

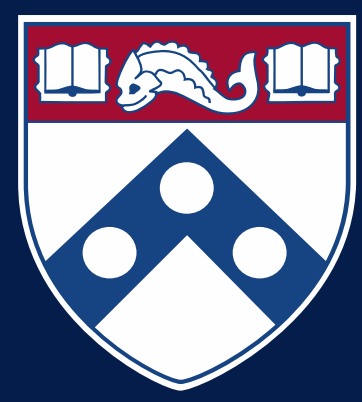
Retrospective analysis of factors related to the clinical outcome of alveolar ridge augmentation using guided bone regeneration

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Poster No. P19



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Introduction

Guided bone regeneration (GBR) has been shown to be a predictable and effective regenerative technique for alveolar ridge augmentation.¹ Predictable bone formation requires the presence of essential biological components, including cells, signaling molecules, and scaffolds.² Adequate blood supply, soft tissue isolation, and time have also been shown to be critical components for bone regeneration.³ Consequently, significant effort has been made to develop novel GBR techniques and materials to improve clinical outcomes for patients undergoing ridge augmentation. Advancements in regenerative materials, and their potential to meet treatment objectives whilst offering unique properties, have seen the adoption of diverse surgical techniques and biomaterials.⁴⁻⁵ Due to such a diverse library of materials, clinicians must have an evidence-based approach to material selection to optimize alveolar ridge augmentation, improve clinical outcomes and minimize complications.

The aim of this study is to retrospectively analyze factors related to the difficulties of alveolar ridge augmentation using GBR in a university setting.

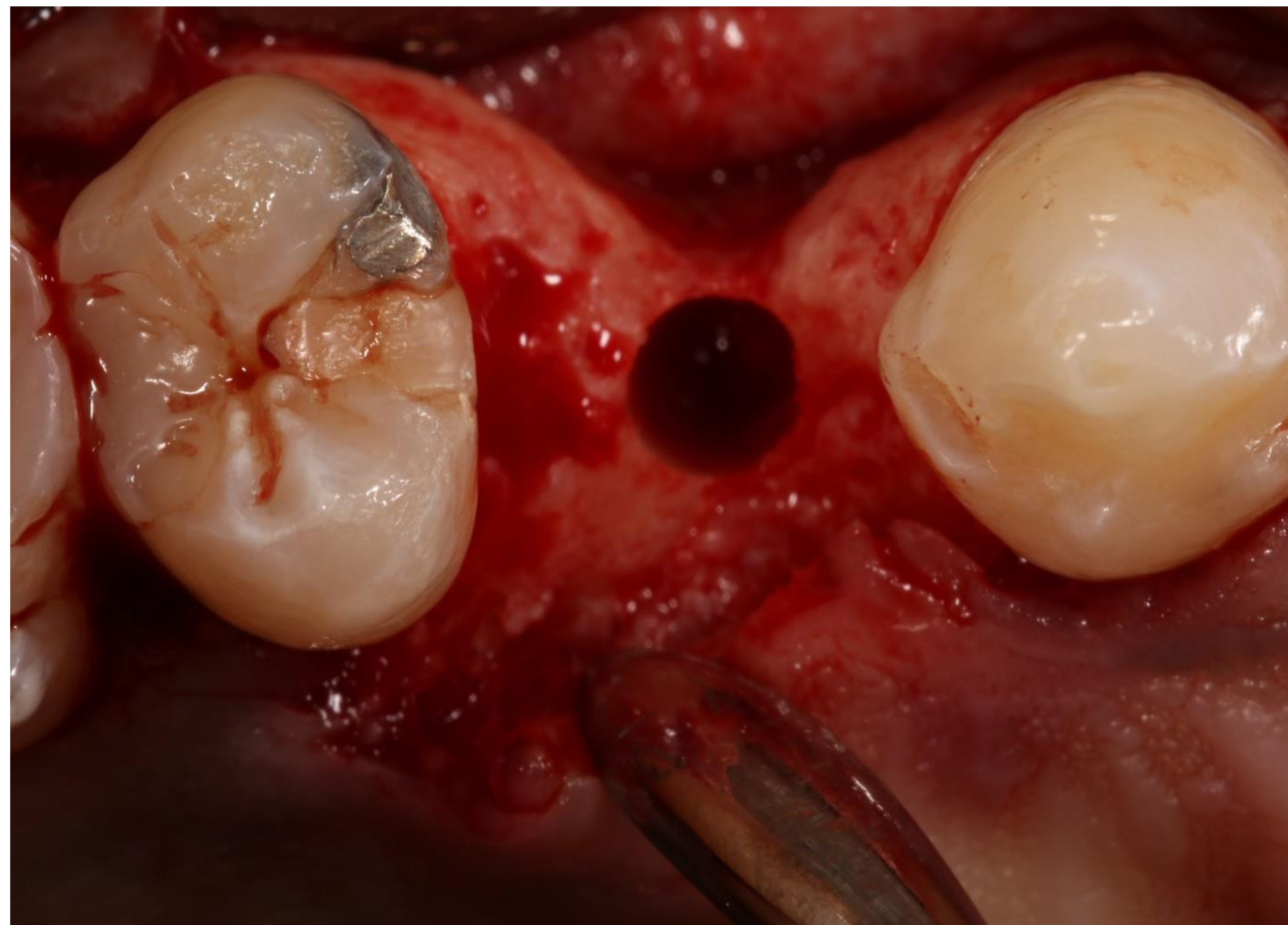


Figure 1. Deficient buccal bone at implant placement

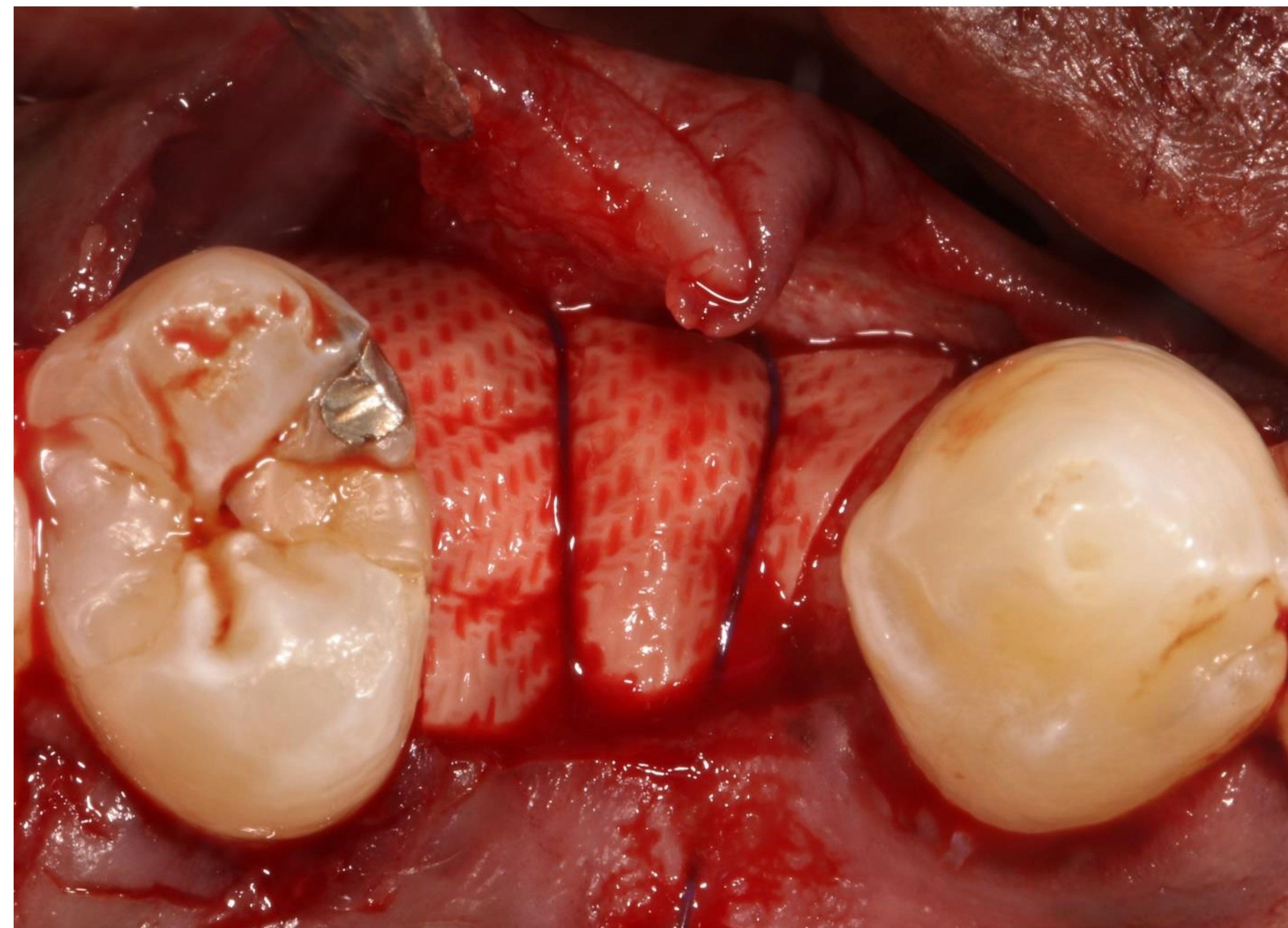
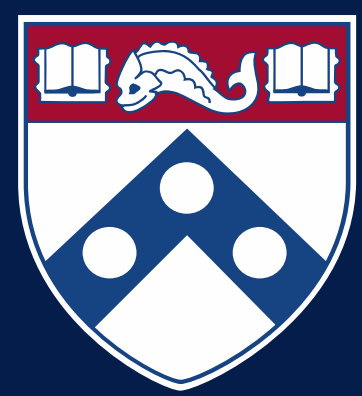


Figure 2. GBR with resorbable membrane and suture stabilization



Figure 3. 2 weeks post-op view shows complication (membrane exposure)



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Materials and Methods

This retrospective case-control study was approved by the University of Pennsylvania Institutional Review Committee. Dental records of patients of Penn Dental Medicine who received GBR from 2019 to 2021 were retrospectively reviewed and evaluated. Patient demographics, surgical techniques, and materials (gender, smoking status, ASA classification, prescription of pre-and post-operative medication, decortications, bone graft material, barrier membrane material, graft stabilization technique, leukocyte-platelet rich fibrin, and suture material) and risk factors with complications related to GBR were evaluated (infection, membrane exposure, osteonecrosis and the need for prospective additional grafting) were collected. Descriptive statistics were evaluated, including the correlation between surgical complications and other covariance through the Chi-Square test.



Figure 4. Leukocyte-platelet rich fibrin (L-PRF)

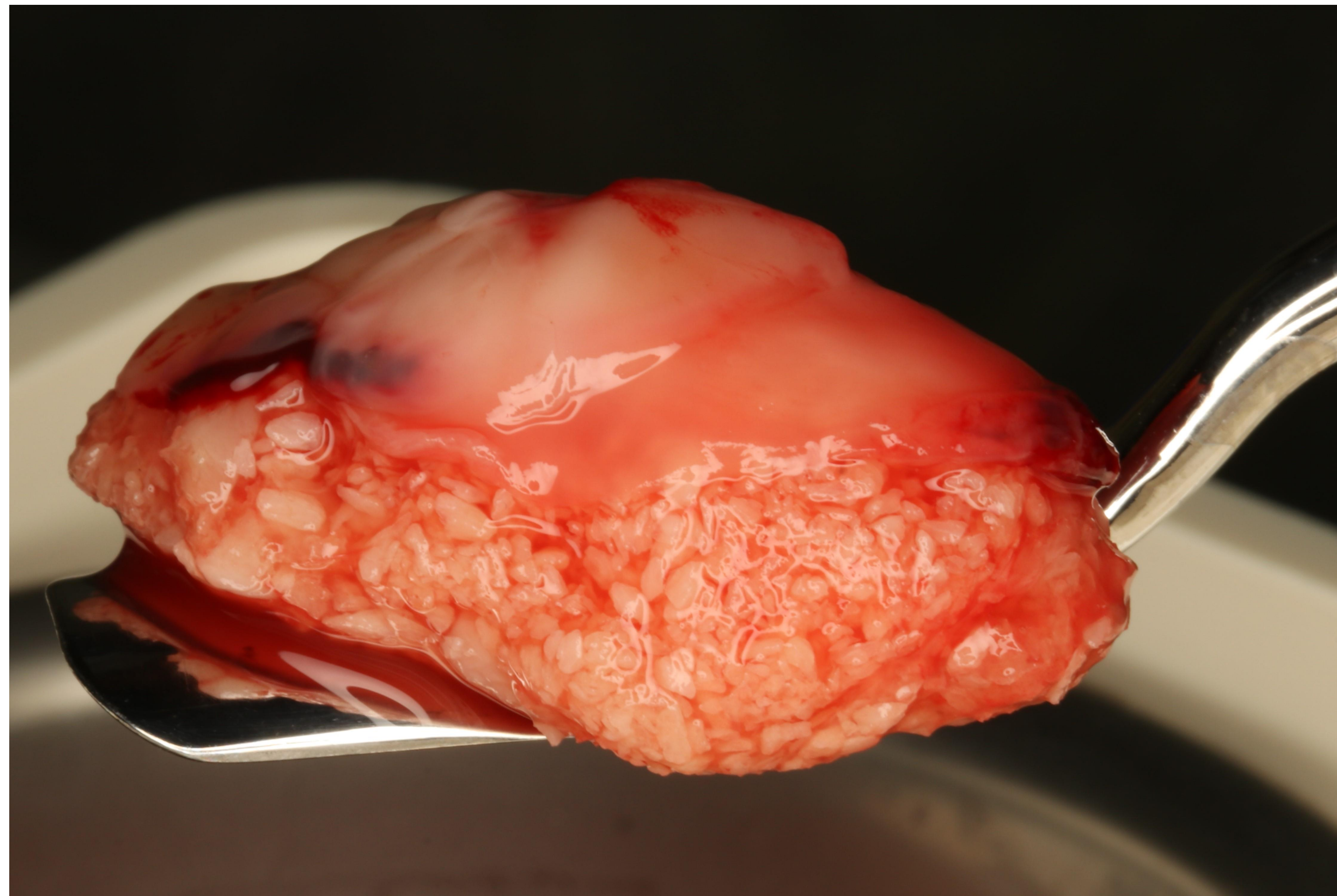


Figure 5. FDBA "sticky bone" with L-PRF membrane



Figure 6. Cross-linked collagen membrane

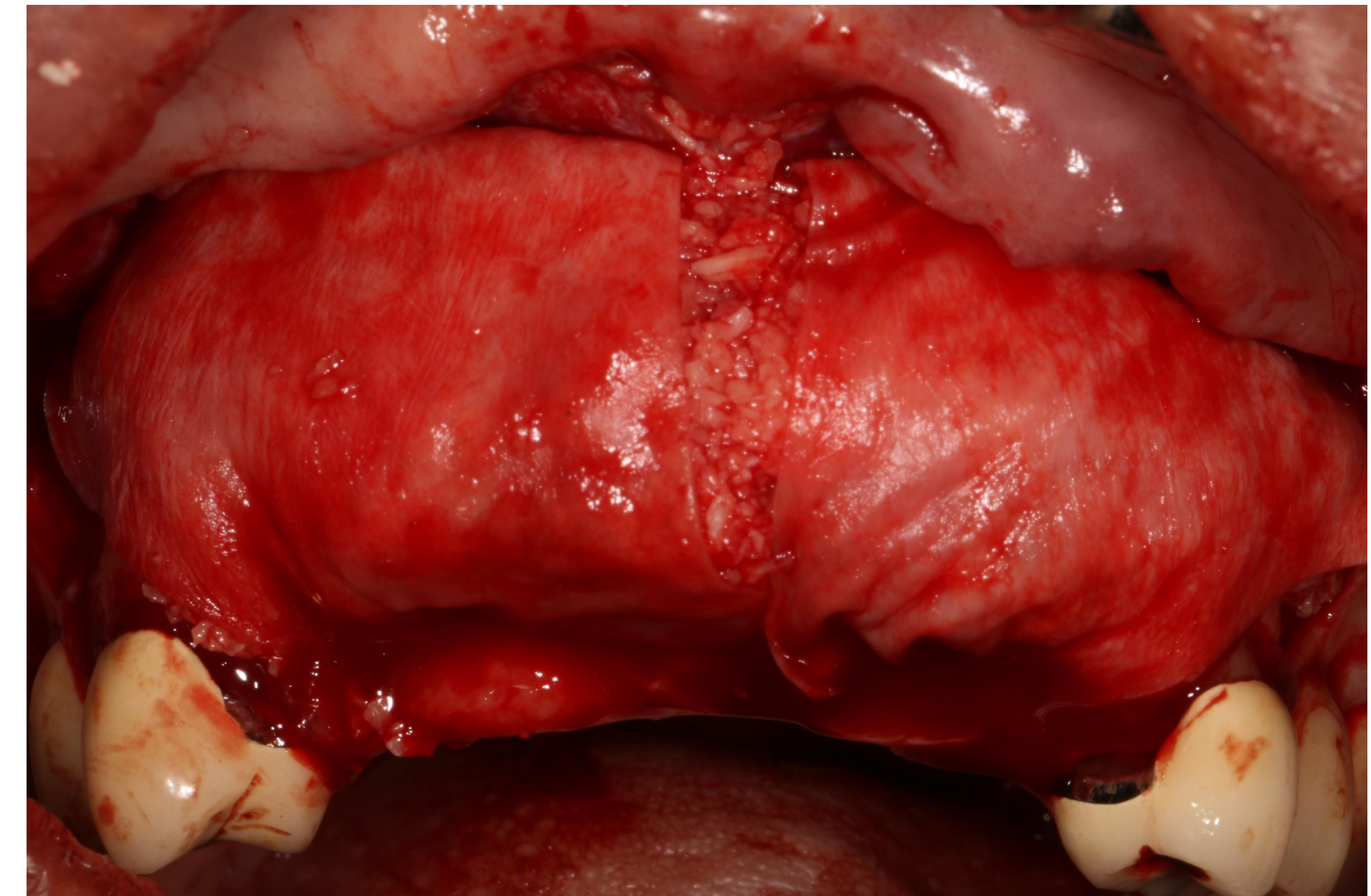
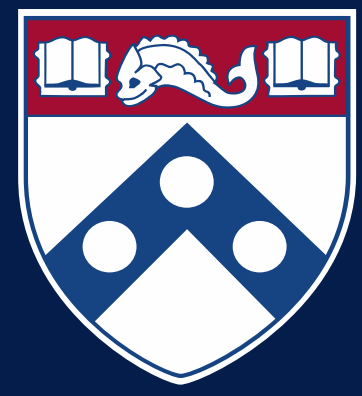


Figure 7. Non-cross-linked collagen membrane fixated using tacks



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Results

A total of 119 patients with a total of 137 GBR procedures were included in this retrospective study. There were 85 females and 50 males, with a mean age of 57.31 years. A total of 59 (43.07%) complications were noted in these 137 procedures.

Health status, both ASA classification and a diagnosis of diabetes, failed to demonstrate a statistically significant increase in complications ($p>0.05$). No statistically significant differences were observed among bone grafting materials used. There were increases in trends of complications with gender (female (37.8%) versus males (26.6%)) and graft stabilization (absence of graft stabilization (40.7%), use of tacks (35.8%) and suture (23.2%)). However, these were not statistically significant ($p>0.05$).

When the type of membrane utilized was evaluated, the use of resorbable barrier membranes had fewer complications (30.5%) ($p<0.05$) when compared to non-resorbable membranes (77.8%).

Table 1. The Influence of Patient, Surgical and Material Factors on the incidence of Complications Associated With Guided Bone Regeneration

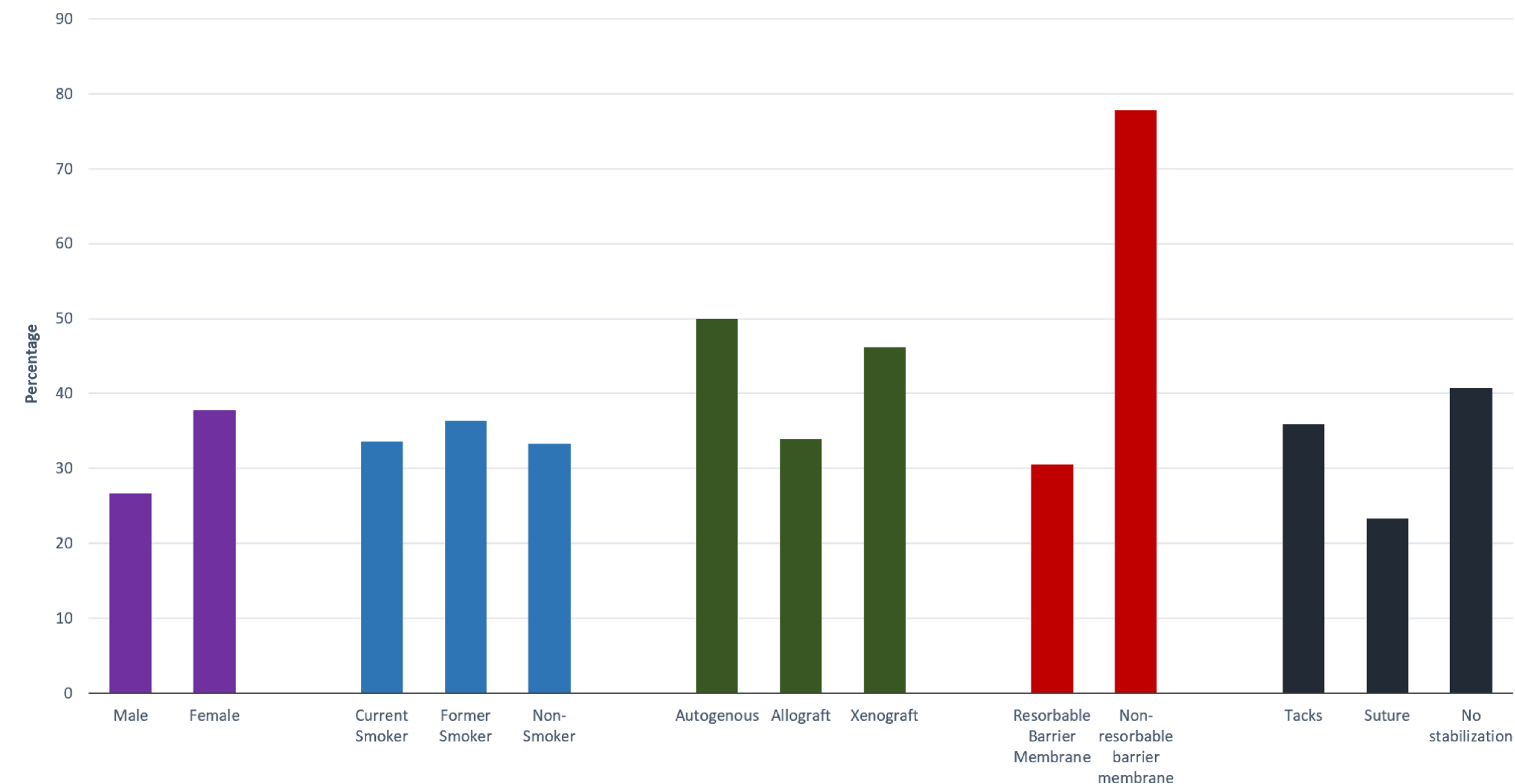


Figure 8. GBR complication rate

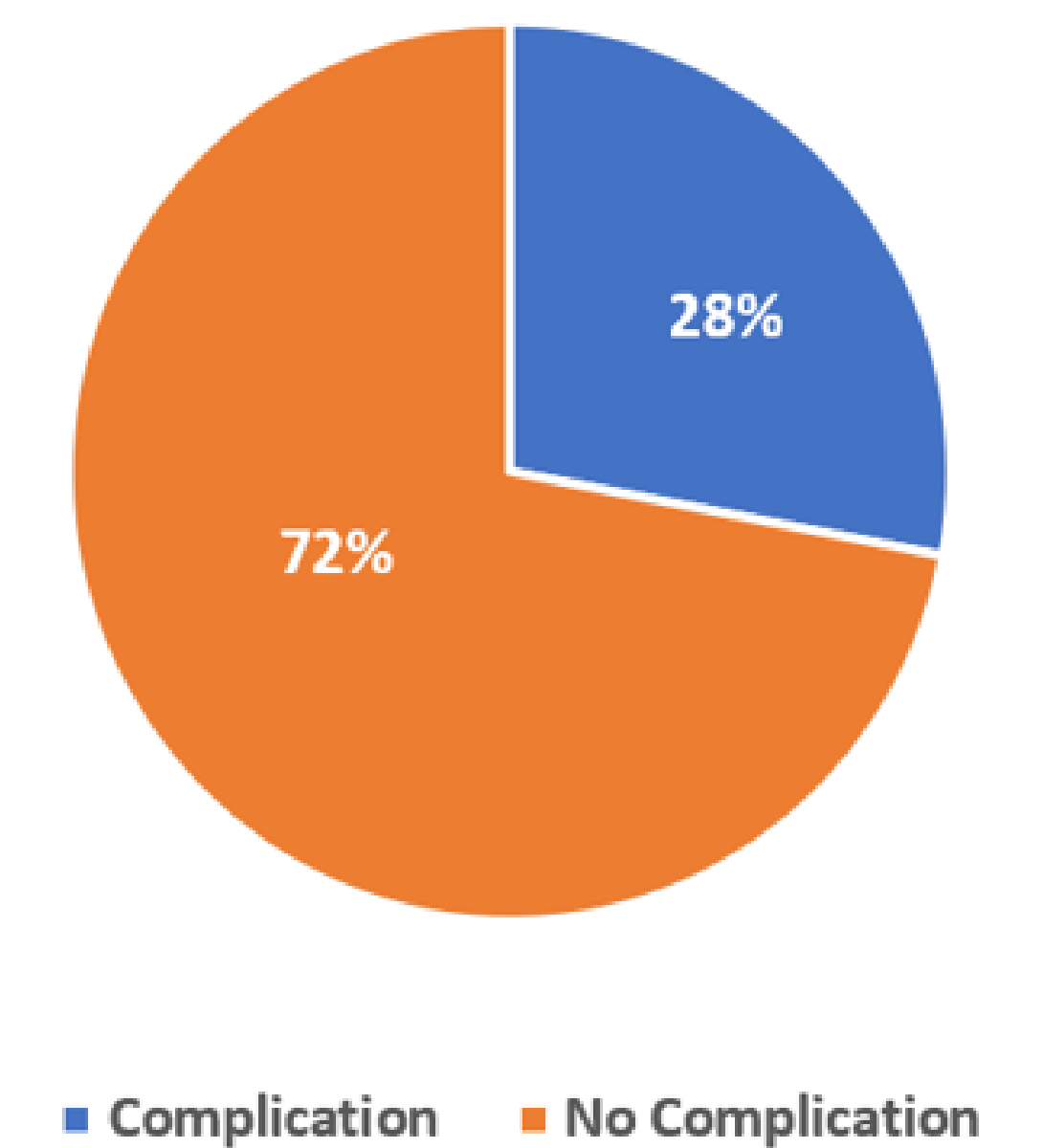
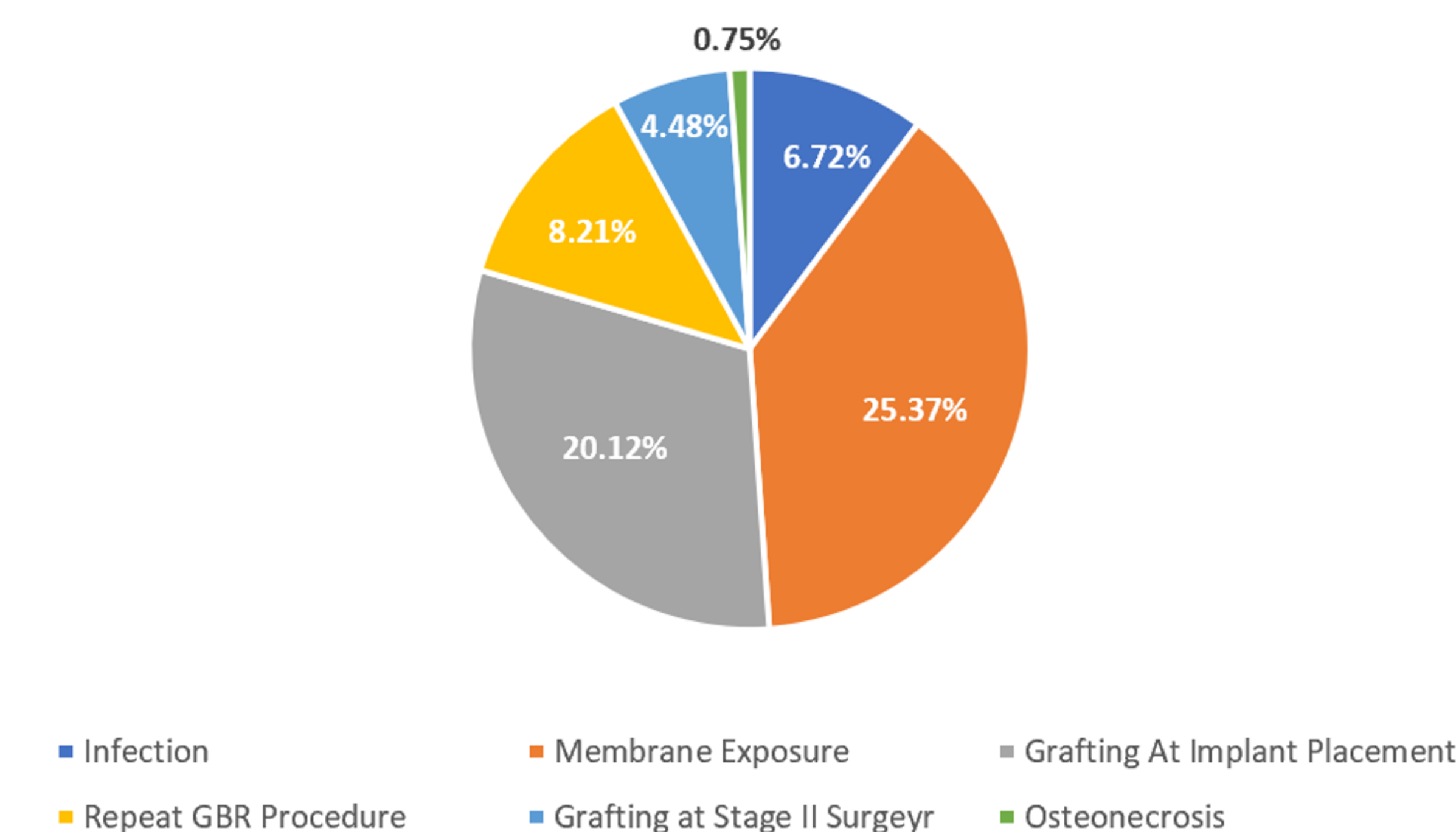
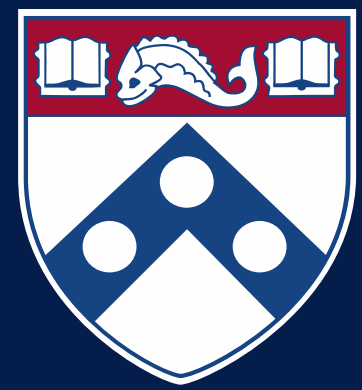


Figure 9. Varieties of complications seen in GBR





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Conclusion

Within the limitations of this study, barrier membrane selection plays a critical role in the complication rates of GBR. According to this study, non-resorbable barrier membranes seem to have more complications during healing time. Further evaluation is needed to check complication rates during and after implant placement. Patient factors and surgical techniques did not significantly influence the incidence of complications associated with GBR.

References

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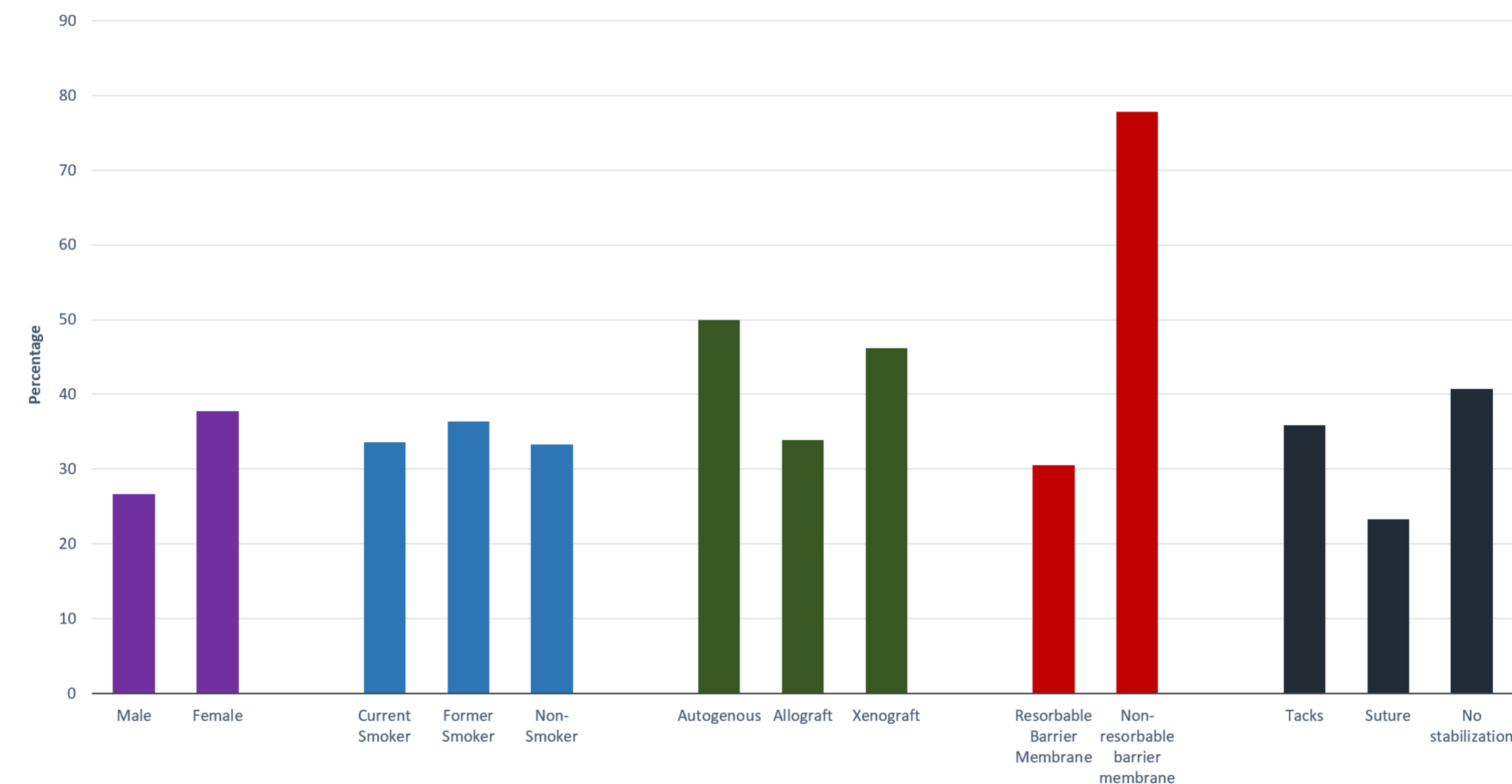


Figure 8. GBR complication rate

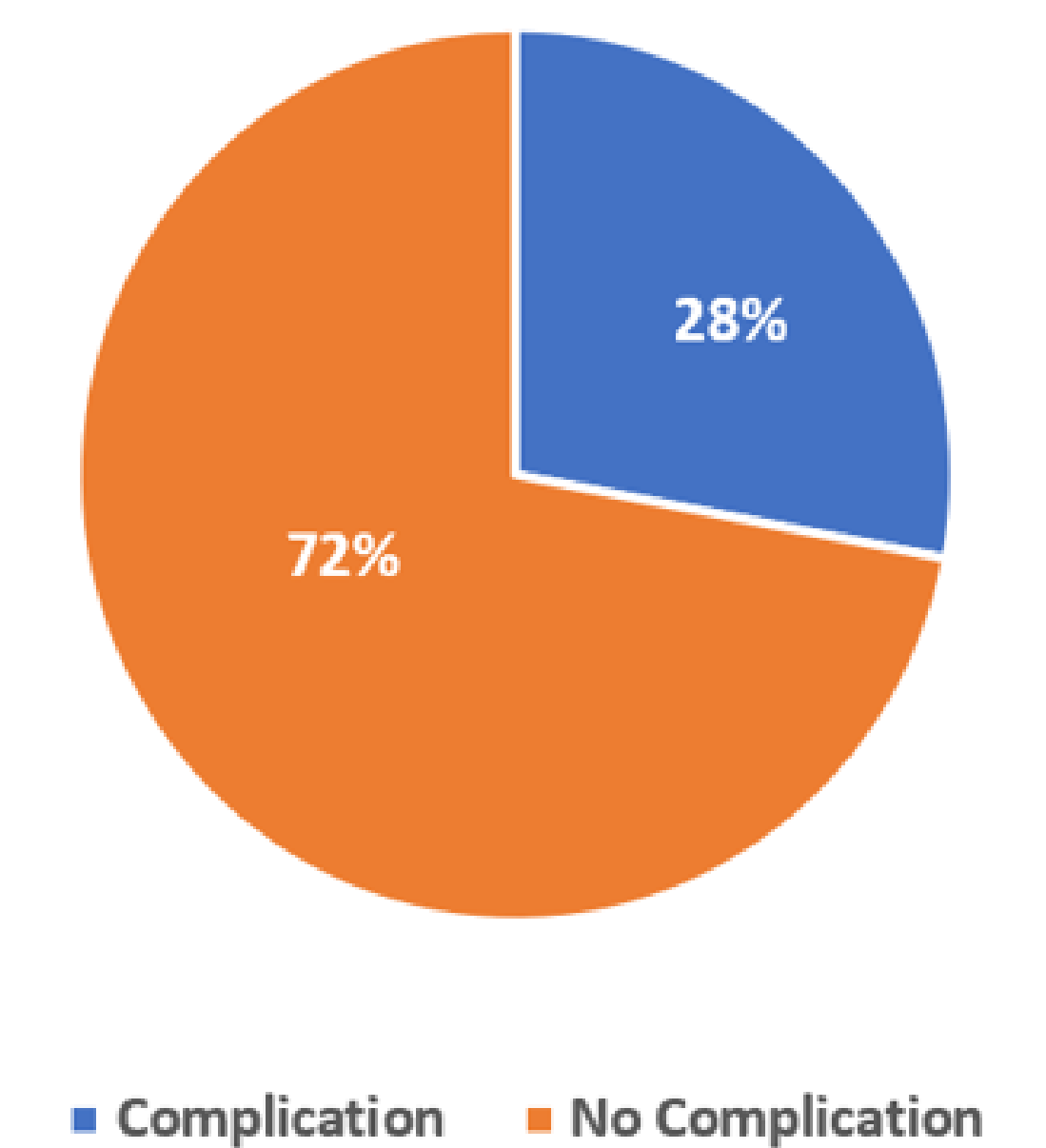


Figure 9. Varieties of complications seen in GBR

