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Scientific Challenges beyond Osseointegration

From 4 to 8 mm

Guided bone regeneration in the esthetic zone using a non-resorbable titanium mesh membrane at delayed implant placement.

Introduction

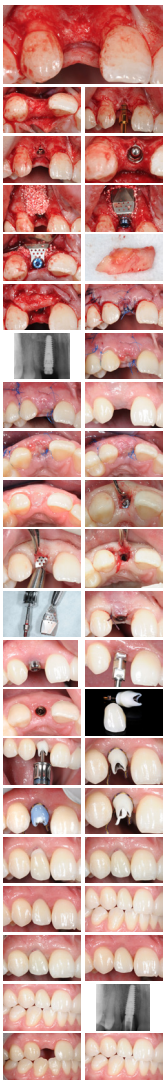
The use of an absorbable membrane over bone particles is an accepted treatment strategy. A disadvantage might be the movement of the membrane and the particles. A new treatment strategy might be by utilizing a titanium mesh membrane that is fixated on the implant.

Objective

Implants in the esthetic zone can be a challenging procedure. There are thee distinct moments at which an implant can be placed; immediate after extraction, early and delayed[1]. Early is described at 6-8 weeks when the soft-tissue have healed. Delayed means after a minimal of 3 months, when the hard tissue remodeling after extraction has taken place. In many cases in the esthetic zone in the maxilla there is a lack of hard and soft tissue. These cases can be treated by a bone augmentation procedure followed by implant placement after several months, but then 2 operative procedures are nececscary[2]. Another possibility is guided bone regeneration at implant placement[3]. Accepted treatment strategies are the use of a resorbable or a non-resorbable membrane. The non-resorbable membrane has to be fixated by small screws. The disadvantage of this procedure is that the screws have to be removed and therefor a second surgery is needed. Recently MegaGen Implant Company has developed a new product named the i-Gen membrane; a non-resorbable titanium mesh, which can be fixated on top of the previously placed implant. The membrane is designed so that an optimal buccal bone of more than 2 mm is present[4]. The following case report will give a step-by-step description of delayed implant placement with the use of guided bone regeneration (GBR) and connective tissue graft (CTG) as well as the prosthodontic procedure.

Material & Methods

A healthy non-smoker, male patient at the age of 22 was missing tooth #12. Due to a persisting apical infection the tooth was removed 1 year ago and since then the patient had a removable partial denture. As a result of this the ridge had a width of 4 mm in bucco-palatal direction together with a buccal concavity as seen on the preop CBCT. Patient was subscribed pre-operative Amoxicillin 2 grams, analgesia Ibuprofen 600 mg 3 times per day during 5 days and a chlorhexidine 0.12% rinse solution to rinse with 2 times per day for 14 days. At surgery an intra sulcular flap was made at tooth #11 and #13 with a releasing incision into the mucosa at the distal part of tooth #13. After flap elevation the periosteum was released and tunneling was performed till tooth #21 for tension free flap closure. The width of the buccal bone in bucco-palatal direction was 4mm. It was decided to make an osteotomy of 2.9x13 mm along the palatal wall and a MegaGen AnyRidge implant 3.5x13 mm was placed with an insertion torque of 40N/cm^2. From the palate a split thickness flap was made from tooth #14 to #16 and a connective tissue graft was harvested. The split thickness flap was closed by means of continuous sutures. On the implant a MegaGen flat abutment of 2 mm was screwed on. At the buccal side bovine bone xenograft particles (Mega-Oss®) were placed. An A1 type i-Gen membrane was placed on the flat abutment and was screwed in place with an i-Gen coverscrew. The CTG was sutured at the buccal side of the membrane. Vertical and horizontal matrass sutures (non-absorbable polypropylene 5x0) were used to close the flap as tension free as possible. Sutures were removed at 2 weeks. After an osseo-integration period of 3 months a small flap was made to remove the coverscrew, flat abutment and i-Gen membrane. By removing the membrane the distal papilla was cut, so one single suture was placed along with a 4x5 mm AnyRidge healingabutment. Impression taking took place 4 weeks later with open-tray technique and a polyether impression material (Impregum®). The dental technician made only a hard gypsum model. On this model an individual lithium disilicate (e-Max Press®) abutment with a titanium insert was made with a S-line on the cervical part of the abutment. The abutment had the shape of a tooth with a buccal facing preparation. Therefor only a lithium disilicate facing was made which could be adhesively cemented to the abutment, to close the screw hole.



Result

After 3 months the buccal contour was corrected and no concavity was present. At the post op CBCT the volume of the buccal bone increased from 4 to 8 mm. Due to augmentation of hard and soft-tissue a ceramic crown could be made without the use of an temporary implant crown to correct the soft-tissue.

Conclusion

The i-Gen membrane seems to have beneficial features compared to a resorbable membrane. Especially the fixation of the membrane on the implant, which prohibits any movement of the graft material, seems to be an advantage.

References

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