Geistlich
Bio-Gide®

Geistlich
Bio-Oss®

# Product Information

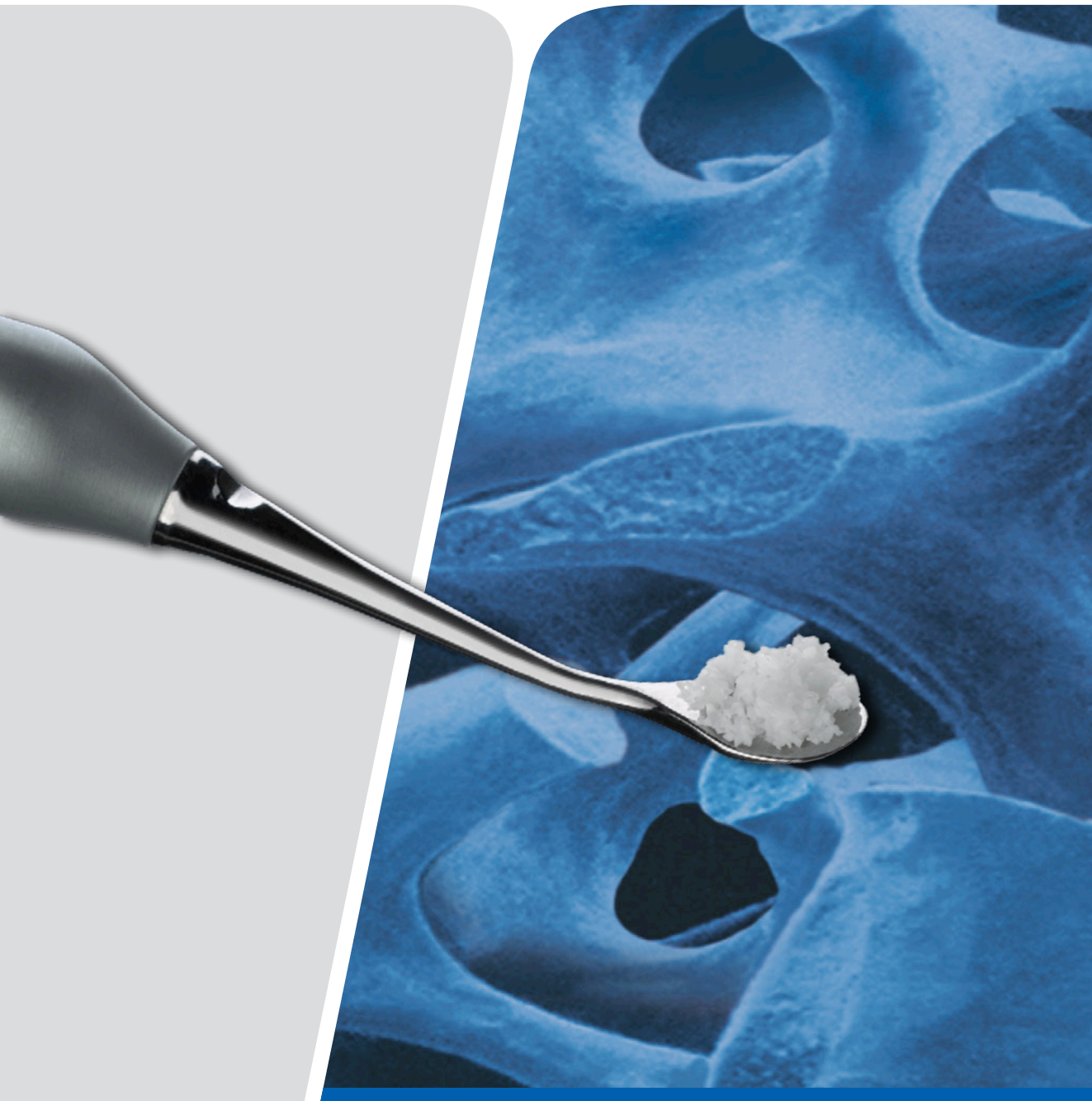




LEADING REGENERATION

Geistlich
Bio-Oss®

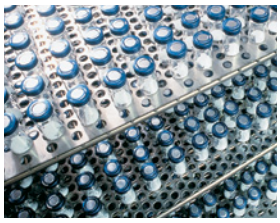
# The Master's Choice



LEADING REGENERATION

# Geistlich Bio-Oss®

Geistlich Bio-Oss®, the leading bone substitute in oral bone regeneration, has been used with success clinically for 25 years. In collaboration with over 100 universities and leading dental surgeons, Geistlich Bio-Oss® was tested and further developed for the use in the most varied indications. Outstanding results with Geistlich Bio-Oss® are documented in more than 700 publications – and this number is increasing constantly. Nowadays Geistlich Bio-Oss® is regarded as a standard material in dental bone regeneration.



Used more than 2.500 × per day.



More than 4.000.000 patients.



More than 700 publications.

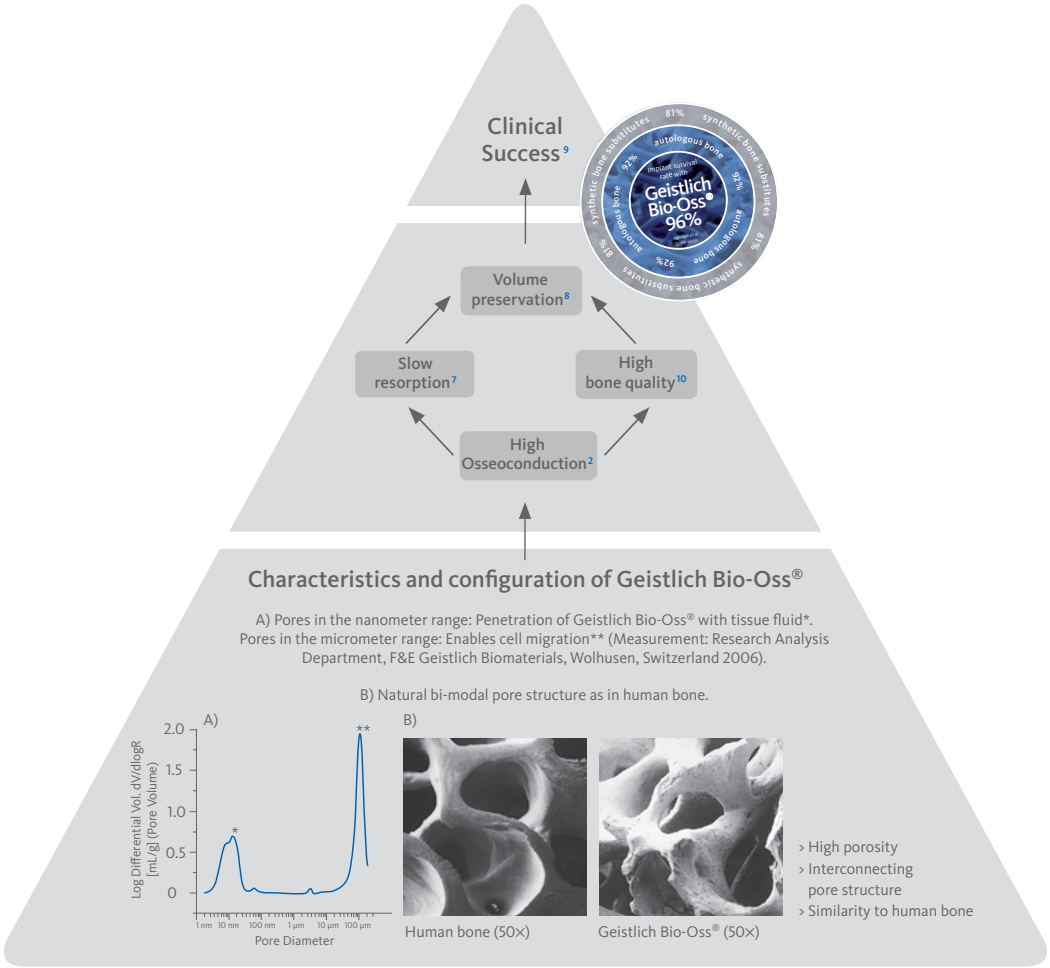


Geistlich Bio-Oss® small granules (0.25–1 mm)

# Biofunctionality

## Scientific background

Because of close resemblance to human bone, Geistlich Bio-Oss® is incorporated into the natural modelling and remodelling process. The highly porous structure of Geistlich Bio-Oss® offers plenty of space for blood vessels to form (angiogenesis) and new bone to be deposited (osteogenesis).[1,2] The microstructure of the Geistlich Bio-Oss® surface supports optimal ingrowth of osteoblasts, which are responsible for bone formation. Thus the Geistlich Bio-Oss® particles do become an integral part of the newly forming bone framework.[3,4,5,6] The slow rate of conversion[7] of Geistlich Bio-Oss® to autogenous bone (remodelling) stabilises the framework and enables the volume of the augmentate to be maintained long-term. These biofunctional processes make Geistlich Bio-Oss® unique.



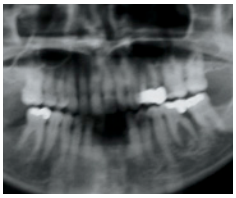


[1] Weibrich G. et al., Mund Kiefer Gesichtschir 4, 2000; 148–152
[2] Degidi M. et al., Oral Dis. 12(5), 2006: 469–475
[3] Orsini G. et al., J Biomed Mater Res. B: Appl Biomater 74B, 2005; 448–457
[4] Piattelli M. et al., Int J Oral Maxillofac Implants 14, 1999; 835–840
[5] Orsini G. et al., Oral Diseases 13, 2007; 586–593
[6] Traini T. et al., J Periodontol 78, 2007; 955–961
[7] Perrotti V. et al., J Biomed Mater Res., 2008
[8] Maiorana C. et al., Int J Periodontics Restorative Dent. 25, 2005; 19–25
[9] Aghaloo TL et al., Int Journal of Maxillofac Implants 22, 2007; 49–70
[10] Degidi M. et al., Clin Implant Dent Relat Res. 2008 Sep 9

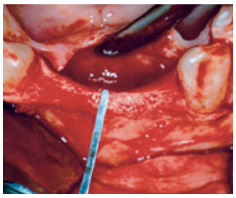
## Biofunctionality in practice

In daily clinical practice evidence from the literature should be considered to identify which materials show the most predictable results. The widely used and documented inorganic bone matrix Geistlich Bio-Oss® leads to a successful long-term outcome of augmentation, combining optimal osseointegration with volume preservation, both of which are crucial for implant survival. Geistlich Bio-Oss® may also be placed over autogenous bone grafts, taking advantage of its biofunctional properties to compensate for bone resorption.

## Volume Preservation in horizontal ridge augmentation[8]



Preoperative panoramic radiograph showing partially edentulous ridge at teeth 32, 31, 41.



Bone resorption and ridge width reduction can be seen in the edentulous area.



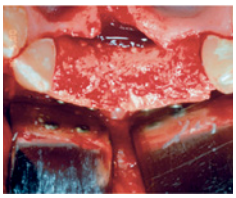
Bone block harvesting from chin.



Veneer graft fixation and Geistlich Bio-Oss® contouring and covering.



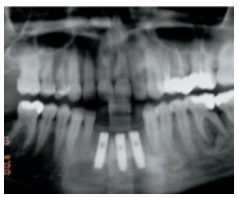
Soft-tissue healing 4 months after surgery.



Occlusal view showing complete preservation of the graft volume after 6 months.



Dental implants in place.



Postoperative panoramic radiograph.



# The All-rounder

## Scientific background

Implantological indications: To meet functional and aesthetic demands when placing implants, regeneration procedures are necessary in approximately 40% of all cases.[1] The use of Geistlich Bio-Oss® and Geistlich Bio-Gide® as part of Guided Bone Regeneration (GBR) is nowadays regarded as the standard therapy to build up bone and soft tissue in the following indications:

› Peri-implant defects [1, 2]

› Extraction sockets [3, 4, 5]

› Sinus floor elevations [6, 7, 8]

› Horizontal augmentations [9, 10]

› Vertical augmentations [11]

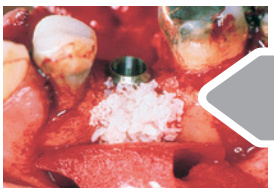
Periodontal indications: In order to preserve the tooth in the long-term, regenerative periodontal therapy aims to restore the complete periodontium consisting of cementum, ligament and bone. This requires a matrix, which supports the regeneration of these tissues, and a membrane, which prevents the long marginal epithelium from ingrowth. Numerous studies, some including human histologies, show the high regeneration potential of Geistlich Bio-Gide® and Geistlich Bio-Oss® in periodontal indications. [12, 13]

Cranial and maxillofacial indications: As an innovative company Geistlich constantly strives in collaboration with the leading surgeons, to discover new treatment methods and indications for regenerative products. Our biomaterials are being used increasingly for cranial and maxillofacial indications. More information is available from your Geistlich partner.


[1] Hämmerle CH. and N.P. Lang, Clin Oral Implants Res. 12, 2001; 9–18
[2] Zitzmann N.U. et al., Int J Oral Maxillofac Implants 16, 2001; 355–366
[3] Zuhr O. et al., Implantologie 14, 2006; 339–353
[4] Weng D. et al., Implantologie 14, 2006; 355–363
[5] Araujo MG et al., Int J Periodontics Restorative Dent. 28, 2008; 123–135
[6] Valentini P. et al., and D. Buser, Int J Oral Maxillofac Implants 18, 2003; 556–560
[7] Wallace S.S. Int J Periodontics Restorative Dent. 25, 2005; 551–559
[8] Aghaloo TL et al., Int J Oral Maxillofac Implants 22, 2007; 49–70
[9] Von Arx T., Clin Oral Implants Res. 17, 2006; 359–366
[10] Maiorana C. et al., Int J Periodontics Restorative Dent. 25, 2005; 19–25
[11] Canullo L. and M. Simion, Int J Periodontics Restorative Dent. 26, 2006; 355–361
[12] Sculean A. et al., J Clin Periodontol 34, 2007; 72–77
[13] Linares A. et al., J Clin Periodontol 33, 2006; 351–358

## The All-rounder in practice

Thanks to its biofunctionality, Geistlich Bio-Oss® has a broad range of indications. A large number of long-term studies confirms this for indications in implantology, periodontology or cranio-maxillofacial surgery.



Peri-implant defects



Horizontal augmentation



Sinus floor elevation

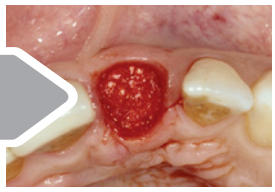
Geistlich Bio-Oss® small and large granules



Geistlich Bio-Oss® Collagen 100 mg and 250 mg



Ridge augmentation



Extraction sockets



Vertical augmentation

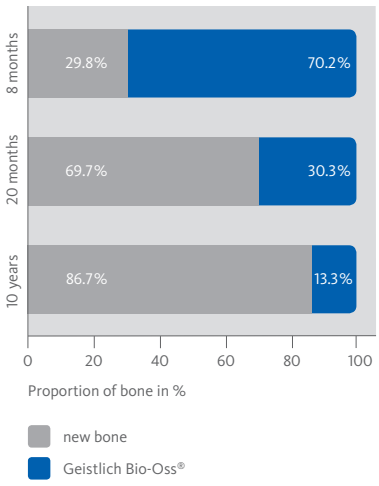


# Long-term Success

## Scientific background

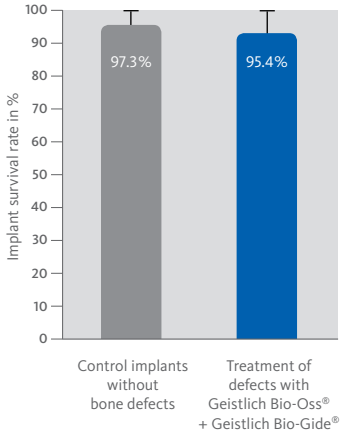
True success is rarely achieved overnight – it only becomes apparent after a certain period. Geistlich Bio-Oss® took its time confirming its effectiveness clinically, since only the well-tried and tested products instil real confidence – confidence that is reflected in 25 years experience and in more than 700 publications, many of which document the long-term success of treatment with Geistlich Bio-Oss®.[1, 2, 3, 4, 5, 6] Thanks to its biofunctionality, Geistlich Bio-Oss® has delivered promising results also as a carrier matrix for growth factors.[7, 8]

Long-term behaviour (remodelling)



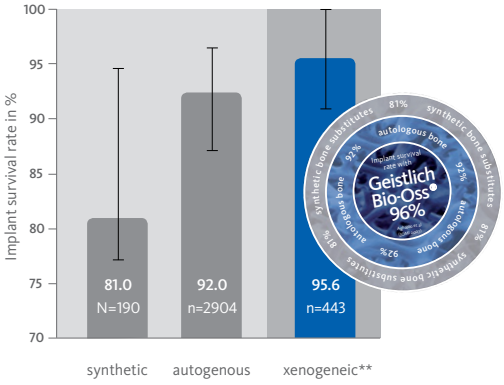

Geistlich Bio-Oss® is integrated and is converted continuously into bone. Histomorphometric analysis of bone and Geistlich Bio-Oss® in the patient.[1]

Long-term implant survival rate




Geistlich Bio-Oss® and Geistlich Bio-Gide® regenerate bone reliably and lead to a longterm implant survival rate of over 95% similar to sites with no defect. (112 implants, follow-up) 5 years.[4]

High implant survival rates



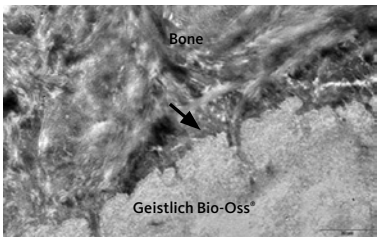

**Note: The 22 referenced studies with xenogeneic material were carried out with Geistlich Bio-Oss®

Predictability of implant survival rates in external sinus floor elevation (5128 Implants, follow-up 12-102 months).[9]


[1] Sartori S. et al., Clin Implants Res. 14, 2003; 369–372
[2] Schlegel K. A. and J. Wiltfang, Int J Oral Maxillofac Implants 18, 2003; 53–58
[3] Schlegel K. A. et al., Journal of Long-Term Effects of Medical Implants 8, 1998; 201–209
[4] Zitzman N. U. et al., Int J Oral Maxillofac Implants 16, 2001; 355–366
[5] Sculean A. et al., J Clin Periodontol 34, 2007; 72–77
[6] Valentini P. et al., Int J Periodontics Restorative Dent. 20, 2000; 245–253
[7] Warnke P. H. et al., Biomaterials 27, 2006; 1081–1087
[8] Terheyden H. et al., Int J Oral Maxillofac Surg. 33, 2004; 164–172
[9] Aghaloo TL, Moy PK., Int J Oral Maxillofac Implants 22, 2007; 49–70
[10] Orsini G. et al., Oral Dis 13 (6), 2007; 586–593
[11] Traini T. et al., J Periodontol 78, 2007; 955–961

## Long-term Success in practice

### Excellent long-term tissue response

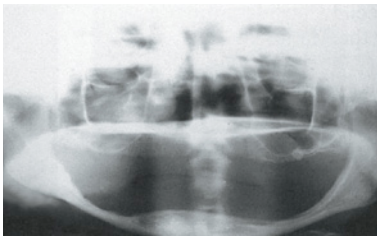



Transmission electron micrograph of the Geistlich Bio-Oss®–bone interface after 7 years. There is close contact between the particle and the bone, which presents features of mature bone (arrow).[10]

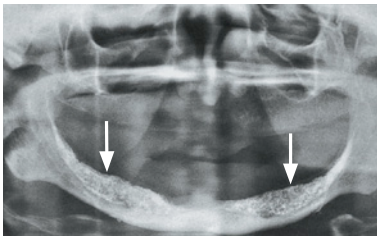



9 years postoperatively: new bone is in direct contact with the Geistlich Bio-Oss® particles. Bone is forming bridges between bone trabeculae and Geistlich Bio-Oss® as well as between the particles of the inorganic bone matrix.[11]

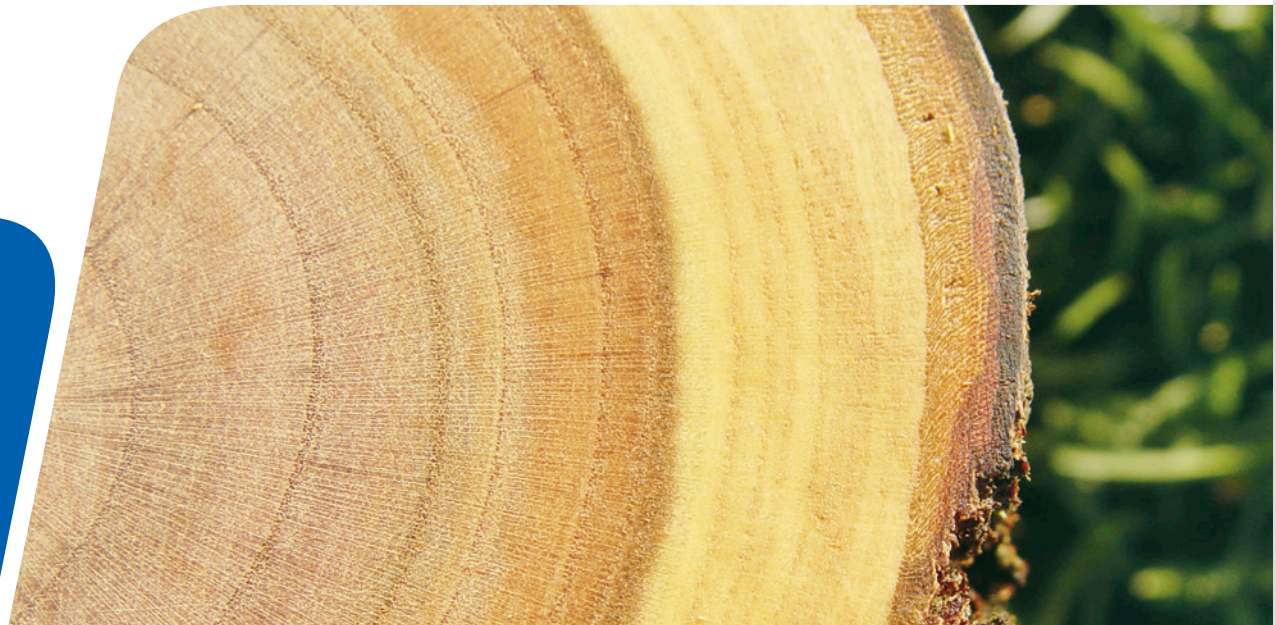
### Long-term volume preservation



Baseline situation: severely atrophied mandible (Case: Boyne P.J., 1997).

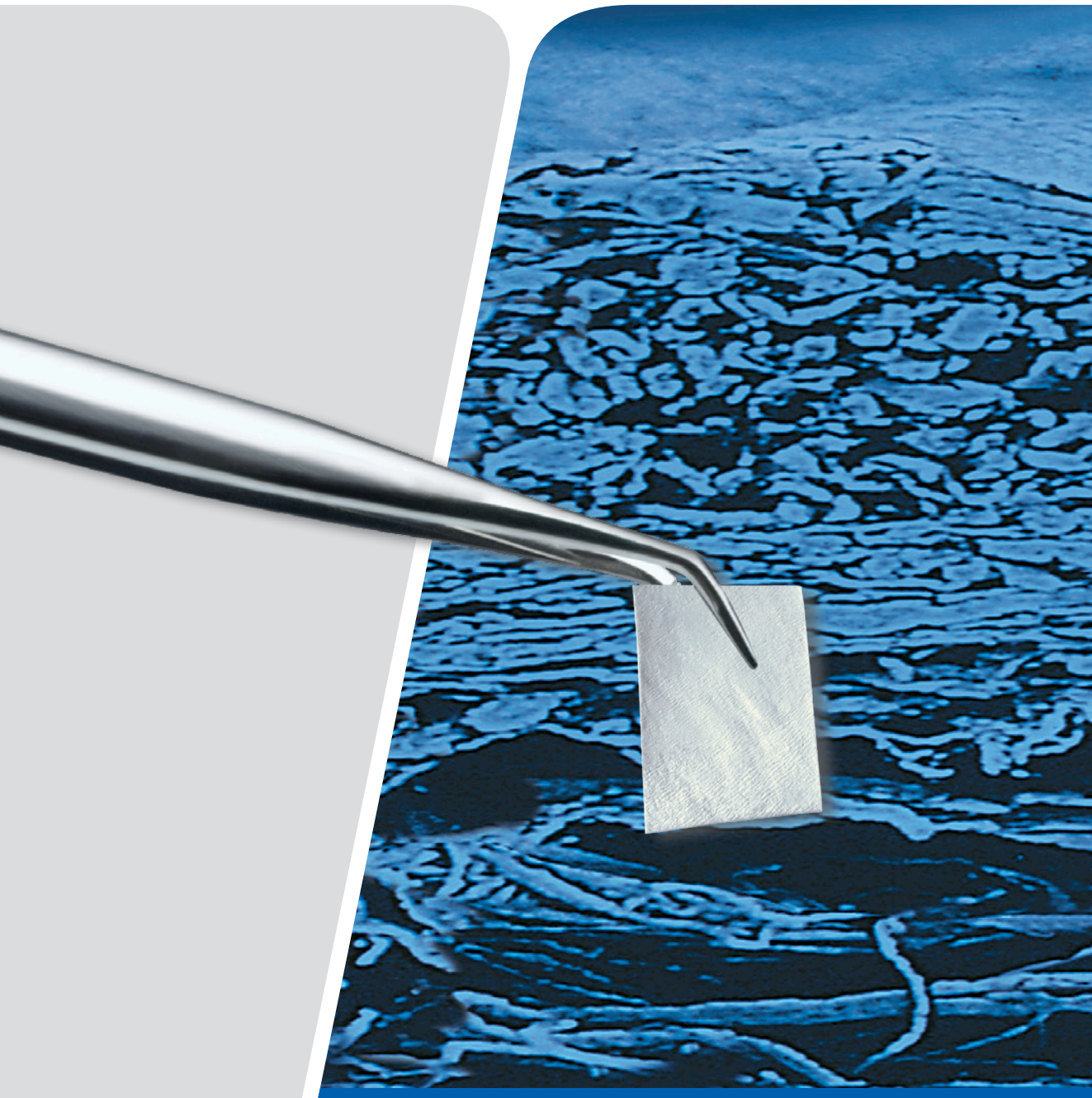


5 years postoperatively: the mandible shows a stable ridge height after the treatment with Geistlich Bio-Oss® and autogenous bone (mixing ratio 50:50).



Geistlich
Bio-Gide®

# More than a Barrier



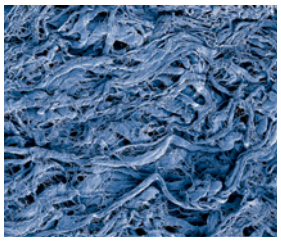
LEADING REGENERATION

# Geistlich Bio-Gide®

Geistlich Bio-Gide® is the leading collagen membrane for tissue regeneration, confirmed by an ever increasing number of publications. Uncomplicated procedures, optimal bone formation and excellent wound healing are the main reasons for the high level of therapy safety that leading surgeons worldwide appreciate with Geistlich Bio-Gide®. Its success is based on the natural bilayer structure, which contributes to excellent tissue integration, while maintaining a barrier function long enough to yield optimal tissue regeneration. Geistlich Bio-Gide®'s reliability is confirmed by 15 years of clinical use in over 2 million patients. Find out more about the favourable properties of Geistlich Bio-Gide® in the following pages.



Hi-tech production at its best.



Nature prefers natural structures (Geistlich Bio-Gide®).



Optimal aesthetic outcome.



Geistlich Bio-Gide® (30 × 40 mm)

# Natural Structures

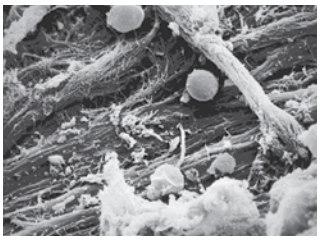
## Natural collagen

Soft tissue consists for the most part of collagen and healing of the gingiva is known to work best with the support of natural collagen. Geistlich Bio-Gide® is a non cross-linked collagen membrane, which is highly similar to collageneous human membranes (pictures 1 and 2). Geistlich Bio-Gide® degrades enzymatically into amino acids, a natural process that does not produce toxic, inflammatory by-products, which have been observed repeatedly with polylactide and polyglycolide membranes.[1]

## Good vascularisation

The native collagen structure of Geistlich Bio-Gide®, altered neither chemically nor physically, acts as a guide for blood vessels. The membrane body becomes homogeneously vascularised during the healing process (picture 3).[2, 3, 4] This leads to a good integration of the membrane with the surrounding tissue, which provides the stability necessary for both osseous and soft-tissue healing.[5] GBR (guided bone regeneration) membranes, which facilitate early anastomosis of the vasculature of the flap and the regenerated tissue are said to enhance new tissue formation.[3, 6]

High similarity of Geistlich Bio-Gide® to human collagen

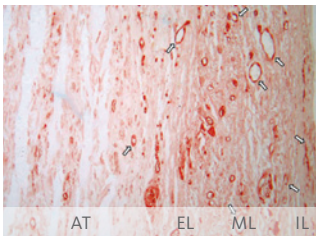


Picture 1: Human Schneiderian membrane (Scanning electronic microscopy [SEM] 2000×, Prof. Dr. Benner).



Picture 2: Geistlich Bio-Gide® – natural collagen structure (SEM 2000×).

Good vascularisation



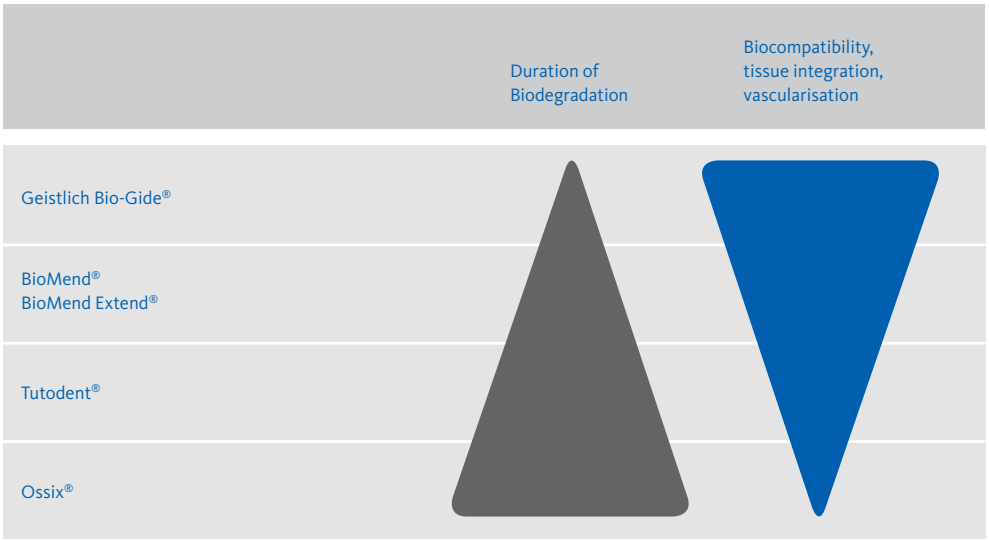

Picture 3: Transmembranous vascularisation of Geistlich Bio-Gide® (20×). AT, adjacent tissue; EL, external layer; ML, middle layer; IL, internal layer. Arrows indicate the formation of blood vessels (Schwarz et al., 2006).


[1] Alpar B. et al., Clin Oral Invest. 4, 2000; 219–225
[2] Rothamel D. et al., Clin Oral Implants Res. 16, 2005; 369–378
[3] Schwarz F. et al., Clin Oral Implants Res. 17, 2006; 403–409
[4] Schwarz F. et al., Clin Oral Implants Res. 19, 2008; 402–415
[5] Hardwick R. et al., Quintessence Publishing, 1994; 101–136
[6] Wang Y. et al., Ann N Y Acad Sci. 1117, 2007; 1–11
[7] Tal H. et al., Clin Oral Implants Res. 19, 2008; 295–302
[8] Patino M.G. et al., J Periodont Res. 38, 2003; 458–464
[9] Biocompatibility tests conducted in collaboration with MDT in compliance with ISO 10993–1, 2005
[10] Möhler H., Analysis Report ETH Zurich, 1995
[11] Friedmann A. et al., J Periodontol. 72, 2001; 1616–1623

Geistlich Bio-Gide®

## High biocompatibility

A recently published study has shown that significantly less dehiscence occurs when Geistlich Bio-Gide® is used instead of a cross-linked collagen membrane.[7] The natural structure of Geistlich Bio-Gide® has a positive effect on the tolerability of the Geistlich Bio-Gide® membrane and its biocompatibility. [8, 9, 10] When collagen membranes are artificially cross-linked, alterations to the native structures lead to restricted collagen digestion. Thereby the extended barrier presence is coupled to diminished biocompatibility, impaired tissue integration, and increased foreign body reactions.[2, 7, 11]




An increased duration of barrier presence leads to decreased biocompatibility, impaired tissue integration and more dehiscence. Based on Rothamel et al., 2005.



# Two in One

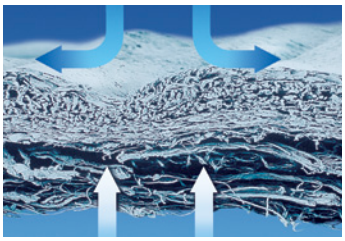
## Unique bilayer structure

For optimal bone and soft-tissue healing, more than just a barrier function is required. Geistlich Bio-Gide® is a unique bilayer collagen membrane composed of a smooth and a rough layer (picture 1). Thus, Geistlich Bio-Gide® not only prevents soft tissue from growing into the defect but also acts as a guide for bone and soft-tissue cells[1, 2] as well as for blood vessels. Endogenous tissue readily bonds with the porous collagen mesh, while blood vessels grow between the fibres and along the membrane surface.[3, 4, 5] These are ideal conditions for efficient regeneration of bone and soft tissue.[6, 7]

Smooth layer: The smooth, upper layer of Geistlich Bio-Gide® is an ideal basis for the attachment of fibroblasts that leads to favourable healing of the gingiva and an optimal aesthetic result. This dense layer also performs the necessary barrier function, protecting the young bone from ingrowing soft tissue (picture 2).

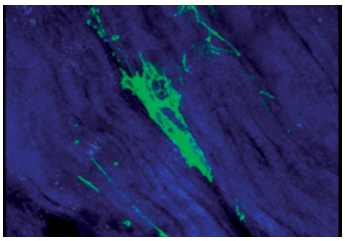
Porous layer: The rough side of Geistlich Bio-Gide® acts as a guide for osteoblasts, thereby supporting optimal bone healing. The cells grow along the fibres into the mesh-like collagen structure (picture 3).

Bilayer structure of Geistlich Bio-Gide®



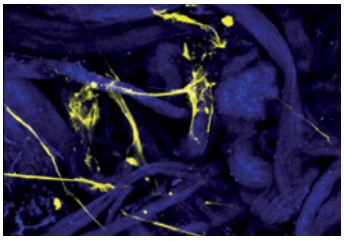
Picture 1: SEM illustration of the unique bilayer structure (stained blue, 100×).

Fibroblasts on the smooth surface



Picture 2: Confocal laser scanning microscope (CLSM) visualisation of the smooth surface of Geistlich Bio-Gide® with fibroblast colonisation. The cells (green) settle in the compact membrane surface and then grow along the collagen fibres (Prof. Dr. Duschner).

Osteoblasts in the porous layer



Picture 3: Confocal laser scanning microscope (CLSM) visualisation of the porous surface of Geistlich Bio-Gide® with osteoblast colonisation. The cells (yellow) grow into the collagen structure (Prof. Dr. Duschner).

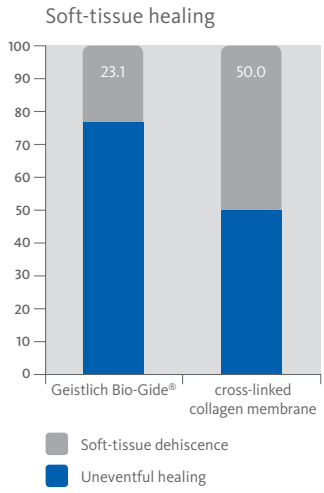

[1] Rothamel D. et al., Clin Oral Implants Res. 15, 2004; 443–449
[2] Reinsch G. et al., Poster DGI, 12/2006
[3] Rothamel D. et al., Clin Oral Implants Res. 16, 2005; 369–378
[4] Schwarz F. et al., Clin Oral Implants Res. 17, 2006; 403–409
[5] Schwarz F. et al., Clin Oral Implants Res. 19, 2008; 402–415
[6] Zitzmann N.U. et al., Int J Oral Maxillofac Implants. 12, 1997; 844–852
[7] Tal H. et al., Clin Oral Implants Res. 19, 2008; 295–302
[8] Schenk R.K. et al., Int J Oral Maxillofac Implants. 9, 1994; 13–29
[9] Gielkens P.F. et al., Clin Oral Implants Res. 19, 2008; 516–521
[10] Kim M. et al., In Vivo. 22, 2008; 231–236

## Unique double function

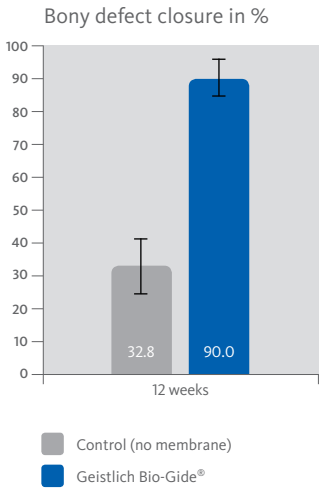
The Geistlich Bio-Gide® bilayer membrane combines optimal wound healing with undisturbed bone regeneration.

Excellent wound healing: The native collagen structure of Geistlich Bio-Gide® is highly biocompatible. Clinical data show that the use of Geistlich Bio-Gide® leads to less dehiscence than ePTFE membranes or cross-linked collagen membranes (graph 1). Even in rare cases of postoperative dehiscence, the soft tissue usually heals without any problem when Geistlich Bio-Gide® is used.[6, 7]

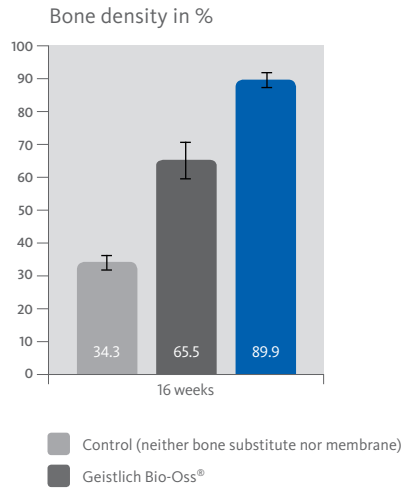
Undisturbed bone regeneration: Bone regeneration begins with a blood clot, which is converted into osteoid tissue within a few weeks.[8] During this process, Geistlich Bio-Gide® performs the necessary barrier function and protects the young bone from potential ingrowth of soft tissue (GBR principle).[6] This leads to more bone, as evidenced by improved defect closure (graph 2)[9], and improved bone quality, represented by greater bone density (graph 3)[10].



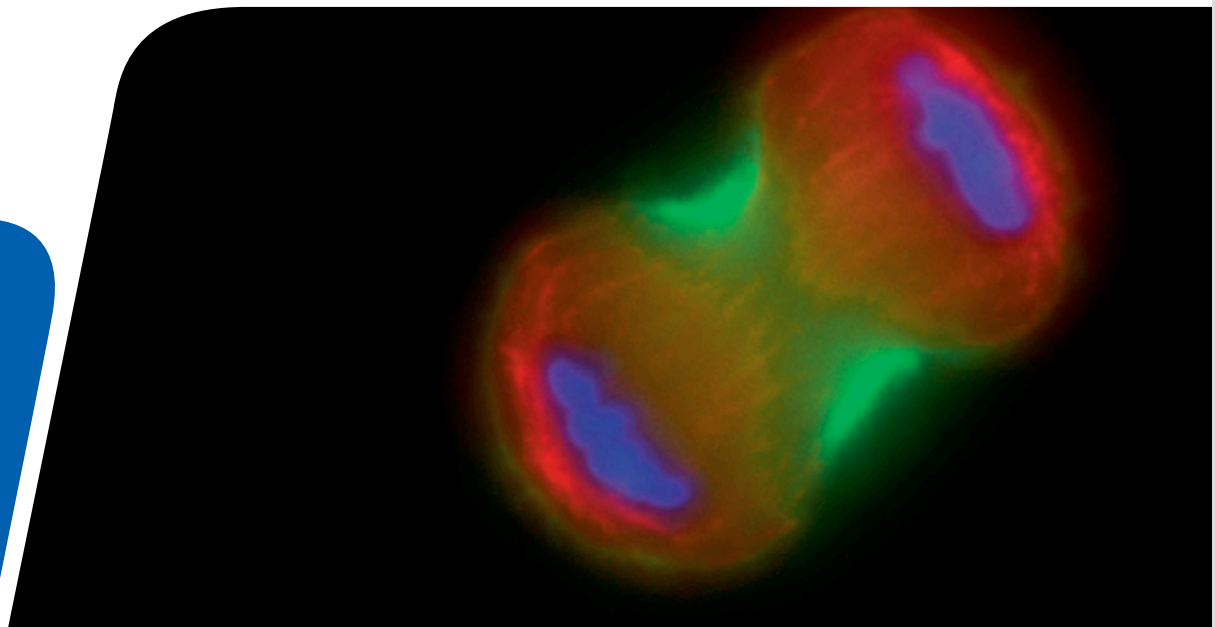

Graph 1: Significantly less dehiscence with Geistlich Bio-Gide® as compared to cross-linked collagen membranes (Tal et al., 2008).




Graph 2: Significantly more bone formation underneath Geistlich Bio-Gide® compared to the control group (Gielkens et al., 2008).




Graph 3: Significantly higher bone density with Geistlich Bio-Gide® compared to the use of Geistlich Bio-Oss® alone (Kim et al., 2008).



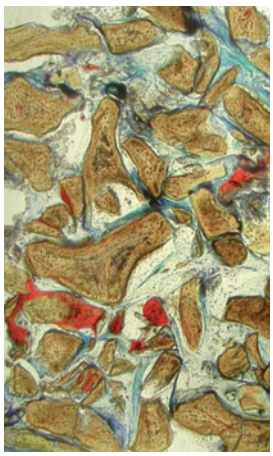
# High Therapy Safety

## Higher implant survival rate

The unique natural bilayer structure of Geistlich Bio-Gide® leads to a predictable and safe outcome in bone and soft-tissue regeneration.

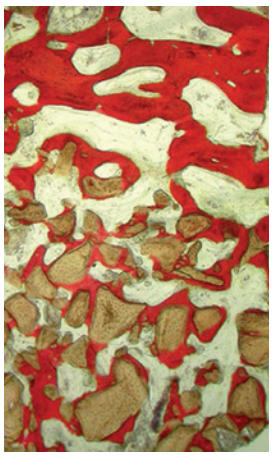
The use of a membrane for the regeneration of bone and periodontal tissue is an essential component of the guided bone and guided tissue regeneration concept.[1, 2, 3, 4, 5, 6] During the initial phase of wound healing the membrane ensures efficient bone formation, due to its protection of the augmentate from faster growing soft tissue. The membrane also stabilises the augmented region, prevents the migration of particles and provides support for the blood clot. Through the combination of these attributes, more bone and an improved bone quality can be achieved (pictures 1 and 2)[7, 8], which in turn leads to a higher implant survival rate (graph 1).[9, 10, 11, 12]

Without membrane



Picture 1: Connective-tissue encapsulation of Geistlich Bio-Oss®

With Geistlich Bio-Gide®

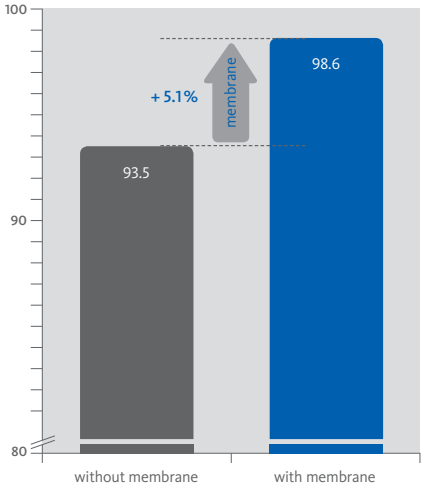


Picture 2: Complete osseointegration of Geistlich Bio-Oss®

By covering the lateral window with a membrane during sinus lift, the proportion of newly formed vital bone can be increased considerably (Wallace et al., 2005).

red: new bone
yellow: Geistlich Bio-Oss® particles
white: connective tissue/bone marrow

Implant survival rate in %



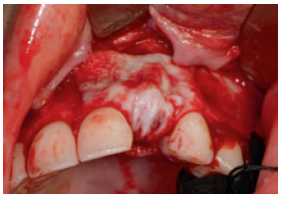

Graph 1: Survival of 5.1% more implants when a membrane is applied on the lateral window after sinus floor elevation (meta-analysis by Wallace and Froum, 2003).


[1] Zitzmann N.U. et al., Int J Oral Maxillofac Implants. 12, 1997; 844–852
[2] Cortellini P. et al., Periodontol. 22, 2000; 104–132
[3] Hämmerle CH. and T. Karring, Periodontol. 17, 2000; 151–175
[4] Hämmerle CH. et al., Clin Oral Implants Res. 19, 2008; 19–25
[5] von Arx T. and D. Buser, Clin Oral Implants Res. 17, 2006; 359–366
[6] Hürzeler M.B. and J.R. Strub, Pract Periodontics Aesthet Dent. 7, 1995; 37–47
[7] Gielkens P.F. et al., Clin Oral Implants Res. 19, 2008; 516–521
[8] Kim M. et al., In Vivo. 22, 2008; 231–236
[9] Norton M.R. and C. Gamble, Clin Oral Implants Res. 12, 2001; 79–84
[10] Wallace S.S. and S.J. Froum, Ann Periodontol. 8, 2003; 328–343
[11] Wallace S.S. et al., Int J Periodontics Restorative Dent. 25, 2005; 551–559
[12] Pjetursson B.E. et al., J Clin Periodontol. 35, 2008; 216–240
[13] Hardwick R. et al., Quintessence Publishing, 1994; 101–136
[14] Schwarz F. et al., Clin Oral Implants Res. 17, 2006; 403–409
[15] Tal H. et al., Clin Oral Implants Res. 19, 2008; 295–302

## Optimal soft-tissue healing

One of the essential advantages of the natural structure of Geistlich Bio-Gide® is the excellent wound healing properties resulting from its good vascularisation and tissue integration.[13, 14] Less dehiscence occurs with Geistlich Bio-Gide® compared to synthetic or altered collagen membranes.[1, 15] Even in case of dehiscence, the soft tissue usually heals uneventfully and a further augmentation is not necessary.

An optimal and predictable outcome despite soft-tissue dehiscence (Dr. Bormann/Prof. Dr. Dr. Gellrich)



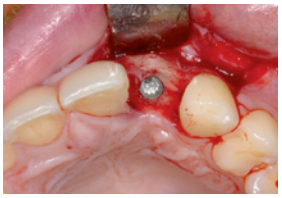
The augmentation is covered with Geistlich Bio-Gide®.



Occurrence of soft-tissue dehiscence (7 days postop.).



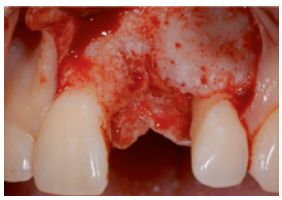
Complication-free healing of the dehiscence (4 weeks postop.).



Implant insertion (12 weeks postop.). Despite dehiscence, augmentation was successful.

## Predictable outcome in the aesthetic zone

The soft-tissue outcome in the aesthetic zone is particularly crucial for the success of the therapy. Many surgeons rely on Geistlich Bio-Gide®, which helps to achieve an optimal and predictable outcome, even in difficult cases. (PD Dr. Jung).



Bone defect visible after flap elevation.



Augmentation of the defect after implant installation with Geistlich Bio-Oss® particles.



The augmentation is covered with a Geistlich Bio-Gide®.



Optimal aesthetic outcome expressed as optimal bone and soft-tissue healing.



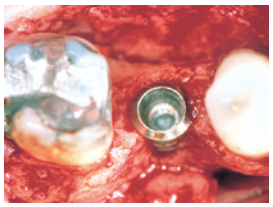
# Implantology

Geistlich Biomaterials

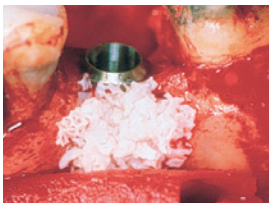
## Recommended treatment

### Dehiscence

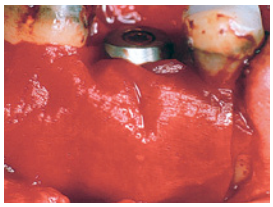
Case: Prof. Dr. Ch. Hämmerle



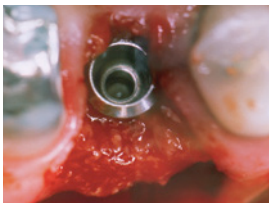
Buccal bone dehiscence at the implant.



Filling of the defect with Geistlich Bio-Oss®.



Covering with Geistlich Bio-Gide®.



Complete regeneration of the defect 8 months postoperatively.

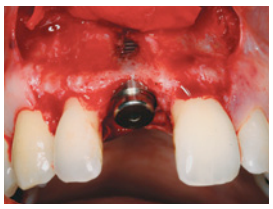
**Geistlich Bio-Oss®**
0.25–1 mm
**Geistlich Bio-Gide®**
25×25 mm
**Geistlich Combi-Kit Collagen**

Scientific evidence:

Joudzbalys et al. 2007
Hämmerle/Lang 2001
Van Steenberghe et al. 2000
and more...

### Fenestration

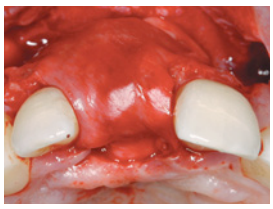
Case: Dr. K.-L. Ackermann



Bone loss over apical implant thread.



Application of Geistlich Bio-Oss®.



Covering with Geistlich Bio-Gide®.



Good healing of hard and soft tissue 13 months postoperatively.

**Geistlich Bio-Oss®**
0.25–1 mm
**Geistlich Bio-Gide®**
25×25 mm

Scientific evidence:

Zitzmann et al. 2001
Hämmerle/Lang 2001
and more...

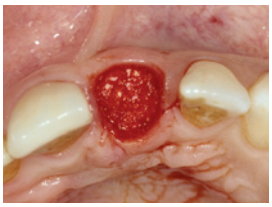
Indication sheets:
PIR1 Gardella

### Extraction socket

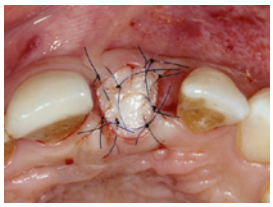
Case: PD Dr. R. Jung



Following extraction: Application of a volume of Geistlich Bio-Oss® Collagen corresponding to the tooth root.



Insertion to the level of the crestal bone margin.



Covering the socket with a soft-tissue graft.



Good soft-tissue situation 6 weeks postoperatively allows for implant placement.

**Geistlich Bio-Oss® Collagen**
100 mg / 250 mg
**Geistlich Combi-Kit Collagen**

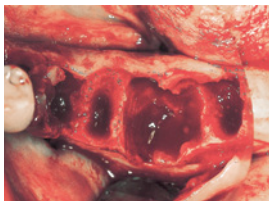
Scientific evidence:

Ackermann 2009, Schlee/Esposito 2009,
Araujo et al. 2009, Jung et al. 2004
and more...

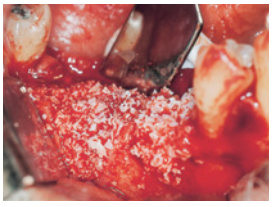
Indication sheets:
E1 Hämmerle/Jung, E2 Nevins,
E3 Ackermann, IIP–1 Testori,
IIP2 De Lange/Randelzhofer

### Ridge augmentation

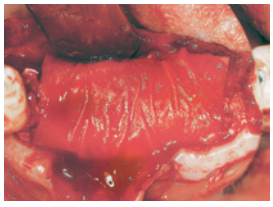
Case: Prof. Dr. C. Maiorana



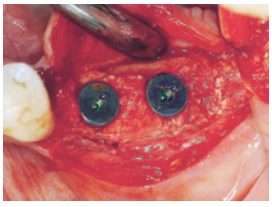
Occlusal view after opening the defect.



Application of Geistlich Bio-Oss®.



Covering with Geistlich Bio-Gide®.



Optimal bone support for implant insertion 6 months postoperatively.

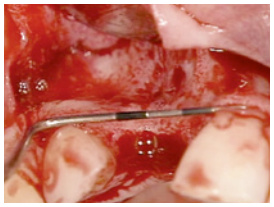
**Geistlich Bio-Oss®**
1–2 mm
**Geistlich Bio-Gide®**
30×40 mm

Scientific evidence:

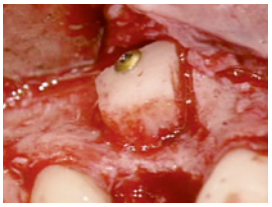
Von Arx/Buser 2006
Maiorana/Simion 2005
and more...

### Horizontal augmentation

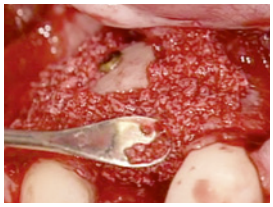
Case: Prof. Dr. D. Buser



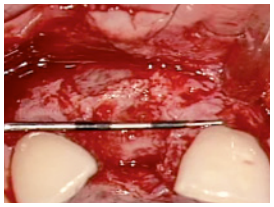
Defect with major horizontal bone loss.



Corticocancellous bone graft from the chin region.



Contouring with Geistlich Bio-Oss® and covering with Geistlich Bio-Gide®.



Suitable bone site for implant insertion 6 months postoperatively.

**Geistlich Bio-Oss®**
0.25–1 mm / 1–2 mm
**Geistlich Bio-Gide®**
25×25 mm / 30×40 mm

Scientific evidence:

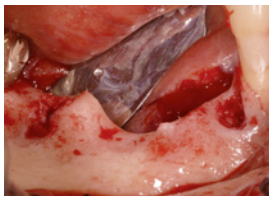
Von Arx et al. 2006
Maiorana et al. 2005
and more...

Indication sheets:
H1 Maiorana

Indications / Handling: Geistlich Bio-Gide® / Geistlich Bio-Oss®

## Vertical augmentation

Case: Prof. Dr. M. Simion



Defect exposed after opening.



Augmentation with Geistlich Bio-Oss® (addition of autogenous bone should be considered).



A shape-retaining membrane, fixed buccaly with 2 screws, protects the graft.



Suitable bone support for implant insertion 6 months postoperatively.

**Geistlich Bio-Oss®**
1–2 mm

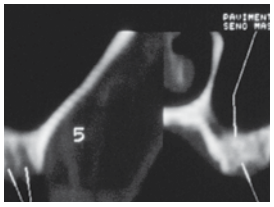
Scientific evidence:

Canullo/Simion et al. 2006
Artzi et al. 2003
and more...

Indication sheets:
V1 Simion/Rocchietta

## Ridge reconstruction

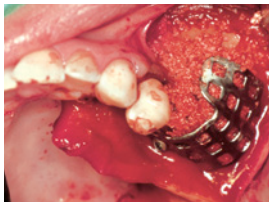
Case: Prof. Dr. C. Maiorana



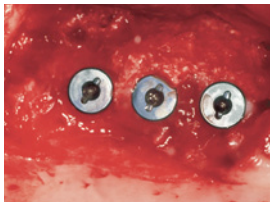
Computed tomogram shows horizontal and vertical bone deficit.



Clinical appearance preoperatively.



Augmentation with a mixture of iliac crest chips and Geistlich Bio-Oss®, covered with titanium mesh.



Stable bone support for implantation 12 months postoperatively.

**Geistlich Bio-Oss®**
1–2 mm
**Geistlich Bio-Gide®**
25×25 mm / 30×40 mm
(depending on defect size)

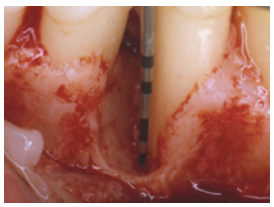
Scientific evidence:

Artzi et al. 2003
Maiorana et al. 2001
and more...

# Periodontology

## Intraosseous defects (1–3 walls)

Case: Prof. Dr. St. Hägewald/Dr. J.-P. Bernimoulin



2-wall bone defect with a vertical dimension of approx. 9 mm.



Filling the pocket with Geistlich Bio-Oss® Collagen.



Application of Geistlich Bio-Gide® Perio over the defect.



Stable-tissue situation 1 year postoperatively.

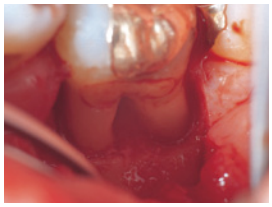
**Perio-System Combi-Pack**

Scientific evidence:

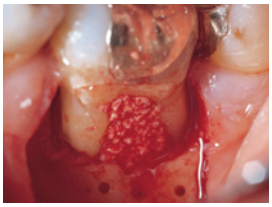
Linares et al. 2006
Tietmann et al. 2006
Tonetti et al. 2005
Sculean et al. 2003
and more...

## Furcation defects (class I–II*)

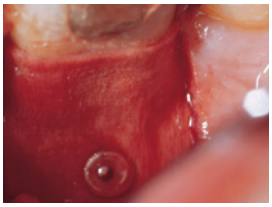
Case: Dr. H. Wachtel/Prof. Dr. M. B. Hürzeler



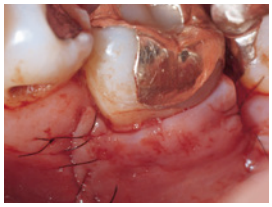
Class II furcations defect.



Filling the defect with Geistlich Bio-Oss® Collagen.



Covering with Geistlich Bio-Gide® Perio and apical fixation with pins.



Wound closure.

**Perio-System Combi-Pack**

Scientific evidence:

Reddy et al. 2006
Hauser et al. 2001
and more...

*Class I and II furcation defects are regarded as treatable. However, conditions for eliminating the bacterial infection are more difficult. Class III furcations are regarded as non-treatable.

# Sinus floor elevation

Geistlich Biomaterials

## Recommended treatment

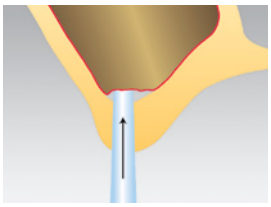
### Procedure of choice (after Zitzmann et al. 1998)

| | |
|---|---|
| Two-stage procedure: | with residual bone height < 4–5 mm |
| Simultaneous procedure: | with residual bone height > 5 mm and sufficient primary stability |
| Osteotome technique: | with residual bone height > 6 mm |

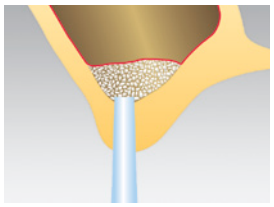
### Treatment of perforations of the Schneiderian membrane

Medium to Large perforations: cover with Geistlich Bio-Gide®
Small perforations: use Geistlich Bio-Gide® or biological adhesive

### Crestal procedure/Summer's technique (internal)



Crestal approach with osteotome: elevate Schneiderian membrane carefully.



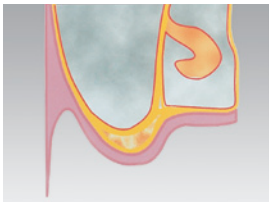
Augmentation with Geistlich Bio-Oss® and implant insertion. Loading after 6–8 months.

**Geistlich Bio-Oss®**
0.25–1 mm

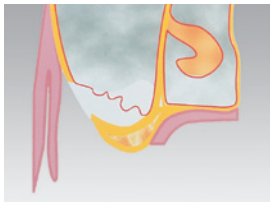
Scientific evidence:

Meriszke et al. 2006
and more...

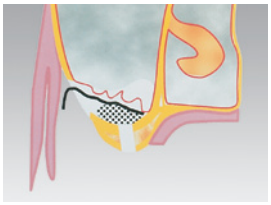
### Lateral/fenestration technique (external)



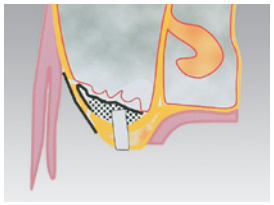
Insufficient bone thickness posteriorly.



Open a lateral window; carefully elevate the sinus mucosa using a blunt periosteal elevator.



Application of Geistlich Bio-Oss®. Insert Geistlich Bio-Gide® if Schneiderian membrane is thin or ruptures.



Cover the lateral window with Geistlich Bio-Gide®.

**Geistlich Bio-Oss®**
0.25–1 mm / 1–2 mm

**Geistlich Bio-Gide®**
25 × 25 mm

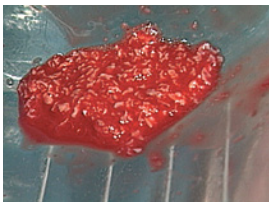
Scientific evidence:

Del Fabbro et al. 2004, Wallace/Froum 2003, Aghaloo et al. 2007, Pjetursson et al. 2008, Ferreira et al. 2009 and more...

## Using Geistlich Bio-Oss®

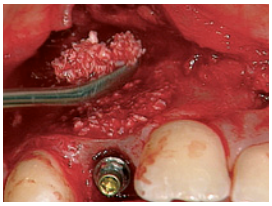
### 1. Mix Geistlich Bio-Oss®

Mix Geistlich Bio-Oss® in a container with blood from the defect or with saline solution. Thanks to the marked hydrophilic characteristics, the particles adhere very well to one another.



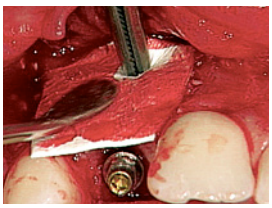
### 2. Application in situ

Geistlich Bio-Oss® is brought in situ and can be modelled easily. It also exhibits optimal adhesion to the walls of the defect. Excessive compression should be avoided so that enough room is left between the particles for new bone to grow through.



### 3. Protection by Geistlich Bio-Gide®

The graft is covered with Geistlich Bio-Gide®. Thus, on the one hand bone regeneration can take place unimpeded and on the other hand, Geistlich Bio-Gide® acts as an outstanding guide for the overlying soft tissue.



### Using Geistlich Bio-Oss® Collagen

Geistlich Bio-Oss® Collagen can be cut to the desired shape either dry or after moistening (with saline solution). It can then be applied easily with forceps and adheres well to periodontal defects because of the collagen content.



## Using Geistlich Bio-Gide®

### 1. Adjusting it to the defect size

After measuring the defect (e.g. with a sterile aluminium foil or periodontal probe), the dry Geistlich Bio-Gide® is cut to the desired shape. For periodontal defects, Geistlich Bio-Gide® Perio is delivered with sterile templates that can be used as cutting patterns.



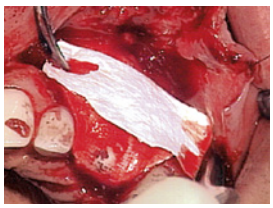
### 2. Apply dry – moisten in situ

Geistlich Bio-Gide® is applied dry (rough side facing towards the defect) and is only moistened with blood from the defect region when it is in situ. In order to maintain the shape and stability a resorbable membrane should be used in combination with Geistlich Bio-Oss®.



### 3. Fixation

Thanks to its marked hydrophilic characteristics, Geistlich Bio-Gide® adheres well to the graft and the surrounding bone. In most cases, no further fixation is necessary. For particularly large defects, the so-called double-layer technique leads to increased stability. Alternatively, Geistlich Bio-Gide® can be sutured or pins can be used.



### 4. Open healing

Whenever possible, the soft tissue flaps should be completely closed and sutured tightly but without tension. However, it has been shown that open healing is possible with Geistlich Bio-Gide® in cases where the wound cannot be closed fully. Complete healing usually occurs within a few weeks. However, appropriate postoperative treatment with disinfectant oral rinses is indicated in every case (Valentini/Abensur 2003).



# Product range



## Geistlich Bio-Oss®

Small granules (0.25 – 1 mm)

Quantities: 0.25 g, 0.5 g, 2.0 g (1 g ≙ 2.05 cm³)

The small Geistlich Bio-Oss® particles allow close contact with the surrounding bone wall. They are recommended for smaller 1–2 socket defects and for contouring autogenous block grafts.






## Geistlich Bio-Oss®

Large granules (1–2 mm)

Quantities: 0.5 g, 2.0 g (1 g ≙ 3.13 cm³)

The large Geistlich Bio-Oss® granules have more space between the particles than the small granules. Particularly in large defects, this enables improved regeneration over large distances and provides enough space for the ingrowing bone.





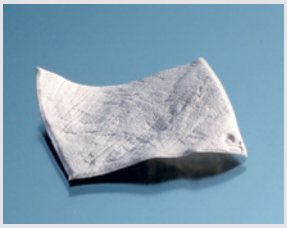

## Geistlich Bio-Oss® Collagen

Geistlich Bio-Oss® (small granules)
+ 10 % collagen (porcine)

Sizes: 100 mg (0.2–0.3 cm³), 250 mg (0.4–0.5 cm³)

Geistlich Bio-Oss® Collagen is indicated for use in periodontal defects and extraction sockets. Through the addition of collagen, Geistlich Bio-Oss® Collagen can be tailored to the morphology of the defect and is particularly easy to apply.



## Geistlich Bio-Gide®

Resorbable bilayer membrane

Sizes: 25 × 25 mm, 30 × 40 mm

Geistlich Bio-Gide® consists of porcine collagen and has a bilayer structure – a rough side that faces the regenerated bone tissue and a smooth size that faces the soft tissue. Geistlich Bio-Gide® is easy to handle: it can be positioned easily, adheres well to the defect, and is resistant to tension and tearing.






## Geistlich Bio-Gide® Perio

Resorbable bilayer membrane

Size: 16 × 22 mm with cutting pattern

Geistlich Bio-Gide® Perio has the same biological properties as Geistlich Bio-Gide® but has a smoothened upper surface. This slows the absorption of moisture. Particularly in periodontal indications, this offers the practitioner a longer time window to enable exact positioning of the membrane, especially in the interdental space.






## Perio-System Combi-Pack

Geistlich Bio-Oss® Collagen 100 mg
+ Geistlich Bio-Gide® Perio 16 × 22 mm

When used in combination, the system has optimised properties for periodontal regeneration.






## Geistlich Combi-Kit Collagen

Geistlich Bio-Oss® Collagen 100 mg
+ Geistlich Bio-Gide® 16 × 22 mm

When used in combination, the system has optimised properties for ridge preservation and minor augmentations according to the GBR principle.



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