

## Treatment of a vertical bone defect with Straumann Emdogain Plus



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The treatment of vertical bone defects is a great challenge, particularly in the esthetically important anterior region. It is essential to avoid postoperative recession of the gingiva.

Primary wound healing should also be obtained in the anterior region to prevent the development of scars and craters in the interdental papillae.

For this reason, the use of Straumann Emdogain in periodontal regeneration in the anterior region has proven useful, as very rapid primary wound healing occurs in the area of the interdental papillae. The bone substitute in Straumann Emdogain Plus prevents collapse of the soft tissue in the case of wide defects. The use of Straumann Emdogain is much less susceptible to complications than alternative treatment methods with membranes, where primary wound healing occurs in only about 80 % (Tonetti et al. 2004).

### Requirements

For predictably successful treatment of vertical bone defects in the anterior region, adequate width and thickness of the keratinized gingiva is desirable. The width of the keratinized gingiva should be at least 2 mm. Radiating labial bands should be removed preoperatively in order to obtain movement-free wound healing (Cortellini et al. 1996).

Patients should be advised about the very negative effect of smoking on primary wound healing and periodontal regeneration and should be informed of the need for regular professional follow-up for long-term success.

### Operation technique

Careful scaling of the subgingival root surfaces should be carried out a few weeks before the surgery in order to obtain inflammation-free gingiva. Any increased probing depths that are still present, especially beside the posterior teeth, should have been treated with periodontal surgery prior to a periodontal regeneration procedure in order to minimize colonization with pathogenic periodontal microorganisms as far as possible (Nowzari et al. 1998). During periodontal regeneration, preservation as completely as possible of the interdental tissue is essential. A gentle microsurgical operation technique is therefore of crucial importance (Cortellini et al. 2007). Modified papilla preserving flaps have proven effective when the interdental gingiva is over 2 mm wide and simplified papilla preserving flaps when the width of the interdental gingiva is less than 2 mm (Cortellini et al 2007). With a vertical bone defect 4 mm in depth (Fig. 1) the



**Fig. 1:** Preoperative clinical appearance

2.5 mm width of the interdental papilla allowed a modified papilla preserving flap incision (Fig. 2). To do this, a vertical incision down to the bone was made with a microsurgical scalpel in the extension of



**Fig. 2:** Preoperative radiographic appearance

the buccal tooth surfaces of teeth 21 and 22, and this was extended one tooth width mesially and distally.

The interdental papilla is then undermined horizontally with the microsurgical scalpel and is moved carefully toward the palate with papilla elevators so that the vertical bone defect is readily accessibly.

After removing the granulation tissue using an ultrasonic scaler, the root surface is cleaned carefully with hand instruments and ultrasonic scalers (Fig. 3).



**Fig. 3:** Vertical bone defect after removal of the granulation tissue

Straumann PrefGel, saline and Straumann Emdogain PLUS are prepared. The root surface is then conditioned for two minutes with 24 % EDTA (Straumann PrefGel) and then irrigated thoroughly with saline.

After drying the root surfaces, Straumann Emdogain is applied to the root surface. Leftover Emdogain is mixed with Straumann BoneCeramic and introduced into the vertical bone defect, ensuring that the entire defect is filled as far as the coronal bone margin (Fig. 4 and Fig. 5).



**Fig. 4:** Filling the vertical bone defect with Straumann Emdogain Plus



**Fig. 5:** X-ray after filling the vertical bone defect

The base of the interdental papilla is first immobilized with a horizontal mattress suture. The tip of the papilla is then closed with simple interrupted sutures (Fig. 6). A monofilament non-absorbable material above size 6/0 is used in order to prevent deposits of plaque and inflammatory processes due to the breakdown of an absorbable material.



**Fig. 6:** Suture with a horizontal mattress suture at the base of the papilla and interdental sutures to close the tip of the papilla

Patients are told to try to avoid chewing on the operated side and to clean the operated region from the second postoperative day, initially only carefully with a soft toothbrush dipped in chlorhexidine solution. Postoperative healing should be checked after 3 days and again after a further 7 to 10 days. The sutures are removed after 10 to 14 days in order to ensure stable wound healing.

On inspection 3 days postoperatively, primary wound healing is apparent (Fig. 7). Seven days postoperatively, healing of the interdental tissue is complete (Fig. 8).



**Fig. 7:** 3 days postoperative, primary wound healing



**Fig. 8:** 7 days postoperative, wound healing nearly complete

6 months postoperatively, teeth 21 and 22 are widened with composite fillings. Patients should be in a 4 to 6-month recall program. Three years postoperatively, there is no gingival inflammation (Fig. 9) and the previous 4 mm deep vertical bone defect has been filled (Fig. 10).



**Fig. 9:** Clinical appearance 3 years postoperative



**Fig. 10:** X-ray appearance 3 years postoperative

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