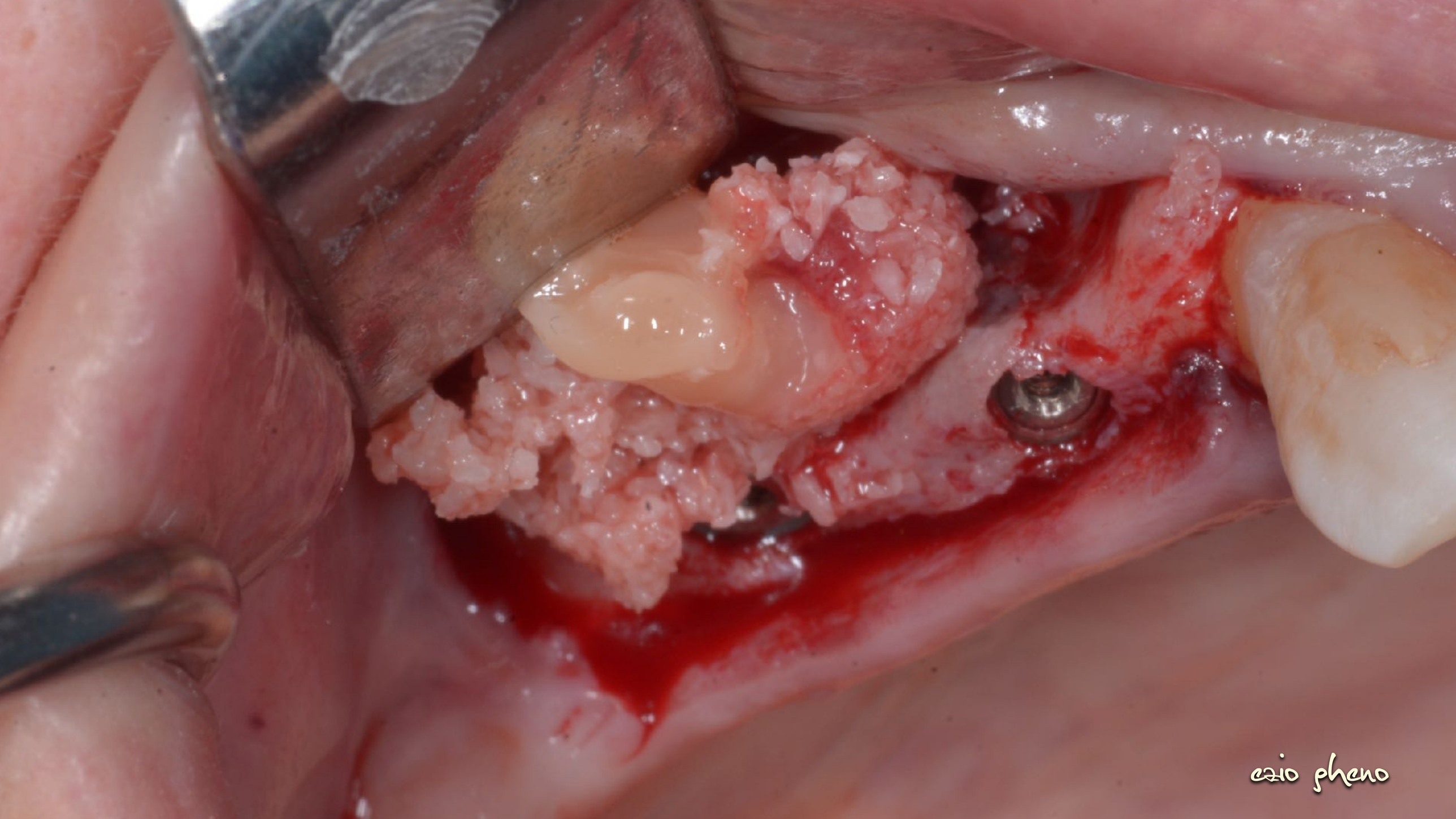
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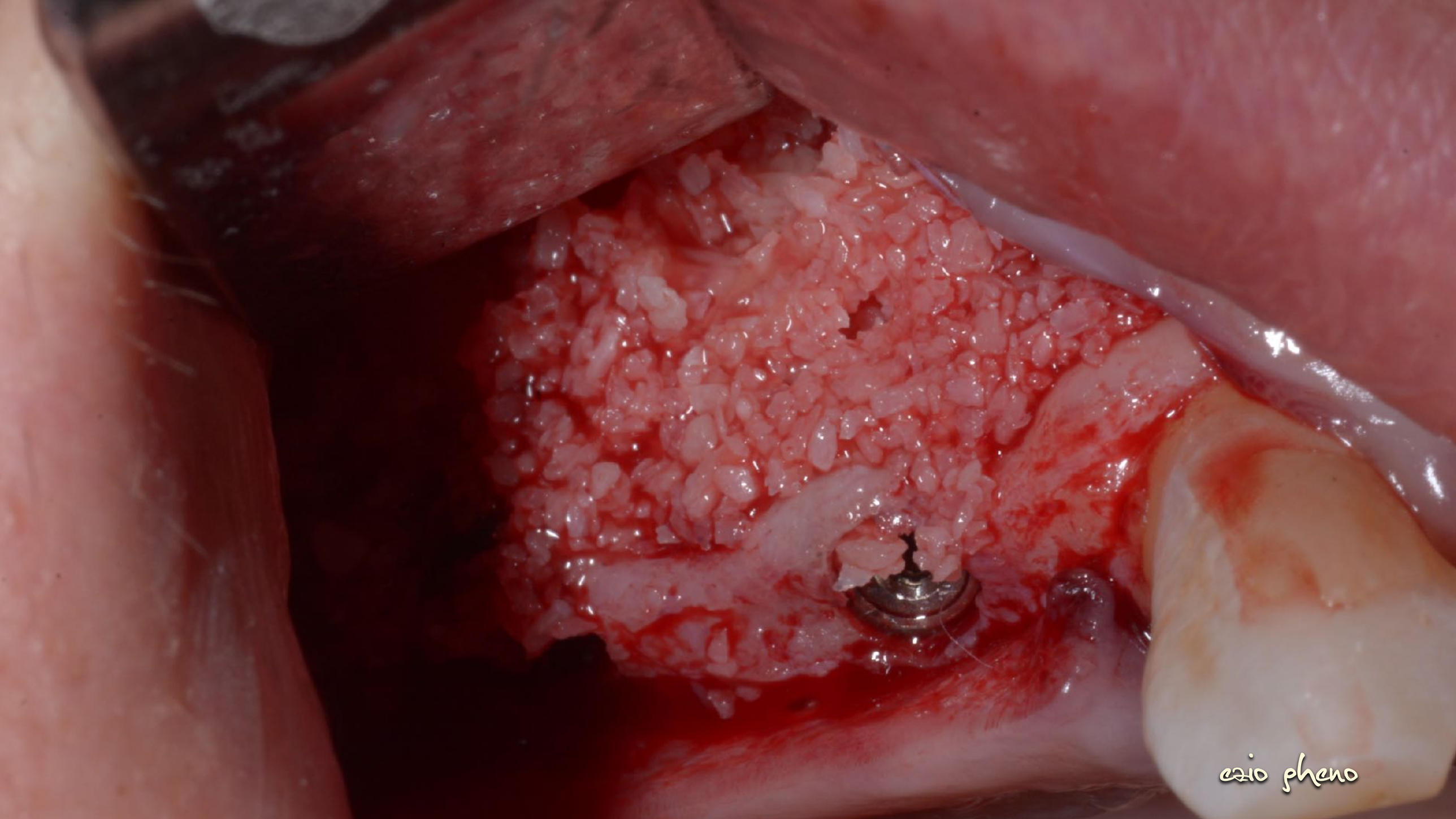
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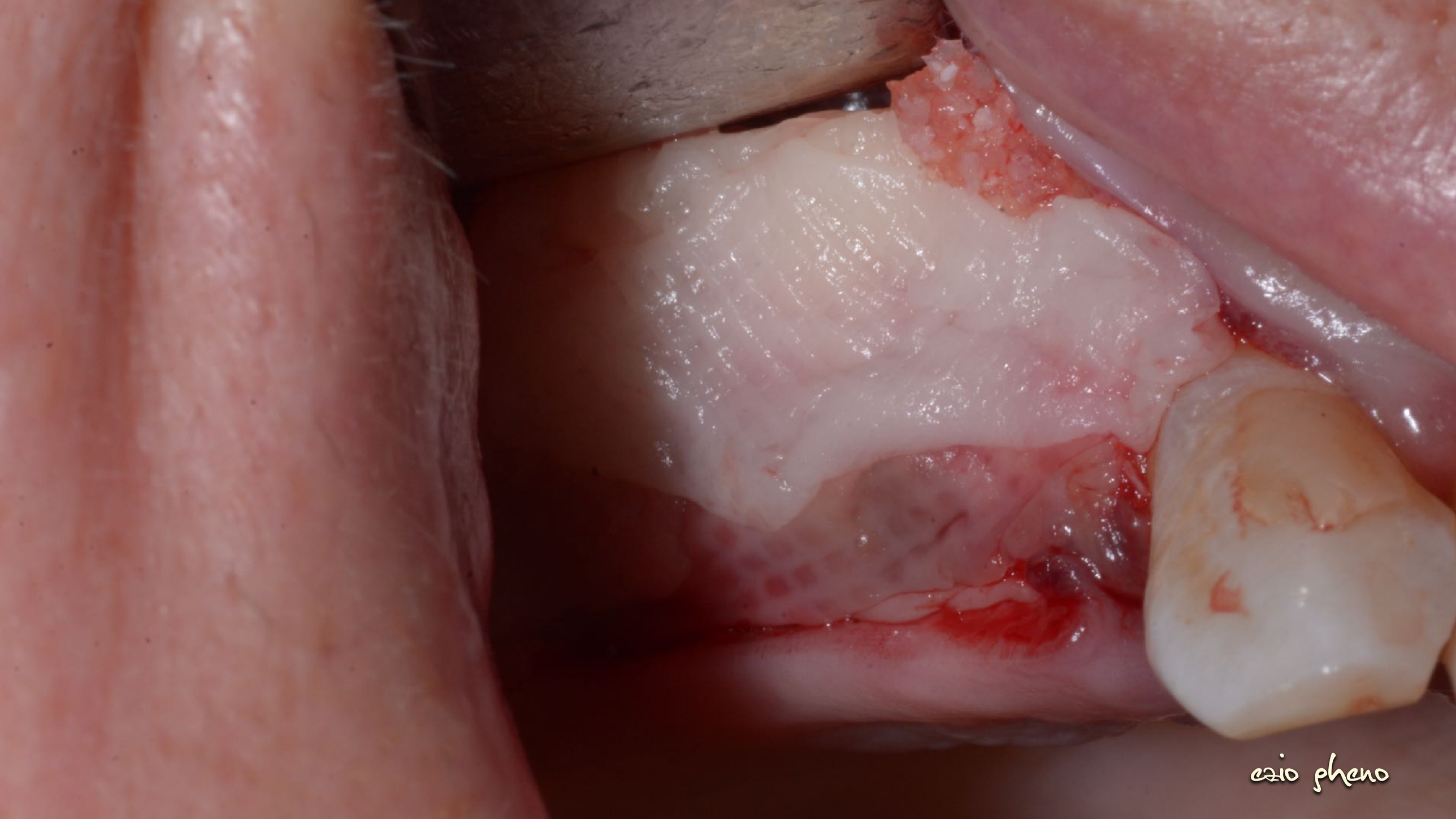
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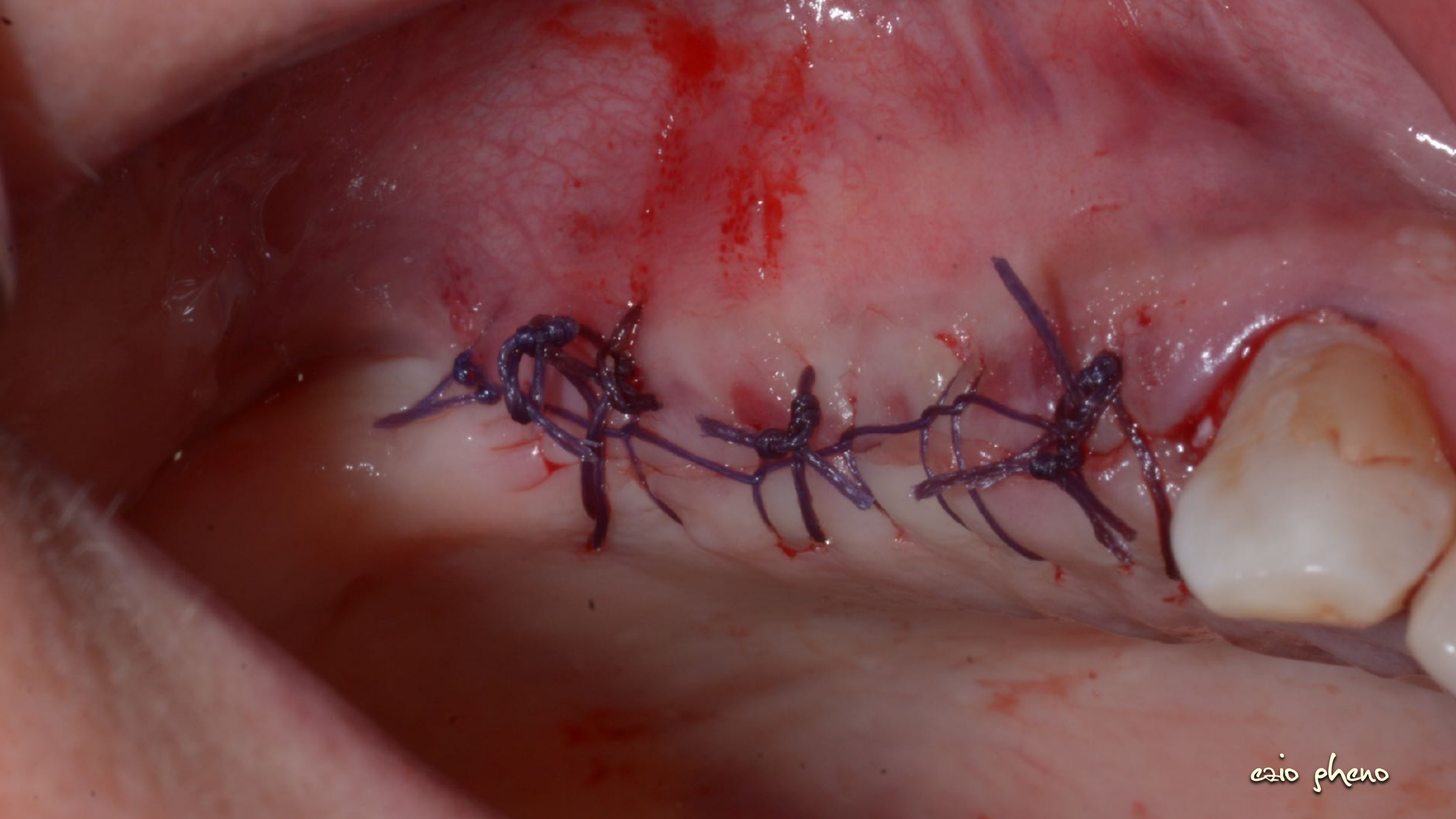
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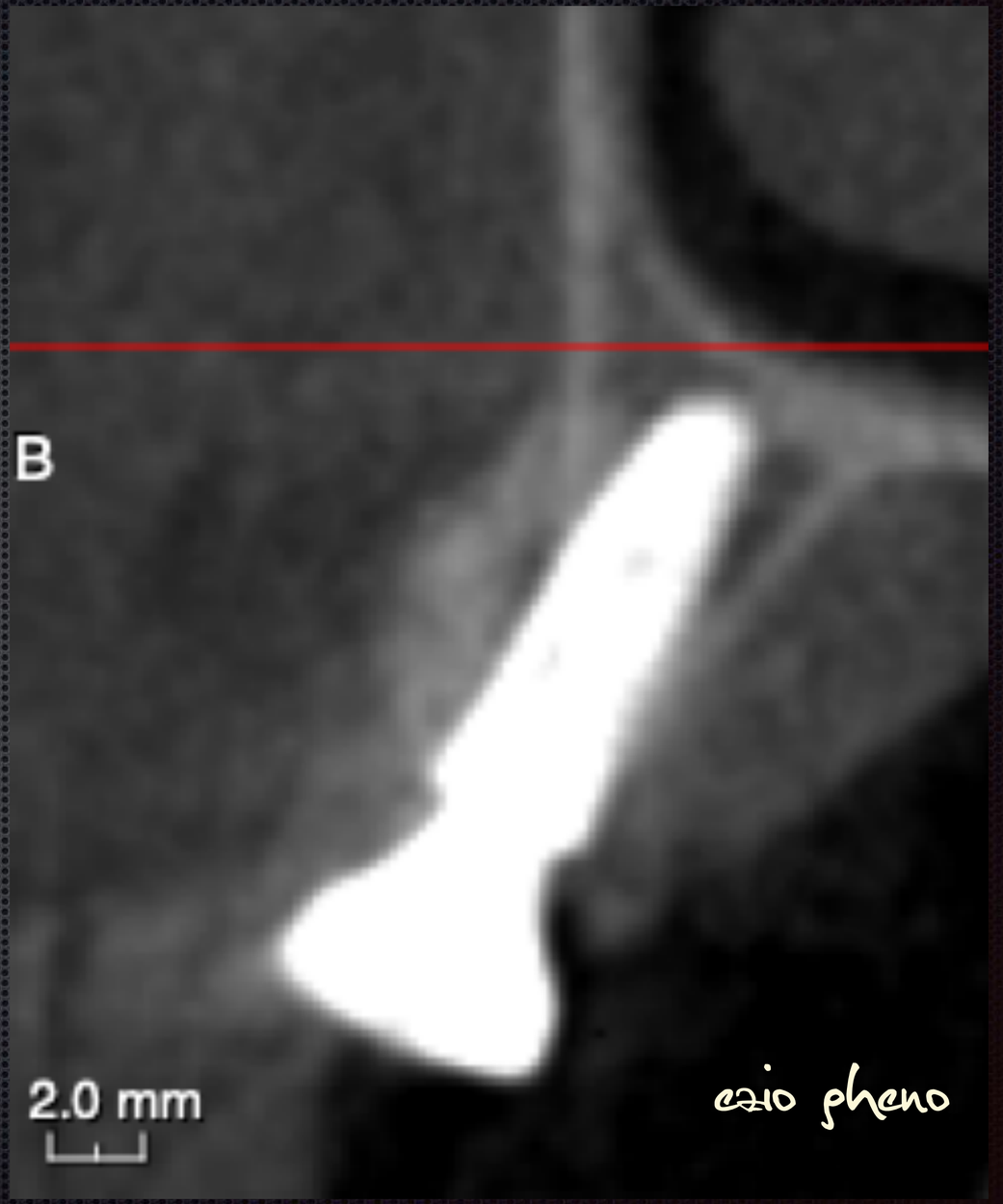
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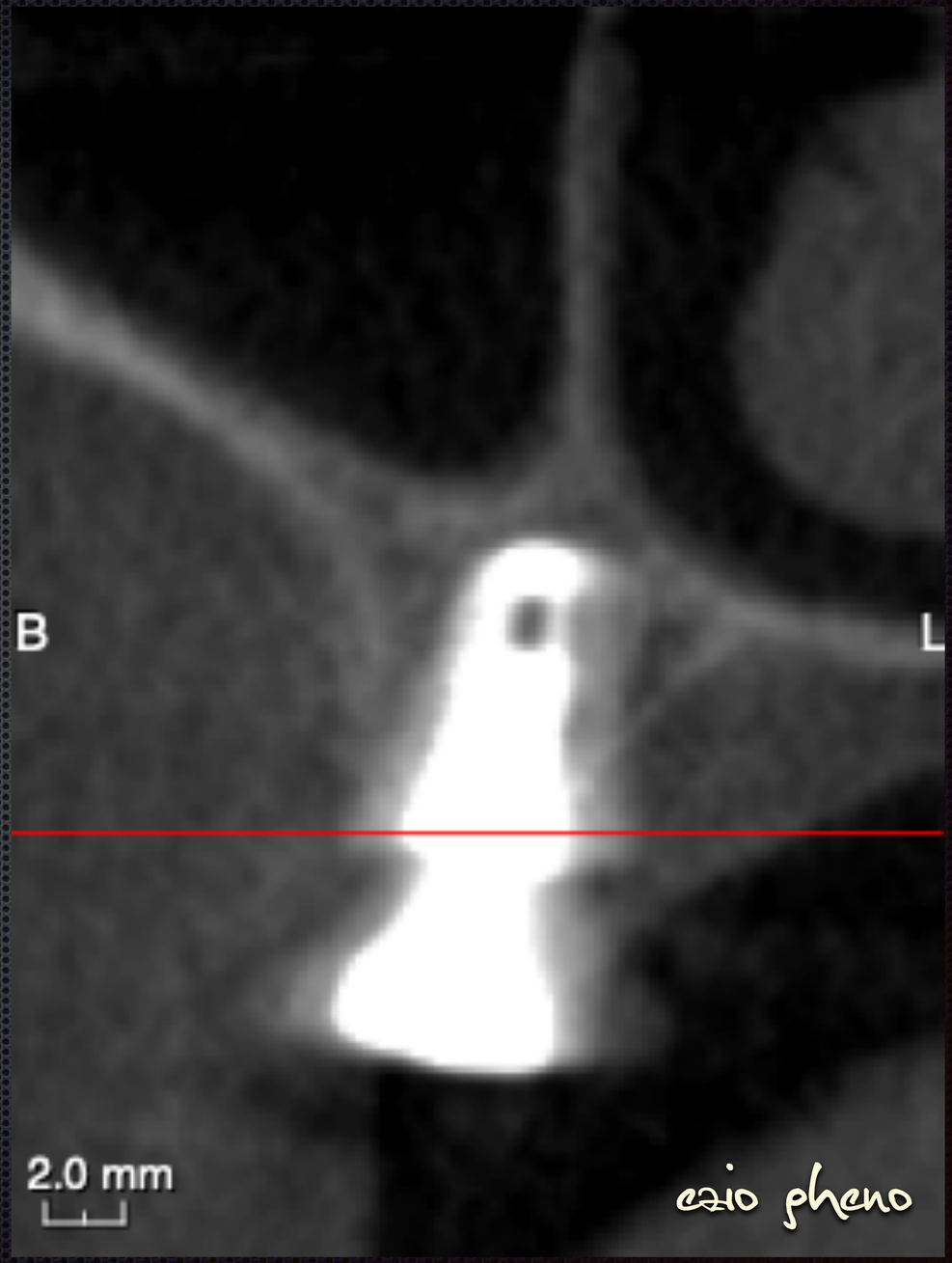
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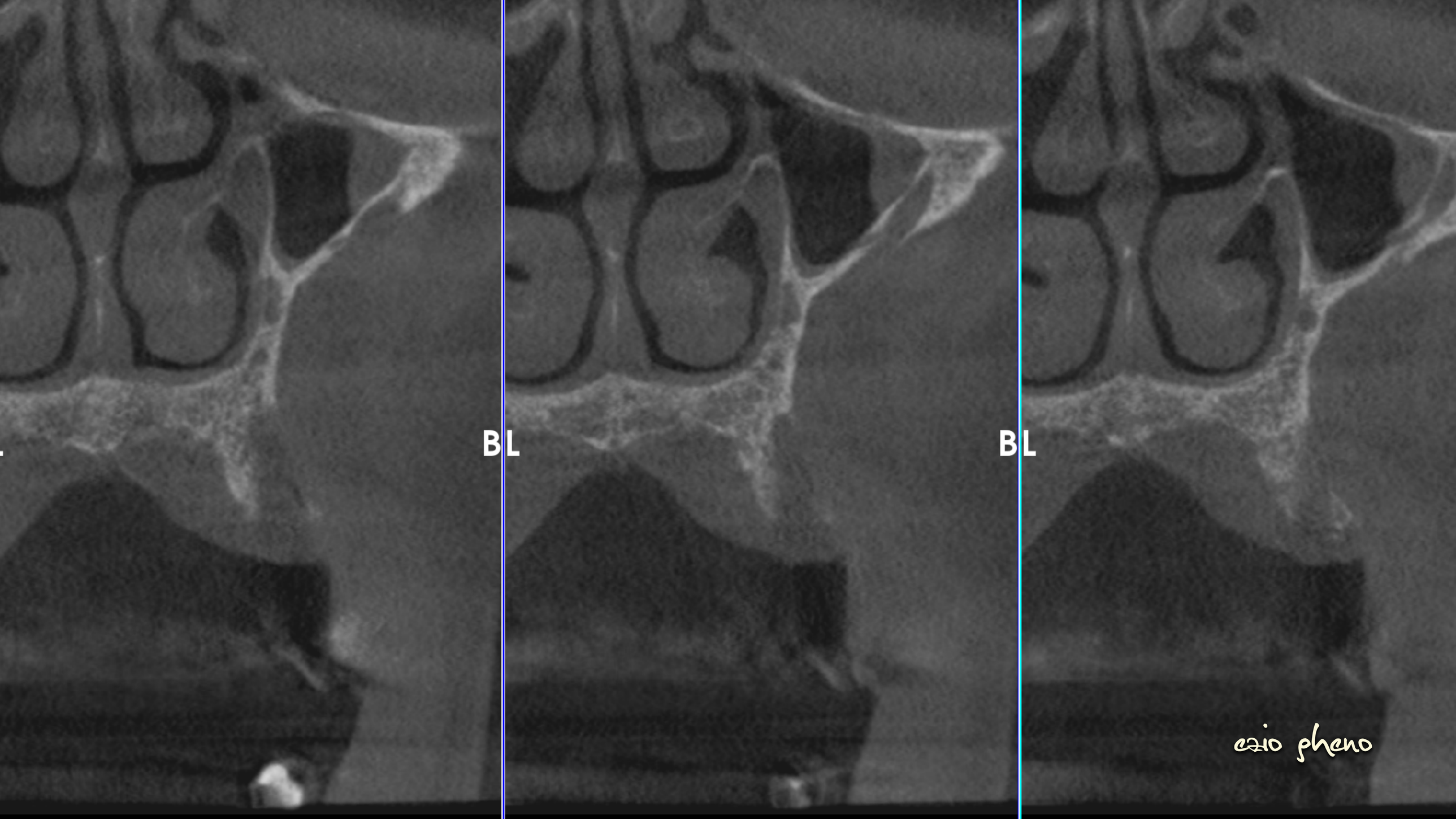
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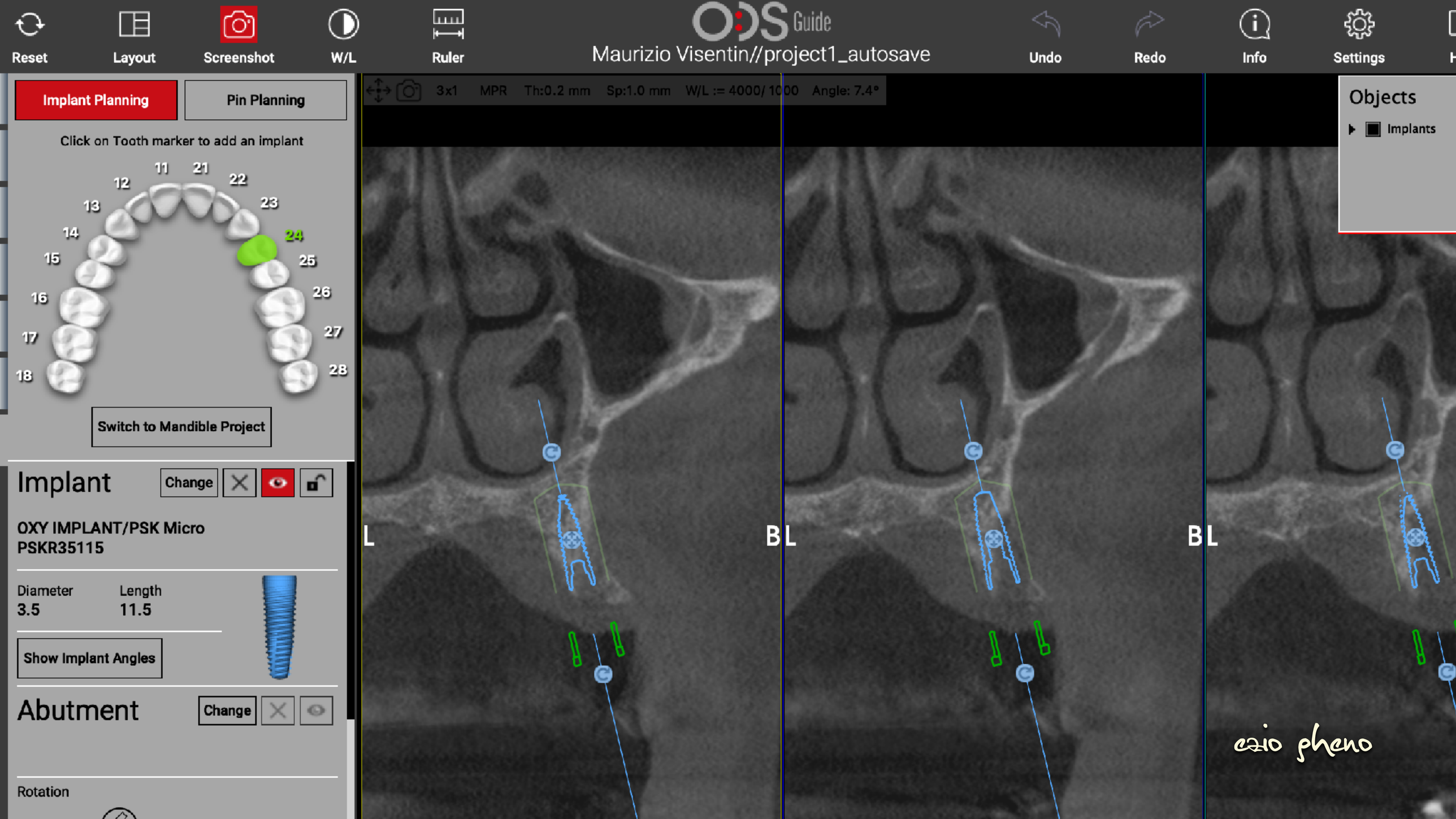
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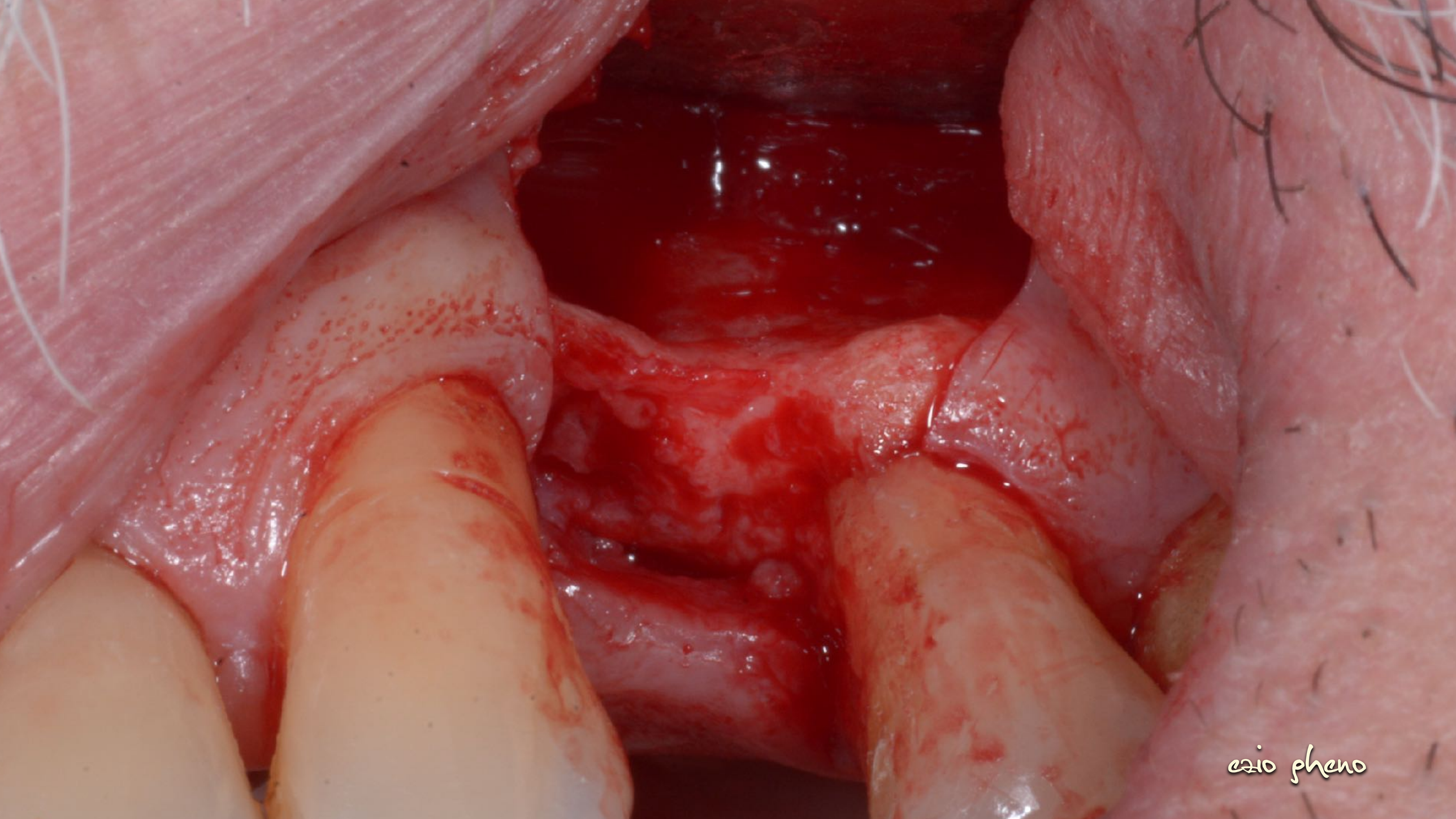
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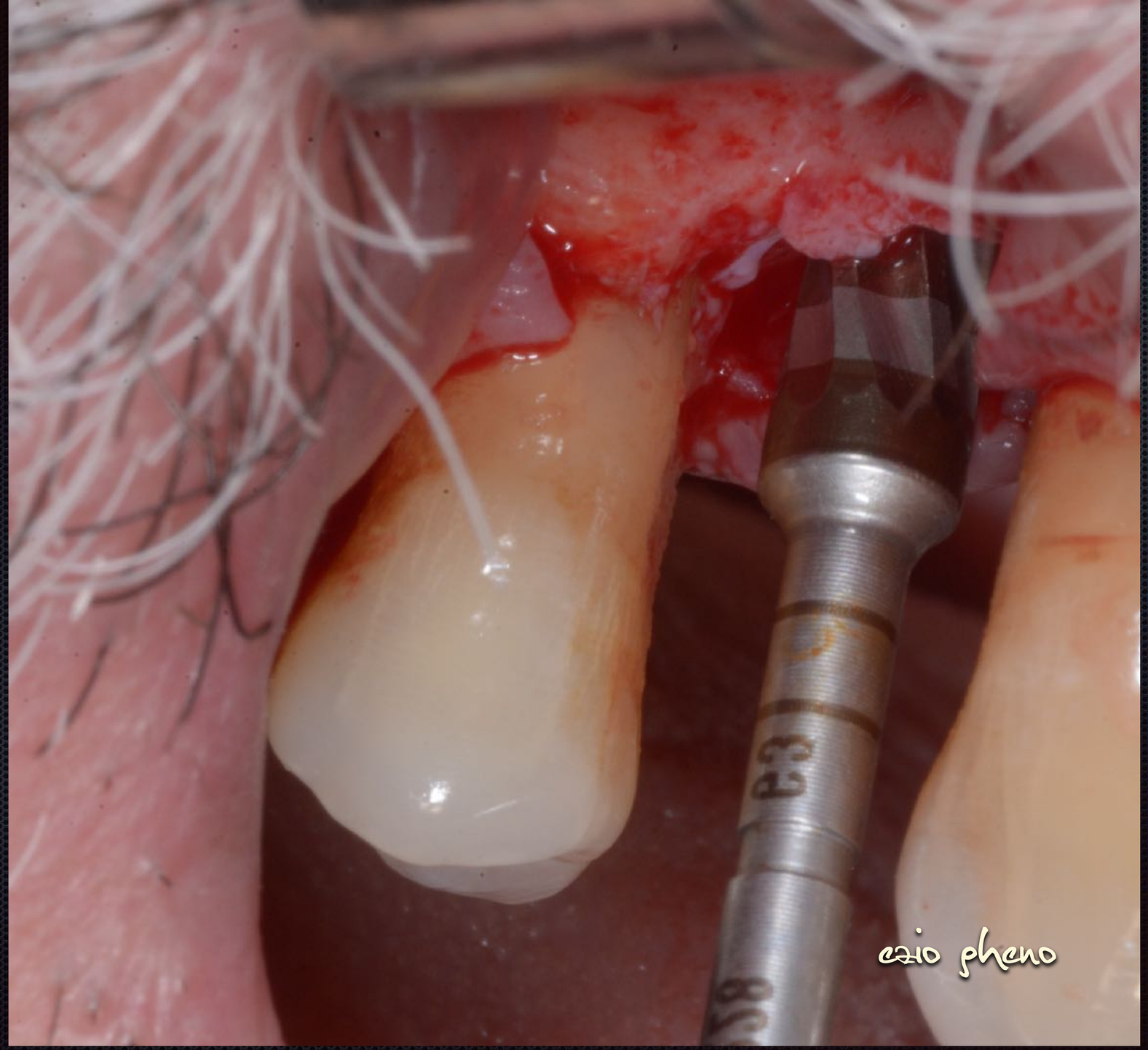
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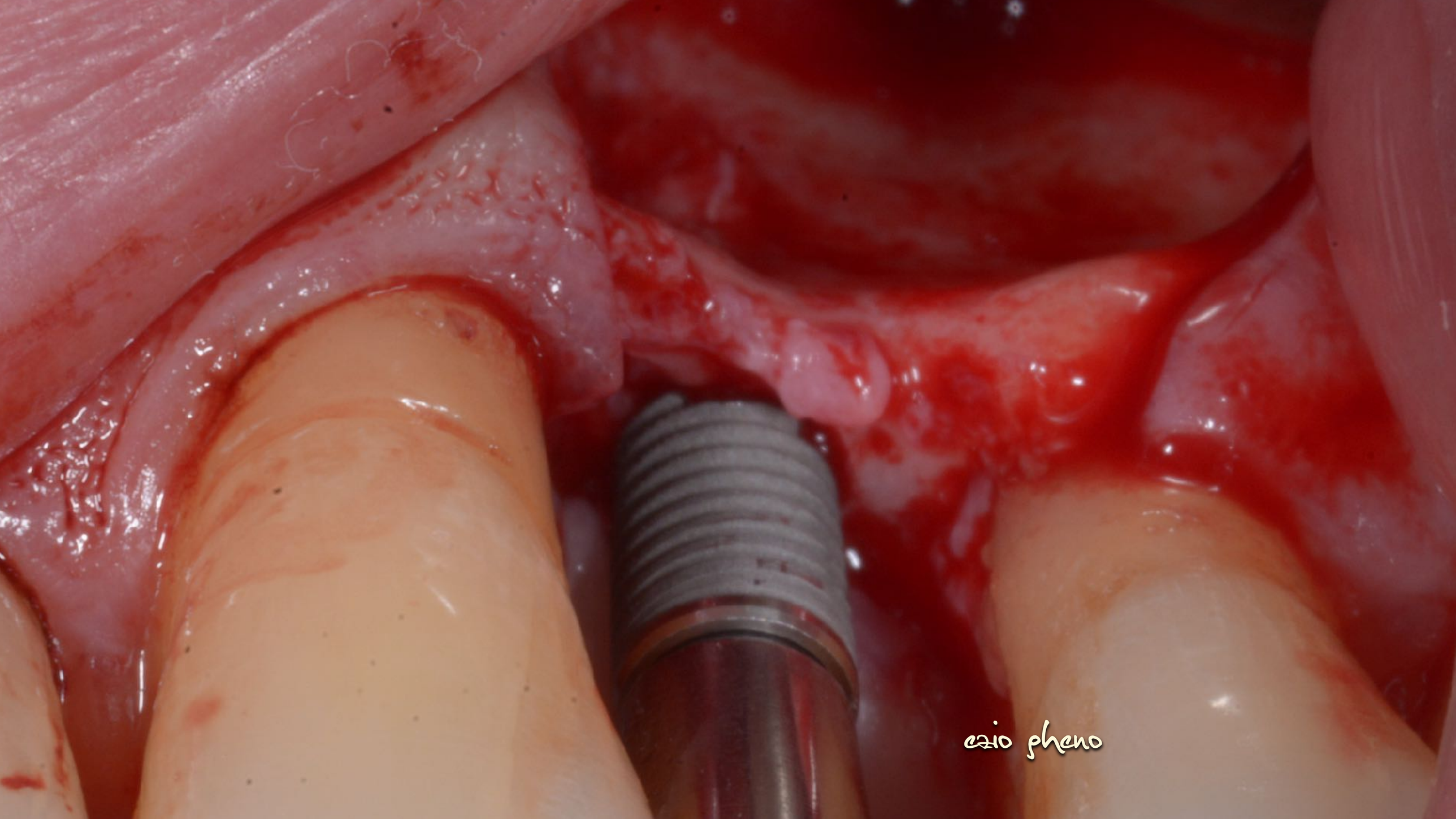
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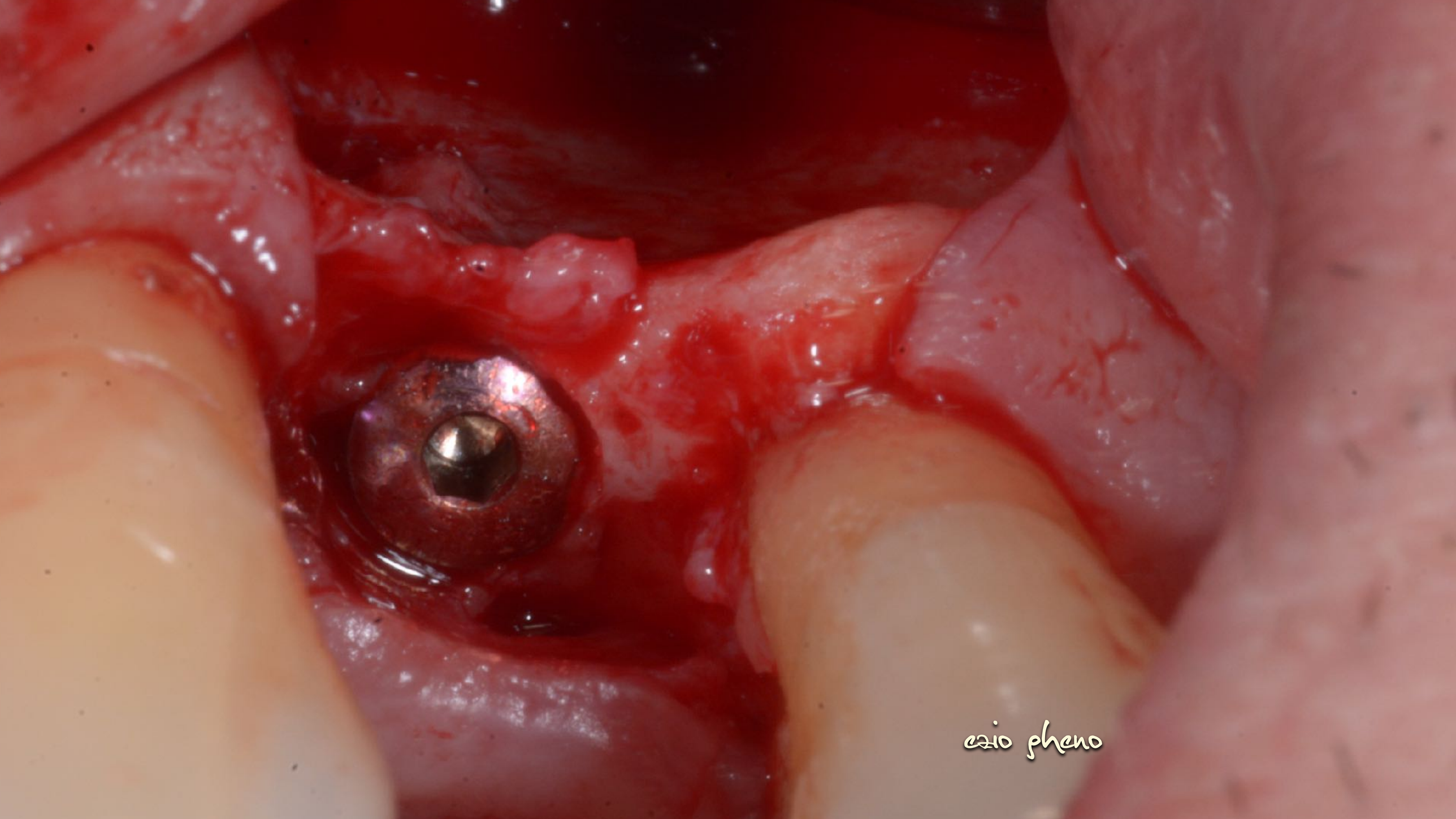
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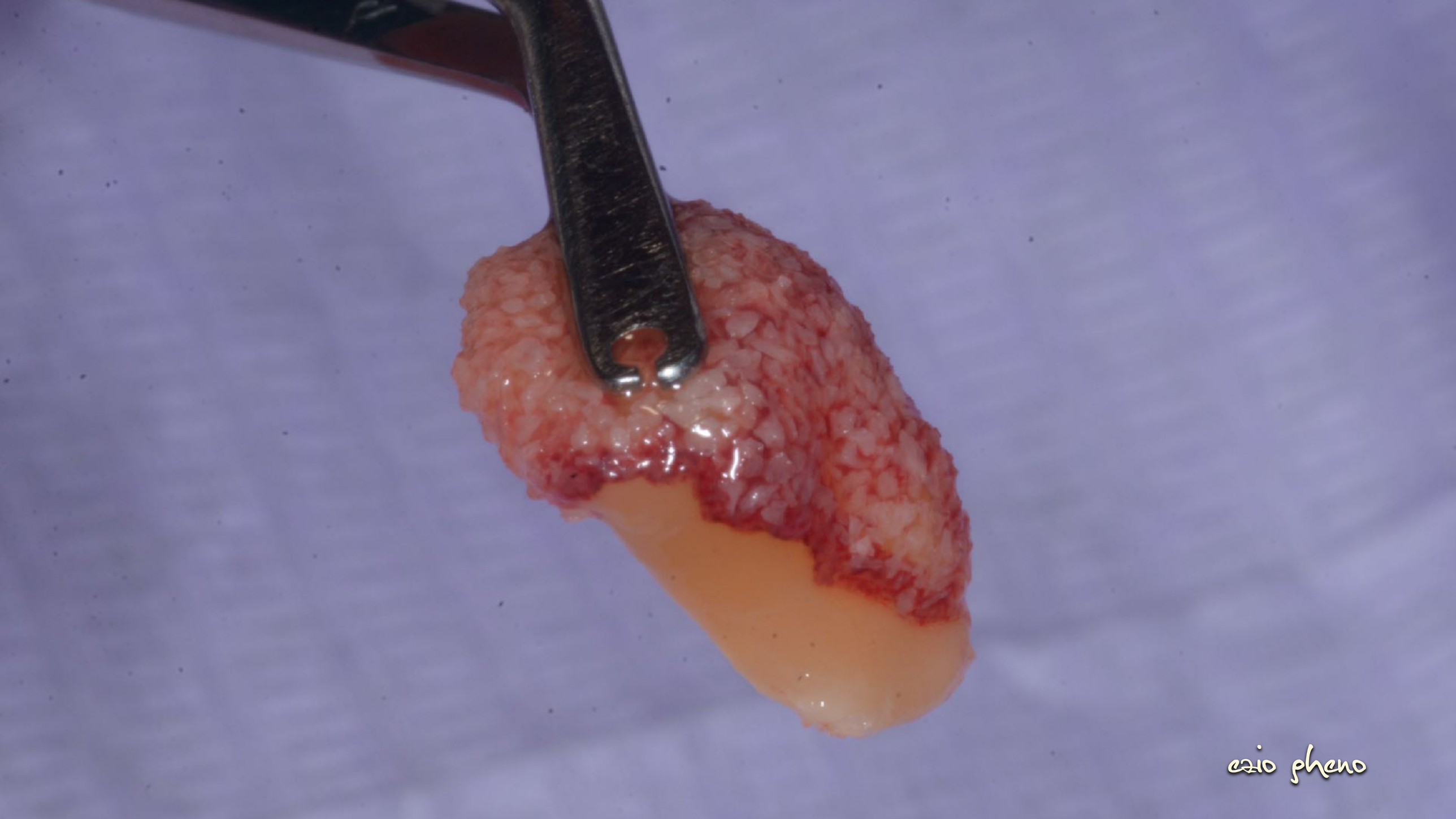
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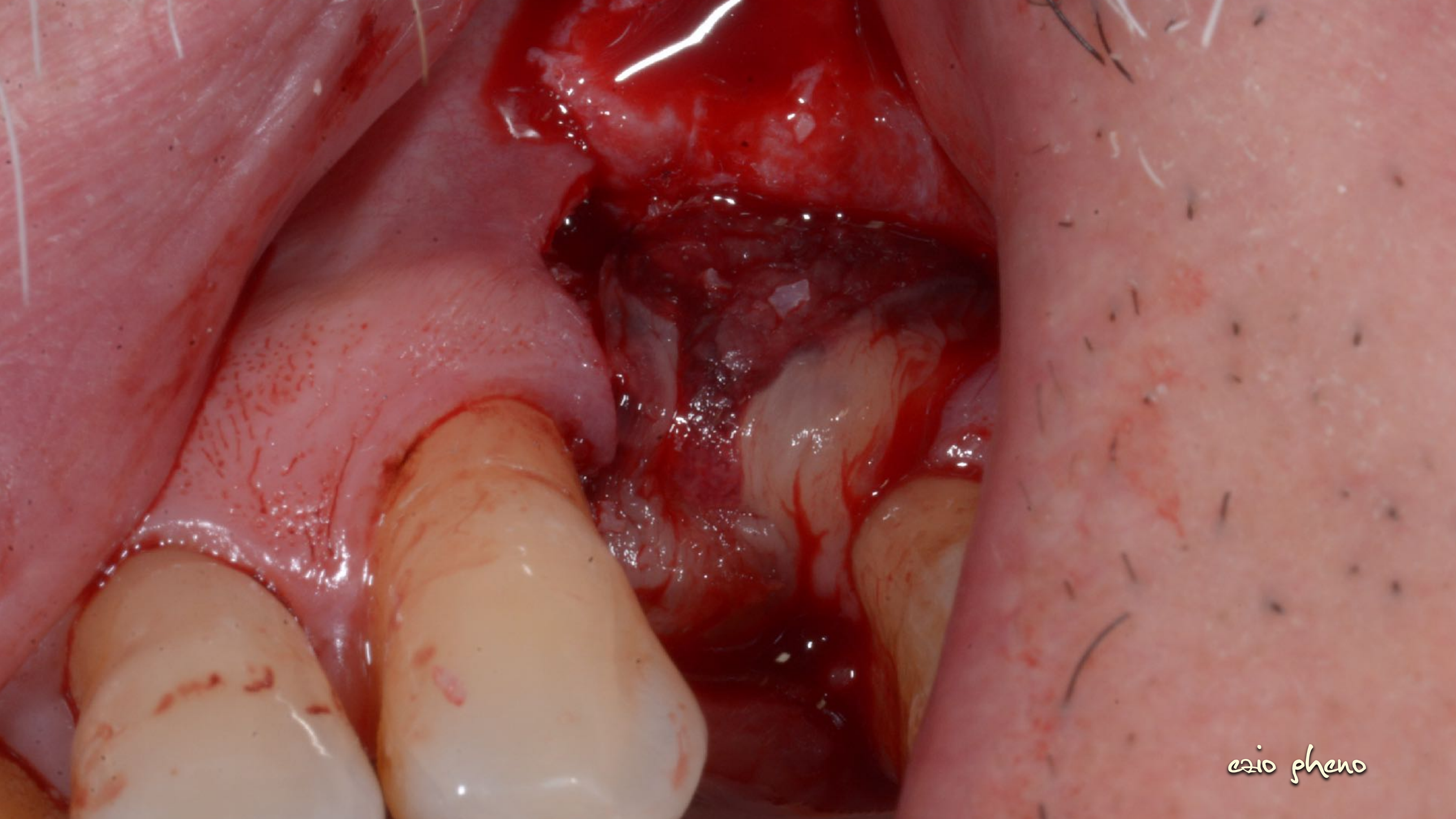
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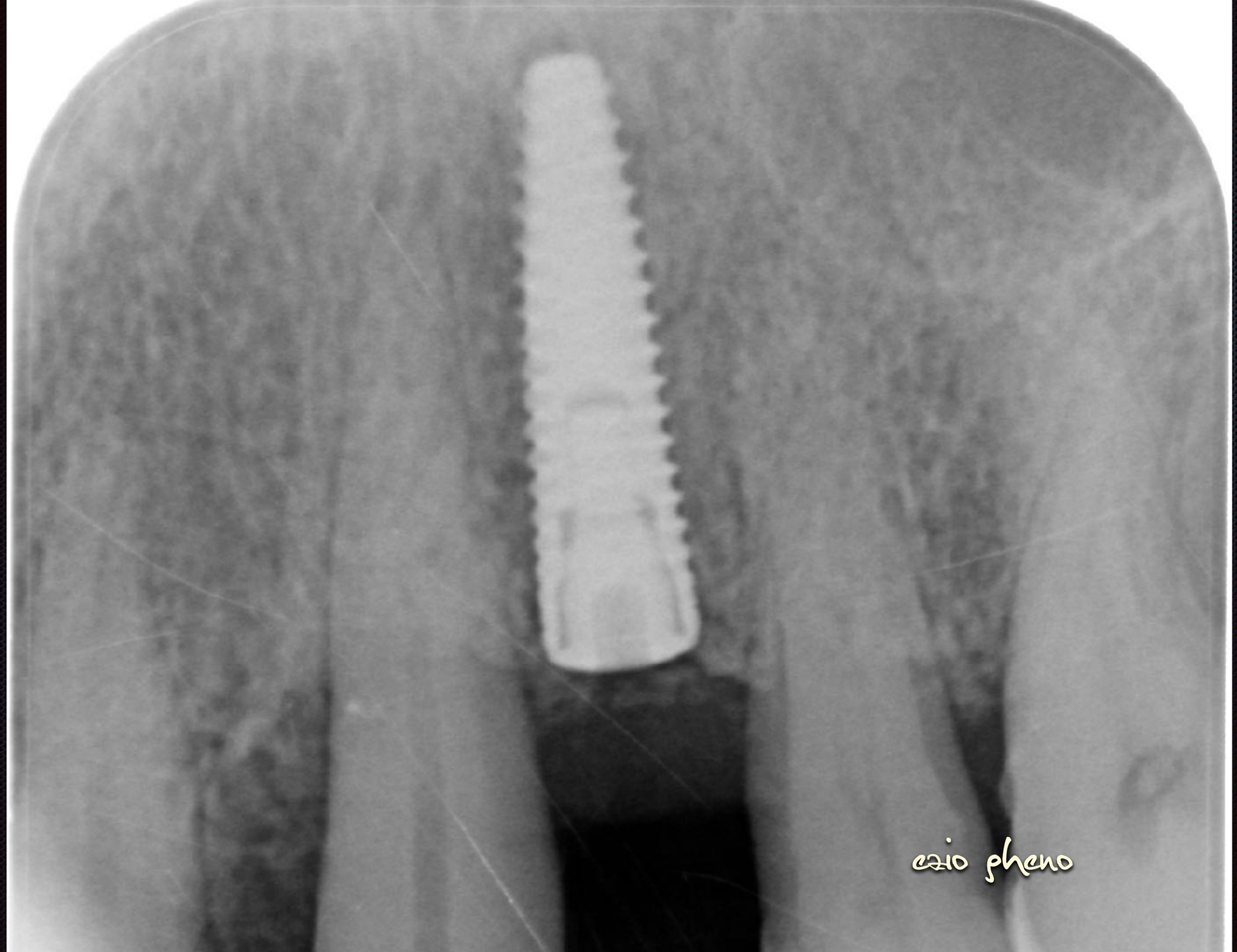
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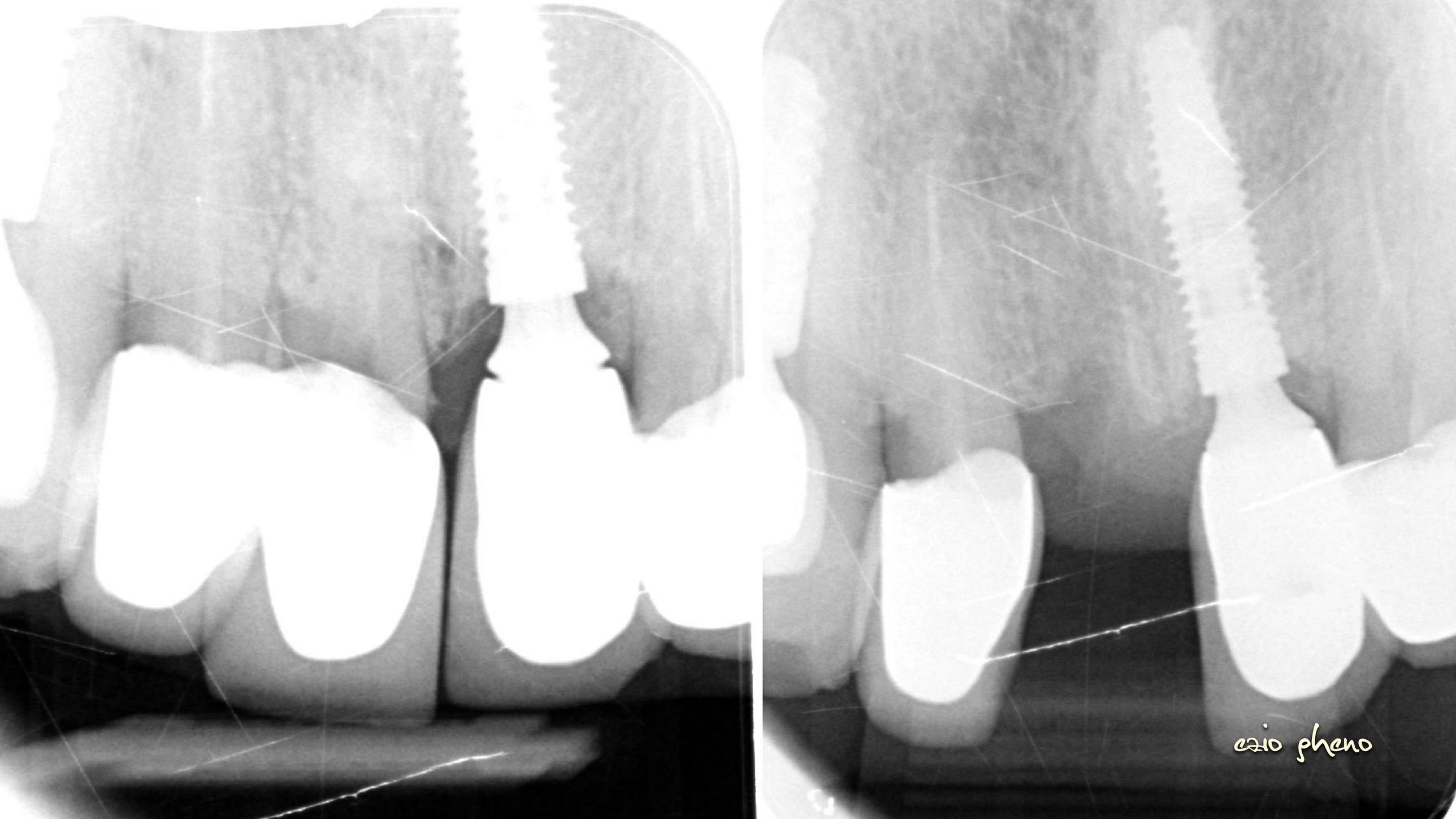
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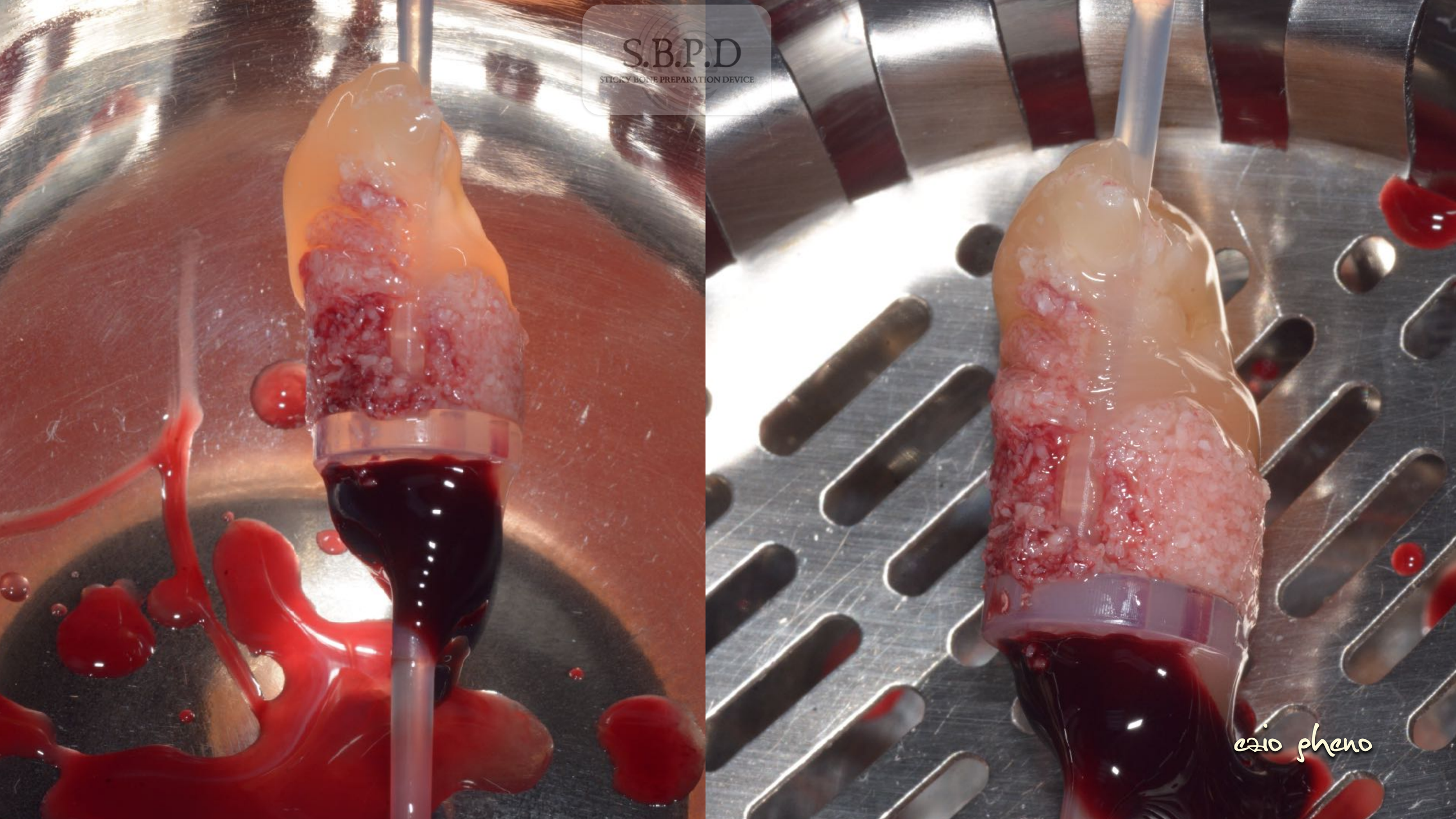
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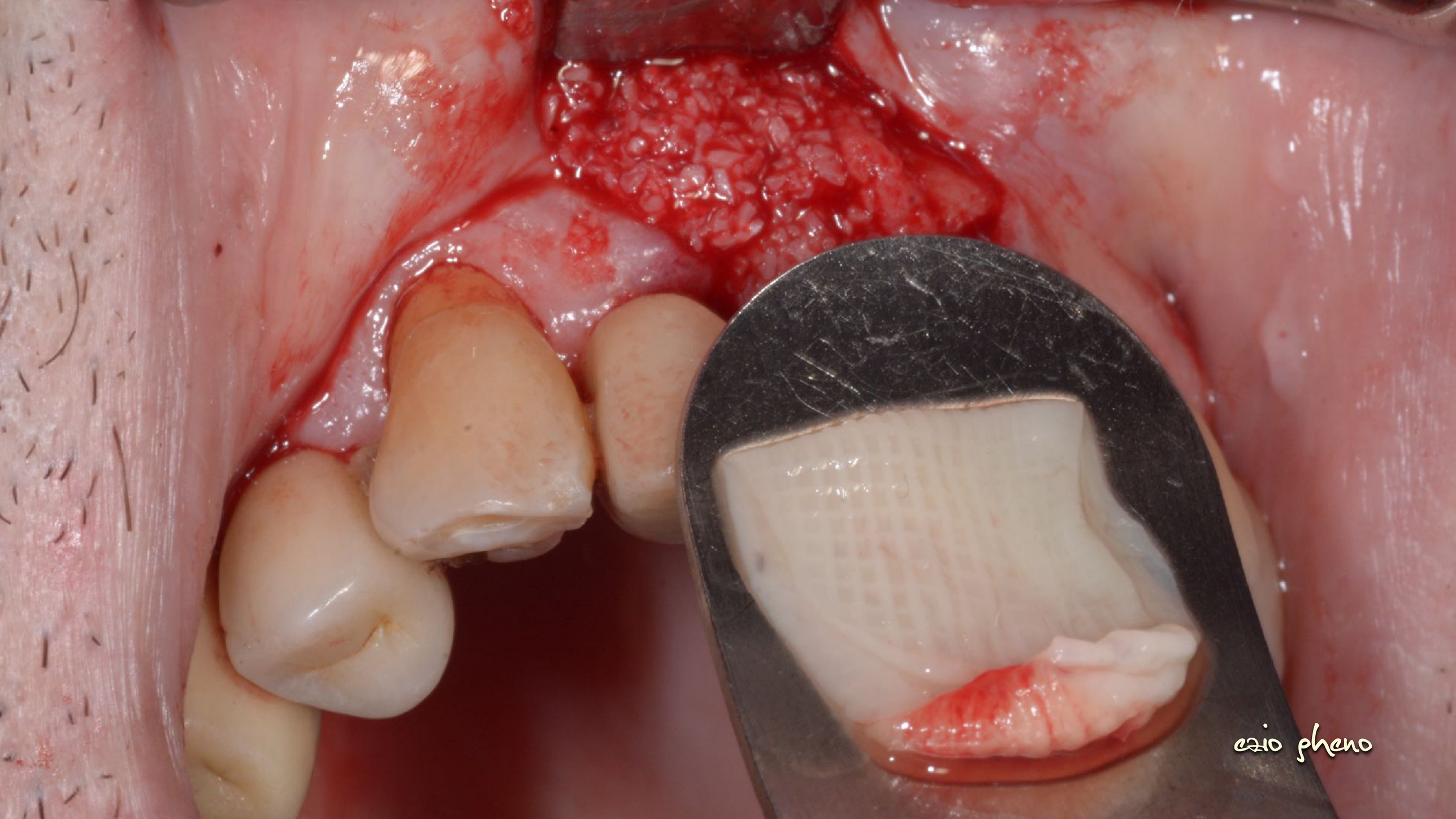
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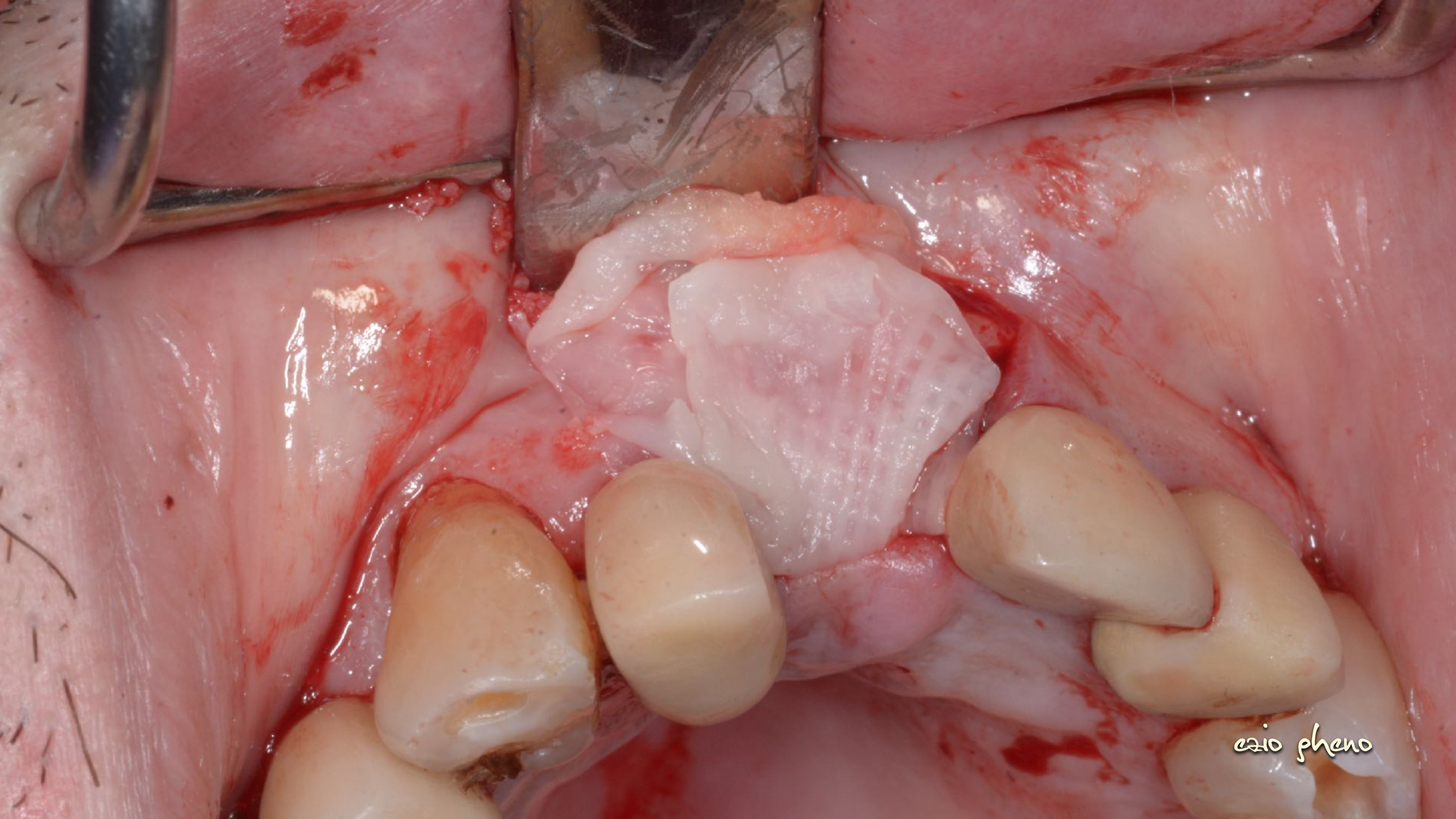
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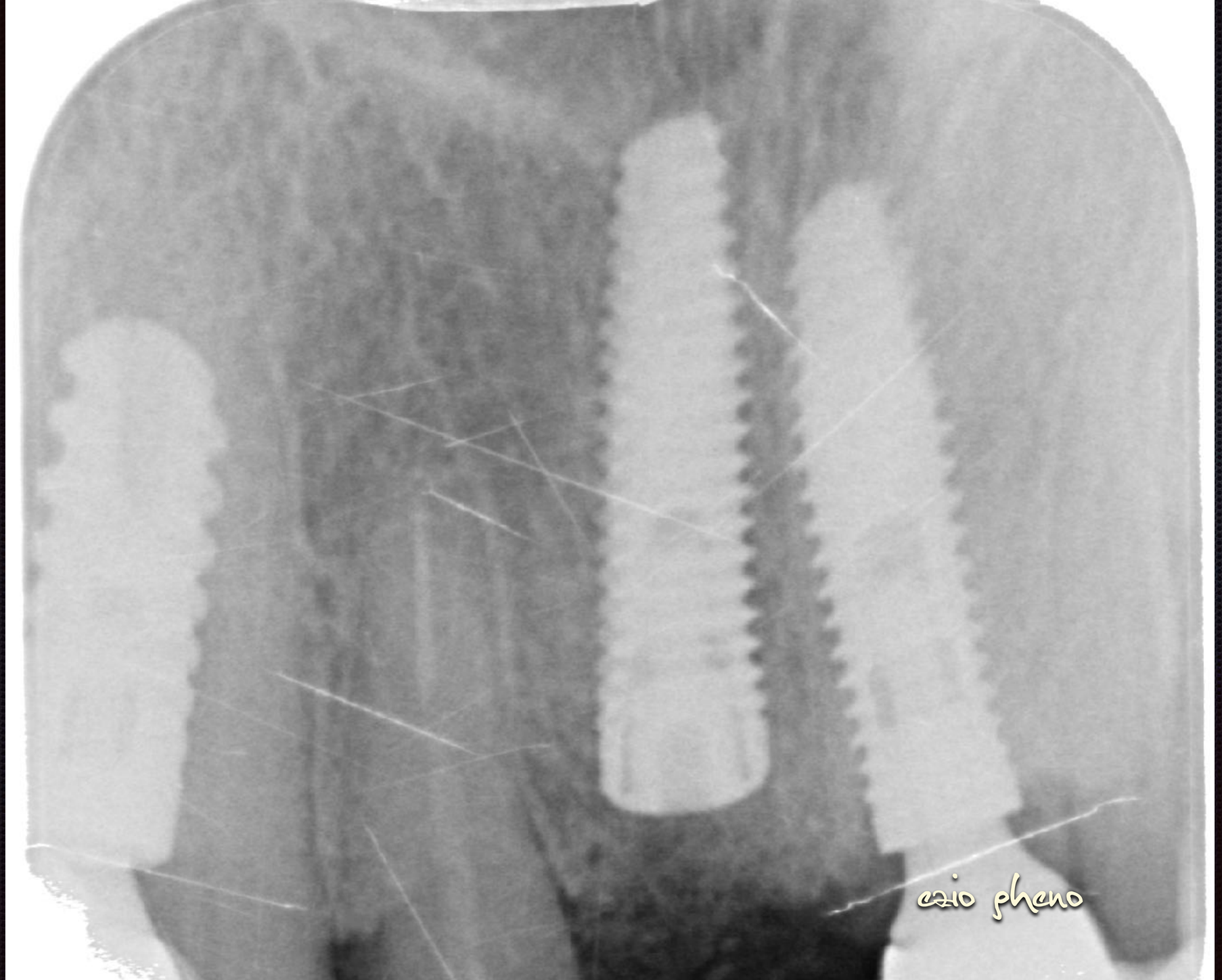
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Preliminary rooth extraction to eliminate infection

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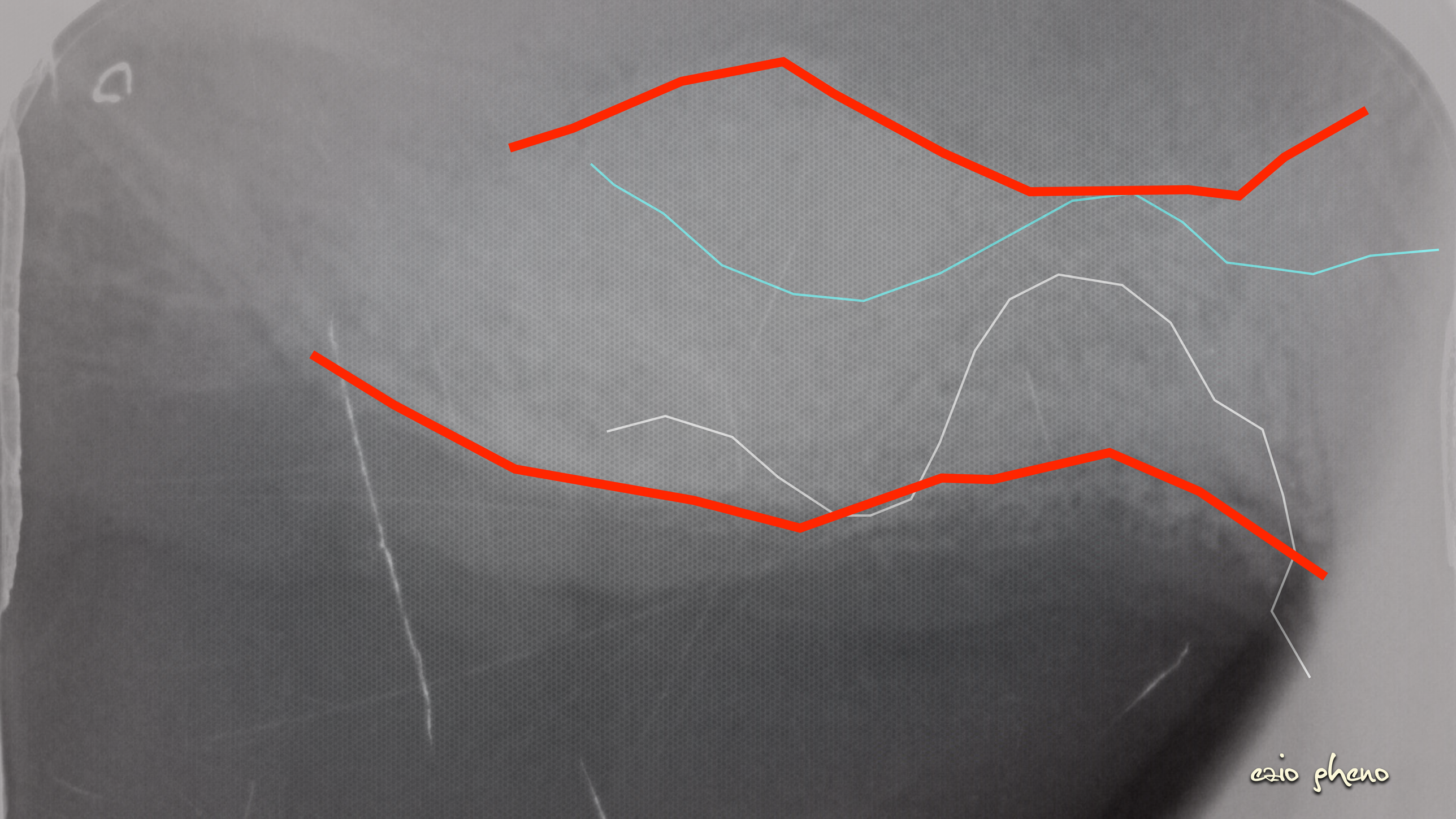
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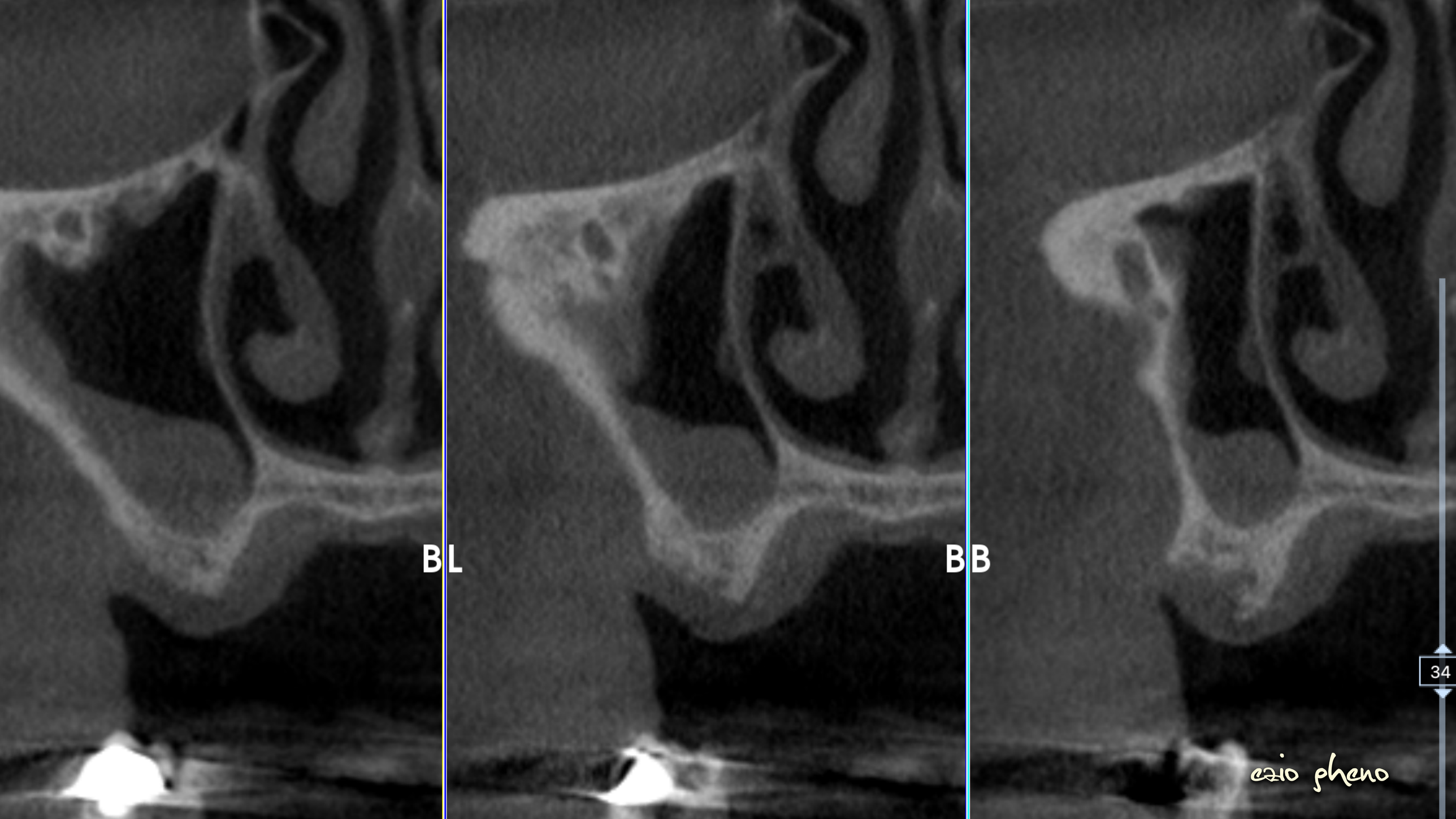
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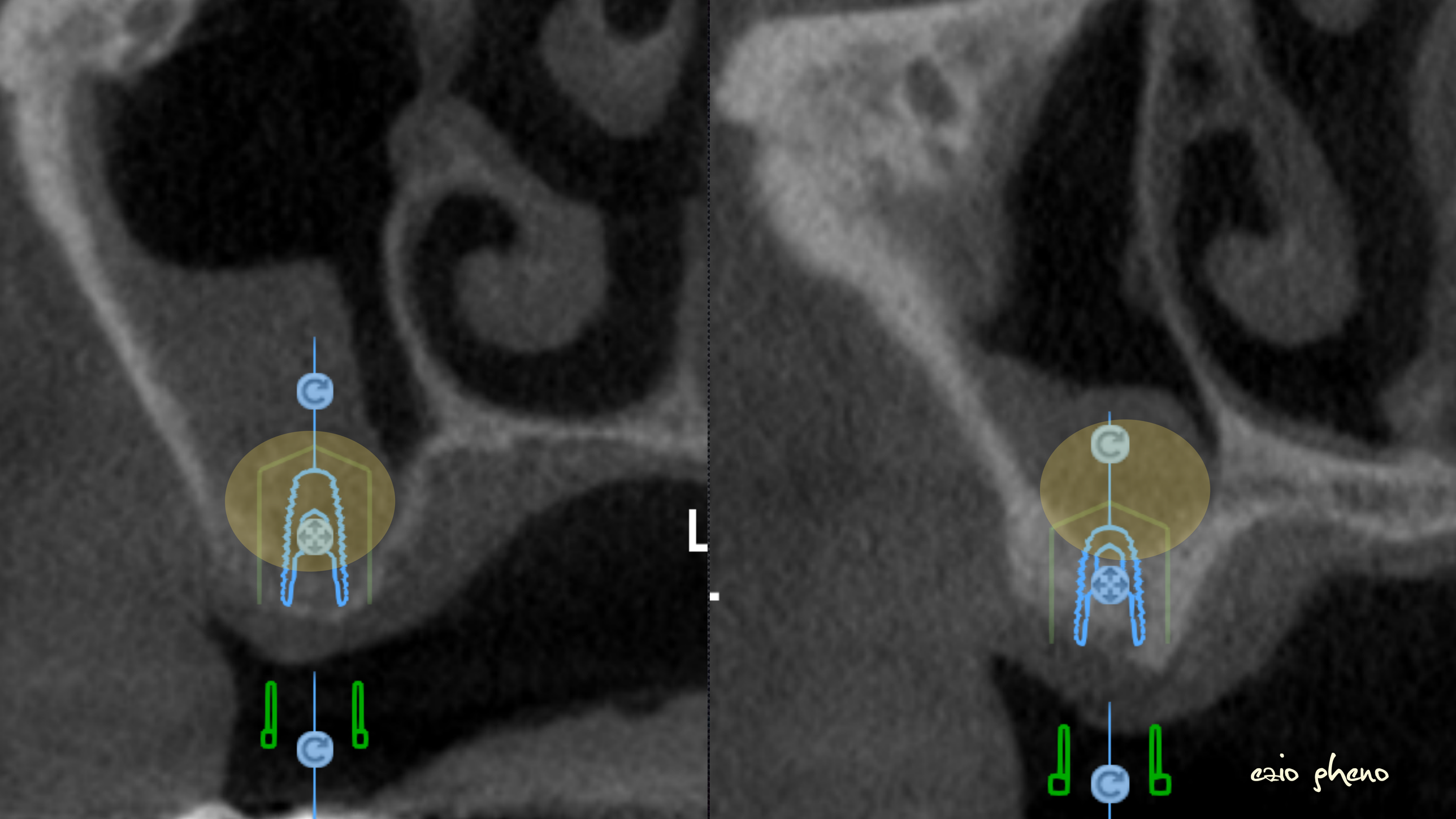
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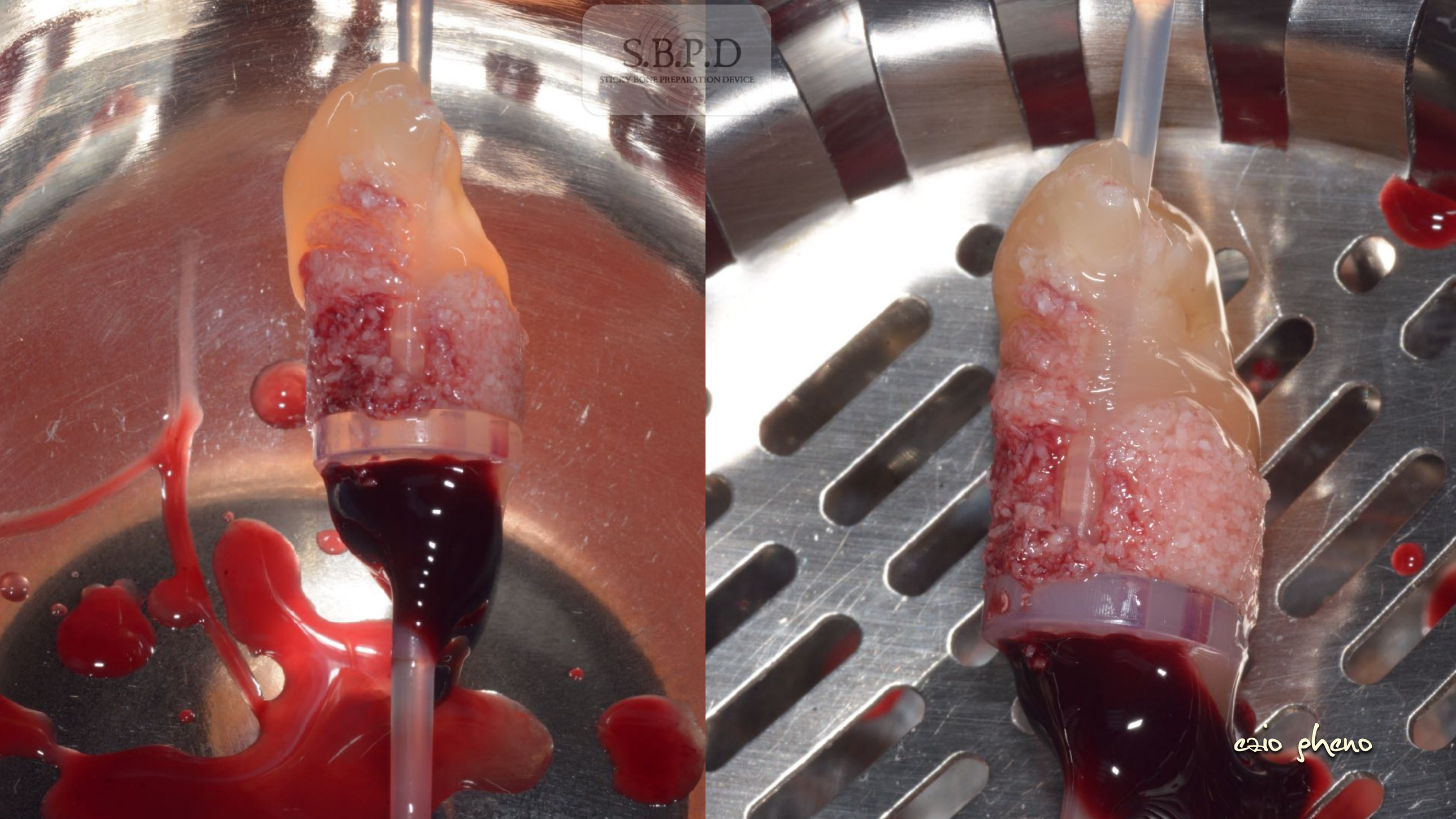
S.B.P.D
STICKY BONE PREPARATION DEVICE
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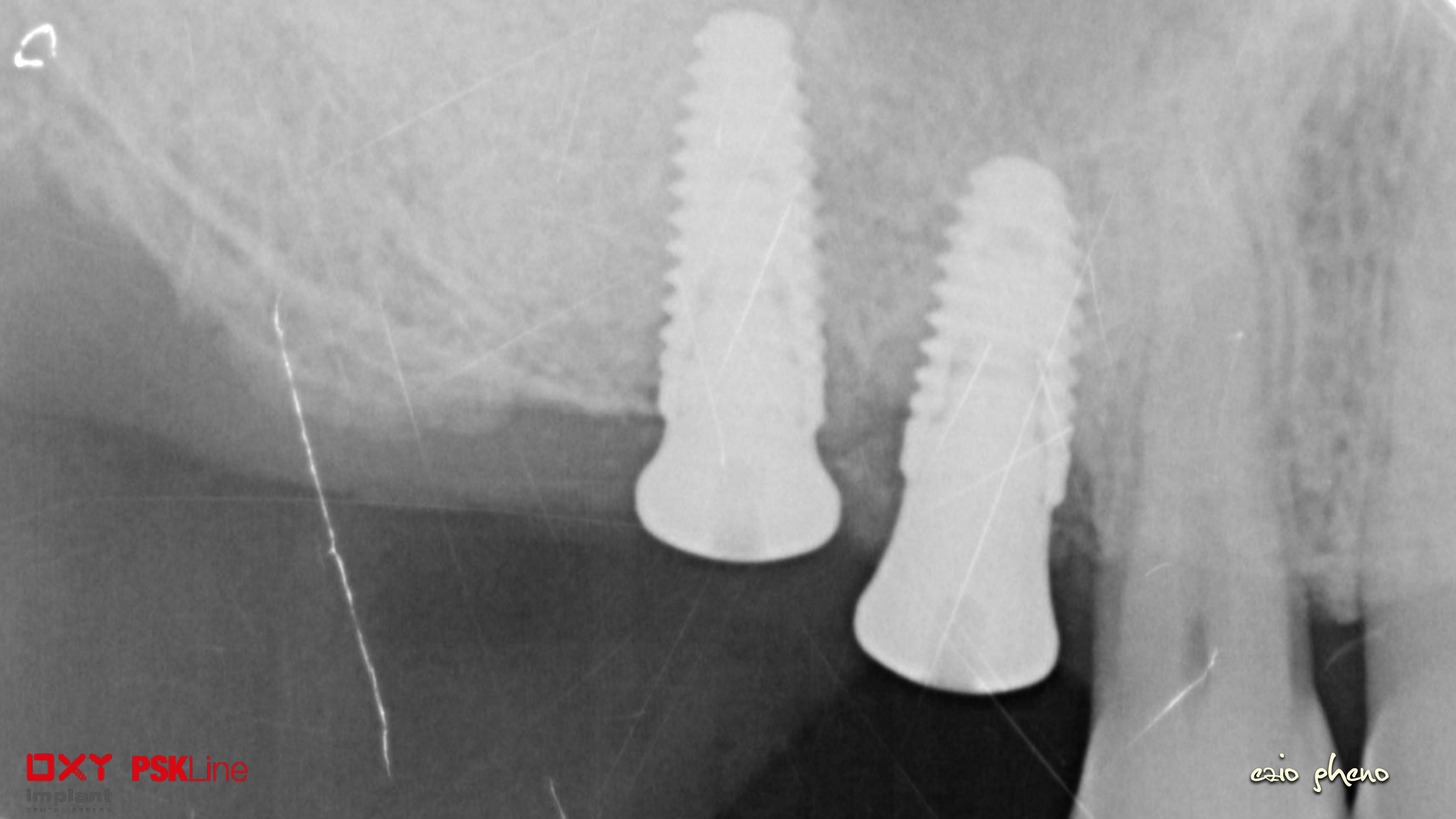
S.B.P.D
STICKY BONE PREPARATION DEVICE
Vestibular sinus lift and crestal are reshaping
with Sticky bone
ezio pheno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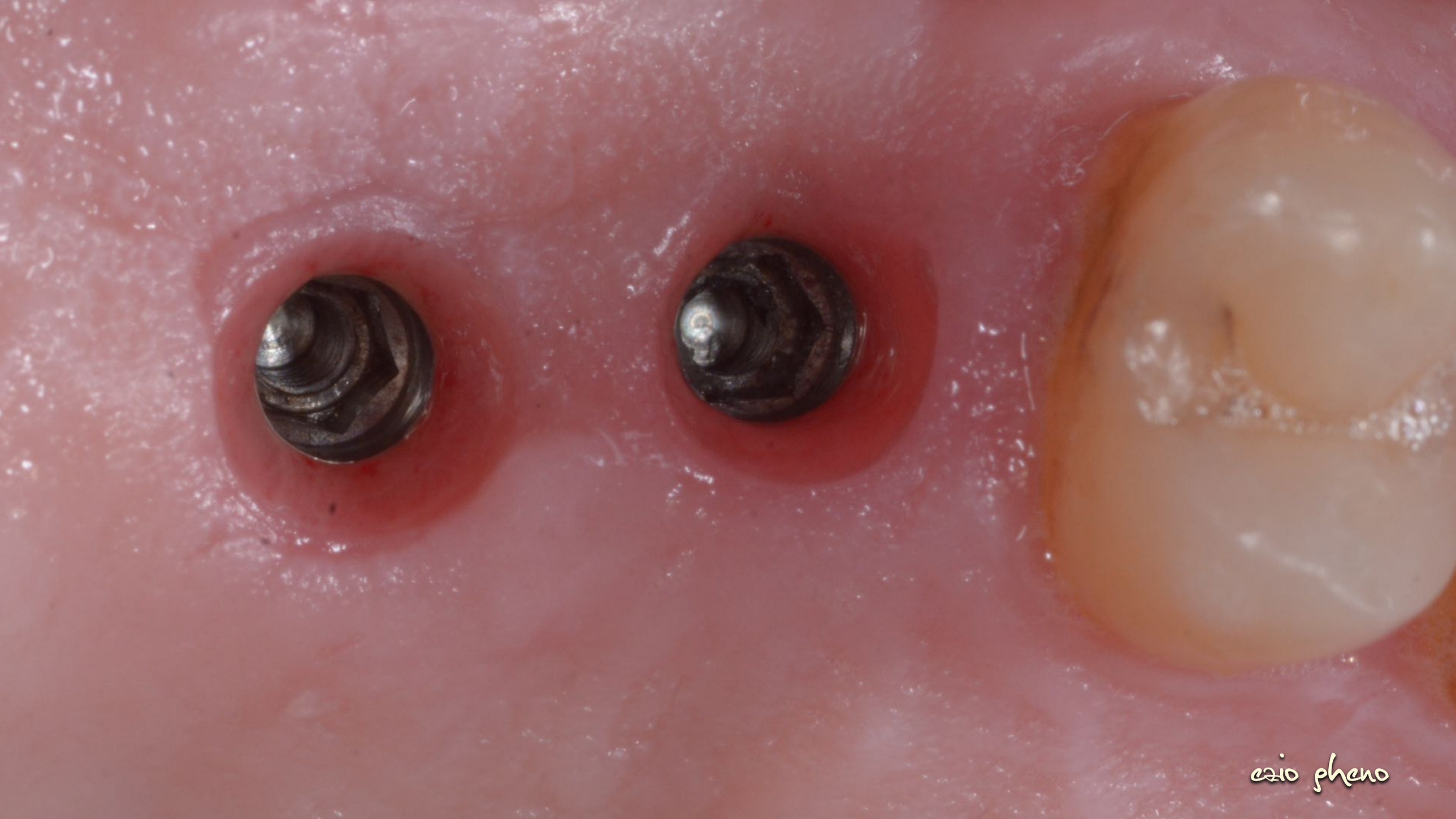
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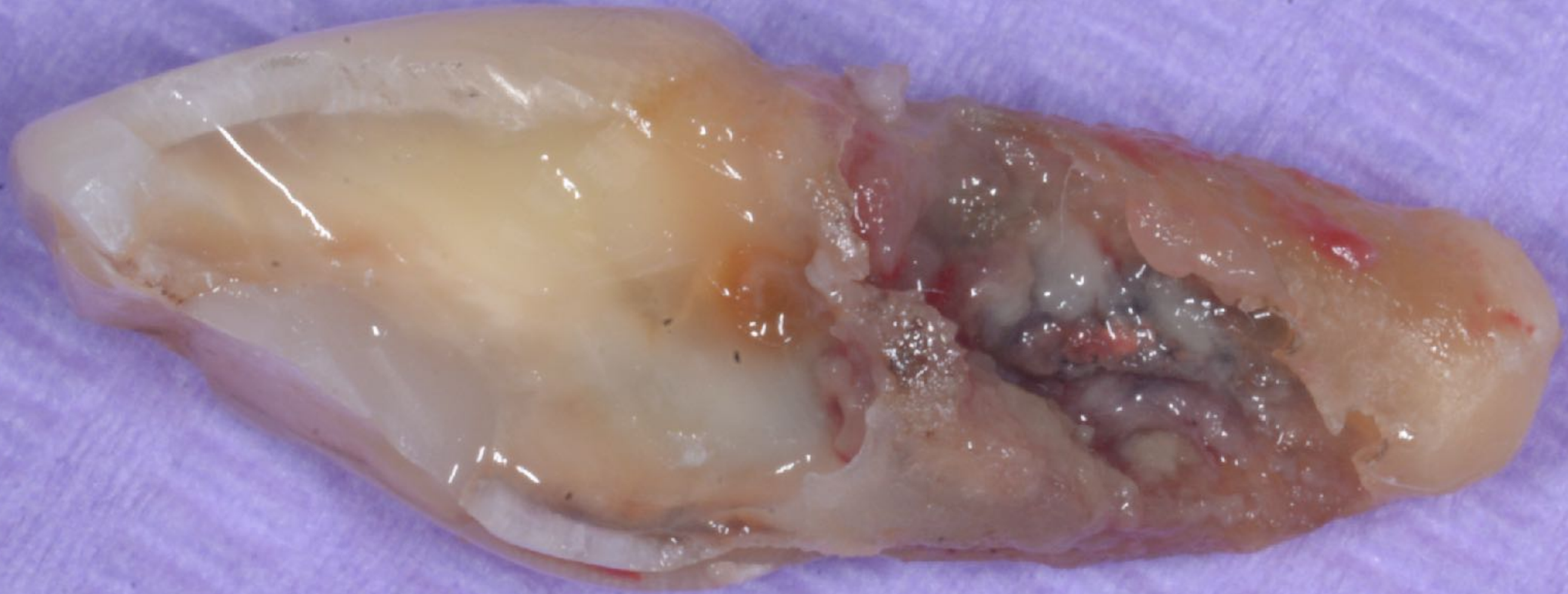

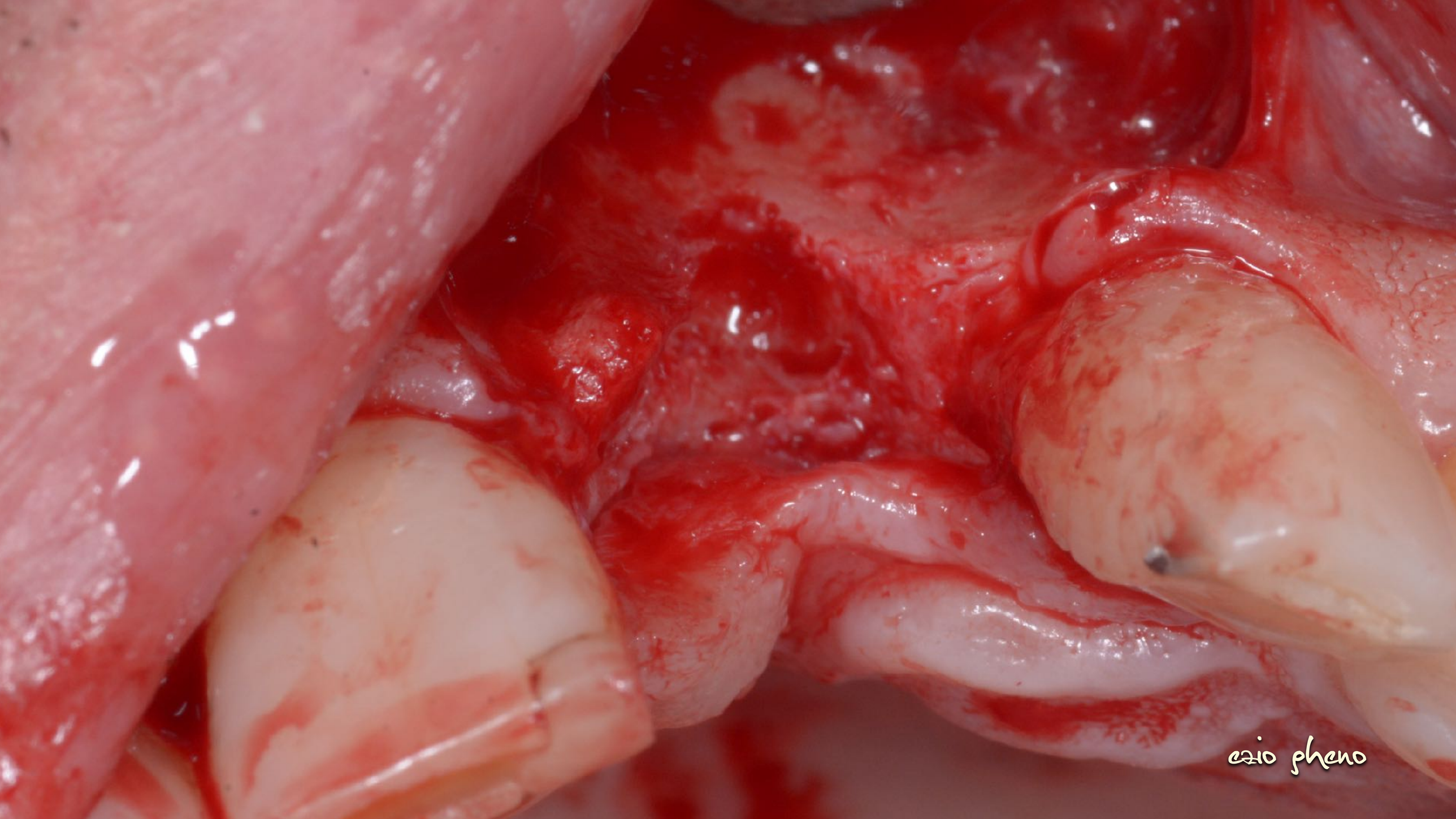
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GF’s permeation

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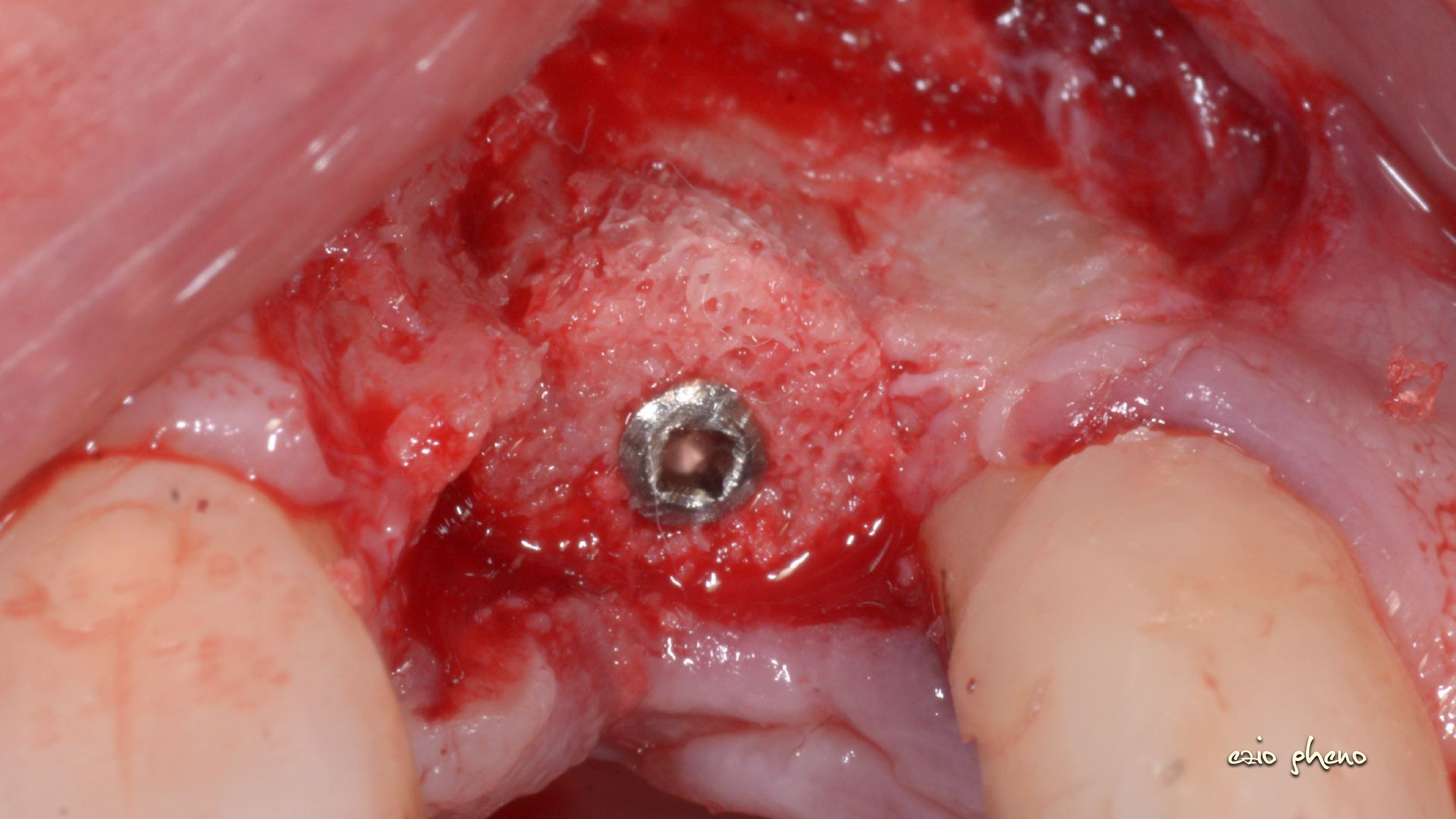
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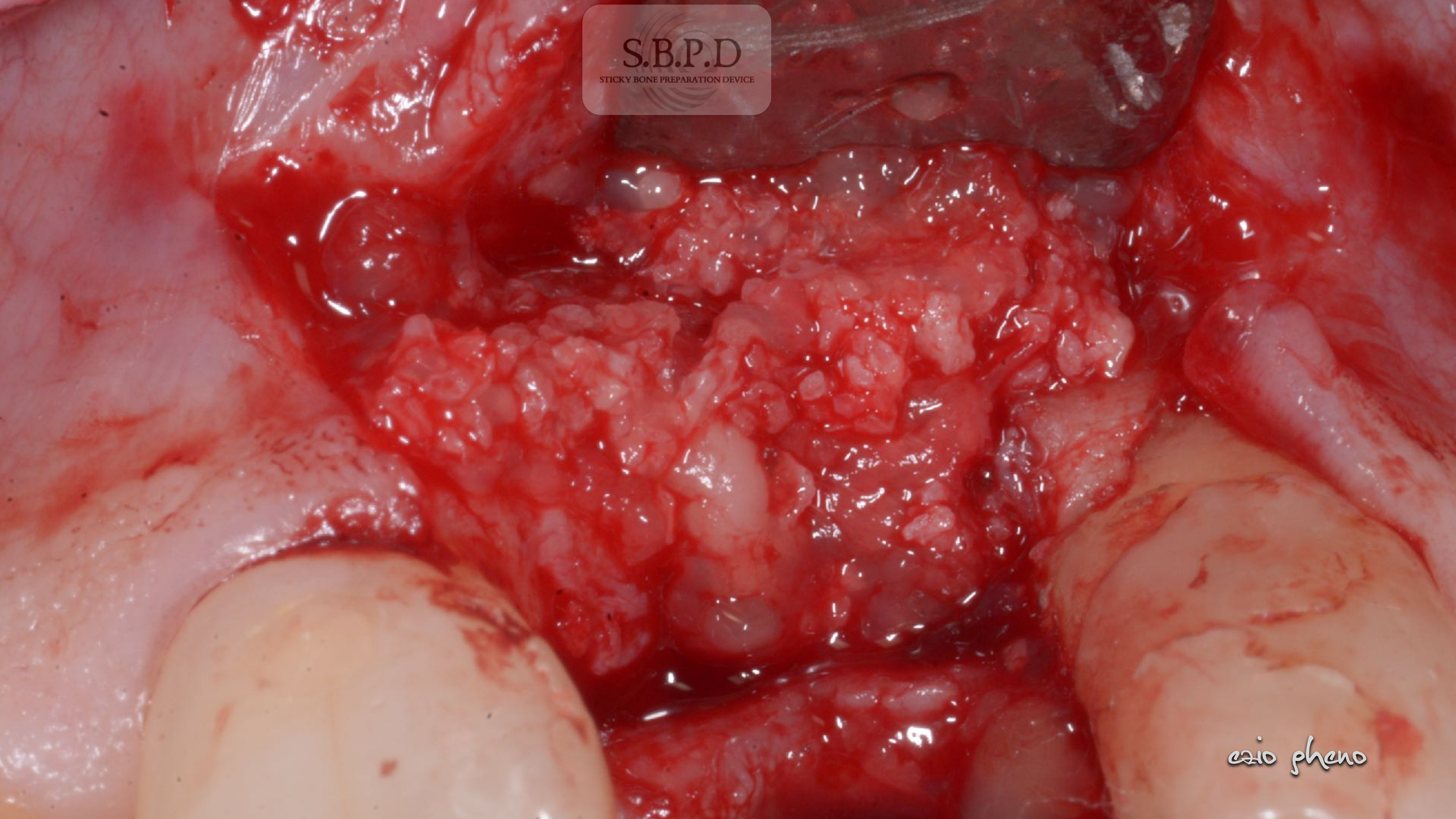
S.B.P.D
STICKY BONE PREPARATION DEVICE
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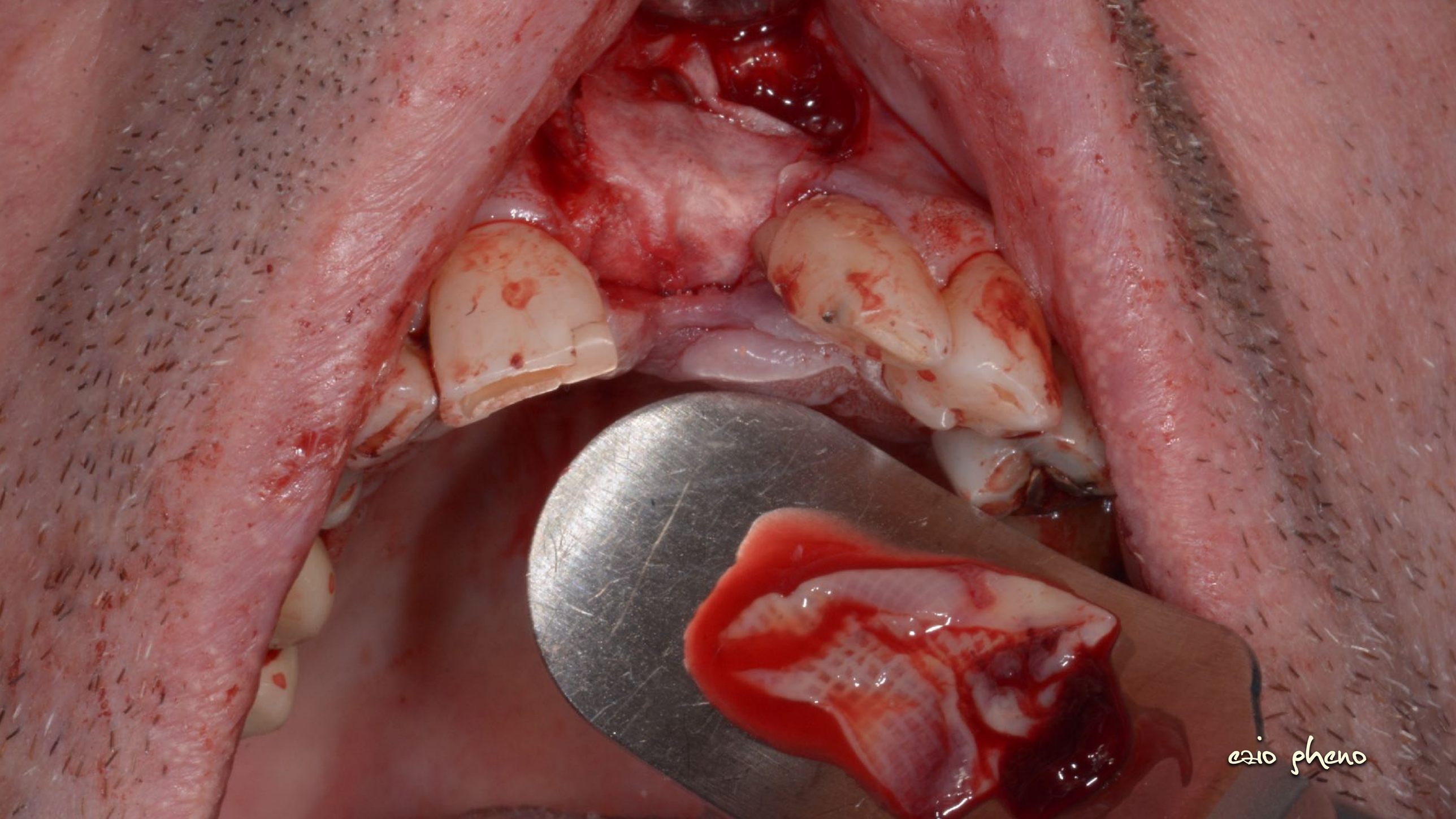
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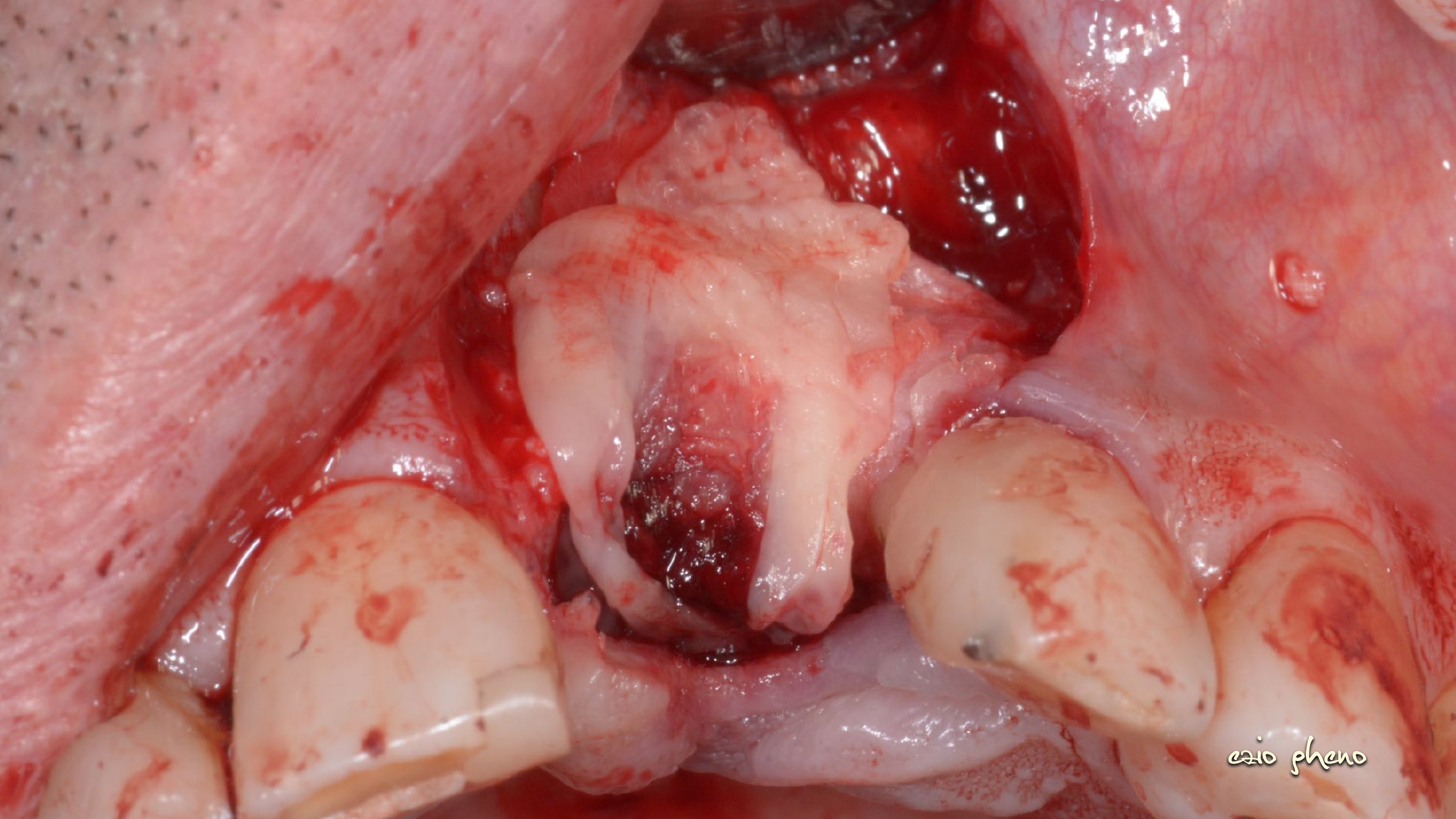
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After two months
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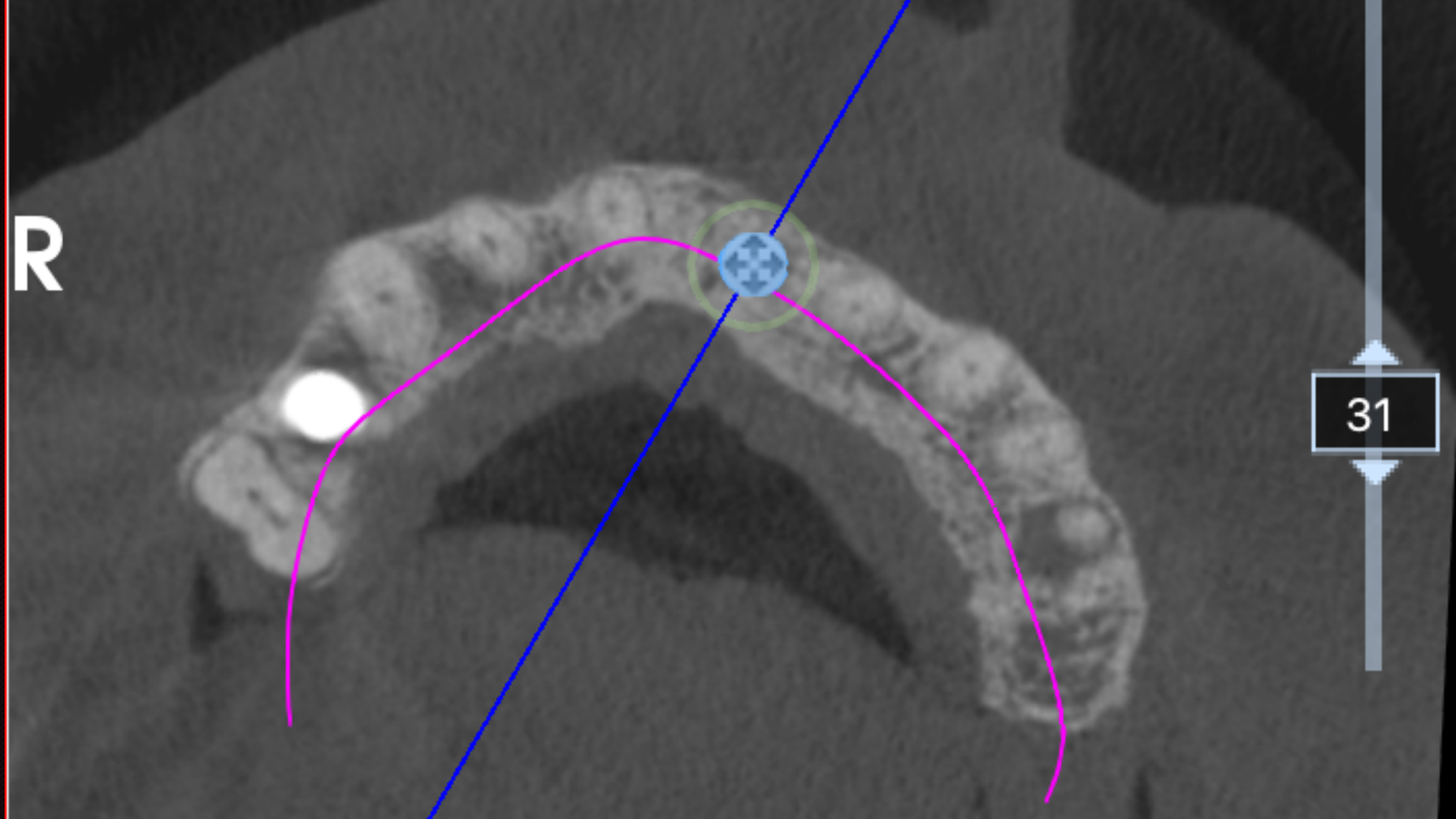
R
31


75
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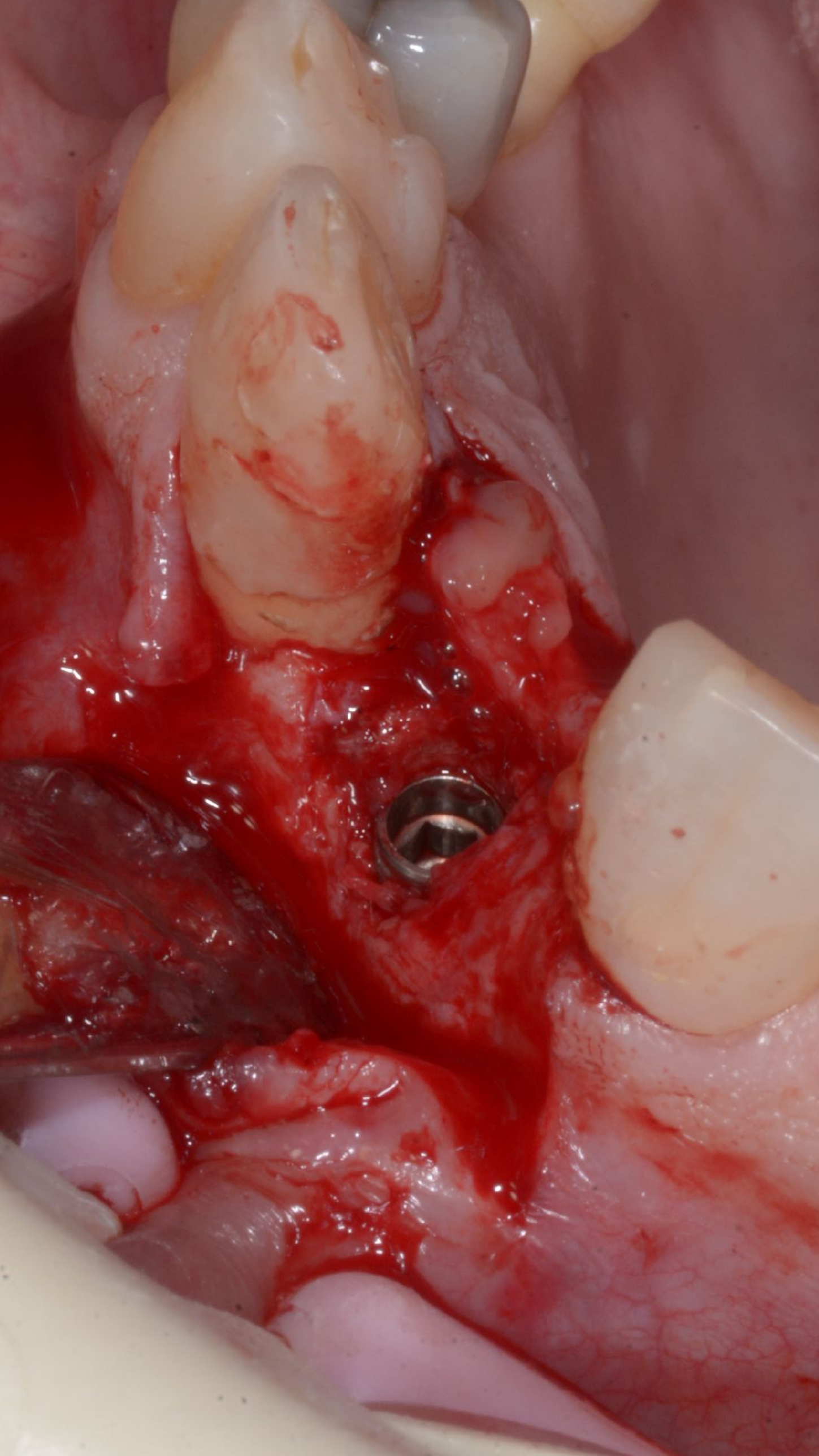

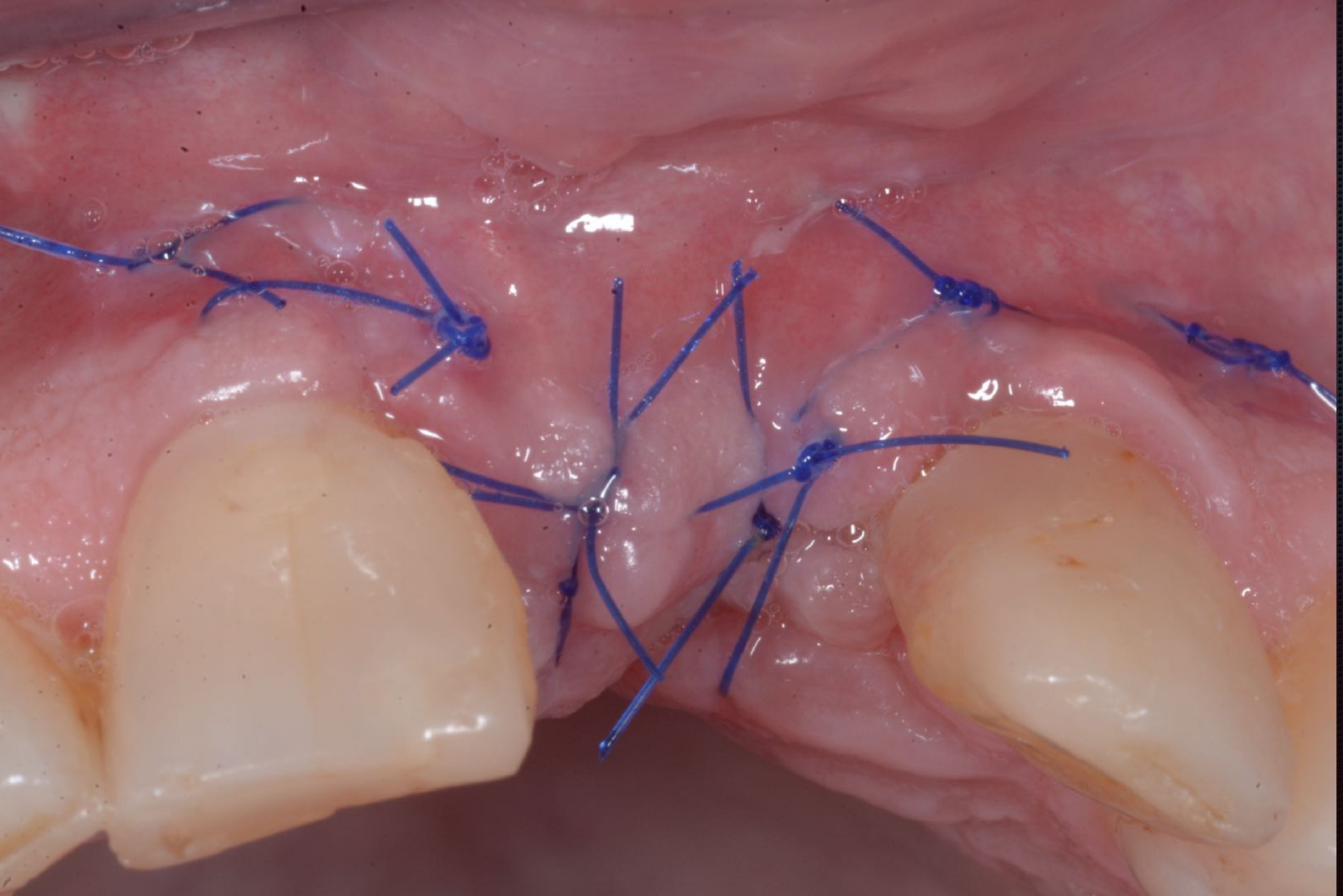
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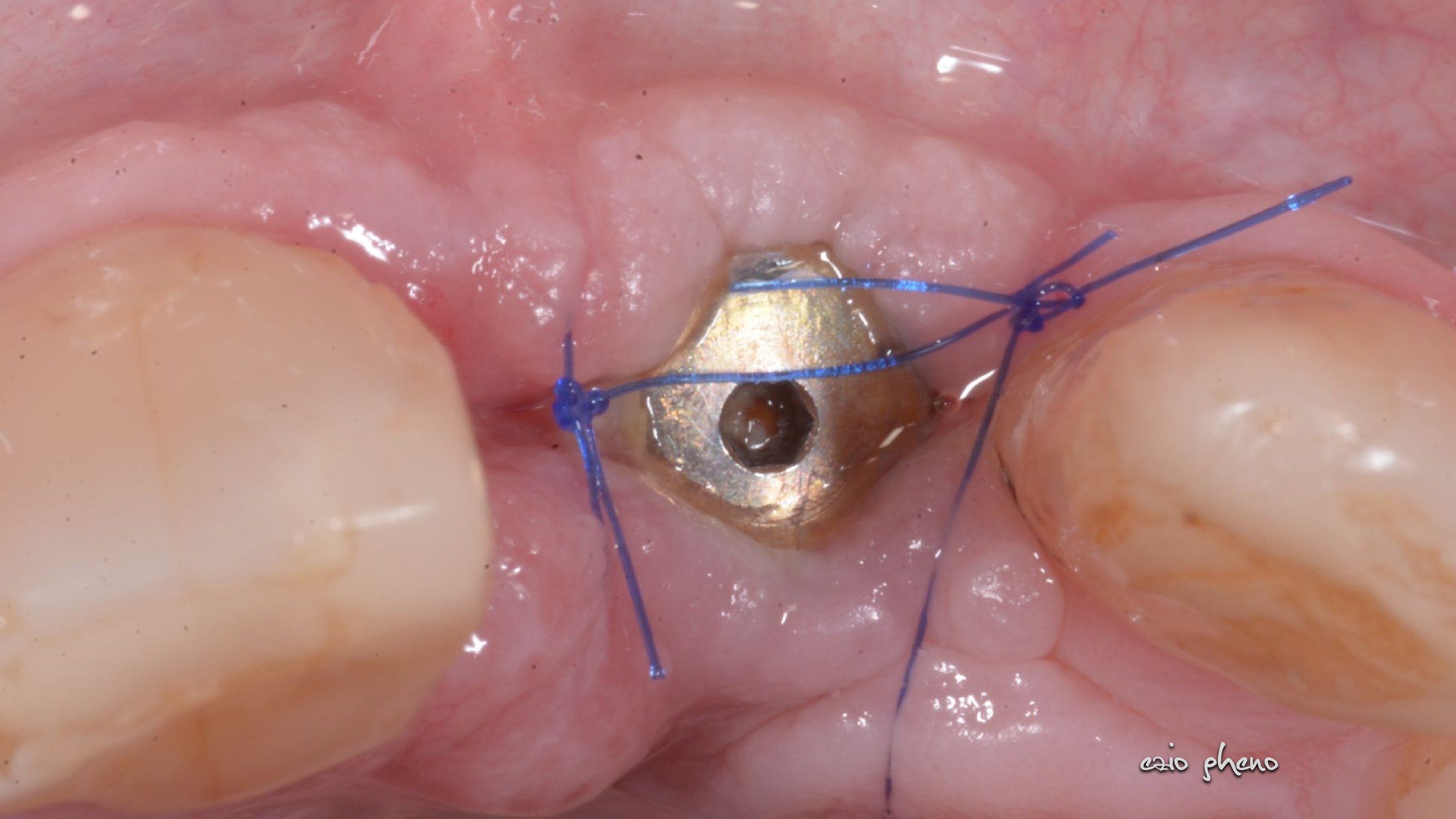
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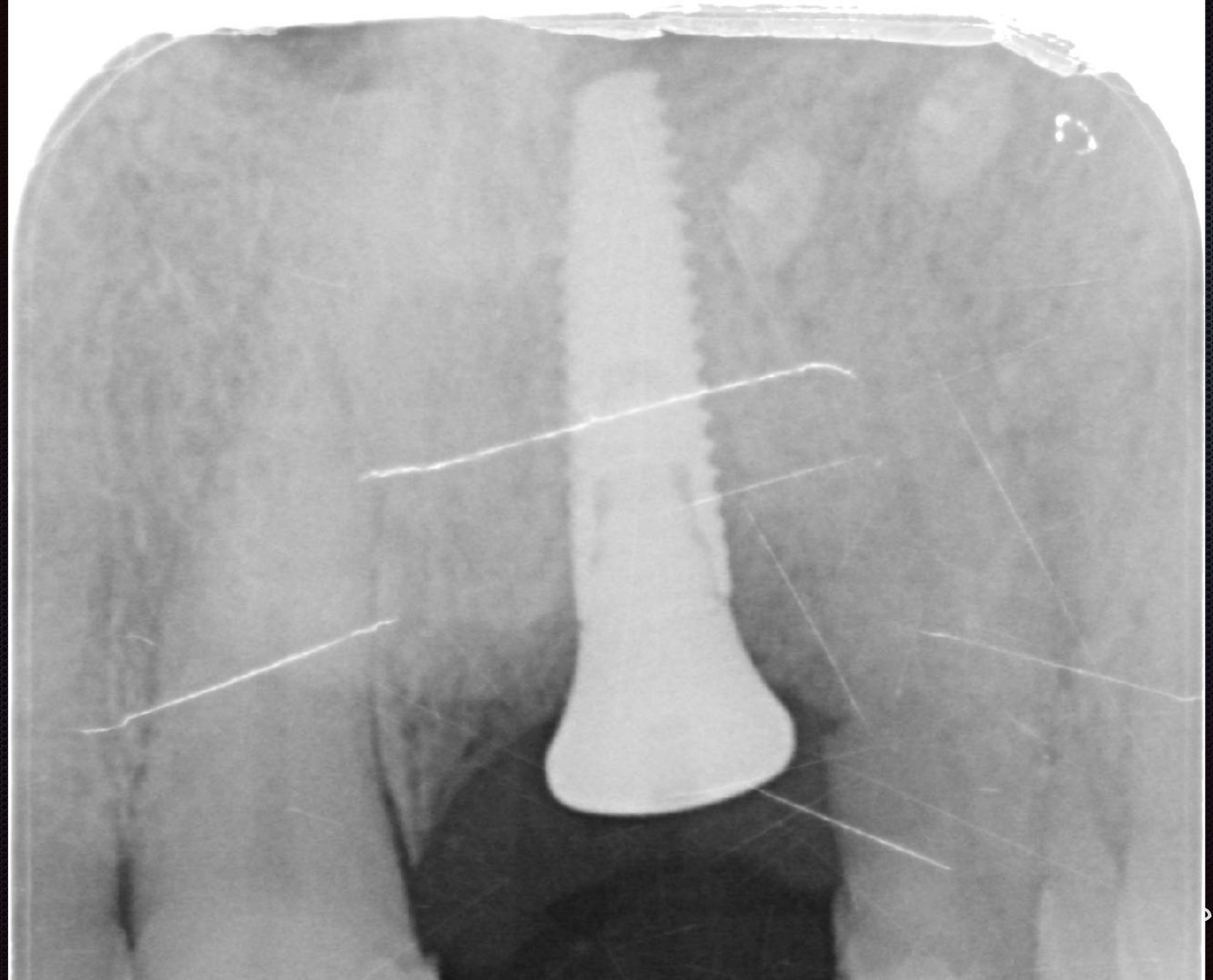

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