MEGA'GEN

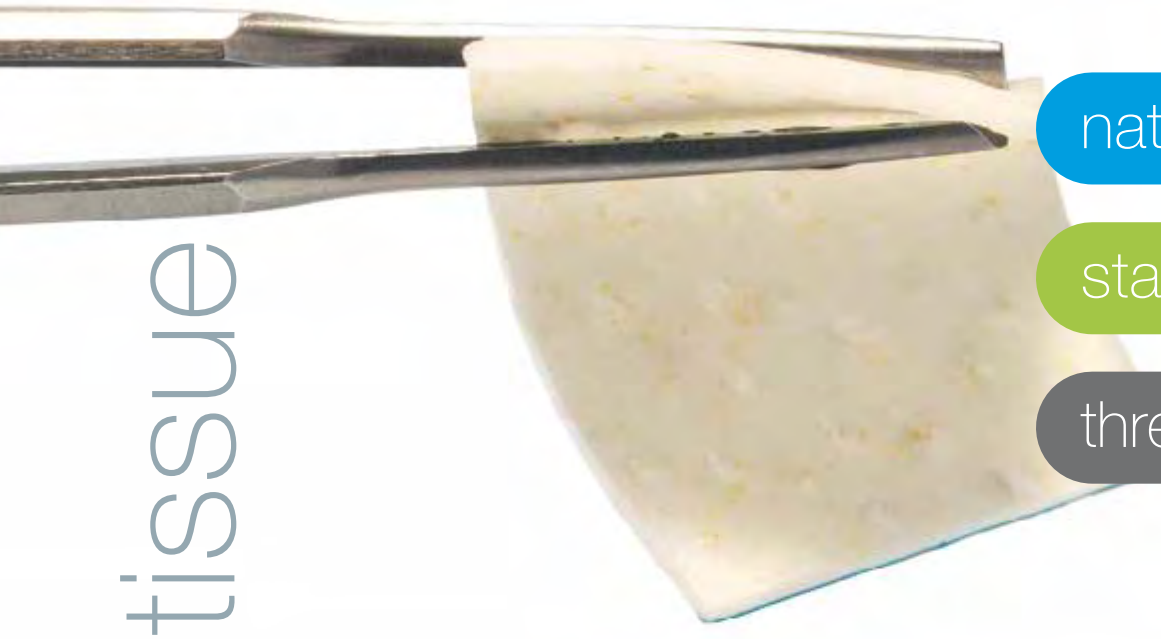
bone & tissue regeneration

botiss biomaterials

mucoderm®

3D-REGENERATIVE TISSUE GRAFT

Scientific and clinical evidence



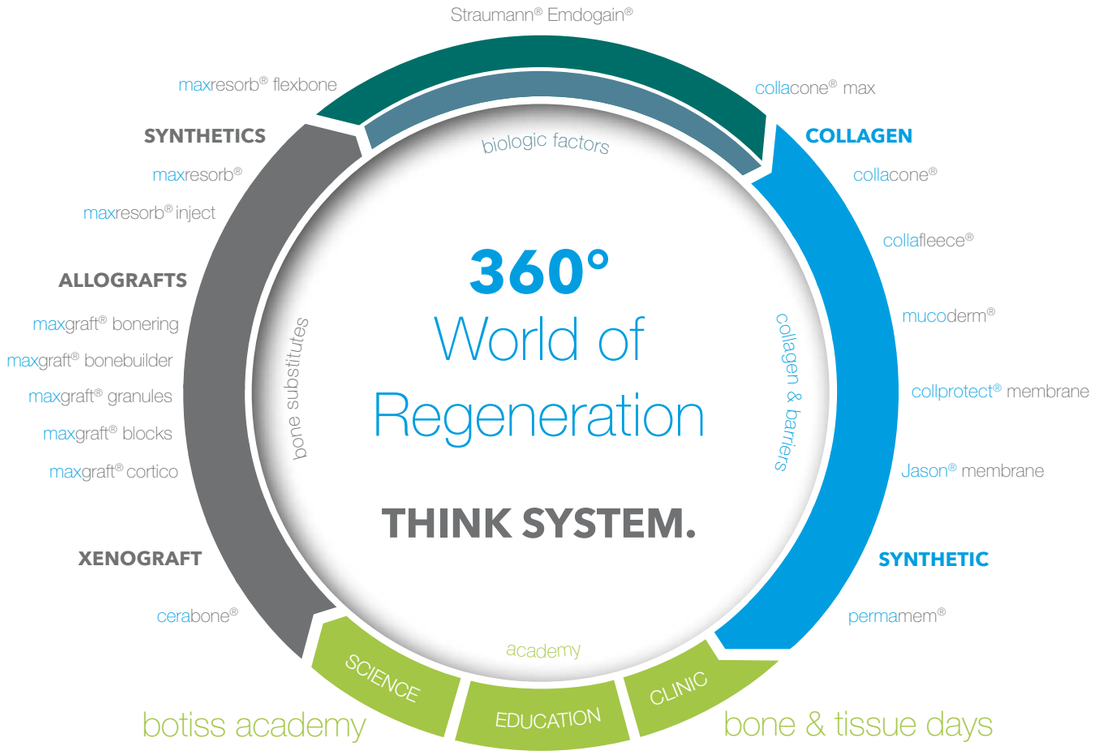
native

stable

three-dimensional

soft tissue

botiss regeneration system



Development / Production / Distribution

cerabone®

Natural bovine bone graft

maxgraft® cortico

Processed allogenic bone plate

maxgraft®

Processed allogenic bone graft

maxgraft® bonebuilder

Patient matched allogenic bone implant

maxgraft® bonering

Processed allogenic bone ring

maxresorb® inject

Synthetic injectable bone paste

maxresorb®

Synthetic biphasic calcium phosphate

maxresorb® flexbone

Flexible blocks (CaP / Collagen composite)

Straumann® Emdogain®

Enamel matrix derivative

collacone® max

Flexible cone (CaP / Collagen composite)

collacone®

Collagen hemostat (Cone)

collafleece®

Collagen hemostat (Sponge)

mucoderm®

3D-stable soft tissue (Collagen) graft

collprotect® membrane

Native collagen membrane

Jason® membrane

Native pericardium GBR / GTR membrane

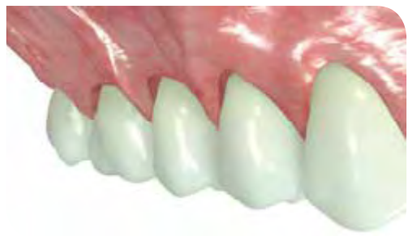
permamem®

High-density PTFE barrier membrane

Periodontal surgery and soft tissue grafts

Importance of periondontal plastic surgery

The growing demand for aesthetic procedures has recently led to an increased interest in periodontal plastic surgery, resulting in the development of new surgical techniques and concepts. Gingival recessions as well as reductions of the mucosa around pontics/dental implants or the reduced width of the keratinized gingiva may have a significant impact on the patient's smile. Beside aesthetic reasons, several indications require the treatment of soft tissue deficiencies.



Clinical consequences of soft tissue reduction

Despite the ongoing debate about the meaning of keratinized gingiva, most scientists and clinicians agree that a sufficiently broad band of keratinized tissue exerts a positive effect on the tooth health and long-term prognosis of dental implants. Not only does the attached gingiva provide protection against mechanical traumas, it also acts as a barrier against the penetration of bacteria and food particles. Studies are still debating if a reduction in the width of the keratinized gingiva is associated with an increased risk of infections, loss of attachment, and higher plaque accumulation. Such situations may favor gingival recessions, which in turn may lead to hypersensitivity of tooth roots, root caries, and, at worst, tooth loss.

Mucosal- and connective tissue grafts

Today, modern techniques of plastic-aesthetic periodontal surgery ensure a satisfactory regeneration of soft tissue deficiencies in the majority of cases. Free mucosal- and subepithelial connective tissue grafts, both commonly harvested from the palate, are frequently used. Despite their clinical success, their use is associated with significant disadvantages. For instance, when harvesting autologous tissue a second surgical site is created, which may result in increased post-operative pain as well as a higher risk of infections and complications. In addition, the quality of the harvested tissue varies from patient to patient, and its limited availability may become an issue, particularly for the correction of larger soft tissue defects or multiple recessions.

In order to overcome these issues, allogenic and porcine acellular collagen matrices have been developed. mucoderm® is a xenogenic matrix produced by botiss that offers a valid alternative to autologous soft tissue grafts.

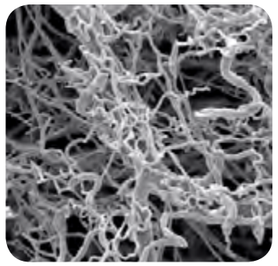
mucoderm®

3D-REGENERATIVE TISSUE GRAFT

mucoderm® is a natural, non-cross-linked tissue matrix, consisting of collagen type I and III, which strongly resembles the native structure of the human dermis. In a natural enzymatic process mucoderm® is integrated into the surrounding tissue and replaced by the patient's own connective tissue. The natural collagen network of mucoderm® that results from the multistep purification process acts as a scaffold for soft tissue cells and blood vessels.

The porous structure of the mucoderm® surface enables the ingrowth of micro-vessels and soft tissue cells

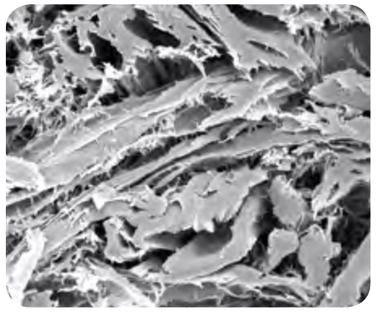
During the healing process, mucoderm® is vascularized and integrated into the surrounding tissue. For a broad range of indications mucoderm® serves as a safe alternative to autologous connective tissue grafts.



Corrosion preparation showing a vascular network running through the mucoderm® matrix

Natural, three-dimensional collagen structure

The mucoderm® matrix is made of pure porcine collagen without any artificial/ chemical cross-linking. Scanning electron microscopic pictures of mucoderm® show its rough surface and open-porous collagen network that acts as a guiding structure for soft tissue cells and blood vessels.



Compact collagen structure of mucoderm®

PROPERTIES

- Native collagen matrix
- Fast vascularization and integration
- Soft tissue graft avoiding the need for autograft harvesting
- Complete remodeling into patient's own tissue in ~six to nine months
- Rapid hydration
- Easy handling

General product handling of mucoderm®

HYDRATION

A sufficiently long hydration of mucoderm® prior to application is necessary. Hydration should be performed in sterile saline solution or blood for five to 20 minutes, depending on the technique used and the desired flexibility of the matrix—the flexibility of the mucoderm® graft increases with hydration time.

TRIMMING

Trimming of hydrated mucoderm® with a scalpel

The size and shape of the matrix should be adapted to the size of the defect. After hydration, mucoderm® can be easily trimmed to the desired size with a scapel or a pair of scissors. Rounding off the edges following brief hydration of the matrix can prevent a perforation of the gingival tissue during flap closure.
For the coverage of multi-recession defects, the surface of mucoderm® can be extended by cutting the matrix on alternating sides (mesh-graft technique) and pulling it.

EXPOSURE

mucoderm® should only be left for open healing, if a revitalization from the surrounding or underlying wound bed is ensured. Exposure should always be avoided when used for recession coverage. Open healing is feasible in the case of a vestibuloplasty, if mucoderm® is sutured to the periosteum.

Convenient handling of mucoderm® after hydration in blood

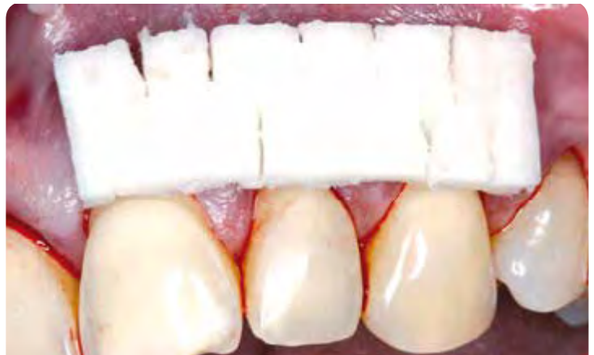
FIXATION

When a split-thickness flap is used, a close contact between the periosteal wound bed and the immo-bilized mucoderm® matrix should be ensured by suturing the matrix to the intact periosteum using single-interrupted- or crossed sutures.

SUTURING

A tension-free flap closure is always recommended.

mucoderm® trimmed for application with the mesh-graft-technique



Handling Tips

Hydration
from five to 20 minutes
Trimming
use a scapel or a pair of scissors to cut to the desired shape
Exposure
mucoderm® should only be left for open healing, if a revitalization from the surrounding or underlying wound bed is ensured
Fixation
suturing of mucoderm® helps to prevent micromovements

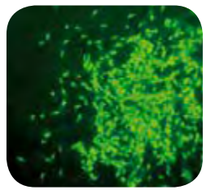
Scientific results

Biocompatibility

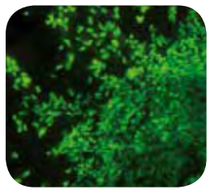
affirmed by MTT-based cell viability assay[1]

The viability assay supports the high biocompatibility of the mucoderm® three-dimensional collagen matrix *in vitro*.

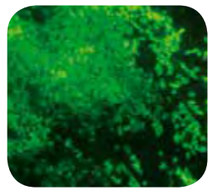
The MTT test demonstrated a significantly higher viability of gingival fibroblasts, endothelial cells, and osteoblasts on mucoderm® compared to the control at day six *in vitro* ($p<0.05$).



Gingival fibroblasts on mucoderm®

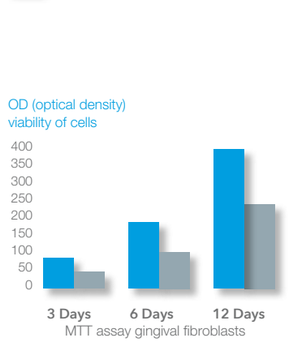


HUVEC cells on mucoderm®

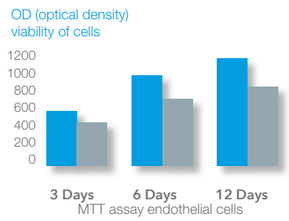


Osteoblasts on mucoderm®

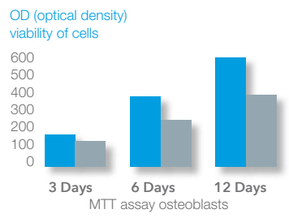
In vitro testing



MTT assay gingival fibroblasts



MTT assay endothelial cells



MTT assay osteoblasts

mucoderm® is characterized by a high interconnected porosity and natural collagen structure

Visualization of the open porous collagen structure of mucoderm® by the innovative synchrotron-based x-ray tomography[2].

The unique structure of the matrix strongly resembles that of the human dermis and supports the ingrowth of cells and blood vessels, thereby promoting a fast tissue integration of mucoderm®.

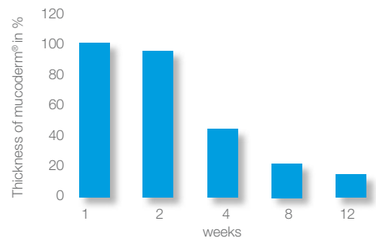
1 Pabst et al. (2014): In vitro and in vivo characterization of porcine acellular dermal matrix for gingival augmentation procedures. In J Periodont Res 49 (3), pp. 371–381. DOI: 10.1111/jre.12115.
2 Pabst et al. (2015): Synchrotron-based X-ray tomographic microscopy for visualization of three-dimensional collagen matrices. In Clinical oral investigations. 19(2):561-4, DOI: 10.1007/s00784-014-1312-4.

Tissue integration and degradation of mucoderm®

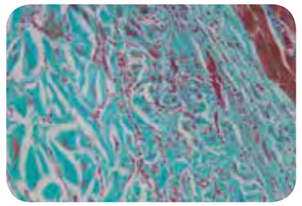
Results from Prof. Dr. Dr. Daniel Rothamel

after subcutaneous implantation of mucoderm® in rats[3]

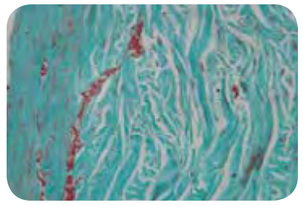
After only two weeks, mucoderm® showed an extensive ingrowth of blood vessels as well as an inflammation-free healing with superficial cell invasion. In the following four to eight weeks, a continuous degradation with an increasing homogeneous cell distribution can be observed. After eight weeks, 20% of the original matrix volume functioning as scaffold for the formation and reorganization of the connective tissue.



After 12 weeks, mucoderm® was almost completely replaced by newly formed connective tissue (please note that a period of one month in rats corresponds to approximately three months in humans).



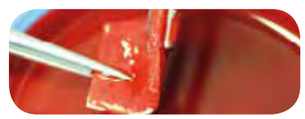
mucoderm® demonstrates a very good tissue integration and initial cell invasion after two weeks

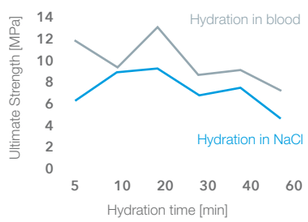


Complete remodeling of mucoderm® and inflammation-free connective tissue were observed after 12 weeks *in vivo*

Biomechanics and hydration of mucoderm®

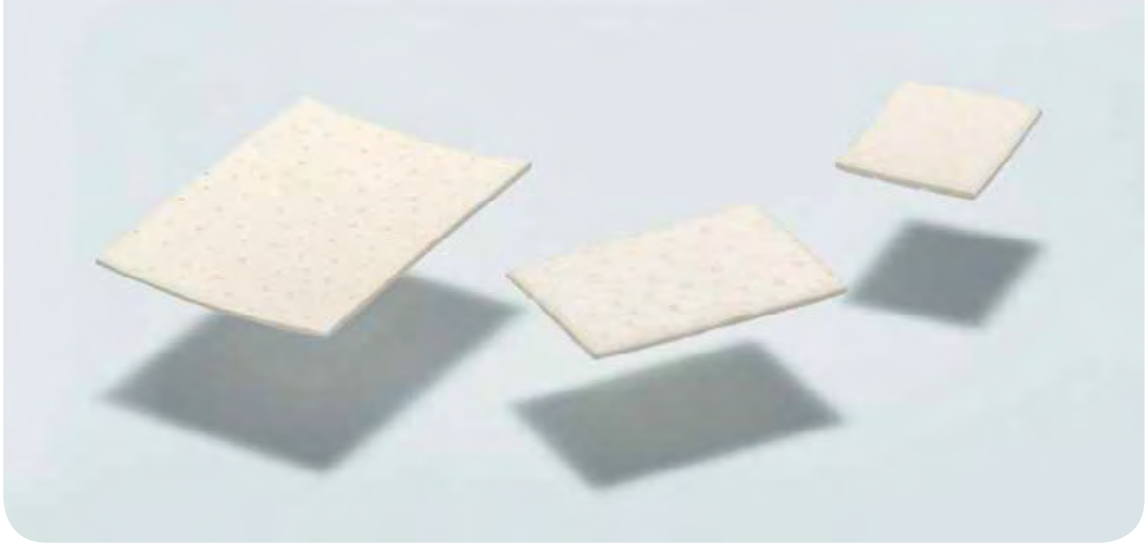
The hydration protocol and its influence on the biomechanical properties of mucoderm® were analyzed in a study of Prof. Dr. Adrian Kasaj[4]. mucoderm® demonstrated optimal mechanical properties after hydration for ten to 20 minutes. A rehydration in blood can improve the biomechanical properties of mucoderm®. Notably, prolonged hydration (30 to 60 minutes) showed only minor effects on the biomechanical properties of the collagen matrix.





3 Rothamel et al. (2014): Biodegradation pattern and tissue integration of native and cross-linked porcine collagen soft tissue augmentation matrices – an experimental study in the rat. In Head Face Med 10 (1), p.10, DOI: 10.1186/1746-160X-10-10.
4 Kasaj et al. (2015): The influence of various rehydration protocols on biomechanical properties of different acellular tissue matrices. Clin Oral Investig. 20(6):1303-15, DOI: 10.1007/s00784-015-1614-1.

INDICATIONS for mucoderm®



Implantology, Oral Surgery and CMF

- Thickening of peri-implant soft tissue
- Soft tissue augmentation in combination with GBR
- Widening of attached gingiva
- Closing of extraction sockets (socket seal technique)

Periodontology

mucoderm® is indicated for guided tissue regeneration procedures as well as for periodontal and recession defects for periodontal plastic surgery.
It can be used in conjunction with:

- Coronally advanced flap technique
- Envelope technique
- Tunnel technique

Product Specifications

Art.-No.	Dimensions	Content
701520	15 × 20 mm	1 × matrix
702030	20 × 30 mm	1 × matrix
703040	30 × 40 mm	1 × matrix
710210	Ø 10 mm	1 × punch

mucoderm® punch

Peri-implant soft tissue thickening

Studies have shown that the initial thickness of the mucosa plays an important role in the etiology of early bone loss around dental implants[5]. It has been demonstrated that a thickness of 2 mm or less increases the risk of crestal bone lack.

In order to prevent bone loss and to improve the long-term stability of dental implants, it is recommended to thicken the peri-implant soft tissue in cases of thin gingiva biotypes. Soft tissue thickening can be performed prior or simultaneously to implant placement. The application of a xenogeneic soft tissue matrix, such as mucoderm®, helps to avoid soft tissue harvesting from the palate. For simultaneous implant placement and soft tissue augmentation, mucoderm® can be applied as a "poncho" over the healing cap. In that indication, mucoderm® should be covered by vital tissue (flap) to guarantee revitalization of the matrix by ingrowing cells and blood vessels. Prevention of tension is crucial for a complication-free wound healing.

CLINICAL CASE BY

Dr. Algirdas Puisys, Vilnius, Lithuania

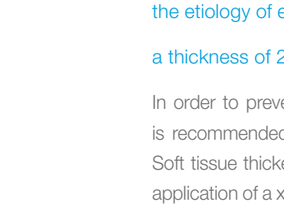
MUCOSAL THICKENING AROUND BONE LEVEL IMPLANTS[6]

Crestal incision of the edentulous ridge and raising a full-thickness flap bucally and lingually

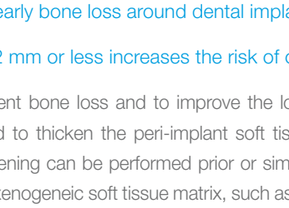
Bone preparation for Straumann® Bone Level implant placement

Implant insertion and crestal bone contouring with a straight handpiece

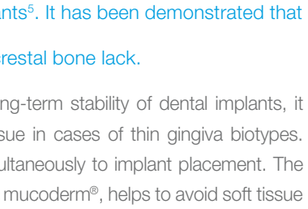
Hydrated mucoderm® perforated and pulled over the healing cap



The margins of the flap are adapted and sutured leaving the abutment open

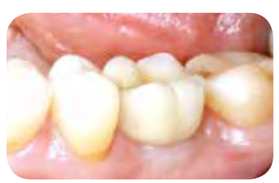


Situation after suture removal one week post-operative

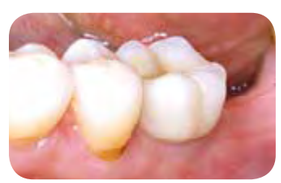


Wider healing abutment after four months

Smooth emergence profile visible after removal of the healing abutment



Final restoration five months post-operative



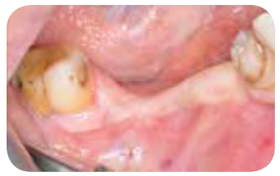
Stable clinical situation after five years

5 Puisys A, Linkevicius T (2015). The influence of mucosal tissue thickening on crestal bone stability around bone-level implants. A prospective controlled clinical trial. Clin Oral Implants Res ;26(2):123.
6 Puisys A, Schlee M, VIndasiute E, Linkevicius T (2015). Vertical soft tissue augmentation with porcine-derived collagen matrix membrane: A prospective study with 20 consecutive patients. EAO Stockholm. Manuscript in preparation.

CLINICAL CASE BY
Dr. Massimo Frosecchi, Florence, Italy

PERI-IMPLANT SOFT TISSUE AUGMENTATION WITH MUCODERM® FOR PONTIC

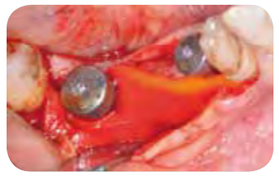
X-ray of the initial clinical situation



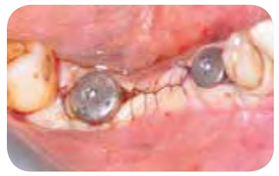
Lost ridge bone and lack of keratinized tissue after tooth extraction

Primary stability of two placed Straumann® BLT implants

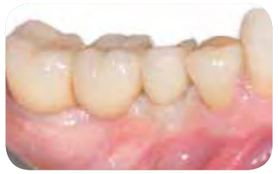
mucoderm® cut in half and inserted buccally to increase the tissue thickness



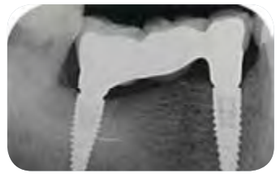
Second half of mucoderm® positioned to correct the anatomical shape of the soft tissue



Tension-free wound closure with a slightly exposed area



Healing three months post-op with larger layer of keratinized tissue

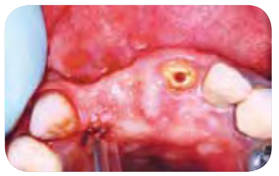


Placement of standard ceramic-metal bridge

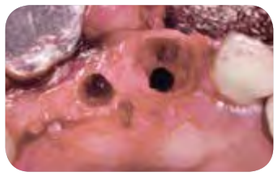
X-ray control shows stable tissue for pontic

CLINICAL CASE BY
Dr. Hassan Maghaireh, Leeds, UK

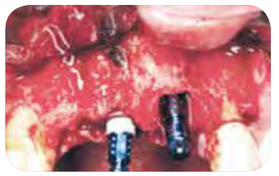
GBR AND SOFT TISSUE AUGMENTATION WITH CERABONE® AND MUCODERM®



Initial situation: missing teeth 11 & 12 and badly broken tooth root 21



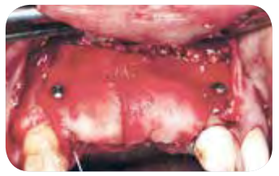
Bone defect after extraction, occlusal view



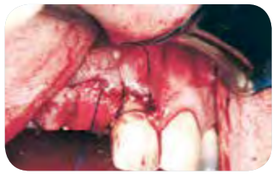
Immediate implant placement of tooth 21 and delayed implant placement of tooth 11

GBR with autologeous bone chips covered with small cerabone® particles and two mucoderm® as barrier membrane and for soft tissue augmentation.

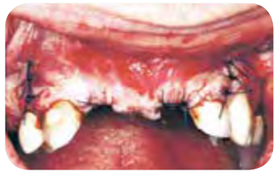
Augmentation site occlusal view



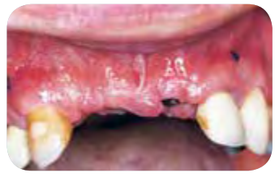
mucoderm® stabilized with titanium pins and sutured together to achieve maximum stability



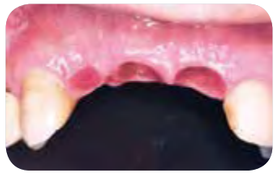
Closure without tension using sling sutures



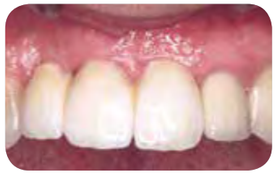
Complete closure of the wound



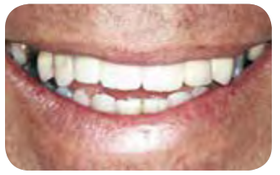
12 weeks after surgery: satisfactory convexity



18 weeks after surgery: regenerated and matured soft tissue



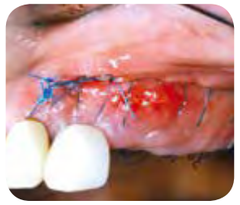
Final screw retained restoration five months after surgery



Final clinical outcome

ATTACHED GINGIVA–
protection of teeth and implants

Under healthy conditions, the teeth are lined by a band of attached gingiva of about five millimeters in width, which is anchored to the underlying alveolar bone and cementum through connective tissue fibers. This particular arrangement creates a barrier around the teeth, protecting the tooth roots against penetration of bacteria and food particles.



Moreover, the attached gingiva reduces the mechanical strain from the lip-, cheek-, and mimic muscles, shielding the teeth from the strain. A reduction or lack of attached gingiva may cause root recessions and inflammation (periodontitis), which may lead to bone resorption and tooth loss.
Likewise, a sufficient width of attached gingiva around dental implants may improve their survival by facilitating plaque control in the peri-implant area and preventing recessions at the implant. In particular, prior to or immediately after implant placement, an augmentation of the attached gingiva is indicated.

AUGMENTATION OF THE ATTACHED GINGIVA

The current standard technique to widen the attached gingiva is called vestibuloplasty, which is performed in combination with a free mucosal graft[7]. Following the preparation of a mucosal flap, the soft tissue graft is fixed to the exposed periosteum (donor bed) and left for open healing.

However, the harvesting of the graft causes additional discomfort for the patient and may cause further post-operative discomfort, an increased risk of swelling, post-operative bleeding, paresthesia, and inflammation[8]. In some cases, post-operative discomfort may persist for several weeks. The application of a xenogenic collagen matrix, such as mucoderm®, can avoid the painful harvesting procedure and consequently increase the patient's acceptance of the treatment plan.

APPLICATION OF MUCODERM® IN PLACE OF A FREE MUCOSAL GRAFT

mucoderm® matrix may be applied instead of a free mucosal graft to cover the prepared donor bed during vestibuloplasty. Following hydration and shaping, the matrix is adapted to the periosteum and fixed with sutures.

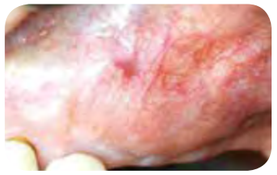
A close contact between the periosteum and mucoderm® is essential to ensure fast integration and revitalization of the matrix by the ingrowth of blood vessels and cells. mucoderm® serves as a scaffold for the formation of connective tissue and is completely remodeled into the patient's own tissue within weeks following surgery.

7 Fröschl and Kerscher (1997): The optimal vestibuloplasty in preprosthetic surgery of the mandible. In Journal of Cranio-Maxillofacial Surgery 25 (2), pp. 85–90. DOI: 10.1016/S1010-5182(97)80050-9.

8 Griffin et al. (2006): Postoperative complications following gingival augmentation procedures. In J Periodontol 77 (12), pp. 2070–2079. DOI: 10.1902/jop.2006.050296.

CLINICAL CASE BY
Dr. Attila Horváth, Semmelweis University, Budapest, Hungary

TREATMENT WITH MUCODERM® TO INCREASE THE PERI-IMPLANT KERATINIZED MUCOSA[9]

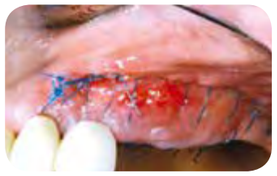


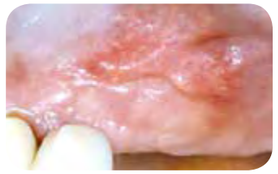
Lack of sufficient keratinized mucosa is visible as a result of considerable horizontal ridge augmentation

The split-thickness flap was prepared; the buccal peri-implant mobile mucosa was positioned apically, creating an immobile periosteal recipient bed

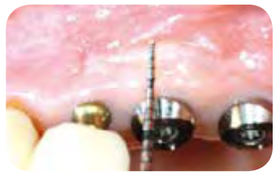
The xenogenic dermal matrix (mucoderm®) was trimmed and rehydrated in sterile saline

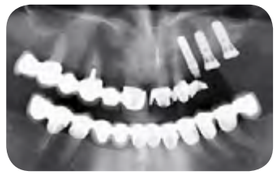
mucoderm® was immobilized with modified deep periosteal and superficial mattress sutures to attain a tight contact to the periosteum



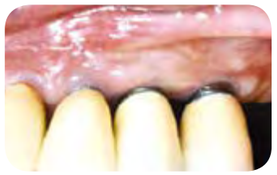


No signs of allergy, rejection, suppuration, or ulceration were detected; following maturation of the graft, three Straumann SLActive® implants were inserted according to the prosthetic indication

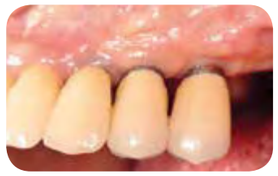




Sufficient peri-implant keratinized mucosa and deep vestibulum were achieved around all implants



Six months after insertion of the xenogenic dermal matrix, the new peri-implant keratinized mucosa showed matured and stable properties



Six years follow-up

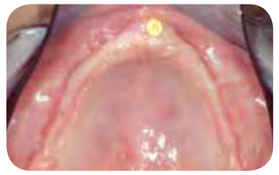
9 Horvath et al., (2014): Comparison of different approaches aiming at increasing peri-implant keratinized mucosa. ITI Poster presentation.

CLINICAL CASE BY

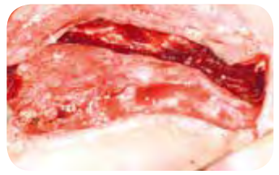
Dr. Bálint Mólnar and Prof. Dr. Péter Windisch, University of Budapest, Hungary

AUGMENTATION OF THE ATTACHED GINGIVA WITH MUCODERM®

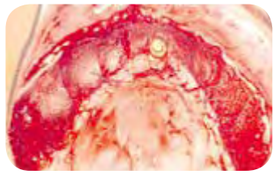
Full arch reconstruction of insufficient vestibular depth and lack of keratinized tissues.
Application of mucoderm® with an apically repositioned split-thickness flap.



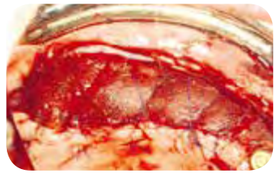
Insufficient keratinized mucosa and extremely shallow vestibulum on the edentulous maxilla following bilateral sinus floor elevation and horizontal GBR therapy



Apically repositioning of the flap by palatal incision along the maxilla. Split-thickness flap preparation with an intact periosteal layer over the augmented bone



Fixation of the buccal flap to the exposed periosteum deep in the vestibular fold. Fixation of mucoderm® with resorbable monofilament (Monolac) single and cross-typed sutures



mucoderm® fixed to the periosteum with single and cross-sutures

Clinical situation one week post-operative: secondary epithelization and newly formed capillary vessels detectable

Two weeks post-operative: secondary healing continued over mucoderm® treated areas, remaining sutures were removed

Clinical situation four weeks post-operative: secondary healing completed

Clinical situation six months post-operative: excellent tissue maturation, favourable color and thickness of the newly formed soft tissue around the implants

The socket seal technique

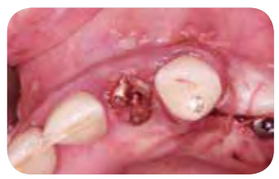
In recent years, a variety of treatment concepts has been developed to prevent/minimize the loss of hard and soft tissue structures following tooth extraction and to create optimal conditions for later implantation or conventional prosthetic restoration.[10,11]

The socket seal technique aims to maintain the soft tissue volume as well as ridge contour. After an atraumatic tooth extraction, the socket is closed with a soft tissue graft. The extraction socket may be filled with a bone substitute material prior to sealing. The sealing stabilizes the blood clot, while the grafting material (if used) protects the socket from contamination and helps to maintain the topography of the alveolus. An autologous mucosal transplant harvested with a punch from the palate is typically used to close the alveolus. In this situation, mucoderm® might be applied as an alternative that spares grafting of the tissue from the palate. After rehydration, the matrix may be easily cut to shape and sutured to the marginal gingiva. For this particular indication, botiss has designed a pre-shaped mucoderm®, called mucoderm® punch which does not need further cutting and is ready to use.

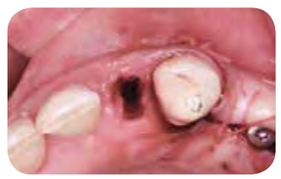
CLINICAL CASE BY

Dr. Hassan Maghaireh, Leeds, UK

SOCKET SEALING WITH MUCODERM® PUNCH



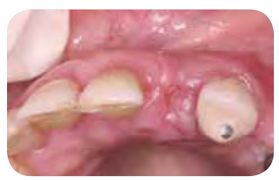
Extraction of tooth 21



Atraumatic extraction

Hydration of mucoderm® punch in sterile saline

Fixation of mucoderm® punch with single interrupted sutures



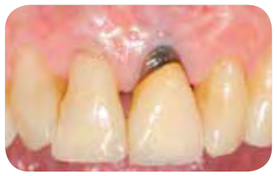
Healing after 12 weeks

10. Rossi AL, Capilupi V, Palombo D, Chiapasco M. 2018. Socket sealing post-extractive with a xenogenic porcine collagen matrix: a prospective clinical trial. DentalCadmos 86(5): 400-413. Original in Italian.

11. Montinari AL, Rossi AL, Manera F, Capilupi V, Chiapasco. 2019. Management of the post-extractive site with a collagen xenogenic membrane: a prospective clinical study. Original in Italian.

CLINICAL CASE BY
Dr. A. Rossi, Milan, Italy

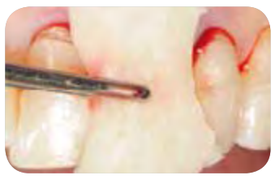
SOCKET SEALING WITH MUCODERM®



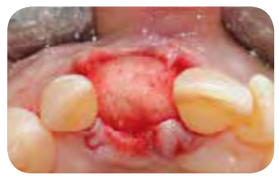
Initial clinical situation showing strongly compromised tooth 21

Enoral, periapical X-ray showing poor root dimension

Filling of extraction socket with bone grafting material

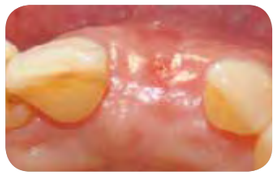


Application of mucoderm® following hydration and cutting to shape



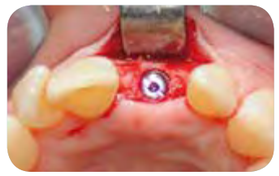
Coverage of the socket with mucoderm® adapted to the alveolar morphology. 2/3 of mucoderm® surface is covered by mucosal flap

Stabilization of the mucosal flap by nylon sutures 5/0

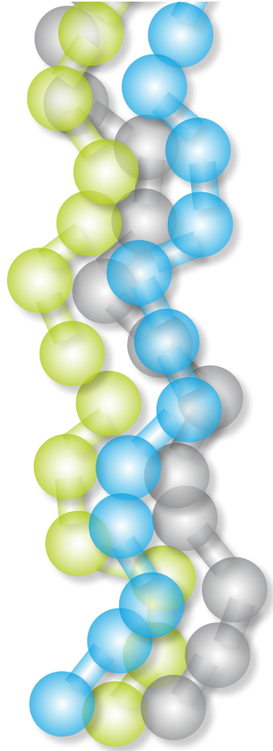


Eight weeks after surgery, occlusal view

20 weeks after surgery perfect aesthetic integration of newly formed keratinized tissue with the surrounding tissue



Implant placement



Collagen triple helix

Application of mucoderm® in plastic-aesthetic periodontal surgery

Gingival recessions are not only an aesthetic issue. They can also cause clinical problems, such as root hypersensitivity, cervical root caries, and root abrasion. Today, autologous connective tissue grafts are considered the “gold standard” for the treatment of periodontal recessions; however, harvesting is often associated with pain and discomfort for the patient. The application of a regenerative tissue graft avoids autologous connective tissue harvesting, thereby enhancing the patient’s acceptance for a surgical procedure.

The correct application and handling of the graft material is a prerequisite for aesthetically optimal, clinical results.
The following application guidelines, based on clinical results, have been developed together with Prof. Dr. Adrian Kasaj, specialist for Periodontology at the Department of Operative Dentistry and Periodontology at the University of Mainz.

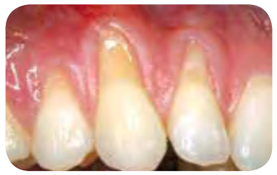
Selection of patients
mucoderm® offers a safe and effective alternative for covering recession defects, especially when patients do not agree to undergo palatal autograft harvesting. Nevertheless, expectations concerning the clinical and aesthetic outcome of the surgery should be carefully considered and discussed with the patient. Compliance with the post-operative treatment plan, as well as an unimpaired or controlled state of health, are indispensable for a successful treatment.

Product Specifications
Regardless of the applied technique, the clinical success of the treatment of Miller class I/II defects is more predictable than that of class III/IV defects. In principle, a complete recession coverage can only be obtained for Miller class I/II defects.
Likewise, the predictability and success rate for the treatment of defects in the maxilla are higher than those of mandibular defects. mucoderm® can be used in combination with all mucogingival surgical techniques, including the coronally advanced flap, envelope technique, and tunnel techniques.

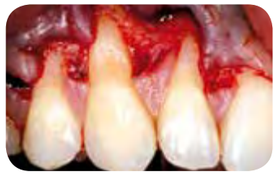
Post-operative treatment
After the surgery, it is necessary to avoid any mechanical trauma of the treated site. Patients should be instructed not to brush their teeth at the respective side for four weeks following surgery. Plaque accumulation can be prevented by rinsing with a 0.2% chlorhexidine solution. Post-operatively, the patient should be recalled weekly for plaque control and healing evaluation.

CLINICAL CASE BY
Prof. Dr. Adrian Kasaj, University of Mainz, Germany

RECESSION COVERAGE WITH THE MODIFIED CORONALLY ADVANCED FLAP TECHNIQUE (ZUCCHELLI TECHNIQUE)

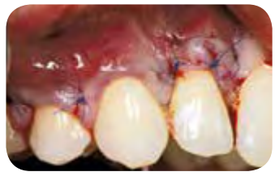


Multiple gingival recessions at teeth 12,13 and 14 before treatment with mucoderm®

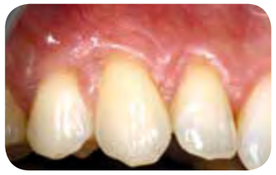


A sulcular incision from tooth 11 to 15 is made and a split-full-split-thickness flap is raised

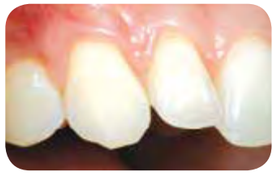
Hydrated mucoderm® is trimmend and placed over the denuded roots and fixed on the periosteum



The flap is coronally repositioned over the root surfaces and the matrix fixed with sling sutures



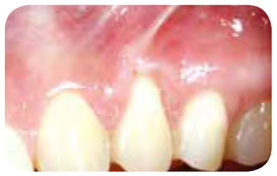
Three months post-operative: Significant coverage of the roots and increased thickness of the marginal tissue



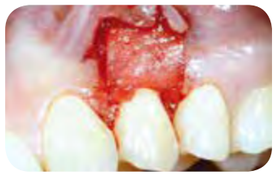
Clinical situation 18 months post-operative

Handling Tips
- Contact of mucoderm® with the periosteal wound bed and immobilization should be ensured by suturing the matrix to the periosteum using single-interrupted- or crossed sutures
- Rounding off the edges of a briefly hydrated matrix prevents perforation of the gingival tissue after flap closure

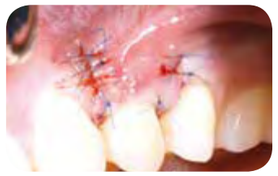
RECESSION COVERAGE WITH THE CORONALLY ADVANCED FLAP TECHNIQUE



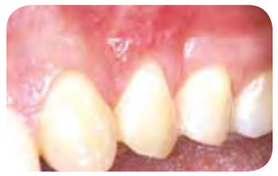
Initial situation with gingival recession and muscle strain on tooth 24



mucoderm® hydrated, cut-to-shape, and sutured to the periosteum



Repositioning and suturing of the flap over mucoderm® and the tooth root



Situation after a healing period of three months

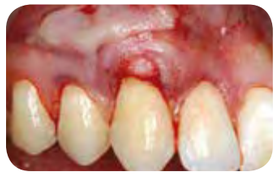
CLINICAL CASE BY
Prof. Dr. Adrian Kasaj, University of Mainz, Germany

RECESSION COVERAGE WITH MUCODERM® BY THE ENVELOPE TECHNIQUE

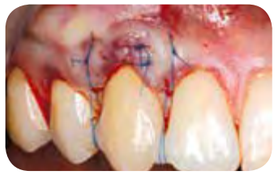
Handling Tips
- For the tunnnel technique a prolonged hydration of mucoderm® is recommended (ten to 20 minutes)
- Fixation of the matrix can be done with single interrupted or cross-sutures

Gingival recession at tooth 13 before the treatment with mucoderm®; previous surgery with FGG is visible

mucoderm® is hydrated and cut to shape for placement over the root

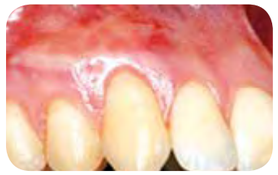


A subepithelial pouch is prepared by a partial thickness incision; mucoderm® is placed in the pouch



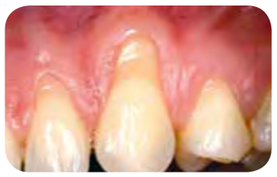
After positioning of mucoderm®, the flap is fixed to completely cover the graft

Clinical situation at three months: significant root coverage and increased thickness of marginal tissue



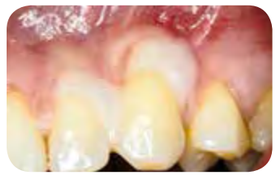
Situation after gingival plastic for leveling of the FGG

COVERING OF MULTIPLE RECESSIONS WITH MUCODERM® BY THE TUNNEL TECHNIQUE



Clinical view before treatment with mucoderm®; gingival recessions at teeth 23 and 24

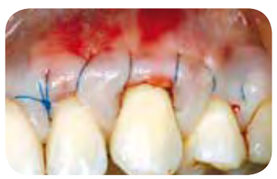
Preparation of roots by scaling and planning with sonic scaler



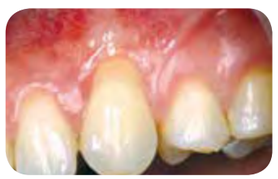
Conditioning of roots with 24% EDTA gel for two minutes

Sulcular incisions around teeth 22 to 25; a partial-thickness dissection by undermining the papillae using tunneling instruments

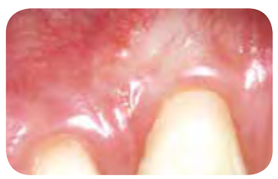
Hydrated and trimmed mucoderm® is checked to fit into the defect and placed over the roots by pulling it through the tissue tunnel



The flap is repositioned over the mucoderm® and sutured



Three months post-operative: previously exposed roots are significantly covered; in addition, the thickness of the marginal tissue has increased



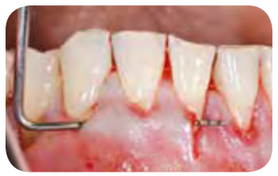
Clinical situation 12 months post-operative

CLINICAL CASE BY

PD Dr. Raluca Cosgarea, University of Marburg, Germany and
Prof. Dr. Anton Sculean, University of Bern, Switzerland

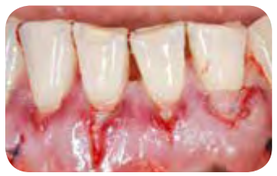
COVERING OF MULTIPLE RECESSIONS IN THE LOWER JAW WITH THE MODIFIED TUNNEL TECHNIQUE AND MUCODERM®

Situation before surgery

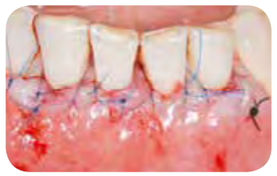


Preparation of the tunnel

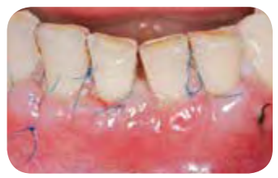
Hydration of mucoderm® and cutting to shape



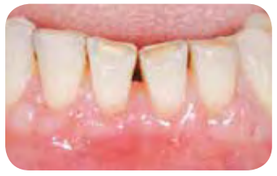
mucoderm® inserted into the tunnel and sutured



Repositioning of the flap over the mucoderm® and suturing



Healing after one week



Clinical situation at suture removal after four weeks

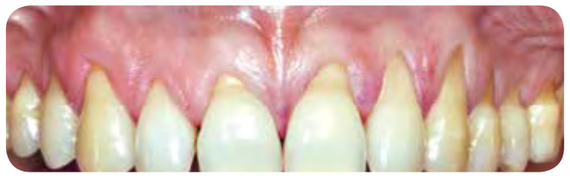
Healing after two months

Healing after 12 months

CLINICAL CASE BY

PD Dr. Raluca Cosgarea, University of Marburg, Germany and
Prof. Dr. Anton Sculean, University of Bern, Switzerland

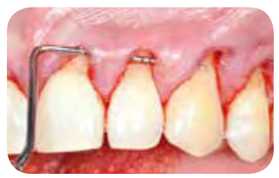
COVERING OF MULTIPLE RECESSIONS WITH THE MODIFIED CORONALLY ADVANCED TUNNEL (MCAT) TECHNIQUE[12]



Clinical situation before surgery: multiple recessions

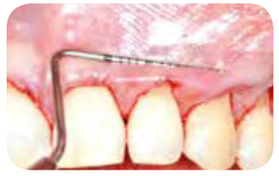
Preoperative measurement of the recession depths

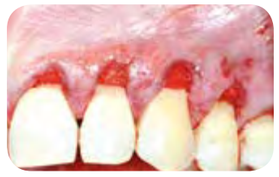
Using a microsurgical blade and tunneling knives, mucoperiosteal flaps were raised beyond the mucogingival junction at each involved tooth



Flaps were then extended laterally from each recession forming a mucoperiosteal tunnel. Interdental papillae were left intact, having only been sligthly undermined

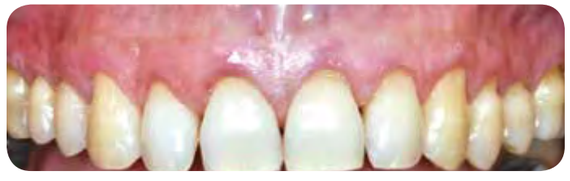
Hydration of mucoderm® for about five minutes in sterile saline or blood and adapting its shape according to the width of the recession defects





For a tension free coronal movement of the flap all muscle insertions and collagen fibres were cut. mucoderm® is pulled into the tunnel by mattress sutures and fixed to the inner aspect of the flap

mucoderm® was fixed at the CEJ of each treated tooth by means of sling sutures. The tunnel flap was moved coronally and fixed by sling sutures, to cover completely the mucoderm® matrix



Stable clinical situation at 24 months post-surgery

12. Cosgarea R, et al. 2016. Clinical evaluation of a porcine acellular dermal matrix for the treatment of multiple adjacent class I, II, and III gingival recessions using the modified coronally advanced tunnel technique. Quintessence Int.;47(9):739-47.

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