Flapless Implant Placement – Revisited with Robotic Assisted Surgery

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INTRODUCTION

Today surgery aims to exploit less invasive surgical procedures as much as is feasible. Patient and surgeon discomfort, time of surgery and hospitalization, esthetic damage, pain, and tissue trauma all need to be reduced. A number of authors have demonstrated that this should be possible. In oral implant placement, minimally invasive surgery often means a flapless procedure. Because it is a blind surgery, some authors limit the procedure to a bone crest at least 7 mm in width in cases requiring a single-stage procedure or in immediate implantation. To use the flapless procedure on a thinner crest, other teams have pioneered the use of the image-guided system (IGS), which objectives are twofold: defining an operative strategy that takes advantage of the localizing capabilities of imaging, and performing the previously defined operative procedure with a less invasive protocol using a suitable guidance system. The rationale of this approach is based on the precision of these systems. For dental implant placement, different approaches have been proposed to transfer the planned position to the surgical field, such as navigating with an optical tracking system or a magnetic tracking system, using a template as a drill guide on the surgical field, fitted on soft tissue or on bone, or using a robot with a mechanical arm. Currently robotic-assisted implant surgery become popular. The purpose of this presentation is to demonstrate clinical advantages of flapless surgery with robotic-assisted implant surgery and to discuss possible limitations and risks.

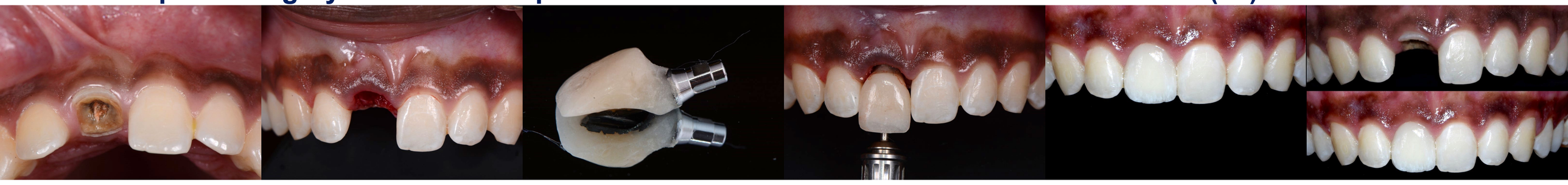
CASE REPORT

Achieving an esthetic restoration with harmonious hard and soft tissue topography in the anterior maxilla is a challenging venture. A variety of different procedures for hard tissue augmentation have been described, such as GBR, OBG, RS and DO. However, dehiscence, shrinkage or loss of the interdental papillae remains a frequent post-surgical finding. Buser D and colleagues have illustrated maintenance of bone level and stable mid-buccal soft tissues using simultaneous implant placement with GBR in a 6-year follow-up study. However, the interdental papillae often appeared blunted following the GBR procedure. Cosyn J and colleagues showed that immediate implant treatment achieved better esthetic outcomes than simultaneous implant placement with GBR and staged implant treatment in grafted bone. Incomplete papilla fill was often associated with the latter two groups. The authors attributed this finding to the number of surgical interventions and repeated papilla elevation. through flap elevation can lead to scar tissue formation as a result of fibroblasts becoming prematurely activated and forming excess fibrotic scar tissue. A favorable soft tissue architecture and volume prior to large augmentation procedures is also important in order to achieve primary wound closure. Soft tissue graft creates an advantageous blood supply bed for the bone augmentation procedure, resulting in higher predictability and setting a solid foundation for future implant and esthetic success.

Case 1: Flapless surgery Immediate Implant Placement and Immediate Provisionalization (#8)
Case 2: Flapless surgery – imm (#7) vs delayed (#10)
Case 3: Flapless (#7&10)
Case 4: Robotic Assisted Flapless Surgery

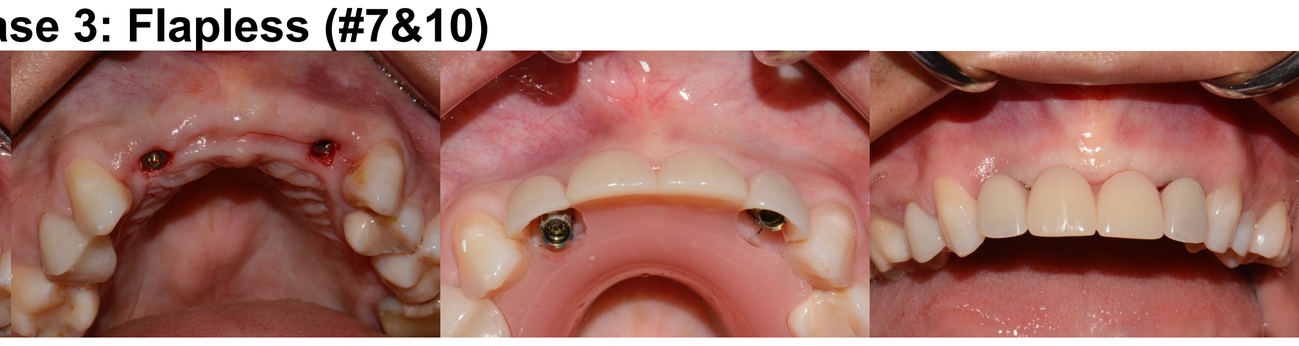
SEQUENCE OF PROCEDURE

Case 1: Flapless surgery Immediate Implant Placement and Immediate Provisionalization (#8)



Case 2: Flapless surgery – imm (#7) vs delayed (#10)

Case 3: Flapless (#7&10)



Case 4: Robotic Assisted Flapless Surgery

CONCLUSION

Placement of implants with a minimally invasive flapless approach has the potential to minimize crestal bone loss, soft tissue inflammation, and probing depth adjacent to implants and to minimize surgical time.
A surgical procedure combining the CARS and GBR techniques is a viable treatment option for anterior esthetic area implant treatment. Additional follow-up and long-term evaluation are needed.

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