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Papilla preservation and minimally invasive surgery for treating peri-implant bone defects following nasopalatine cyst enucleation: Clinical and radiographic outcomes

Abdusalam E. Alrmali BDS, MFDS RCS, MDS , Hom-Lay Wang DDS, MSD, PhD



Background

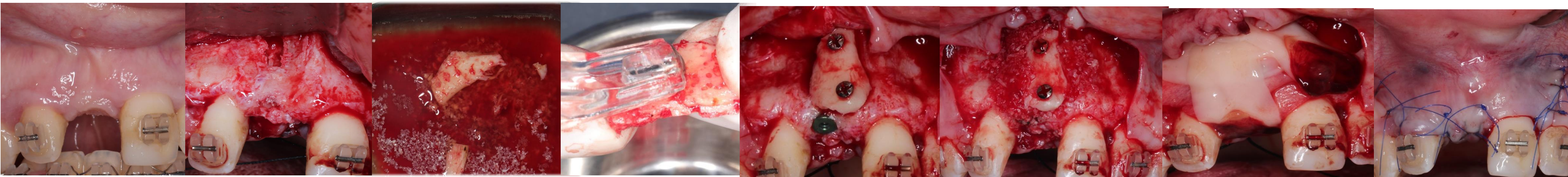
Peri-implant diseases, which include mucositis and peri-implantitis, pose significant challenges to the long-term success of dental implants. These conditions can lead to progressive bone loss, compromising the stability and functionality of the implants. Traditional treatment methods often involve invasive surgical procedures, which can be detrimental to soft tissue aesthetics and long-term health. The presence of cystic lesions, such as those resulting from nasopalatine duct cysts, can further complicate the peri-implant environment. These lesions often require careful management to preserve both the hard and soft tissue architecture, ensuring the implant's functional and aesthetic integrity.

Objective

The primary aim of this case report is to evaluate the clinical feasibility and success of the Papilla Preservation Flap (PPF) technique as a regenerative approach for treating peri-implant cystic lesions after esthetic rehabilitation . This method seeks to address both the aesthetic and functional challenges posed by peri-implant defects, providing an effective alternative to more invasive traditional surgeries.



Figure #1 and 2 preoperative surgical intervention





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Methodology

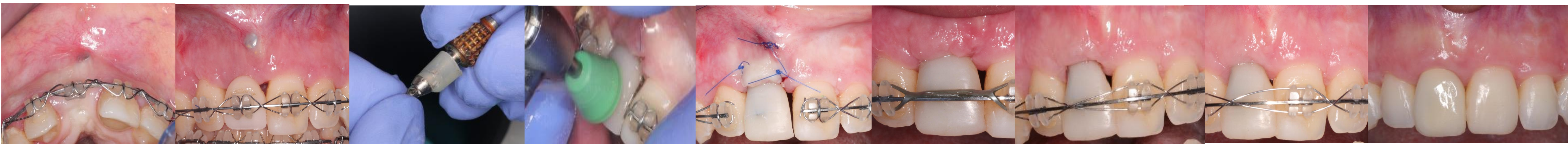
Patient History and Initial Treatment: Four years prior, the patient underwent a Remus block graft procedure to augment horizontal bone volume in preparation for dental implant placement in the maxillary anterior region.

Post-graft, a dental implant was placed successfully, followed by standard osseointegration observation.

Presentation of Current Condition: The patient, a 29-year-old female, presented with notable palatal swelling adjacent to the implant site, prompting further investigation. Radiographic analysis revealed a cystic lesion compromising the peri-implant bone structure, necessitating intervention.

Surgical Approach: Papilla Preservation Flap (PPF) Technique: To address the peri-implant cystic lesion, the PPF technique was utilized for its minimally invasive nature and ability to preserve crucial soft tissue aesthetics. An incision was carefully made, preserving the interdental papilla to maintain blood supply and promote optimal healing. Cyst Enucleation and Implant Decontamination: The cystic lesion was meticulously enucleated to ensure complete removal without disturbing the implant's positioning. Implant surfaces were thoroughly decontaminated using a combination of sterile saline irrigation and chemical decontaminants to facilitate future re-osseointegration. A regimented follow-up schedule was implemented, including appointments at immediate post-op, 3 months, 6 months, and one year to assess healing progress. Clinical evaluations focused on probing depths, tissue health, and esthetics, while radiographic assessments quantified bone regeneration and defect resolution.

Figure #2 soft tissue conditioning





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Results

Achieved 100% primary wound closure at the treated site, with no instances of dehiscence or delayed healing observed. The preservation of the interdental papilla contributed significantly to maintaining soft tissue contour and patient satisfaction with esthetic outcomes.

Probing Pocket Depth (PPD):

Initial reduction in PPD was significant, measuring an average decrease of 3.8 mm at the one-year mark.

The residual probing depth remained stable at approximately 4.1 mm, indicating successful disease control and tissue health maintenance.

Radiographic Outcomes:

Radiographic analysis showed a substantial increase in peri-implant bone levels with a gain of 2.2 mm mesially and 2.4 mm distally after one year. These gains represent a meaningful reconstitution of the bony architecture surrounding the implant.

Patient-Reported Outcomes:

The patient reported high satisfaction with the esthetic outcomes, noting the natural appearance of the gum line and absence of visible scarring.

The retention of papilla height and color consistency of gingiva were key contributors to positive aesthetic judgments.

Enhanced function was observed, with the patient resuming normal oral activities without discomfort or sensitivity.

No signs of recurrence in swelling or other symptoms of peri-implantitis were reported during the follow-up period.

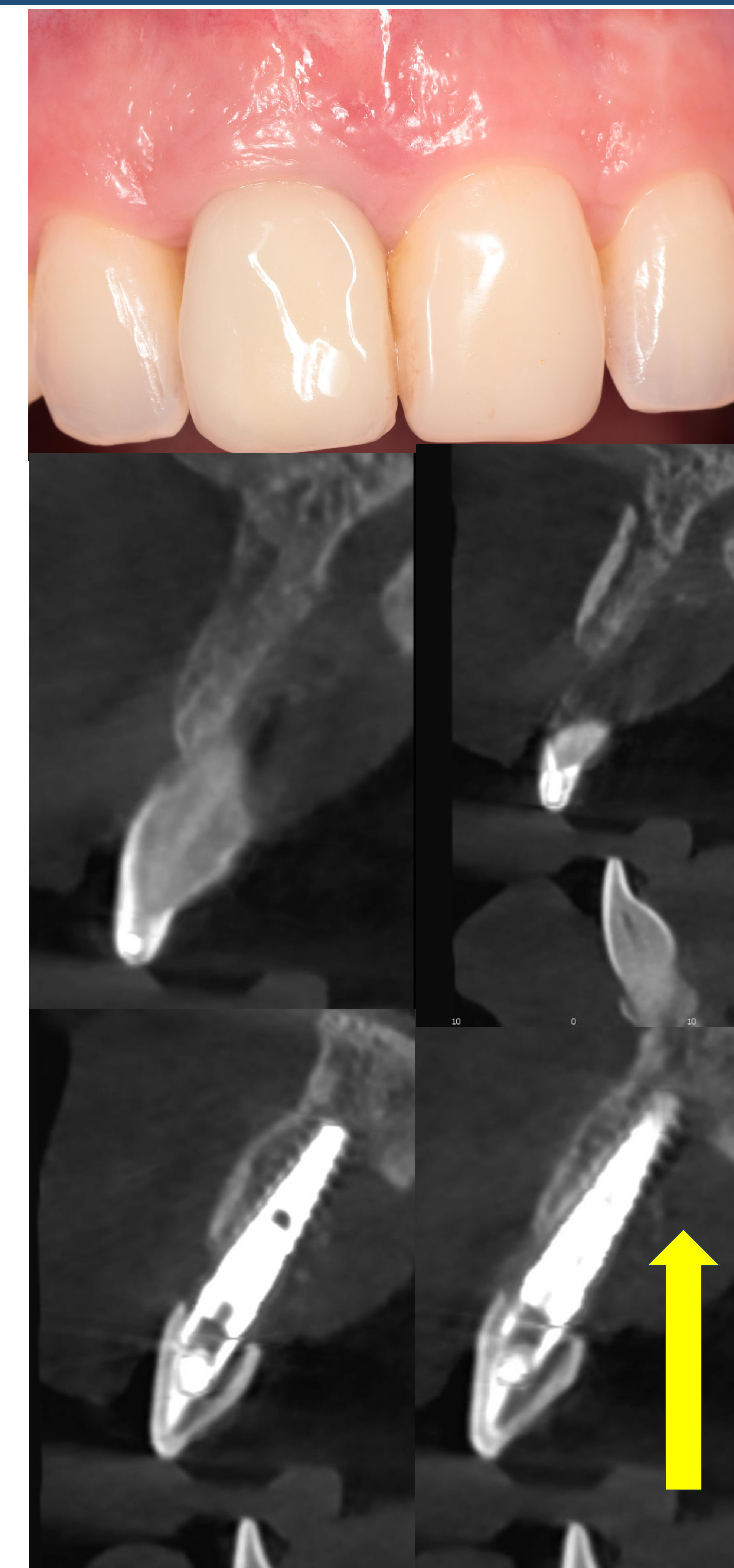


Figure #3 palatal bone destruction caused by NPC



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Discussion

The Papilla Preservation Flap (PPF) technique demonstrated its ability to effectively preserve soft tissue aesthetics, which is crucial in the anterior maxillary region. Preserving the papilla not only maintained esthetics but also contributed to maintaining a robust blood supply, facilitating quicker and more effective healing.

Comparative Advantages:

Traditional surgical methods for managing peri-implant defects often involve aggressive flap designs, which may lead to gingival recession and compromised esthetics, especially in visually sensitive areas. In contrast, the PPF technique minimizes surgical trauma and maximizes esthetic outcomes, making it a superior choice for managing anterior peri-implant defects.

Conclusion

While the results are promising, this report is based on a single case. Future research involving larger sample sizes and randomized controlled trials could provide more definitive evidence of the PPF technique's efficacy across diverse patient populations and implant types.

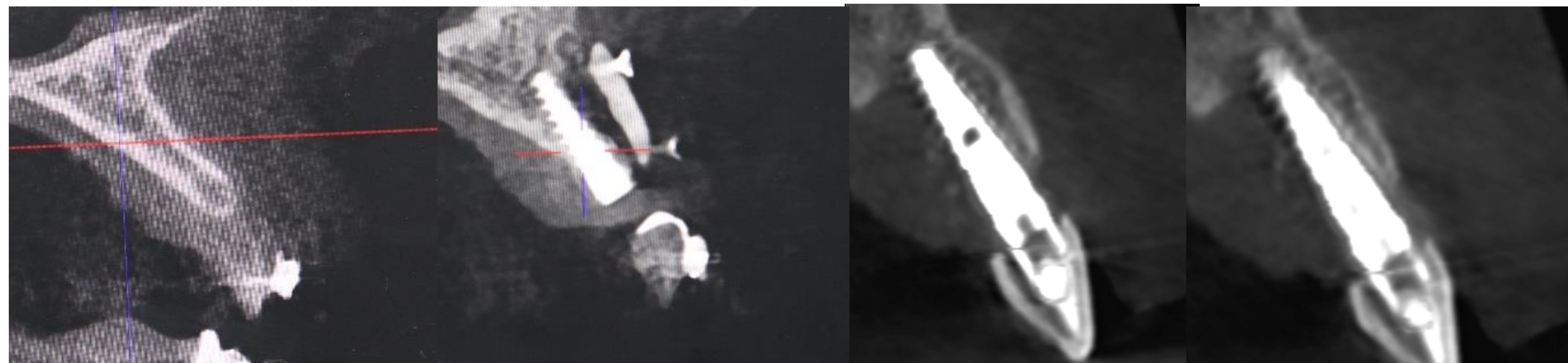


Figure #5 CBCT at, T0,T1 and T2

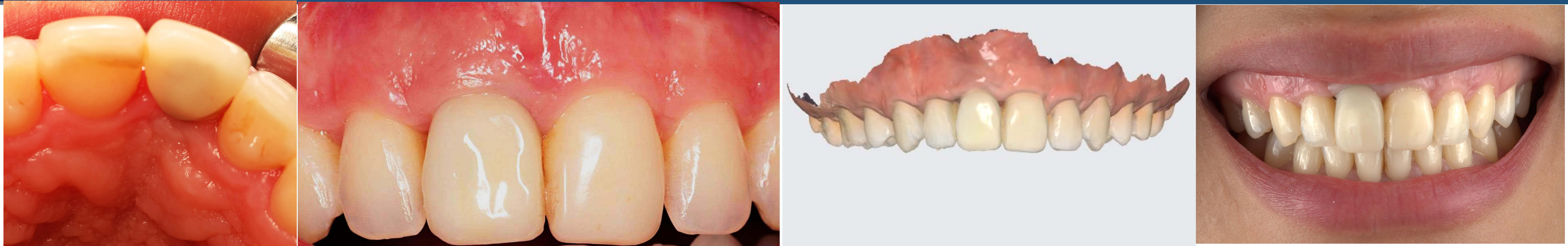
Figure #4 Surgical enucleation



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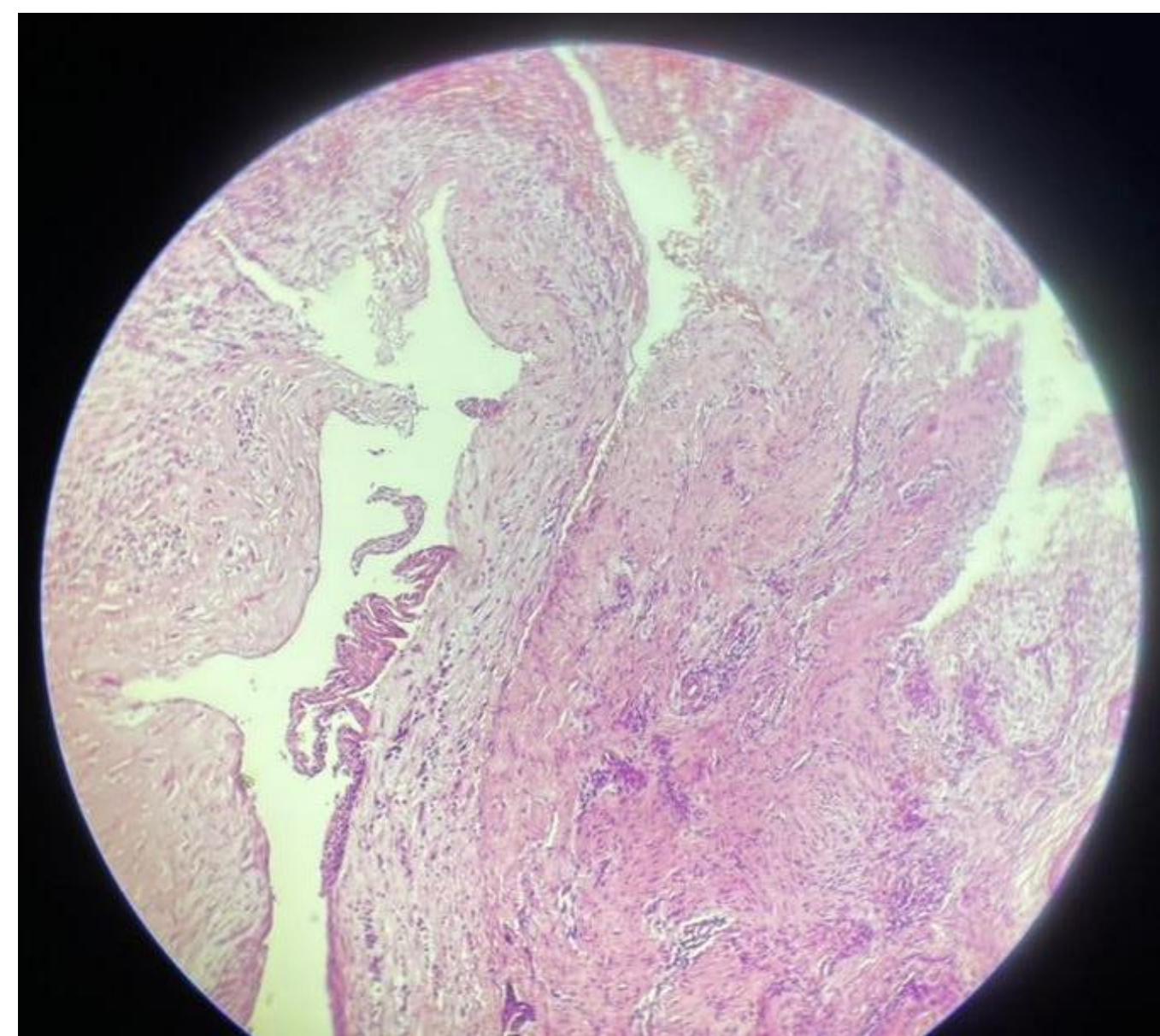
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Histopathology

Histopathologically, nasopalatine duct cysts (NPDCs) typically exhibit a lining of non-keratinized stratified squamous epithelium, either alone or in combination with other epithelial types such as ciliated pseudostratified columnar or simple cuboidal epithelium. The cyst wall often contains a mild to intense chronic inflammatory infiltrate, blood vessels, and nerve fascicles, with occasional findings of salivary glands, cholesterol clefts, and multinucleated giant cells.



References

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Schincaglia GP, Hebert E, Farina R, Simonelli A, Trombelli L. Single versus double flap approach in periodontal regenerative treatment.

