

LEADING REGENERATION

Geistlich

# *The alternative* connective tissue graft

Geistlich Fibro-Gide®



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# From Then to Now

Ever since an alternative to connective tissue grafts has been conceptualized at Geistlich Pharma AG, more than 1,000 prototypes have been tested, in what became the final development of Geistlich Fibro-Gide®. Geistlich Pharma AG has drawn from its vast experience in researching, analyzing and commercializing collagen based products tailor-made for specific dental procedures and therapeutic solutions. This collagen expertise has led Geistlich Pharma AG to its latest innovation, Geistlich Fibro-Gide®, to meet your clinical demand for a volume-stable collagen matrix.



## Screening by cell proliferation

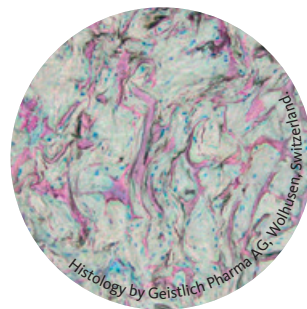
Geistlich Pharma AG developed a bioreactor to mimic the mechanical stresses of human mastication and in-vivo application.

After the first round of testing, the best prototypes were cultured with human gingival fibroblasts under mechanical stress. For the second round of selection the best prototypes in terms of cell proliferation and volume stability were chosen.<sup>1</sup>



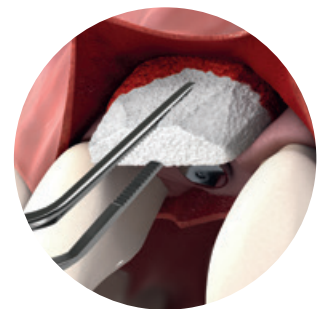
## Mechanical testing

The mechanical properties of the best prototype selection remained stable, and the volume was retained (70–80%) even after mechanical forces were applied in repeated cycles.<sup>1</sup>



## Selecting for soft-tissue integration

Soft-tissue integration, vascularization and remodeling in the remaining prototypes with different degrees of cross-linkage were tested. The Geistlich cross-linking process balances mechanical volume stability with cell compatibility and tissue integration.<sup>2,6,22</sup>



## The alternative to connective tissue grafts: Geistlich Fibro-Gide®

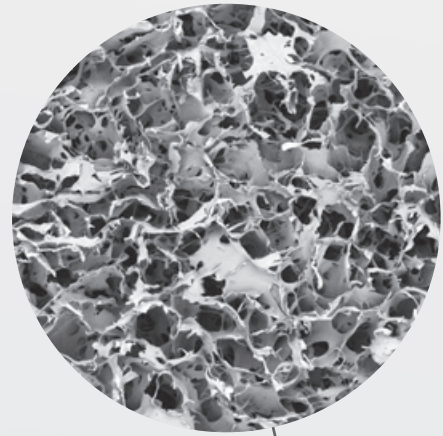
Finally, Geistlich Fibro-Gide® was designed to meet your clinical demand for a volume-stable collagen matrix that supports and promotes soft-tissue regeneration in the field of oral regeneration.

# Geistlich Fibro-Gide®

## In a Nutshell

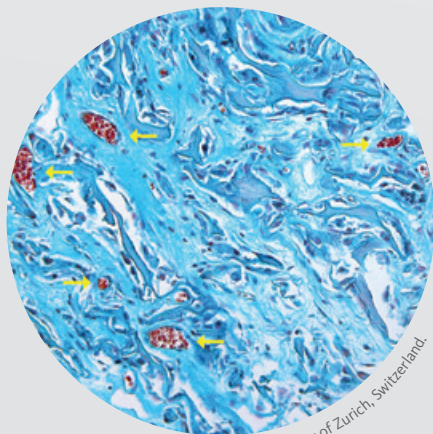
### Volume Stability

The reconstituted collagen undergoes smart cross-linking for volume stability of the device.<sup>7,10</sup> Thus, the porous structure allows blood clot stabilization and the ingrowth of host cells.<sup>2,10</sup>



### Made of Collagen

Geistlich Fibro-Gide® is a porcine, porous, resorbable and volume-stable collagen matrix.<sup>7</sup>



Histology by University of Zurich, Switzerland.

### Supports Soft-Tissue Integration

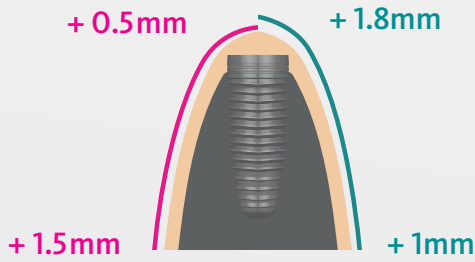
The porous network of Geistlich Fibro-Gide® supports angiogenesis (yellow arrows), formation of new connective tissue and stability of the collagen network in submerged healing situations.<sup>3,6</sup>

### Intended Use & Indications

Geistlich Fibro-Gide® is intended to be used for soft-tissue regeneration at the alveolar ridge.<sup>7</sup>

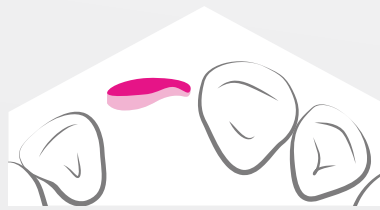
- > insufficient soft tissue volume<sup>7</sup>
- > recession defects<sup>7</sup>

### Linear Measurement<sup>3</sup>



- Connective Tissue Graft
- Baseline
- Geistlich Fibro-Gide®
- Bone

### Volumetric Measurement<sup>18</sup>



Connective Tissue Graft

VS



Geistlich Fibro-Gide®

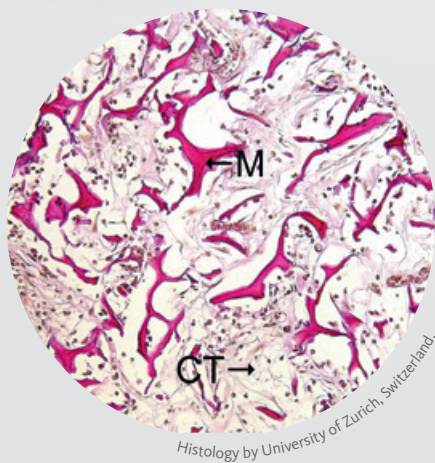
### Compared to Connective Tissue Graft

Geistlich Fibro-Gide® has been proven to provide a stable augmented soft tissue both in terms of quality and quantity, with the additional benefits of eliminating the donor site and lower patient pain perception when compared to connective tissue graft.<sup>3,18,20,23</sup>

### Soft-Tissue Formation

Animal models have shown good integration of Geistlich Fibro-Gide® into the surrounding soft-tissue while maintaining stability.<sup>2</sup>

(M = collagen matrix; CT = connective tissue)

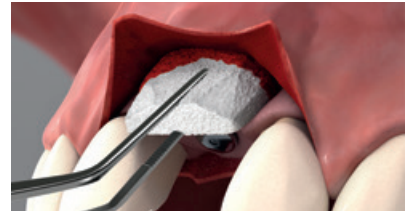


### Conclusion

Geistlich Fibro-Gide® has been proven to provide a stable augmented soft-tissue both in terms of quality and quantity, with the additional benefits of eliminating the donor site, shorter surgical time and lower patient pain perception.<sup>3,18,20</sup>

## Case Reports

On the following pages dental surgeons share their experiences with Geistlich Fibro-Gide®.

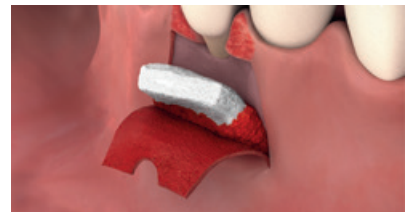


### Staged Approach after Implant Placement

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### Simultaneous Approach with GBR

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### Recession Coverage

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### Under Pontics

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# Insufficient Soft-Tissue Thickness in a Single Tooth Gap in the Anterior Maxilla



Dr. Otto Zuhr | Munich, Germany

**Aim:** Gain in soft-tissue around a single implant in the esthetic area with Geistlich Fibro-Gide®.

**Conclusion:** The use of Geistlich Fibro-Gide® gave successfully esthetic results, providing the missing thickness of soft-tissue.



1 Occlusal view: missing left central incisor with labial soft-tissue deficiency 3 months after implant placement.

2 Labial flap preparation with a micro-surgical tunneling knife.

3 Trimming Geistlich Fibro-Gide® in a wet state to fit the size of the defect.

4 Insertion of Geistlich Fibro-Gide® into the desired area.

5 Tension-free wound closure performed with double sling and single interrupted sutures.

6 Situation before suture removal 7 days post-surgery.

7 Situation 4 months after soft-tissue augmentation.

8 6 months follow-up with the final implant restoration in place.

9 1 year follow-up after crown placement.

# Insufficient Soft-Tissue Thickness Around Single Implant in the Posterior Maxilla

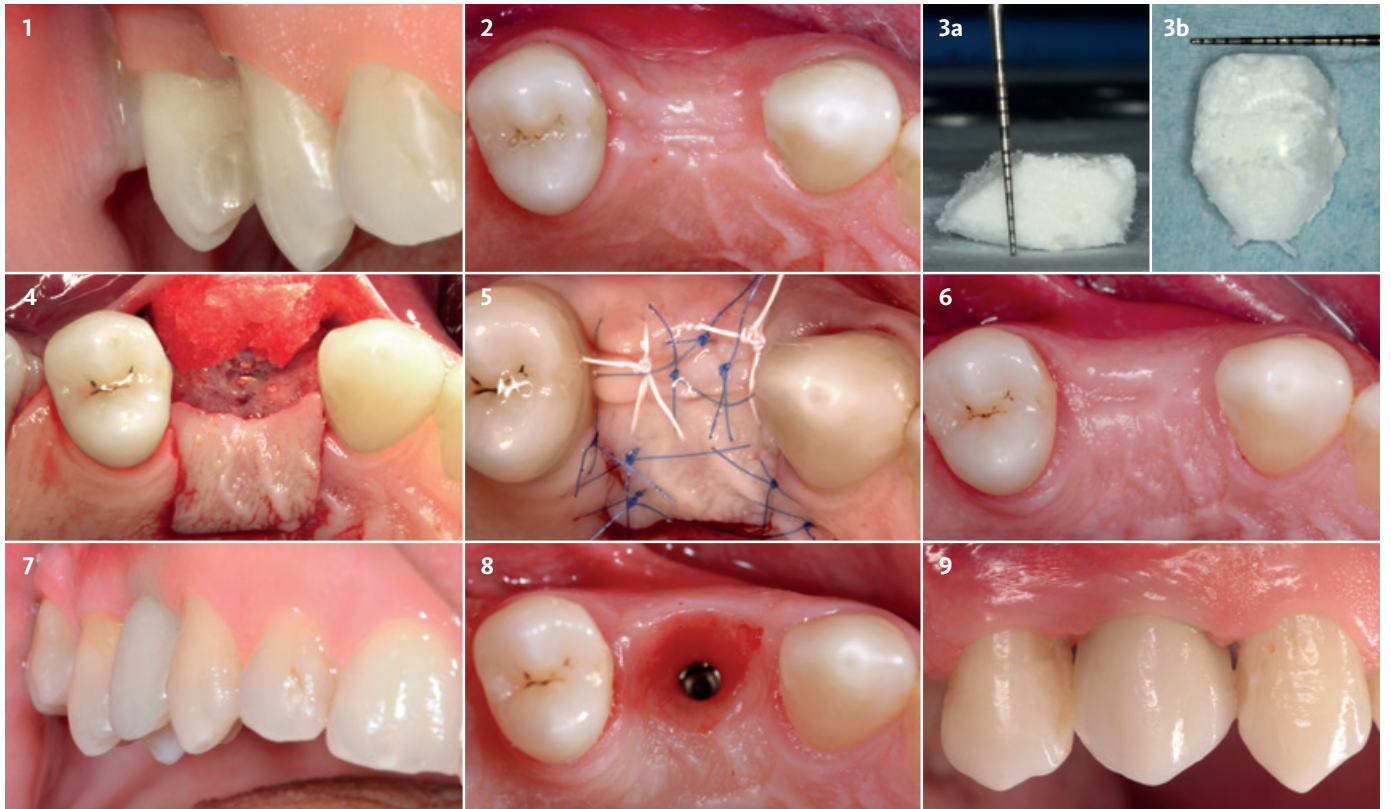


“Geistlich Fibro-Gide® can be used safely as an alternative to harvesting autologous connective tissue grafts.”

Prof. Mariano Sanz and Dr. Ignacio Sanz Martín | Madrid, Spain

**Aim:** Restore soft-tissue volume deficiency.

**Conclusion:** The collagen matrix helped to increase the buccal soft-tissue volume around the implant restoration.



1 Baseline buccal view: soft-tissue concavity at the dental implant site.

2 Baseline occlusal view: volume deficiency on the buccal aspect.

3 Adaptation of Geistlich Fibro-Gide® to the defect size. Notice bevel cut performed in the area positioned close to the incision line.

4 Position of Geistlich Fibro-Gide® and fixation to the buccal flap with horizontal mattress suture.

5 Primary closure obtained by horizontal mattress and single interrupted sutures.

6 4 months follow-up: showing the healed soft-tissue after augmentation surgery.

7 4 months follow-up: provisional restoration. Notice volume recovery.

8 Occlusal view before final restoration.

9 9 months follow-up: final restoration after soft-tissue augmentation surgery.

# Insufficient Soft-Tissue Around Implants in a Fully Edentulous Maxilla

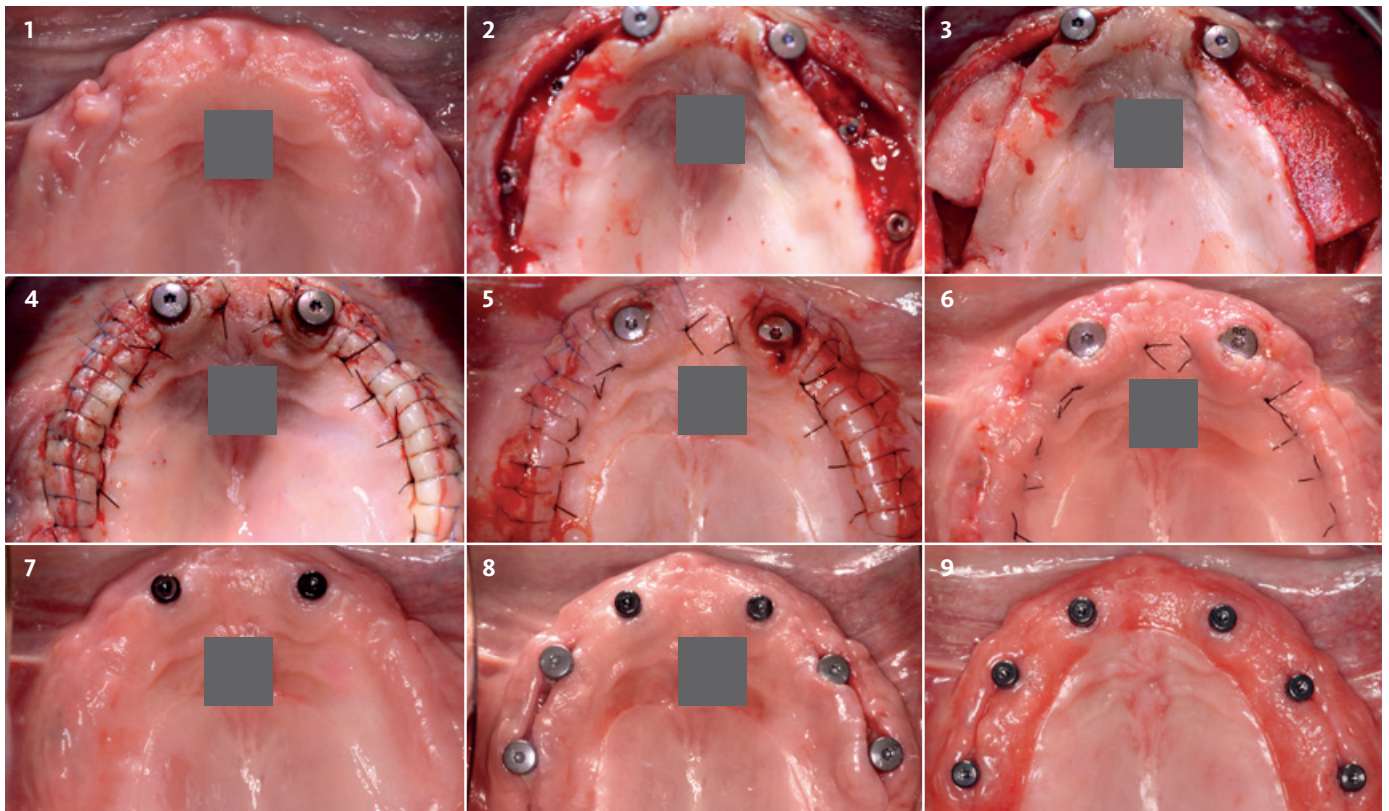


“Geistlich Fibro-Gide® offers promising new avenues in conservative soft-tissue augmentation of edentulous ridges and gingiva around implants and seems to be an alternative to autologous tissue grafts.”

PD Dr. med. dent. Michael Chr. Stimmelmayer | Cham, Germany

**Aim:** Increasing the thickness of soft-tissue around dental implants in an edentulous ridge with Geistlich Fibro-Gide®.

**Conclusion:** Geistlich Fibro-Gide® reduces morbidity, especially in larger cases where bigger grafts are needed.



■ Details covered by grey boxes due to copyright reasons.

- 1 Baseline: fully edentulous upper jaw.
- 2 Re-entry after placement of two anterior equicrestal implants and two-staged hard-tissue augmentation in both posterior regions.
- 3 Covering the inserted 4 equicrestal implants, by using two pieces of Geistlich Fibro-Gide® (3 mm thickness). They were extended from the buccal aspect over the occlusal to the palatal aspect covering and thickening the alveolar ridge on both sides.
- 4 Tension-free wound closure using mattress sutures (Nylon 5-0, Resorba) for flap fixation and single sutures (Mopylen 6-0, Resorba) for wound adaptation. Two implants in the front have been covered with transmucosal healing abutments.
- 5 Healing situation 2 days post-surgery.
- 6 1 week post-surgery: uneventful soft-tissue healing and suture removal.
- 7 Soft-tissue situation 6 weeks post-surgery. Mattress sutures were removed 2 weeks post-surgery.
- 8 A second surgical procedure is required for uncovering the implants: wound healing with stable soft-tissue situation 10 days after uncovering.
- 9 8 months follow-up after surgery.



# Insufficient Soft-Tissue Thickness Around Single Implant in the Anterior Mandible

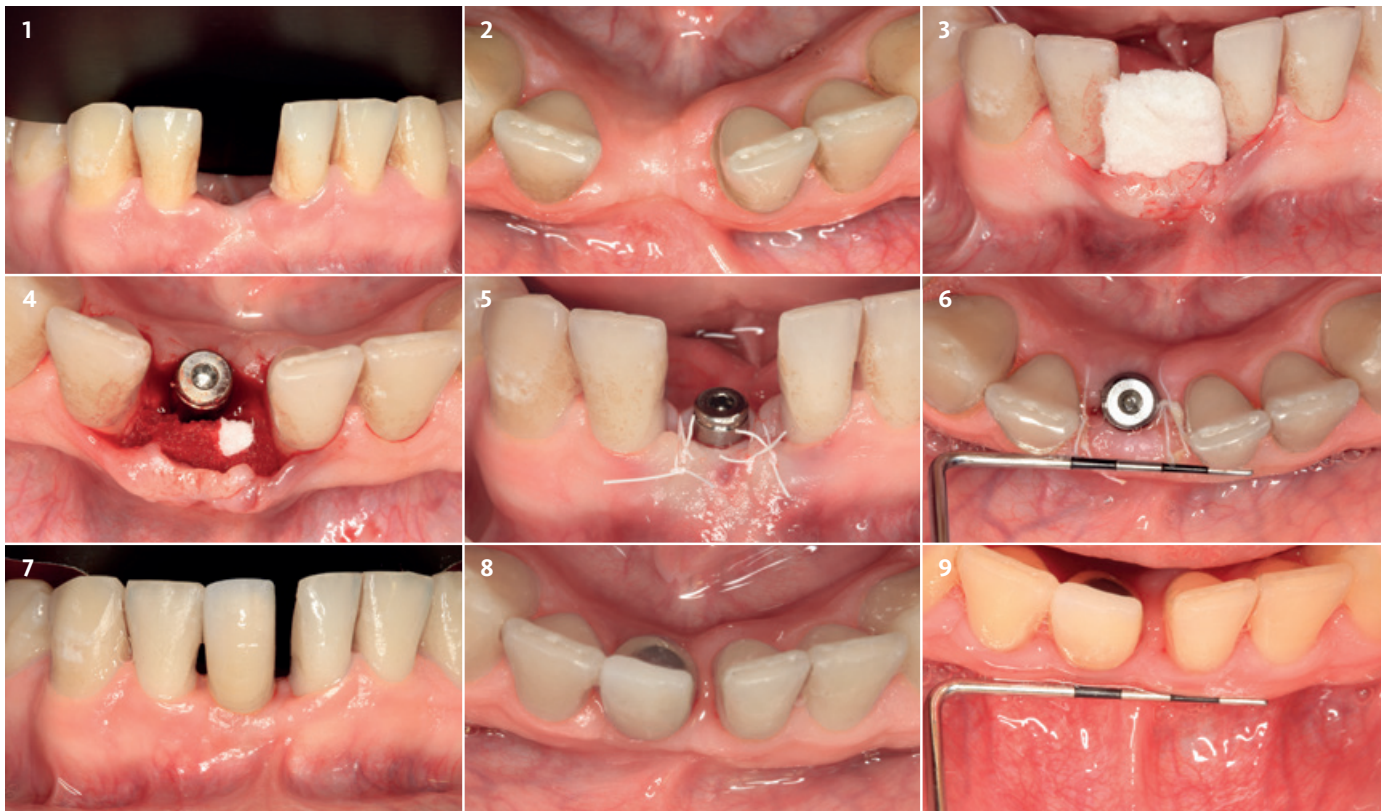


“Geistlich Fibro-Gide® is a good option for patients with soft-tissue deficiencies in the esthetic zone where an easy and pain-free treatment solution is necessary to achieve soft-tissue thickening on the facial aspect of the alveolar ridge.”

Dr. Rafael Naranjo | Málaga, Spain

**Aim:** Increasing the thickness of soft-tissue in single implant sites with Geistlich Fibro-Gide®.

**Conclusion:** Geistlich Fibro-Gide® can be used to safely enhance protocols for implant placement and soft-tissue management.



1 Healed site 2 months after implant placement and GBR to replace missing lower central incisor 41.

2 Occlusal view, healed site: measuring the defect before second stage surgery for soft-tissue augmentation.

3 Insertion of Geistlich Fibro-Gide®: full-thickness envelope flap without vertical releasing incisions. Generously released flap beyond the mucogingival line in the apical direction to ensure a tension-free wound closure.

4 Implant is covered with a trans mucosal healing abutment. Geistlich Fibro-Gide® (trimmed to 9 × 6 × 4 mm) was placed in situ on the buccal aspect.

5 Trans mucosal healing of the implant and tension-free wound closure with two non-resorbable single sutures.

6 2 weeks post-surgery (occlusal view). Measuring the gain in soft-tissue thickness on the lateral aspect.

7 6 weeks post-surgery (frontal view) with temporary, screw-retained crown in situ.

8 6 weeks post-surgery (occlusal view) with temporary, screw-retained crown in situ.

9 13 months follow-up: good healing and maintenance.

# Better Quality of Life for Your Patients

Interview with PD Dr. Daniel Thoma  
(University of Zurich, Switzerland)

## What do you like about Geistlich Fibro-Gide®?

What I like most about Geistlich Fibro-Gide® is its unlimited availability and its standardized quality. In contrast to subepithelial connective tissue grafts, Geistlich Fibro-Gide® does not give a reason to worry about limitations in terms of quantity and quality. Moreover, avoiding a second surgical site reduces patient morbidity as well as my surgical time.

## Do you see any risks in the use of Geistlich Fibro-Gide®?

Every surgical intervention is associated with certain risks. Thus, in the case of Geistlich Fibro-Gide®, incomplete wound healing might occur with exposure of the material to the oral cavity. Based on our own experience, such complications do not result in any local infection, and the material does not have to be removed. As such, I would even expect less risk than with the use of a subepithelial connective tissue graft.

## When patients need a soft-tissue augmentation procedure, what do you tell them?

I usually offer my patients two options when a soft-tissue grafting procedure is indicated. Option one is the use of a subepithelial connective tissue graft. This procedure is well-documented in the literature with long-term outcomes and considered the gold standard.

As an alternative, the use of Geistlich Fibro-Gide® is suggested, which offers benefits in terms of reduced patient morbidity, surgical time and unlimited availability. My patients are informed that the use of Geistlich Fibro-Gide® is less documented, but in pre-clinical and clinical research performed over a ten year period, the outcomes were non-inferior to the gold standard.<sup>3,18</sup>

## How do your patients benefit, and how do you benefit from using Geistlich Fibro-Gide®?

Advantages for me are the unlimited availability and standardized quality, as well as the ease of use and faster surgeries. My patients benefit from shorter treatments, less swelling and less morbidity since no second surgery is needed. Larger areas and more sites can be treated at the same time.



**“Avoiding a second surgical site reduces patient morbidity as well as my surgical time.”**

PD Dr. Daniel Thoma



# Insufficient Soft-Tissue Thickness in Extended Gap in the Posterior Mandible

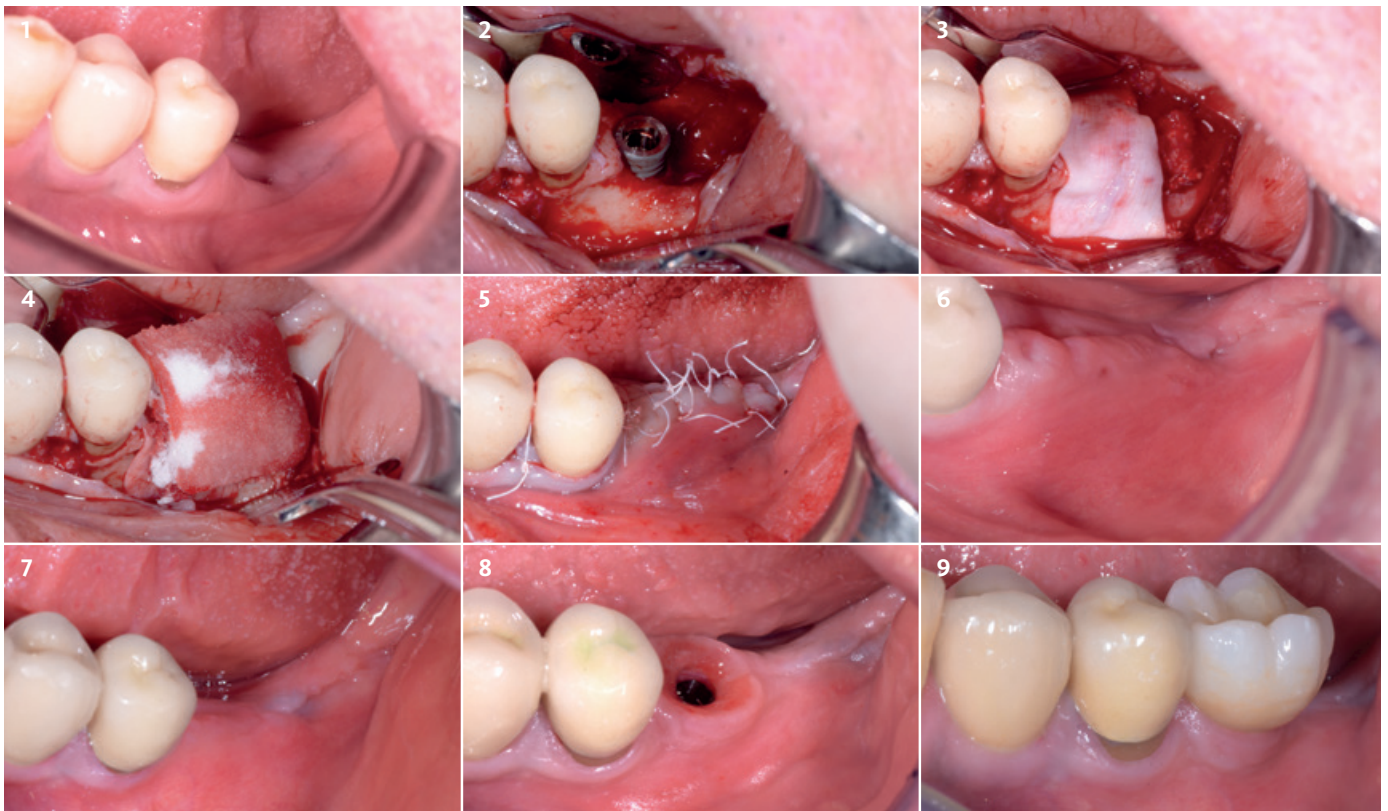


“Geistlich Fibro-Gide® is one of the best innovations for gaining soft-tissue thickness.”

Dr. Daniele Cardaropoli | Torino, Italy

**Aim:** Increasing the thickness of soft-tissue around dental implants with Geistlich Fibro-Gide® in the posterior area of the mandible to support protection and to restore function.

**Conclusion:** Geistlich Fibro-Gide® can be used as an alternative to connective tissue grafts (CTG) to significantly increase the soft-tissue thickness around dental implants.



1 Baseline before implant placement showing the soft-tissue deficiency.

2 Implant surgery after implant placement showing the need for GBR.

3 Guided Bone Regeneration (GBR) with Geistlich Bio-Oss® and Geistlich Bio-Gide®.

4 Geistlich Fibro-Gide® was trimmed to the defect size and placed at full-thickness (6 mm) on top of Geistlich Bio-Gide®.

5 Wound closure (PTFE 5/0 sutures) by combining horizontal mattress sutures and single sutures in a double layer.

6 2 weeks follow-up post-surgery.

7 3 months follow-up post-surgery.

8 Re-entry was performed 3 months post-surgery. Soft-tissue emergence profile at the time of final ceramic-crown delivery 4 months after implant placement.

9 1 year follow-up after final ceramic crown placement.

# Guided Bone Regeneration With Simultaneous Soft-Tissue Augmentation in the Anterior Maxilla

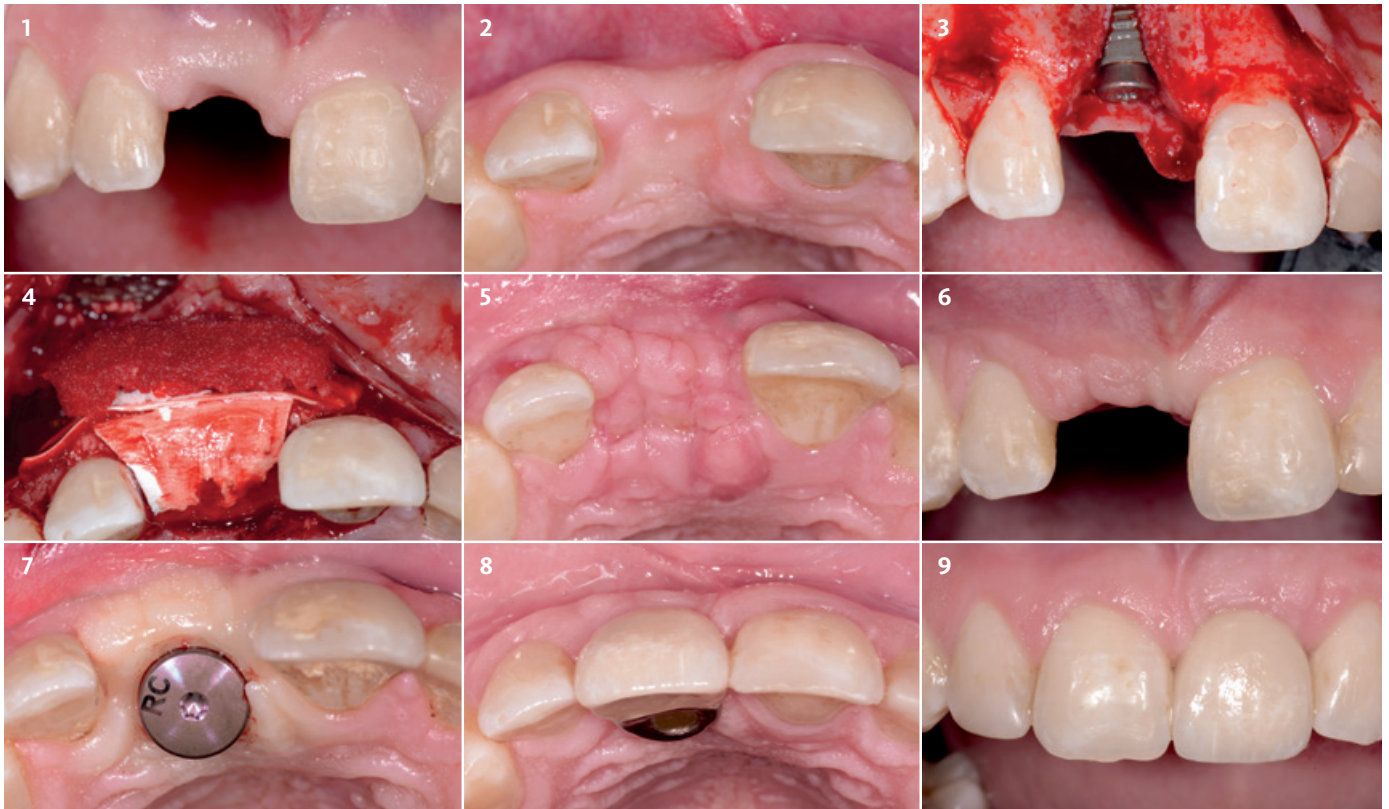


“Geistlich Fibro-Gide® shows an uneventful tissue integration with simultaneous GBR procedures in a preliminary human study after two months of healing.”

PD Dr. med. Vivianne Chappuis | Bern, Switzerland

**Aim:** Guided Bone Regeneration (GBR) procedure with autologous bone chips, Geistlich Bio-Oss® and Geistlich Bio-Gide® simultaneously with soft-tissue augmentation using Geistlich Fibro-Gide®.<sup>21</sup>

**Conclusion:** Guided Bone Regeneration (GBR) can be performed simultaneously with soft-tissue augmentation with Geistlich Fibro-Gide®.<sup>21</sup>



1 Baseline frontal view: missing central incisor.

2 Baseline occlusal view: The facial contour is flattened by physiological dimensional ridge alterations post-extraction.

3 Full-thickness flap using one releasing incision in the distal aspect of the canine. Simultaneous contour augmentation using GBR was performed with autogenous bone chips to cover the exposed implant combined with a layer of Geistlich Bio-Oss® and Geistlich Bio-Gide®.

4 Application of Geistlich Fibro-Gide® on top of the augmented area. A tension-free primary wound closure was obtained by a periosteal releasing incision.

5 Suture removal after 14 days. Please note the uneventful wound healing and an increase in soft-tissue volume.

6 Frontal view 4 weeks post-surgery.

7 2 months follow-up combined with abutment connection.

8 Occlusal view of final restoration 2 years post-surgery.

9 Final restoration 2 years post-surgery shows pleasing esthetics.

# Treatment of Single Gingival Recession With Coronally Advanced Flap Technique

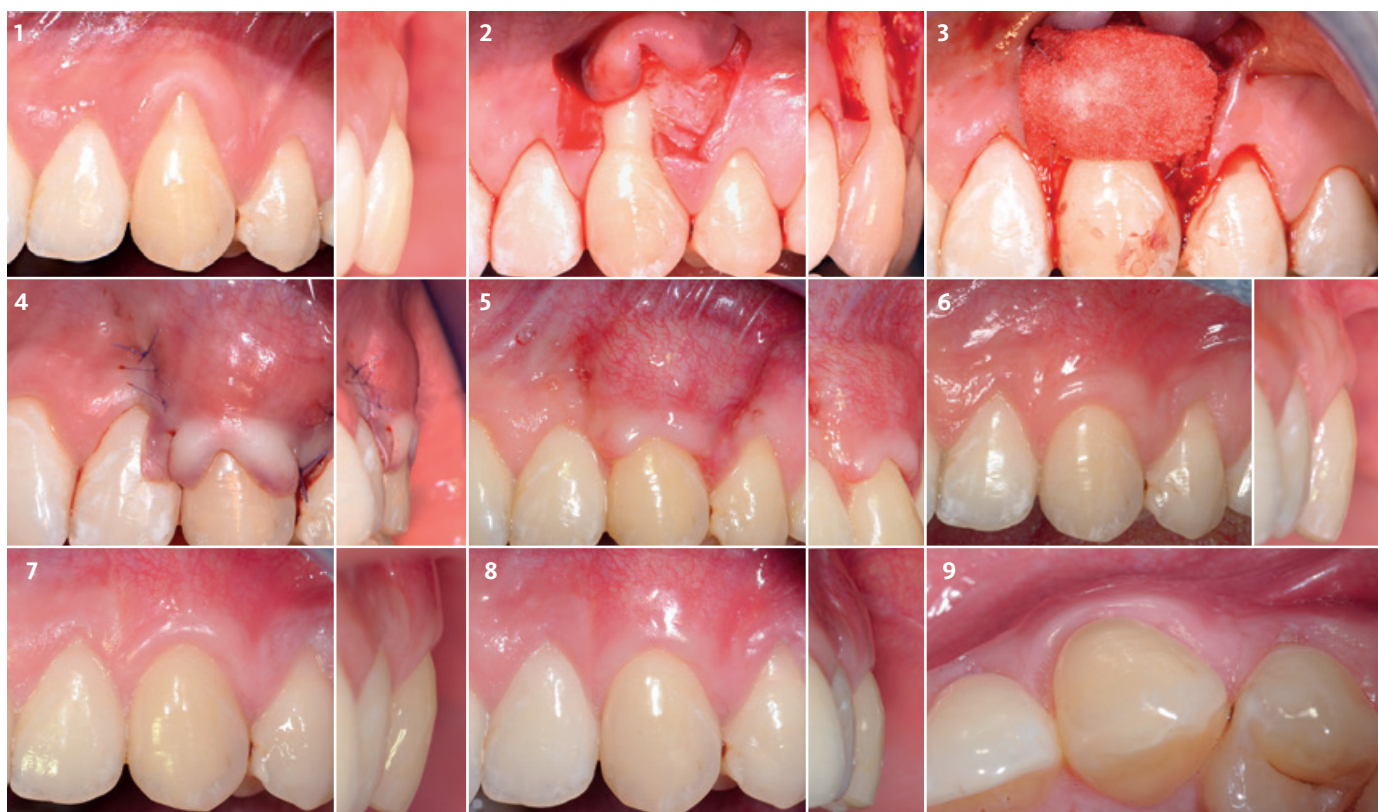


“Geistlich Fibro-Gide® in combination with a CAF is a safe, minimal invasive technique and shows promising results by increasing the soft-tissue thickness and esthetic appearance.”

Prof. Giovanni Zucchelli | Bologna, Italy

**Aim:** Complete root coverage of a single tooth recession defect.

**Conclusion:** The use of Geistlich Fibro-Gide® in combination with coronally advanced flap (CAF) enhanced root coverage and soft-tissue thickness.



1 Baseline: recession defect Miller Class I on site 23.

2 Trapezoidal flap design: split-full-split flap elevation flap.

3 Positioning of Geistlich Fibro-Gide® and fixation with single sutures (PGA 7.0 Sutures) at the base of the de-epithelialized anatomic papillae and in the apical mesial and distal angles.

4 Tension-free wound closure with two sling sutures (PGA 6.0 Sutures).

5 Suture removal 14 days post-surgery.

6 3 months follow-up.

7 3 months follow-up (buccal).

8 Follow-up after 1 year: complete root coverage with Geistlich Fibro-Gide® is achieved.

9 1 year follow-up (occlusal).

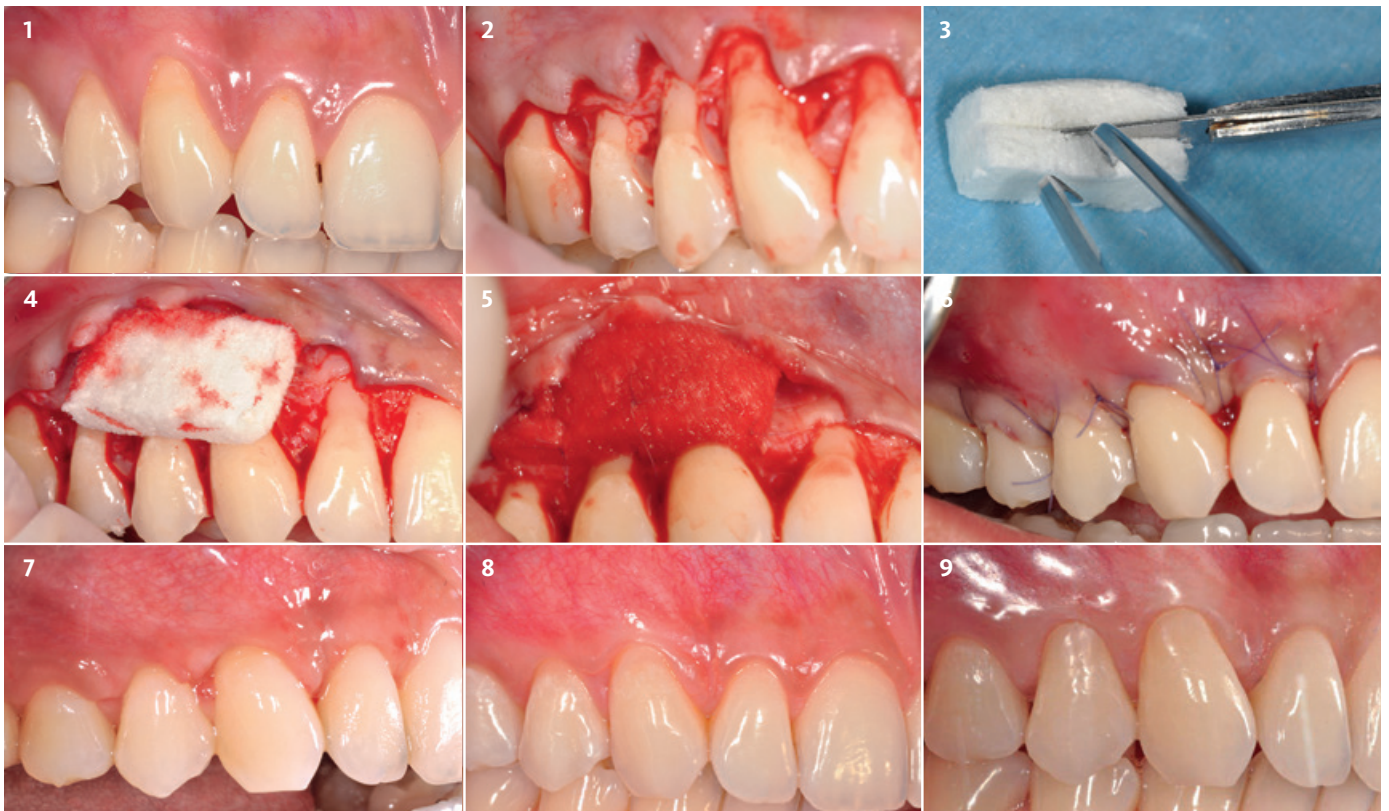
# Treatment of Multiple Gingival Recession With Coronally Advanced Flap Technique



Dr. Raffaele Cavalcanti | Bari, Italy

**Aim:** Complete root coverage of multiple recession defect and dentin hypersensitivity reduction.

**Conclusion:** Complete root coverage was achieved with Geistlich Fibro-Gide® for multiple recession defect and dentin hypersensitivity problem was completely solved.



1 Baseline: multiple recession defects Miller Class I with keratinized tissue less than 3 mm on site 12 to 14.

2 Flap preparation and elevation (coronally advanced flap) for sufficient release.

3 Geistlich Fibro-Gide® is cut in half.

4 3 mm Geistlich Fibro-Gide® is placed in the defect and absorbed blood immediately.

5 Positioning of Geistlich Fibro-Gide® and fixation with single sutures (7-0 PGA sutures).

6 Tension free wound closure with sling sutures (6-0 PGA sutures).

7 Suture removal 14 days post-surgery.

8 3 months follow-up.

9 Follow-up after 12 months: complete root coverage with Geistlich Fibro-Gide® is achieved.

# Vestibular Incision Subperiosteal Tunnel Access (Modified VISTA Technique)



“Using Geistlich Fibro-Gide® in combination with a minimal-invasive technique for root coverage results in an excellent clinical outcome and high patient satisfaction.”

Dr. Ulrike Schulze-Späte | Jena, Germany

**Aim:** Root coverage of multiple recession defects (thin gingival biotype, Miller Class I).

**Conclusion:** A minimal-invasive tunnel approach in combination with the volume-stable Geistlich Fibro-Gide® resulted in complete root coverage.



1 Baseline: recessions at teeth 33, 34, 35 and 36. Exposed root surfaces were thoroughly scaled and planned before surgery.

2 A full-thickness mucogingival tunnel was prepared through a minimal-invasive vestibular access incision apical to the teeth with gingival recessions.

3 Geistlich Fibro-Gide® was cut in dry state into small pieces by using a scalpel.

4 Insertion of Geistlich Fibro-Gide® into the subperiosteal tunnel.

5 Geistlich Fibro-Gide® in situ: the gingival margin had been coronally advanced and stabilized through insertion of Geistlich Fibro-Gide®.

6 1 week post-surgery: anchoring sutures were left in place for 1-2 weeks.

7 2 weeks post-surgery: anchoring sutures in place.

8 2 weeks post-surgery: removal of anchoring sutures.

9 7 months post-surgery: complete recession coverage.



# Ridge Preservation and Simultaneous Soft-Tissue Augmentation in the Posterior Mandible

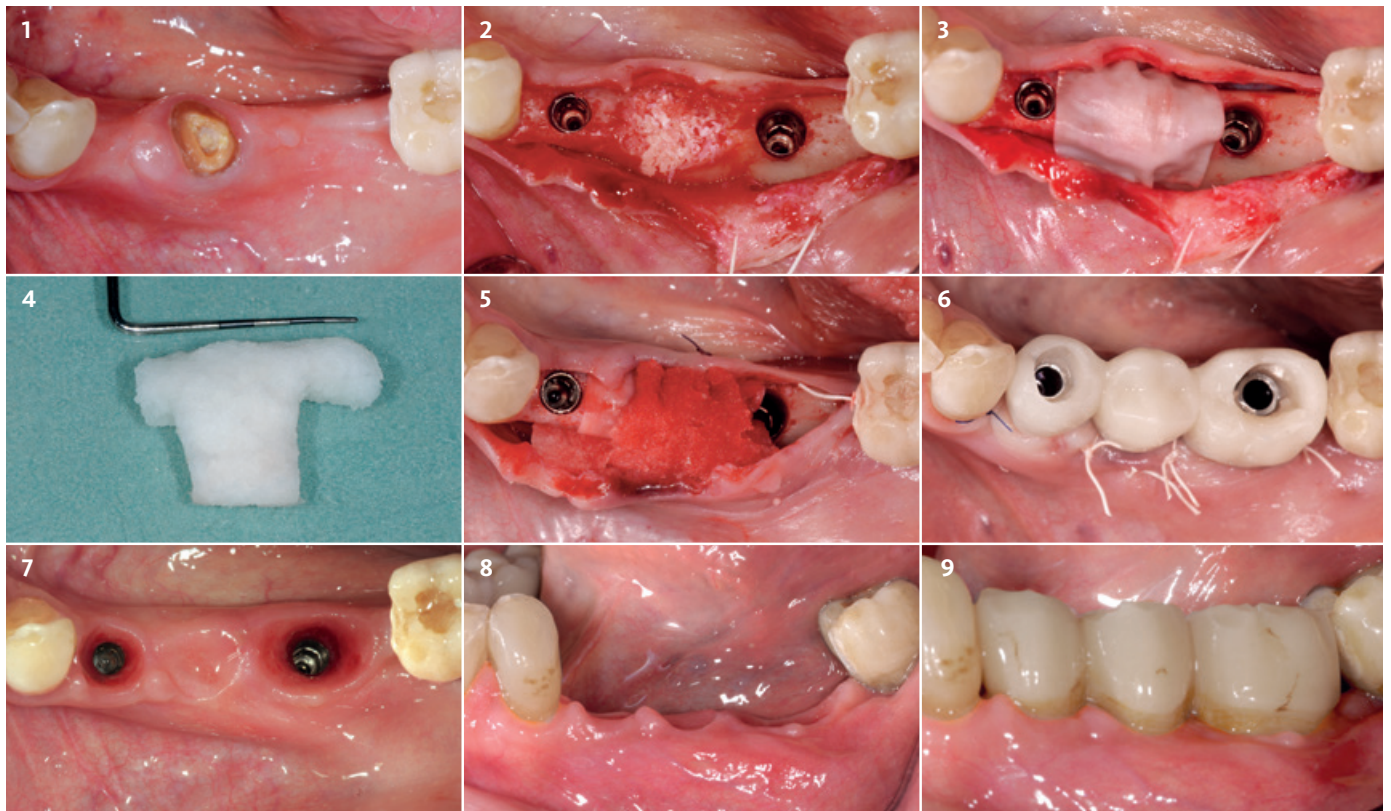


“Geistlich Fibro-Gide® is a ready-to-use product that can easily be used on top of a GBR procedure for soft-tissue thickening.”

PD Dr. Daniel Thoma | Zurich, Switzerland

**Aim:** Augmentation of soft-tissue around dental implants with Geistlich Fibro-Gide® while performing a ridge preservation procedure using Geistlich Bio-Oss® and Geistlich Bio-Gide®.

**Conclusion:** Geistlich Fibro-Gide® shows predictable results in soft-tissue augmentation under pontics compared to connective tissue grafts (CTG).



1 Baseline occlusal view: situation before removal of tooth 35.

2 Tooth removal and extraction socket management.

3 Ridge preservation with Geistlich Bio-Oss® and Geistlich Bio-Gide®.

4 Geistlich Fibro-Gide® was trimmed to the defect size, to augment the buccal and crestal soft-tissue area of the ridge.

5 Geistlich Fibro-Gide® in place augmenting buccal and crestal area of 35 and buccal in the edentulous area 34 to 36.

6 Immediate provisionalization of the implants.

7 3 weeks post-surgery: occlusal view of augmented area with created emergence profile.

8 3 weeks post-surgery: buccal view of augmented area with created emergence profile.

9 Final restoration 1 year follow-up.

# Geistlich Fibro-Gide® Handling at a Glance

**Careful selection of indication** When using Geistlich Fibro-Gide®, it is important to carefully select the indications that have been investigated and stay within the indication for connective tissue grafts.



**Volume Changes** The device will transiently gain approximately 3–12% in each dimension upon wetting.<sup>7</sup> This must be taken into account when defining the final dimension to allow tension-free wound closure.



**Insertion** Geistlich Fibro-Gide® can be applied either in a dry or wet state based on individual preference. Pre-wetting can be done with patient's own blood or sterile saline solution.



**Tension-free Wound Closure** This is key for a successful and complication-free regeneration. It is recommended to bevel the matrix to allow tension-free wound closure.



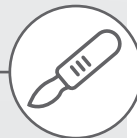
**Learning Curve** As with any new product, you will experience a learning curve until getting used to the handling properties and performance of the device.



**Flap Design** Use your preferred flap design with sufficient release. A split-thickness flap is recommended whenever possible. In challenging situations (e.g. thin biotypes), consider using a full-thickness flap.



**Trimming & Cutting** Geistlich Fibro-Gide® can be adjusted in size and thickness, both in wet and dry state. A scalpel is recommended to use when in dry state and scissors when in wet state.



**Fixation** Geistlich Fibro-Gide® becomes adhesive when soaked with patient blood and keeps a stable position once inserted. Suturing the device to the underlying soft-tissue is usually not necessary.



**Healing** Excessive application of Geistlich Fibro-Gide® can lead to dehiscences. Clinical experience shows low incidence of wound healing complications. In case of dehiscences, Geistlich Fibro-Gide® is forgiving and will heal without additional treatment.



Contents are based on preclinical and clinical evidence gained during the Geistlich Fibro-Gide® pre-launch phase.

## About Geistlich Pharma AG

Geistlich Pharma AG produces innovative bio-derived products for bone and soft-tissue regeneration for use in dentistry and cranio and maxillofacial surgeries. From research and development to marketing, our operations are fully integrated under one roof, which enables us to oversee and optimize all levels of our business.

Backed by more than 160 years of experience in bone and collagen processing, we have developed techniques to either gently preserve collagen structures in raw materials or to remove them entirely without damaging other components. In the 1990's, Geistlich Pharma AG was among the first pharmaceutical companies to apply collagen for medical use. As experts in bone and soft-tissue regeneration, we see tremendous potential for collagen in the future of regenerative dentistry.

That is why we have dedicated a team of biochemists, material scientists, process engineers, and other experts at our headquarters in Switzerland to focus exclusively on collagen, and to explore its possible therapeutic applications. Our pioneering regenerative dentistry products include the Geistlich Bio-Oss<sup>®</sup>, Geistlich Bio-Gide<sup>®</sup>, Geistlich Mucograft<sup>®</sup> and Geistlich Fibro-Gide<sup>®</sup> product families.

Through close ties with the dental and scientific community, we continue to share our knowledge and optimize our bone- and collagen-derived products. Finding ways to improve patient's quality of life remains our overarching goal.

Geistlich  
THE  
COLLAGEN  
EXPERT

- 1 Mathes SH. et al. *Biotechnol Bioeng.* 2010 Dec 5; 107(6): 1029–39 (in vitro).
- 2 Thoma DS. et al. *Clin Oral Implants Res.* 2012 Dec; 23(12): 1333–9 (pre-clinical).
- 3 Thoma DS. et al. *J Clin Periodontol.* 2016 Oct; 43(10): 874–85 (clinical).
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- 5 Thoma DS. et al. *J Clin Periodontol.* 2014 Apr; 41 Suppl 15: S77–91 (pre-clinical).
- 6 Thoma DS. et al. *Clin Oral Implants Res.* 2015 Mar; 26(3): 263–70 (pre-clinical).
- 7 Instructions for Use. Geistlich Fibro-Gide<sup>®</sup>. Geistlich Pharma AG, Wolhusen, Switzerland.
- 8 Benninger B. et al. *J Oral Maxillofac Surg.* 2012 Jan; 70(1): 149–53 (pre-clinical).
- 9 Fu JH. et al. *J Periodontol.* 2011 Jul; 82(7): 1000–6 (clinical).
- 10 Data on file. Geistlich Pharma AG, Wolhusen, Switzerland (pre-clinical).
- 11 Sanz M. et al. *J Clin Periodontol.* 2009 Oct; 36(10): 868–76 (clinical).
- 12 Del Pizzo M. et al. *J Clin Periodontol.* 2002 Sep; 29(9): 848–54 (clinical).
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