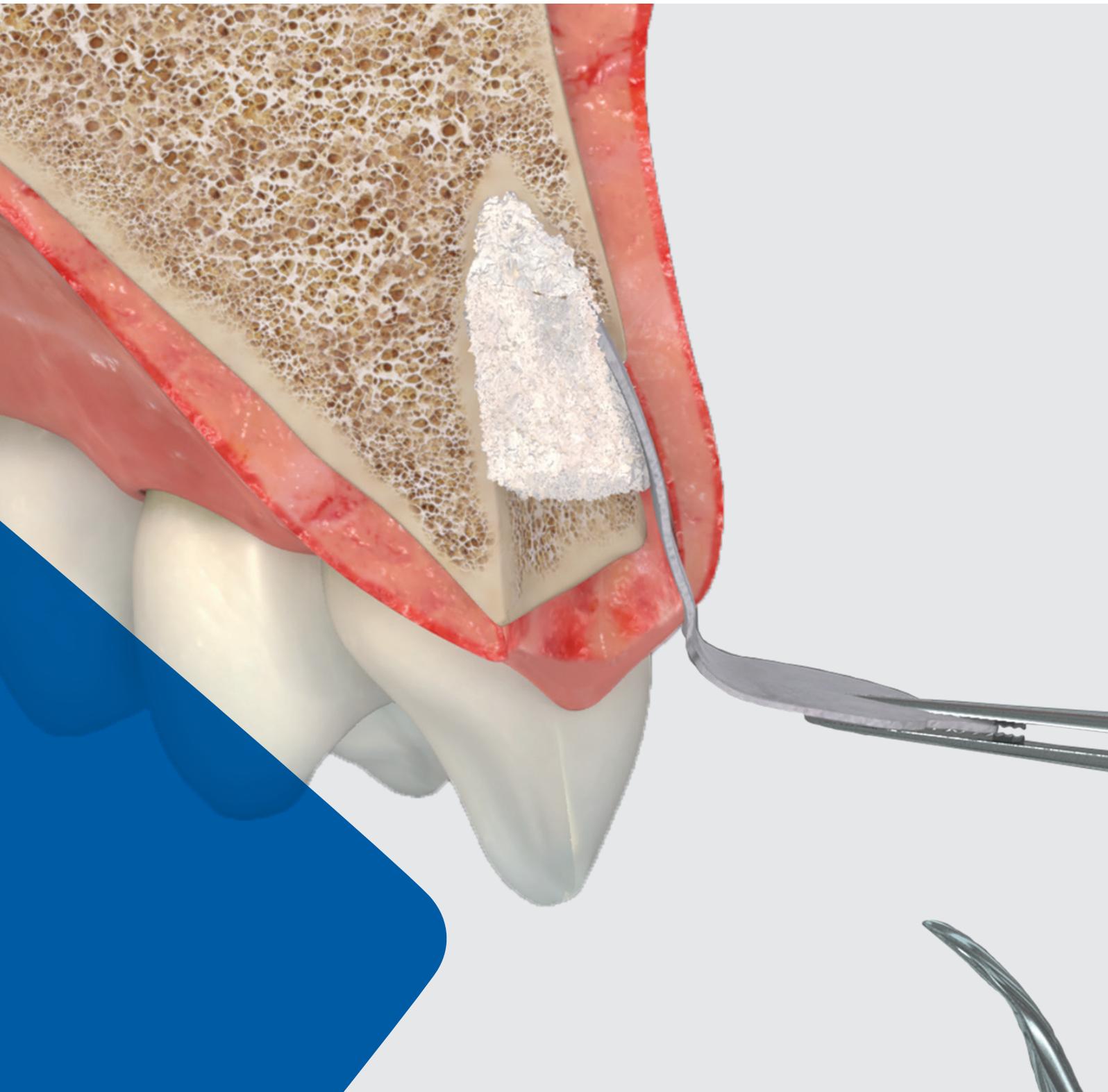


LEADING REGENERATION

**Geistlich**  
Biomaterials

# Extraction Sockets

Treatment Concepts

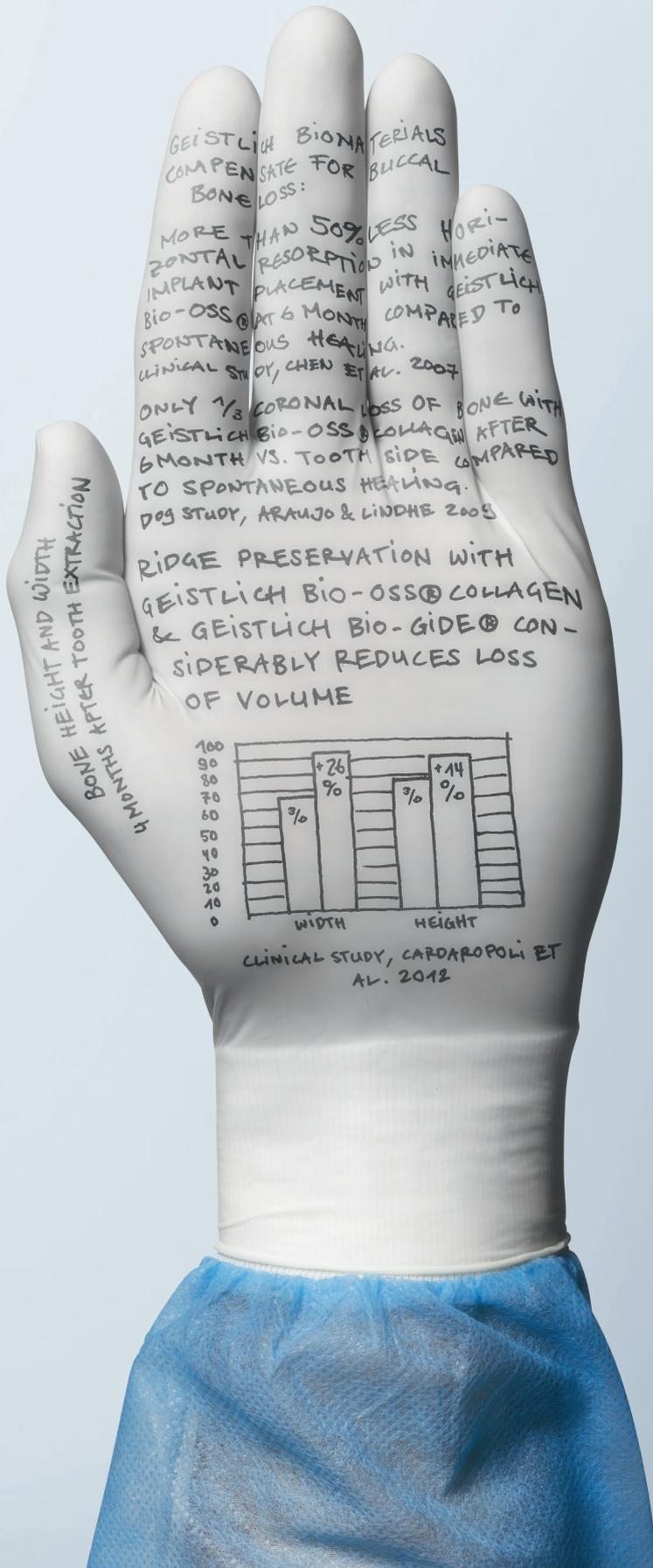


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# All our science

# in our hands



# After tooth extraction:

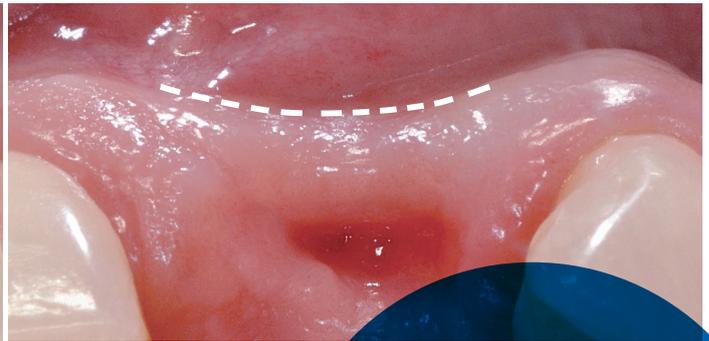
Spontaneous healing implies

alveolar ridge volume loss<sup>1-5</sup>

Spontaneous healing<sup>17</sup>



Volume loss after 2 months<sup>17</sup>



## What happens with spontaneous healing?

The healing of extraction sockets and the resorption processes that take place after tooth extraction have been investigated thoroughly in recent years.

Clinical studies have shown that:

- › The alveolar volume loss after tooth extraction is severe<sup>1-5</sup>
- › Two-thirds of resorption take place within the first three months<sup>1</sup>

## Volume loss: clinical implications

Potentially important clinical implications of spontaneous healing compared to Ridge Preservation:

- › Poorer maintenance of healthy periimplant soft tissues<sup>6</sup>
- › Poorer esthetic outcomes<sup>6</sup>
- › 10 times greater need for hard tissue augmentation at implant placement without previous Ridge Preservation<sup>7</sup>

## Ridge volume loss after extraction in numbers:

### Horizontal loss

- 49%<sup>1</sup> (after 12 months)
- 3.8 mm<sup>4</sup> (after 6 months)

### Vertical loss

- from – 1.2 mm<sup>4</sup> (after 6 months)
- to – 1.5 mm<sup>7</sup> (after ca. 6 months)

Implant placed without Ridge Preservation<sup>8</sup>



1 Schropp L, et al. Int J Periodontics Restorative Dent. 2003 Aug;23(4):313-23. (Clinical study)  
2 Van der Weijden F, et al. J Clin Periodontol. 2009 Dec;36(12):1048-58. (Systematic review)  
3 Sanz M, et al. Clin Oral Implants Res. 2010 Jan;21(1):13-21. (Clinical study)  
4 Hämmerle CH, et al. Clin Oral Implants Res. 2012 Feb;23 Suppl 5:80-2. (Systematic review)  
5 Jung RE, et al. J Clin Periodontol. 2013 Jan;40(1):90-8. (Clinical study)

6 Vignoletti F, et al. Clin Oral Implants Res. 2012 Feb;23 Suppl 5:22-38. (Systematic review)  
7 Weng D, et al. Eur J Oral Implantol. 2011;4 Suppl:59-66. (Systematic review)  
8 Avila-Ortiz G, et al. J Dent Res. 2014 Oct;93(10):950-8. (Systematic review)  
9 Wang RE & Lang NP Clin Oral Implants Res. 2012 Oct;23 Suppl 6:147-56. (Systematic review)  
10 Cardaropoli D, et al. Int J Periodontics Restorative Dent. 2012 Aug;32(4):421-30. (Clinical study)

## Ridge Preservation with Geistlich Biomaterials

largely maintains the alveolar ridge volume<sup>5,10,11</sup>

Ridge Preservation<sup>19</sup>



Volume preservation after 3 months<sup>19</sup>



### Ridge Preservation pays off.

While immediate implant placement does not prevent bone resorption<sup>9</sup>, the treating extraction sockets with Geistlich Biomaterials can largely compensate for bone loss and preserve the contour of the alveolar ridge.<sup>5,10,11</sup>

### Volume preservation: clinical evidence

Systematic reviews (high level of clinical evidence) agree that Ridge Preservation is effective in limiting alveolar volume loss.<sup>6-8,12-14</sup>

### Ridge Preservation with Geistlich Biomaterials can:

- › Prevent volume loss and lead to an optimised hard and soft tissue situation irrespective of the chosen time for implantation<sup>15</sup>
- › Improve the esthetic outcome by preserving the alveolar ridge volume and contour, when the objective of treatment is to place a bridge<sup>16</sup>

**“We found that alveolar ridge preservation is effective in limiting physiologic ridge reduction as compared with tooth extraction alone.”<sup>8</sup>**

11 Cardaropoli D, et al. Int J Periodontics Restorative Dent. 2014 Mar-Apr;34(2):211-7. (Clinical study)

12 Morjaria KR, et al. Clin Implant Dent Relat Res. 2014 Feb;16(1):1-20. (Systematic review)

13 Horváth A, et al. Clin Oral Investig. 2013 Mar;17(2):341-63. (Systematic review)

14 Vittorini Orgeas G, et al. Int J Oral Maxillofac Implants. 2013 Jul-Aug;28(4):1049-61. (Systematic review)

15 Ackermann KL. Int J Periodontics Restorative Dent. 2009 Oct;29(5):489-97. (Clinical study)

16 Schlee M & Esposito M. Eur J Oral Implantol. 2009 Autumn;2(3):209-17. (Clinical study)

17 Pictures by courtesy of Dr. Fernán López

18 Picture by courtesy of Prof. Anton Sculean

19 Pictures by courtesy of Dr. Juanjo Iturralde Jr.

# Ridge Preservation with Geistlich Biomaterials

The use of a biofunctional material such as Geistlich Bio-Oss® is crucial to the long-term successful outcome of extraction socket treatment. After tooth extraction, the slowly resorbing bone matrix Geistlich Bio-Oss® / Geistlich Bio-Oss® Collagen preserves the ridge volume over time and thus makes a major contribution towards the success of Ridge Preservation<sup>1-3</sup> or ridge contouring at a later time point (e.g. for early implant placement after spontaneous healing)<sup>4,5</sup>

## Clinical benefits of Ridge Preservation with Geistlich Bio-Oss®

Clinical studies indicate that Ridge Preservation using Geistlich Bio-Oss® allows for:

- › Stable crest heights in sites with thin buccal bone walls<sup>6</sup>
- › Reduced horizontal bone loss in immediate implantation<sup>7</sup>
- › Preserved ridge volume under pontics<sup>8</sup>



## Not all Bone Substitutes are the same – Take a closer look!

### In controlled clinical trials:

- › Geistlich Bio-Oss® Collagen showed better ridge preservation than fast resorbing  $\beta$ -TCP<sup>1</sup>
- › Geistlich Bio-Oss® showed better ridge preservation than synthetic hydroxyapatite or gelatine sponge<sup>9</sup>
- › Geistlich Bio-Oss® showed more mineralized tissue in sockets than allografts<sup>10</sup>

1 Jung RE, et al. J Clin Periodontol. 2013 Jan;40(1):90-8. (Clinical study)  
 2 Cardaropoli D, et al. Int J Periodontics Restorative Dent. 2012 Aug;32(4):421-30. (Clinical study)  
 3 Cardaropoli D, et al. Int J Periodontics Restorative Dent. 2014 Mar-Apr;34(2):211-7. (Clinical study)  
 4 Buser D, et al. J Dent Res. 2013 Dec;92(12 Suppl):176S-82S. (Clinical study)  
 5 Jensen SS, et al. J Periodontol. 2014 Nov;85(11):1549-56. (Clinical study)  
 6 Nevins M, et al. Int J Periodontics Restorative Dent. 2006 Feb;26(1):19-29. (Clinical study)  
 7 Chen ST, et al. Clin Oral Implants Res. 2007 Oct;18(5):552-62. (Clinical study)

## Open-healing with Geistlich Bio-Gide®

Geistlich Bio-Gide® is a highly biofunctional collagen membrane<sup>4,12,17,19</sup> with a bilayer structure: the smooth side prevents soft-tissue ingrowth and serves as a scaffold for the attachment of fibroblasts.<sup>12,14,16–18</sup> The porous side serves as a framework for bone cells and blood vessels.<sup>12,14</sup>

- › Uneventful wound healing<sup>15,16</sup>
- › High therapy safety with proven open-healing approach<sup>20,21</sup>
- › More new bone formation with Geistlich Bio-Oss® + Geistlich Bio-Gide® vs Geistlich Bio-Oss® alone.<sup>11</sup>

## Seal the socket

The collagen matrix of Geistlich Mucograft® Seal specially designed for soft-tissue regeneration is recommended to be used in combination with Geistlich Bio-Oss® Collagen after tooth extraction, when the alveolar buccal walls are preserved.<sup>13</sup>

Clinical data demonstrates that Geistlich Mucograft® Seal:

- › May enhance early wound healing<sup>22</sup>
- › In combination with Bio-Oss® Collagen significantly reduces the bone loss when compared to spontaneous healing<sup>1</sup>

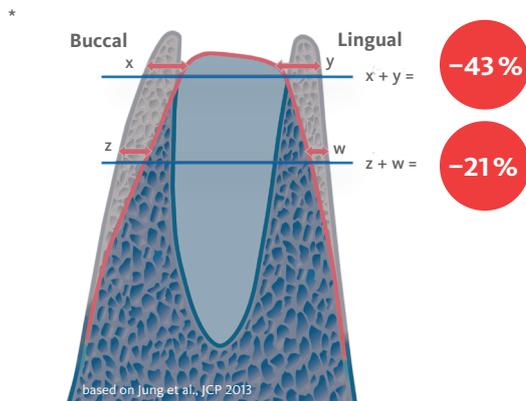
- › Offers flexibility in the therapy concepts: from early implantation 8–10 weeks after extraction through to late implantation or bridge restoration.<sup>13</sup>

## Conclusion

- › + 93 % ridge width maintained with Geistlich Bio-Oss® Collagen and Geistlich Bio-Gide®<sup>2,3</sup>
- › + 83 % ridge width maintained with Geistlich Bio-Oss® Collagen and Geistlich Mucograft® Seal<sup>1</sup>

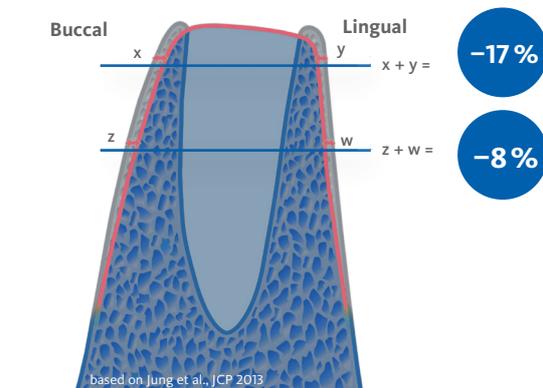
In the following pages you will find a collection of documented clinical cases showing a great variety of treatment concepts with different Biomaterials.

### Ridge resorption with spontaneous healing after 6 months<sup>1</sup>



lost bone volume residual bone

### Ridge Preservation with Geistlich Bio-Oss® Collagen and Geistlich Mucograft® Seal after 6 months<sup>1</sup>



lost bone volume residual bone

8 Schlee M & Esposito M. Eur J Oral Implantol. 2009 Autumn;2(3):209-17. (Clinical study)  
9 Shakibaie-M B. Int J Periodontics Restorative Dent. 2013 Mar-Apr;33(2):223-8. (Clinical study)  
10 Lee DW, et al. Int J Oral Maxillofac Implants. 2009 Jul-Aug;24(4):609-15. (Clinical study)  
11 Perelman-Karmon M, et al. Int J Periodontics Restorative Dent. 2012 Aug;32(4):459-65. (Clinical study)  
12 Rothamel D, et al. Clin. Oral Implants Res. 2005;16:369–378. (Pre-clinical study)  
13 Geistlich Mucograft® Seal Advisory Board Meeting Report 2013. Data on file, Geistlich Pharma AG, Wolhusen, Switzerland.  
14 Schwarz F et al. Clin. Oral Implants Res. 2006;17(4):403-409. (Pre-clinical study)  
15 Becker J et al. Clin Oral Implants Res. 2009; 20(7):742-749. (Clinical study)  
16 Tal H et al. Clin Oral Implants Res. 2008; 19(3) : 295-302. (Clinical study)  
17 Zitzmann NU et al. Int J Oral Maxillofac Implants.12, 1997;844-852. (Clinical study)

18 Rothamel D et al. Clin. Oral Implants Res. 2004;15:443-449. (Pre-clinical study)  
19 Jung RE et al. Clin. Oral Implants Res. 2013 Oct;24(10):1065-73. (Clinical study)  
20 Romano F et al. Int J Periodontics Restorative Dent. 2019 Mar/Apr;39(2):245-251. (Clinical study)  
21 Rocuzzo M et al. Int J Periodontics Restorative Dent. 2014 Nov-Dec;34(6):795-804. (Clinical study)  
22 Thoma DS, et al. J Clin Periodontol. 2012 Feb;39(2):157-65. (Clinical Study)

\* The definition of an intact extraction socket varies among experts and includes buccal bone defects of 0 to 50 %.

# Immediate implant placement with minor bony defect



Prof. Julio Cesar Joly, Prof. Robert Carvalho da Silva & Prof. Paulo Fernando M. de Carvalho | São Paulo, Brazil

**“Geistlich Bio-Oss® Collagen is effective to offset the natural alveolar contraction that naturally occurs following tooth extraction, that could hamper aesthetics and lead to soft tissue instability.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input type="checkbox"/> Medium “medium scalloped”	<input checked="" type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input checked="" type="checkbox"/> ≤ 5 mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input checked="" type="checkbox"/> Vertical defect

## Objectives

- › Replace a hopeless central incisor with a horizontal fracture of the tooth root and buccal bone fenestration.

## Conclusions

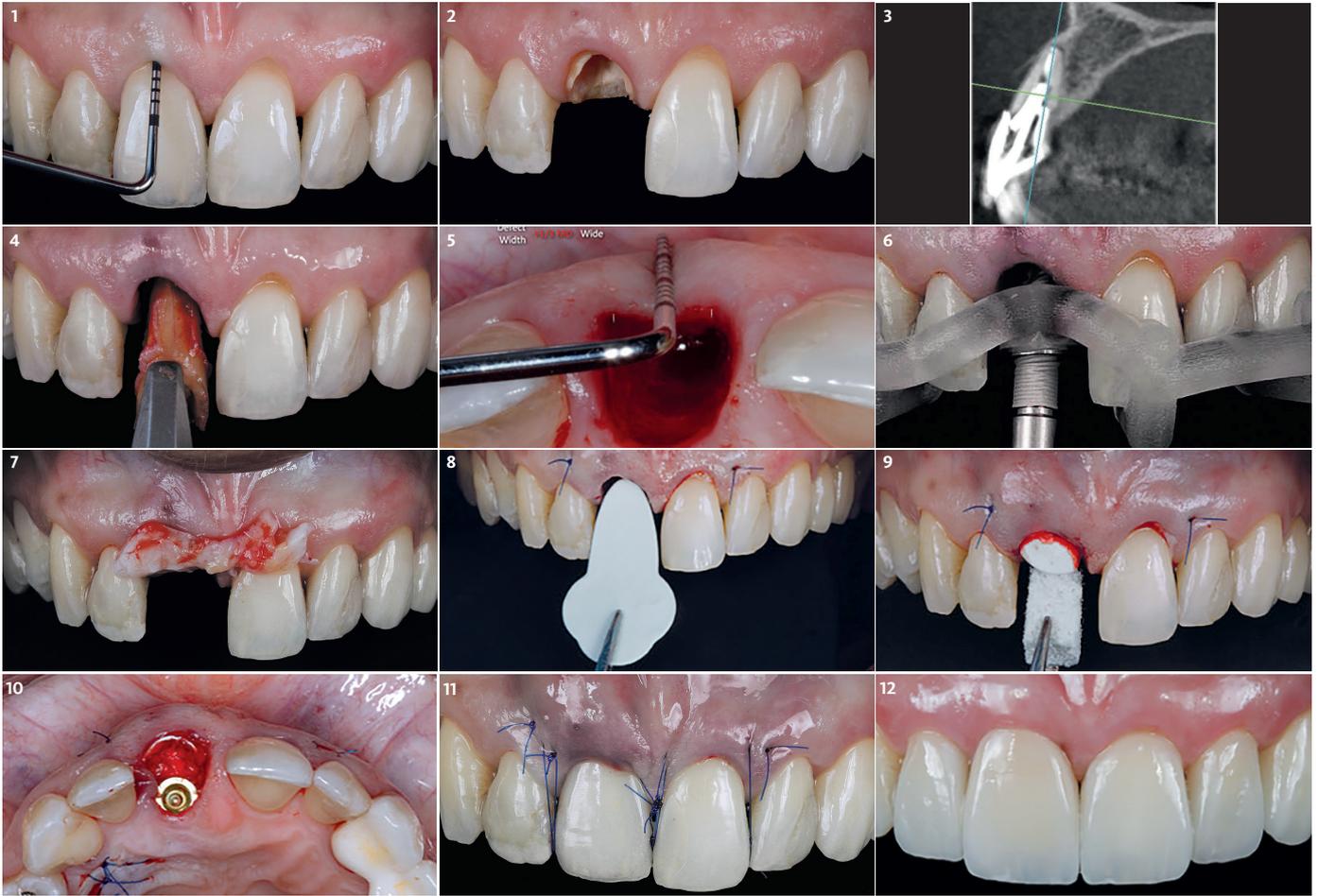
- › Ridge Preservation techniques are effective in minimizing volume loss and achieving a nice emergence profile 6 months after simultaneous grafting and immediate implant placement.

Before extraction.



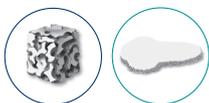
6 Months after extraction.





- 1 Initial examination shows a probing depth of 9,0 mm suggesting a root fracture. A CBCT identifies an extensive loss of buccal bone wall.
- 2 Analyzation of 4 parameters before deciding for a therapy: residual bone, gingival margins, buccal bone wall and gingival biotype.
- 3 Examination of the residual bone by taking a CBCT scan: residual bone is excellent to anchor an immediate implant in a ideal 3D position.
- 4 Careful and gentle minimally invasive extraction of the tooth to no further compromise the socket damage.
- 5 Identification and definition of the U-shaped defect in depth and width by gentle pressing the periodontal probe over the area of the defect.
- 6 Immediate implant placement with a surgical GIDE.
- 7 Connective tissue graft was harvested, positioned and sutured to cover the recession defects in position 11 and 21.
- 8 Geistlich Bio-Gide® Shape is placed below the connective tissue graft and the periosteum.
- 9 Geistlich Bio-Oss® Collagen is placed to fill the gap between the implant and buccal bone wall. The membrane should exceed at least 3mm apical and lateral of the defect.
- 10 Occlusal view of the ETR (esthetic tissue reconstruction) supporting the tissues while maintaining the necessary bone volume.
- 11 The provisional crown was placed immediately after grafting and implant placement. Complementary sutures of coronal traction of the flap were performed in each interproximal area supported at the contact point.
- 12 Replacement of the temporary crown 6 months after surgery. Final prosthesis by Dr. Victor Clavijo

**Material selection**



Geistlich Bio-Oss® Collagen  
 Geistlich Bio-Gide® Shape (14 × 24 mm)

# Immediate implant placement with fill the gap



Dr. Franck Bonnet | Le Cannet, France



Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input type="checkbox"/> Intact immune system (non-smoker)	<input checked="" type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick "low scalloped"	<input checked="" type="checkbox"/> Medium "medium scalloped"	<input type="checkbox"/> Thin "high scalloped"
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> $\leq 5$ mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> $\geq 7$ mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input type="checkbox"/> 1 tooth ( $\geq 7$ mm)	<input checked="" type="checkbox"/> 1 tooth ( $< 7$ mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input checked="" type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Immediate implant placement in order to reduce the treatment period for the patient
- › Preservation of the vestibular bone volume
- › Preservation of the gingival architecture

## Conclusions

- › The technique minimises the treatment time
- › The treatment maintains the archetype of the soft and hard tissues

Before extraction.



1 year after extraction.





- |   |  |   |
|---|--|---|
| <p><b>1</b> The patient presents with a fractured central incisor. The biotype is rather thin with scalloped marginal gingiva.</p>                  | <p><b>2</b> a) X-ray of the fractured tooth. b) Analysis of the bony situation through CBCT allows planning of Type 1 implant placement.</p> | <p><b>3</b> The gap from implant to the buccal bone is filled with Geistlich Bio-Oss®. A connective tissue graft is placed between the mucosa and the buccal bone.</p>  |
| <p><b>4</b> The implant (NobelActive™) is positioned optimally, with a more palatal vestibular orientation. The provisional abutment is placed.</p> | <p><b>5</b> An ideal emergence profile is effected. The provisional crown allows maintenance of the papillae.</p>                            | <p><b>6</b> The provisional prosthesis is placed and left out of occlusion.</p>   |
| <p><b>7</b> Clinical situation 8 days post-operative. The healing occurs uneventfully.</p>  | <p><b>8</b> Situation 4 months after extraction, prior to finalising the prosthetic restoration.</p>   | <p><b>9</b> The natural profile of the soft tissues has been preserved.</p>   |
| <p><b>10</b> An individual impression post is created for precise transfer of the emergence profile to the lab.</p>                                 | <p><b>11</b> The final crown is made directly over a zirconia abutment (Procera®).</p>   | <p><b>12</b> Vestibular view of the final restoration 12 months after tooth extraction. Note the perfect alignment of the neck of the teeth and ideal position of the papillae in relation to the contact points.</p> |

**Material selection**



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

# Early implant placement with GBR after 8 weeks of spontaneous healing



Prof. Daniel Buser & Prof. Urs Belser | Berne, Switzerland



[Find the detailed surgical approach here.](#)

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick "low scalloped"	<input checked="" type="checkbox"/> Medium "medium scalloped"	<input type="checkbox"/> Thin "high scalloped"
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input checked="" type="checkbox"/> $\leq 5$ mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> $\geq 7$ mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth ( $\geq 7$ mm)	<input type="checkbox"/> 1 tooth ( $< 7$ mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input checked="" type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Pleasing esthetic outcome
- › Long-term stable bone and soft-tissue situation in the esthetic region

## Conclusions

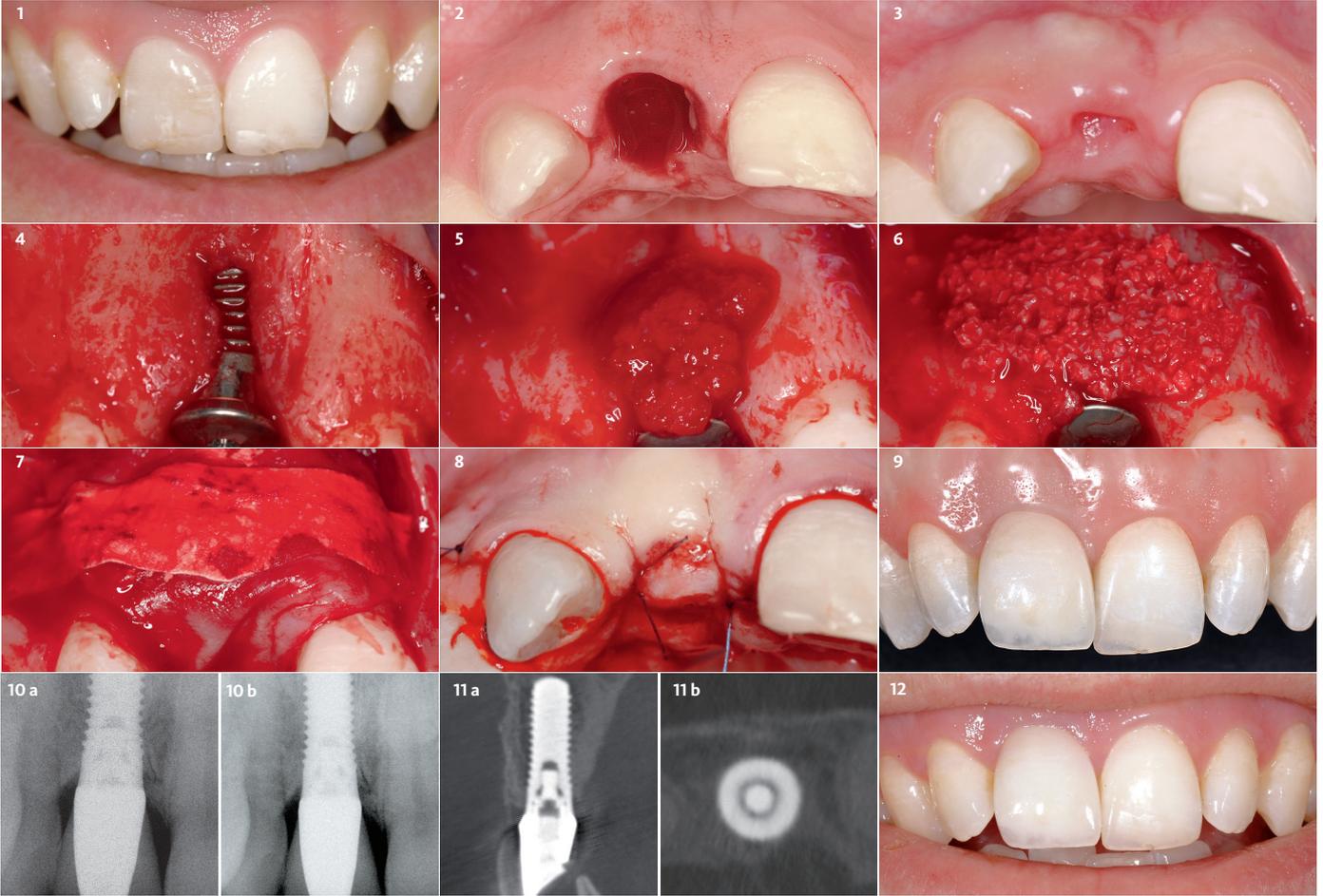
- › The low substitution rate of Geistlich Bio-Oss® helps to maintain the volume of the alveolar ridge over time, which is crucial for the long-term esthetic outcome.
- › Minimal marginal bone loss and low risk of mucosal recession.

Before extraction.



7.5 years after implant therapy.





- 1** Clinical findings in the initial examination. The patient exhibits a high smile line and reports an accident several years ago, which affected tooth 11.
- 2** The extraction socket and the soft tissue are allowed to heal for 4–8 weeks after debridement of the inflammatory tissue.
- 3** Within 4–8 weeks of soft tissue healing, no reduction is visible in the crest width in the approximal region of the socket.
- 4** Special attention is paid to correct prosthetic positioning of the implant in all three dimensions with good primary stability.
- 5** The defect is covered with locally harvested autologous bone chips to promote new bone formation as quickly as possible.
- 6** The bone volume is further optimised by local augmentation using Geistlich Bio-Oss® granules.
- 7** Geistlich Bio-Gide® is applied in two layers to act as a temporary barrier and as a stabiliser for the graft.
- 8** Following the release of the flap by means of mucoperiosteal incisions, a tension-free primary wound closure is achieved. Provisional implant prosthesis starts after 8 weeks.
- 9** The 7.5-year follow-up shows a stable esthetic outcome.
- 10** X-rays a) at 1 year: implant optimally integrated in the bone; b) at 4 years: absolutely stable peri-implant bony conditions.
- 11** CBCT findings at 7.5 years a) section showing a completely intact facial wall; b) 3-dimensionally correctly placed implant.
- 12** The long-term esthetic result is excellent.

**Material selection**



Geistlich Bio-Oss® small granules (0.25–1 mm)  
Geistlich Bio-Gide® (25 × 25 mm)

# Spontaneous healing for cantilever implant bridge



Dr. Luca Cordaro | Rome, Italy

**“Early implantation with simultaneous contour augmentation is predictable in challenging cases in the esthetic zone.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input checked="" type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input checked="" type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input checked="" type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Prosthetic restoration of 2 side-by-side sockets in the anterior area
- › Ridge Preservation for cantilever implant bridge

## Conclusions

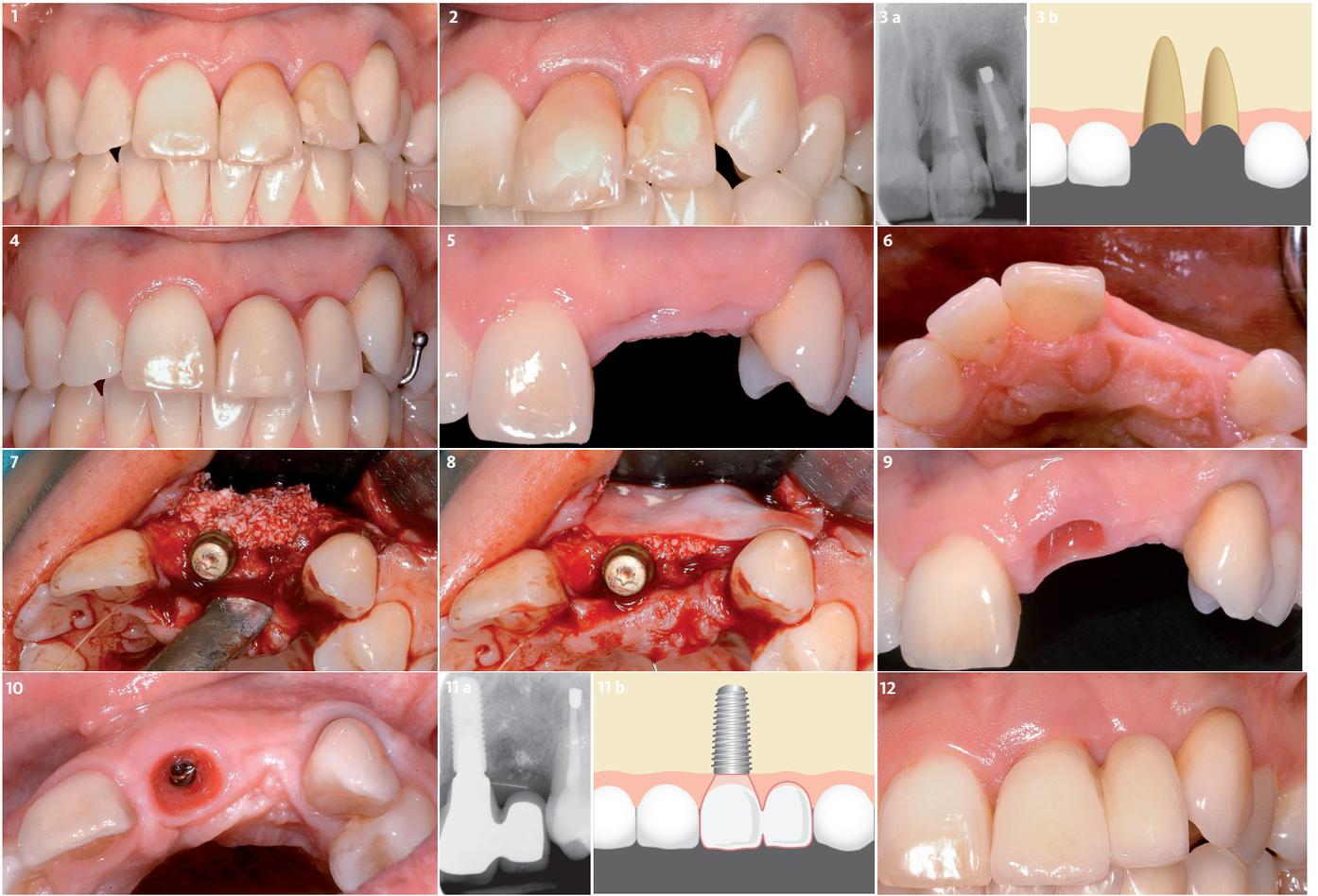
- › Early implant placement is suitable for 2 side-by-side sockets
- › The collapse of the tissues during the 6-week healing period can be compensated with a GBR contouring with Geistlich Bio-Oss® and Geistlich Bio-Gide®.

Before extraction.



5.5 months after extraction.





- 1** Initial situation before extraction of 21 and 22.
- 2** Clinical close-up of the pre-operative site prior to extraction of the teeth.
- 3** a) Radiographic findings of the pre-operative site. Note the apical bone resorption at 22 and internal root resorption of tooth 21. b) Scheme of the 2 side-by-side sockets.
- 4** Teeth 21 and 22 are extracted and left heal spontaneously under a provisional restoration.
- 5** Buccal view after 6 weeks of spontaneous healing. Immediately before re-entry. Note the flattening of the ridge anticipating a horizontal defect.
- 6** Occlusal view 6 weeks post-extraction. The soft tissues are healed.
- 7** After flap elevation and implant placement, the resorption of the alveolar bone is compensated with Geistlich Bio-Oss®.
- 8** Geistlich Bio-Gide® is placed over the treated area to stabilise the graft and to obtain the desired contour augmentation.
- 9** Healing of the treated site 18 weeks post-extraction.
- 10** Occusal view after 18 weeks. Transmucosal healing took place with conditioning of the soft tissues with the provisional crown. The recession on tooth 23 has been covered with a coronally advanced flap and a connective tissue graft.
- 11** a) X-ray of the final prosthetic restoration. b) Schematic representation of the cantilever implant bridge.
- 12** Final situation with the cantilever implant bridge in place 5.5 months after tooth extraction.

**Material selection**



Geistlich Bio-Oss® small granules (0.25–1 mm)  
 Geistlich Bio-Gide® (25 × 25 mm)

# Early implant placement in extraction socket with preserved bone walls



Dr. Raffaele Cavalcanti | Bari, Italy



Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick "low scalloped"	<input checked="" type="checkbox"/> Medium "medium scalloped"	<input type="checkbox"/> Thin "high scalloped"
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> $\leq 5$ mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> $\geq 7$ mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input type="checkbox"/> 1 tooth ( $\geq 7$ mm)	<input checked="" type="checkbox"/> 1 tooth ( $< 7$ mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input checked="" type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Compensation of the bone resorption through Ridge Preservation
- › Provide the patient with a final restoration in a relatively short time period of time

## Conclusions

- › Almost complete maintenance of the ridge volume is achieved
- › After 8–10 weeks, the soft tissue has a quality and maturity that is adequate for early implant placement.

Before extraction.



7 months after extraction.





1 Initial situation before extraction of tooth 14.

2 No buccal bone defect is detected after tooth extraction.

3 Extraction socket with de-epithelialised wound margins.

4 Extraction socket filled with Geistlich Bio-Oss® Collagen.

5 The extraction socket is sealed with Geistlich Mucograft® Seal.

6 Geistlich Mucograft® Seal sutured with single interrupted sutures.

7 Pre-op clinical situation 10 weeks after extraction (prior to implant placement).

8 Preparation of a minimally invasive flap.

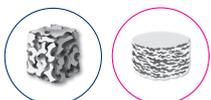
9 Implant placement with a minimally invasive roll flap technique to improve soft-tissue thickness at the buccal aspect.

10 Clinical situation of the soft tissues 4 months after implant placement.

11 Final restoration 7 months after tooth extraction (buccal).

12 Final restoration 7 months after tooth extraction (occlusal).

**Material selection**



Geistlich Bio-Oss® Collagen (100 mg)  
Geistlich Mucograft® Seal (8 mm diameter)

# Ridge Preservation in socket with preserved buccal bone wall



Dr. Hadi Antoun & Dr. Bouchra Sojod | Paris, France

**“With the chosen Biomaterials, hard and soft-tissue volume are preserved in the front area for late implantation.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input checked="" type="checkbox"/> Thick “low scalloped”	<input type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input checked="" type="checkbox"/> No defect*	<input type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Preservation of hard and soft-tissue volume after tooth extraction.
- › Late implant placement, as it is an extremely reliable procedure, which has been proven repeatedly in the international literature.

## Conclusions

- › Geistlich Bio-Oss® Collagen and Geistlich Mucograft® Seal preserve the ridge for optimal implant placement 5 months post-op.
- › At the central incisor, the buccal soft-tissue thickness is optimised with a connective tissue graft.

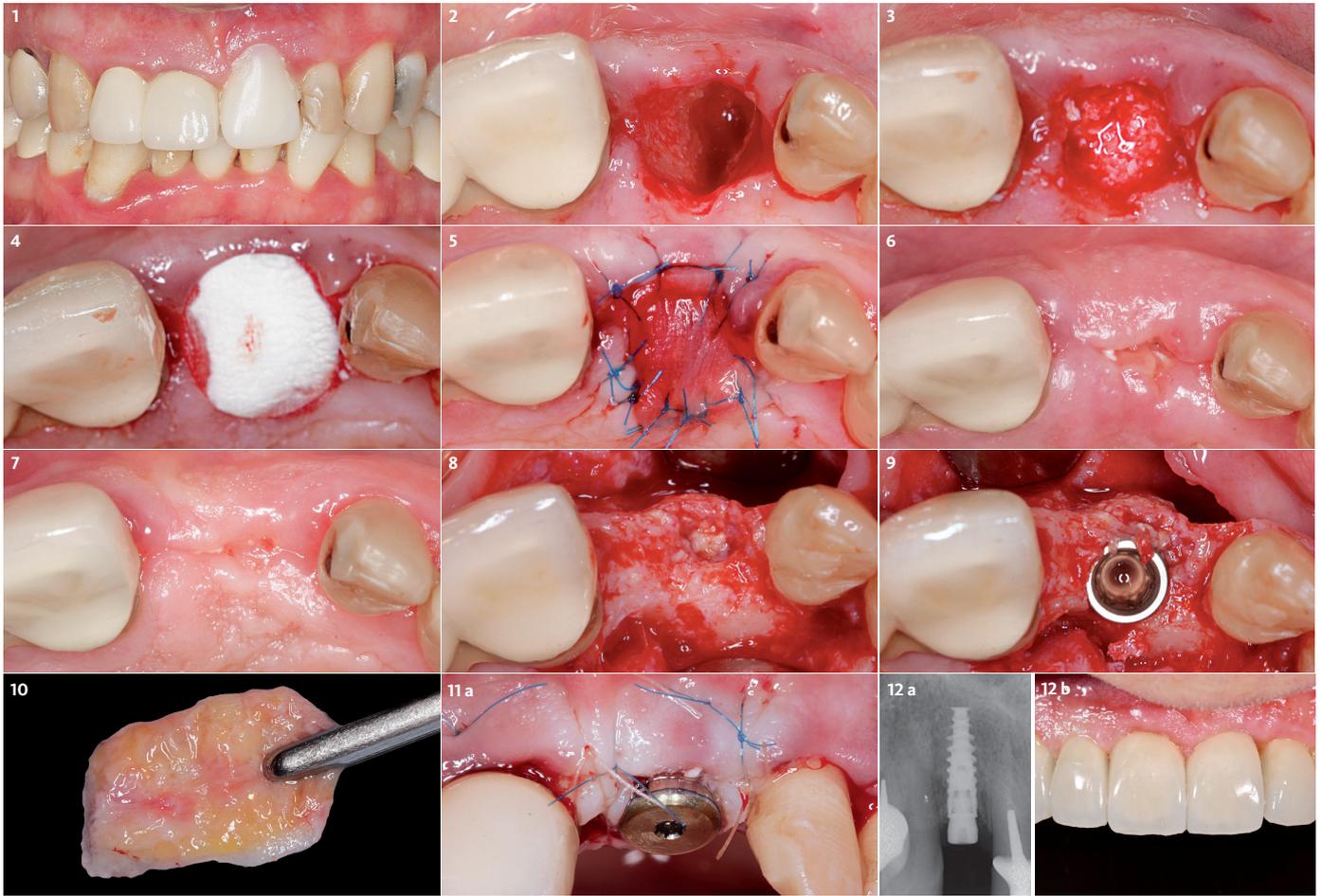
Before extraction.



2 years after extraction.



\* Buccal bone wall preserved, but more apically with respect to the neighbouring teeth because of a discrepancy on the marginal gingiva level.



**1** Tooth 21 is scheduled for extraction due to periodontal problems.

**2** Meticulous curettage of the socket after atraumatic flapless extraction.

**3** Filling of the extraction socket with Geistlich Bio-Oss® Collagen up to the palatal bone.

**4** Geistlich Mucograft® Seal in place: the spongy structure faces towards the bone substitute.

**5** Geistlich Mucograft® Seal is sutured with single interrupted sutures allowing optimal adaptation between the borders of the soft tissues and the collagen matrix.

**6** Wound healing at 2 weeks: good healing of the soft tissues with a beautiful pink colour.

**7** Wound healing at 3 months: complete closure of the socket with mature soft tissues.

**8** Five months after extraction: good maintenance of the alveolar bone volume.

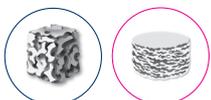
**9** Implant placement to replace tooth 21 without additional GBR.

**10** Connective tissue graft harvested at the left palate.

**11** The connective tissue graft is placed at the buccal site and the flap is closed with suspension sutures and single interrupted sutures (monofilament 6/0).

**12 a)** X-ray shows the osseointegrated implant 3 months after implant placement. **b)** Follow-up 28 months after extraction.

#### Material selection



Geistlich Bio-Oss® Collagen (100 mg)  
Geistlich Mucograft® Seal (8 mm diameter)

# Ridge Preservation in extraction socket with preserved buccal bone



Dr. Stefan Fickl | Würzburg, Germany

**“Soft and hard tissues are well preserved without any scarring on the buccal or occlusal aspect.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input checked="" type="checkbox"/> Thick “low scalloped”	<input type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input checked="" type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input checked="" type="checkbox"/> Horizontal defect*	<input type="checkbox"/> Vertical defect

## Objectives

- › Delayed implant placement 4 months after extraction
- › Minimally invasive treatment of the socket

## Conclusions

- › Good/mature/solid bone obtained 4 months after treatment
- › Fast and scar-free soft-tissue regeneration
- › Optimal clinical and esthetic result for the patient

Before extraction.



2 years after extraction.



\* Intact extraction socket, with a minor bony defect up to 50% of the buccal bone wall



1 Situation on the day of tooth extraction.

2 Pre-op situation (buccal).

3 The sulcus is de-epithelialised using a diamond bur.

4 The extraction socket is filled with Geistlich Bio-Oss® Collagen.

5 Geistlich Mucograft® Seal in place sutured with single and double interrupted sutures.

6 Healing of soft tissues 3 days after tooth extraction.

7 Healing of the soft tissues at the time of suture removal 10 days after surgery.

8 Tissue healing 9 weeks after tooth extraction.

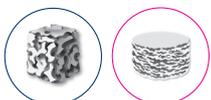
9 Situation after 4 months at the time of implant placement.

10 The flap elevation reveals ideal bony situation for implant placement.

11 Implant seated.

12 Final restoration 11 months after tooth extraction.

#### Material selection



Geistlich Bio-Oss® Collagen (100 mg)  
Geistlich Mucograft® Seal (8 mm diameter)

# Ridge Preservation in defect extraction sockets



Dr. Célia Coutinho Alves | Porto, Portugal

**“Whenever possible we prefer to preserve rather than to rebuild the bone later, specially in the front teeth.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input checked="" type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input checked="" type="checkbox"/> ≤ 5 mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input type="checkbox"/> 1 tooth (≥ 7 mm)	<input checked="" type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input checked="" type="checkbox"/> Horizontal defect	<input checked="" type="checkbox"/> Vertical defect

## Objectives

- › Maintain hard and soft-tissue contour in esthetically demanding region
- › Late implant placement in single tooth gap

## Conclusions

- › Severe ridge resorption was prevented with Geistlich Biomaterials
- › A long-term pleasant outcome was achieved with additional contouring with Geistlich Biomaterials and a connective tissue graft at implant placement

Before extraction.



11 months after extraction.





1 Initial situation before removal of tooth 21.

2 Inspection of the extraction socket with the periodontal probe shows a buccal bony defect.

3 Geistlich Bio-Gide® is placed buccally on the inner alveolar wall, slightly protruding the crestal bone. Geistlich Bio-Oss® Collagen fills the socket up to the crestal bone level.

4 Geistlich Bio-Oss® (small granules) are packed on top of Geistlich Bio-Oss® Collagen up to soft-tissue level.

5 The collagen membrane is folded over the filled socket, adapted under the palatal sulcus, fixed with vertical mattress sutures and heals by secondary intention.

6 Uneventful healing situation 3 days post-extraction.

7 Clinical situation 1 week after tooth extraction.

8 Situation after site-conditioning of the soft tissues 4 months post-extraction.

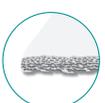
9 Flap elevation and implant placement reveal a fenestration 4 months after tooth extraction.

10 The ridge is contoured with a GBR (Geistlich Bio-Oss® and Geistlich Bio-Gide®) and a connective tissue graft on the buccal-crestal area.

11 The flap is closed over the graft.

12 Loading of the implant with the final restoration 7 months after implant placement (11 months after extraction).

#### Material selection

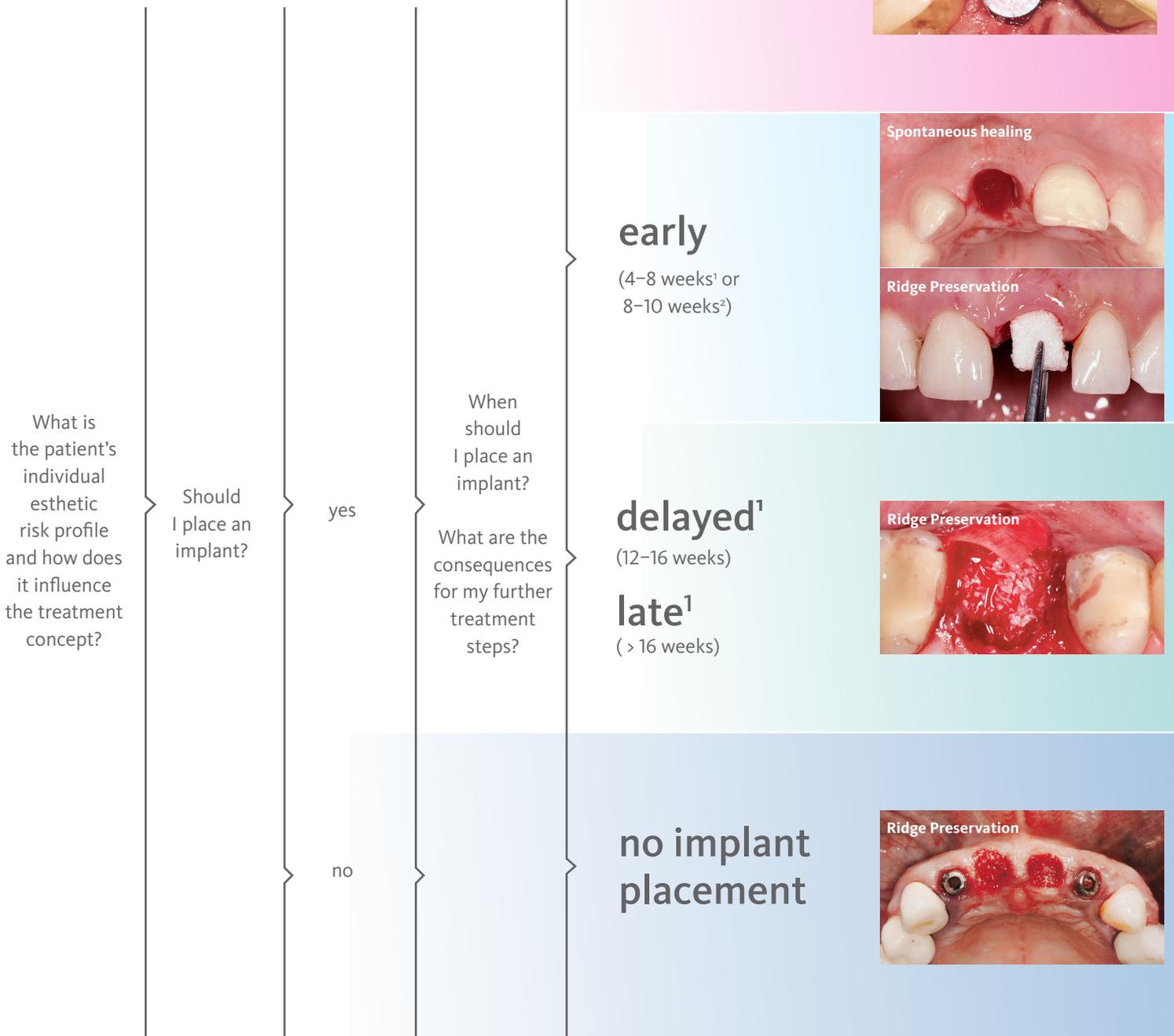


Geistlich Bio-Oss® small granules (0.25-1 mm)  
 Geistlich Bio-Oss® Collagen (100 mg)  
 Geistlich Bio-Gide® (25 x 25 mm)

# Extraction socket treatment options

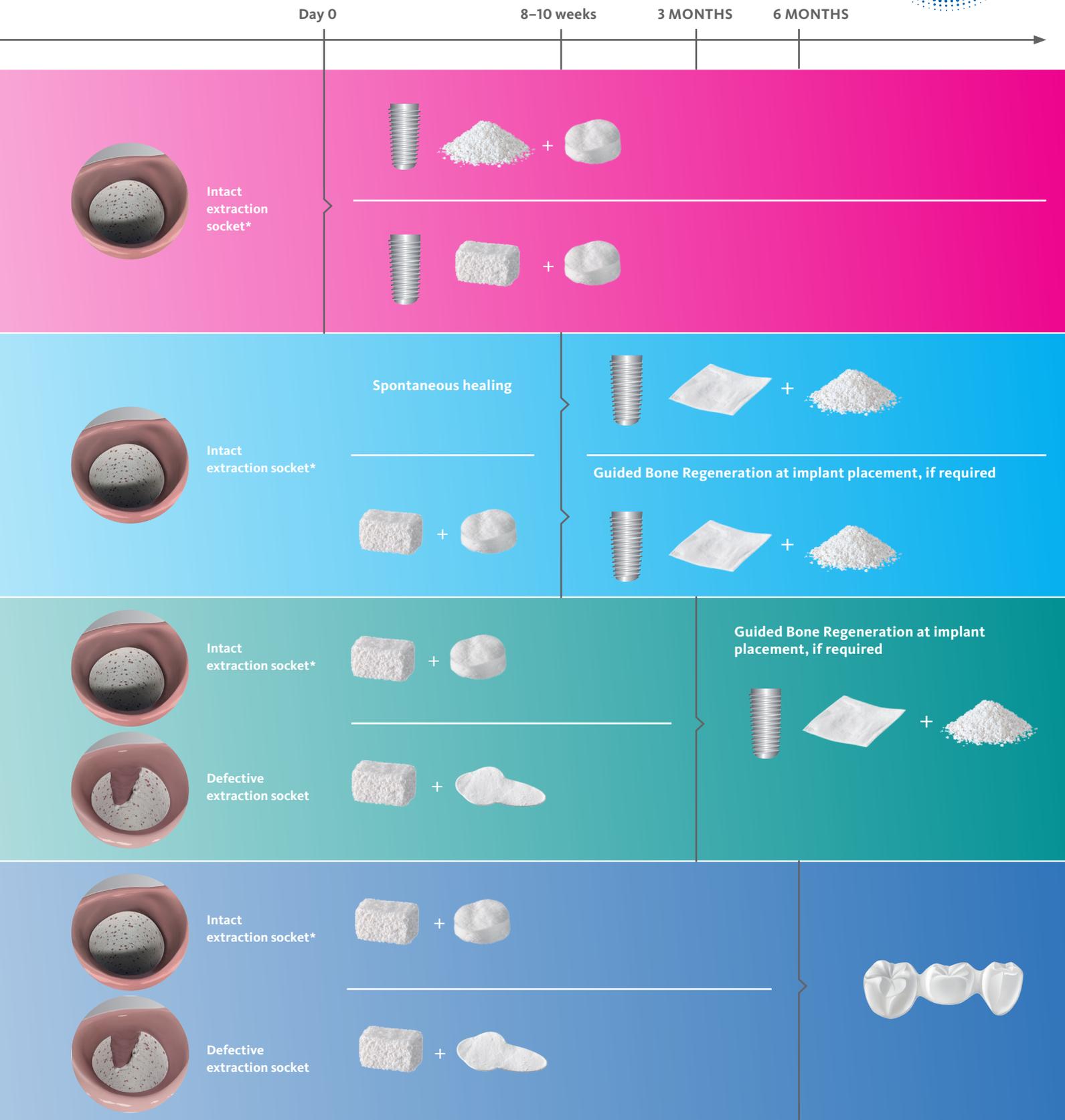
The appropriate type of treatment for the management of extraction sockets is derived from a coherent evaluation of the esthetic risk factors. In addition to the time of implantation, the attending dentist needs to make a decision regarding regenerative measures directly after tooth extraction. Various procedures are recommended:

## Timeline



1 Hämmerle CH. et al., Int J Oral Maxillofac Implants. 2004;19 Suppl:26-8 (Consensus statement).  
 2 Geistlich Mucograft® Seal report on the meeting of the Advisory Committee, 2013. Data on file, Geistlich Pharma AG, Wolhusen, Switzerland.

\* The definition of an intact extraction socket varies among experts and includes buccal bone defects of 0 to 50 %.



# Ridge Preservation in the anterior region for late implantation



Prof. Ronald E. Jung | Zurich, Switzerland



Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input type="checkbox"/> Intact immune system (non-smoker)	<input checked="" type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick "low scalloped"	<input type="checkbox"/> Medium "medium scalloped"	<input checked="" type="checkbox"/> Thin "high scalloped"
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input checked="" type="checkbox"/> $\leq 5$ mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> $\geq 7$ mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth ( $\geq 7$ mm)	<input type="checkbox"/> 1 tooth ( $< 7$ mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input checked="" type="checkbox"/> Horizontal defect*	<input type="checkbox"/> Vertical defect

## Objectives

- › Preservation of hard and soft-tissue volume after extraction in the anterior region for late implant placement.
- › Prevention of extensive guided bone regeneration procedures at implant placement.

## Conclusions

- › Volume of hard and soft tissue can be preserved better with Geistlich Bio-Oss® Collagen and Geistlich Mucograft® Seal than with spontaneous healing.<sup>1</sup>
- › A minimally invasive GBR is performed to contour the ridge at implant placement.

Right after extraction.

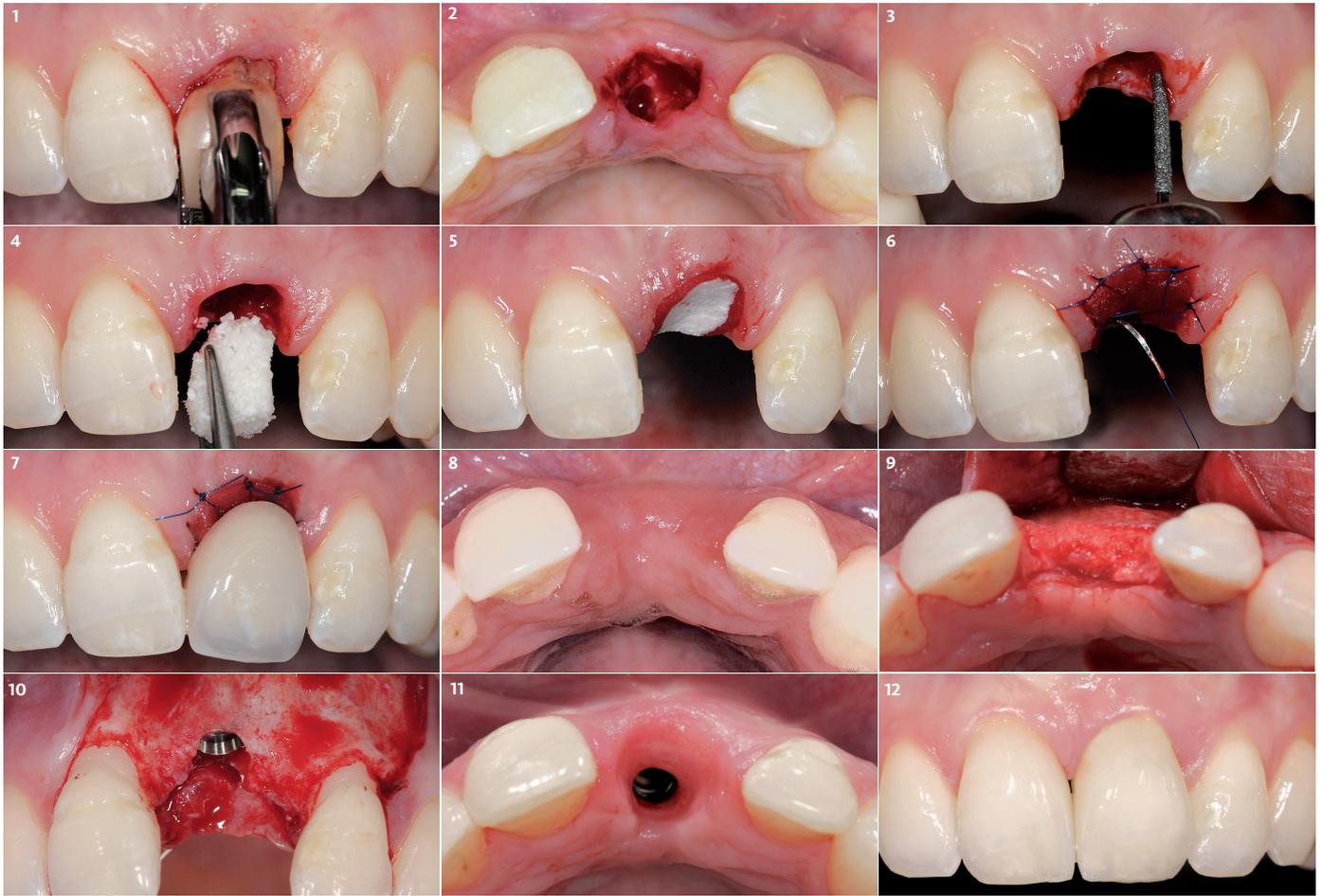


10 months after extraction.



<sup>1</sup> Jung RE, et al. J Clin Periodontol. 2013 Jan;40(1):90–8. (Clinical study)

\* Intact extraction socket, with a minor bony defect up to 50% of the buccal bone wall



**1** Extraction of tooth 21 due to a trauma with concomitant external resorptions. Care was taken in preserving the alveolar bone.

**2** Occlusal view of the socket after tooth extraction. No flaps are raised around the affected area. A slight buccal bone defect was observed.

**3** The socket is gently curetted for removal of granulation tissue. Subsequently, the wound margins were de-epithelialised with a diamond in a counter-piece with water cooling.

**4** Filling of the extraction socket with Geistlich Bio-Oss® Collagen to the level of the palatal bone.

**5** Geistlich Mucograft® is applied dry and adapts perfectly to the wound margins.

**6** Suturing of the Geistlich Mucograft® with 6-0 single interrupted sutures.

**7** The tissues are left to heal beneath the provisional, taking care not to apply pressure to the biomaterials.

**8** Situation 7.5 months after extraction revealing nice soft-tissue situation with a slight dip at the buccal aspect.

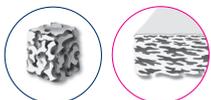
**9** Flap elevation shows the healed bony situation 7.5 months after Ridge Preservation.

**10** Implant placement in fully mature bone. A small GBR for contouring is performed.

**11** Excellent emergence profile after 10 months.

**12** Situation with the final restoration 10 months after tooth extraction.

#### Material selection



Geistlich Bio-Oss® Collagen (100 mg)  
Geistlich Mucograft® (15 × 20 mm punch 8 mm diameter)

# Ridge Preservation in the posterior region for late implantation



Prof. Carlo Maiorana (Milan, Italy)

## “Geistlich Bio-Oss® and Geistlich Mucograft® Seal enable a flapless and effective Ridge Preservation.”

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input type="checkbox"/> Intact immune system (non-smoker)	<input checked="" type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input checked="" type="checkbox"/> Thick “low scalloped”	<input type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input checked="" type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

### Objectives

- › Preservation of the ridge contour with minimal invasion
- › Late implant placement

### Conclusions

- › Geistlich Bio-Oss® and Geistlich Mucograft® Seal enable a flapless and effective Ridge Preservation
- › Hard and soft tissues are optimal for implant placement 6 months after Ridge Preservation procedure

Before extraction.



6 months after extraction.





1 Clinical appearance before treatment (buccal).

2 Clinical appearance before treatment (occlusal).

3 Situation after tooth extraction.

4 The socket is grafted with Geistlich Bio-Oss® up to the bone level.

5 Geistlich Mucograft® Seal is sutured with 8 single interrupted sutures.

6 Healing of the soft tissues 1 week after tooth extraction.

7 Clinical post-op appearance 8 weeks after extraction.

8 Situation 6 months after tooth extraction and before implant placement.

9 Minimal flap elevation reveals optimal bony and soft-tissue situation for correct implant placement.

10 Closure of the flap for submerged healing.

11 Occlusal clinical view 3 weeks after submerged implant placement (6.5 months after extraction).

12 Buccal clinical view 6.5 months after extraction.

#### Material selection



Geistlich Bio-Oss® small granules (0.25–1 mm)  
Geistlich Mucograft® Seal (15 × 20 mm punch 8 mm diameter)

# Ridge preservation of a fenestrated buccal bone wall



Dr. Georg Taffet, Rielasingen-Worblingen | Germany

**“20 years of experience with Geistlich Bio-Oss® and Geistlich Bio-Gide® true to the motto ‘never change a winning team’ also for more complex indications”.**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input type="checkbox"/> Medium “medium scalloped”	<input checked="" type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input type="checkbox"/> Chronic	<input checked="" type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input checked="" type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Replace a hopeless central incisor with a vertical fracture of the tooth root and buccal bone fenestration. The vestibulum already showed a fistula.

## Conclusions

- › Ridge Preservation techniques are effective in minimising volume loss.

Before extraction.



7 years after extraction.





**1** Initial situation of the fractured tooth with the vestibulum showing a fistula.

**2** Extraction of the fractured tooth root.

**3** Examination of the extraction socket.

**4** Exposure of the fenestration by an apical cut to avoid a resorption of the vestibular bone and resorption of the papilla. If a flap would be applied, the blood supply to the remaining thin vestibular bone would be interrupted and certainly resorb. Subsequent removal of the granulation tissue from the apical area under sight and without touching the marginal gingiva.

**5** Insertion of Geistlich Bio-Gide® into the extraction socket and filling with Geistlich Bio-Oss® granules.

**6** Geistlich Bio-Gide® was folded palatally over the socket and marginal-palatal sutured to protect the vestibular alveolar ridge and avoid tension. The apical incision was sutured as well.

**7** 6 months after removing the provisional, a wellpreserved alveolar ridge with well-preserved papillae appeared.

**8** Flapless implantation with a tissue level implant. A provisional was fixed adhesively to the adjacent teeth.

**9** Another 6 months later, final restoration with a porcelain-fused-to-metal crown on an intra-oral solid abutment, following the rules of *Biological Width Protocol (Dr.Taffet)*.

**10** 12 months follow-up with final restoration in place.

**11** Stable soft-tissue situation 5 years post-surgery.

**12** 7 years post-surgery shows a stable esthetic result over time.

#### Material selection



Geistlich Bio-Oss® small granules (0.25-1 mm) 0,5g  
Geistlich Bio-Gide® (25 x 25 mm)

\* Dental technician by Labor Biberle, Stockach, Herr ZTM Thomas Biberle

# Ridge preservation in defect extraction socket



Dr. Fernán López | Medellín, Colombia

**“Ridge Preservation allows correct 3D implant placement reducing additional surgeries (i.e. sinus lift).”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input checked="" type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input checked="" type="checkbox"/> ≤ 5 mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input type="checkbox"/> 1 tooth (≥ 7 mm)	<input checked="" type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input checked="" type="checkbox"/> Vertical defect

## Objectives

- › Prevent tissue collapse in the posterior area due to absence of the buccal bone wall.
- › Avoid a possible sinus elevation.

## Conclusions

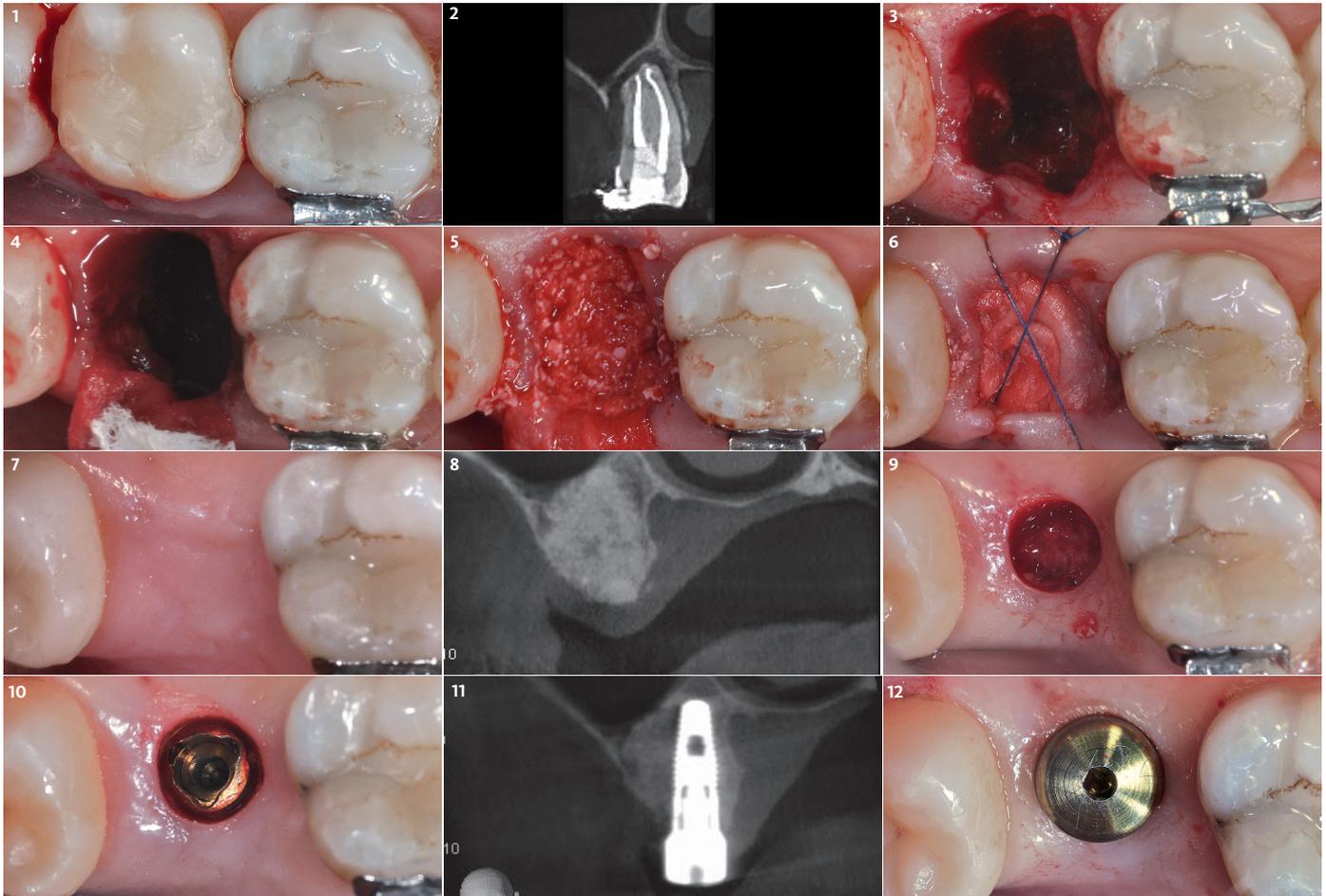
- › Ridge preservation with Geistlich Biomaterials preserved the alveolar ridge contour.
- › A minimally invasive procedure provided enough ridge width for adequate implant placement and esthetic outcome.

Before extraction.



6 months after extraction.





- 1 Compromised upper molar due to longitudinal tooth fracture.
- 2 CBCT upper molar before extraction. Note the absence of the buccal bone wall.
- 3 Socket after tooth extraction.
- 4 Buccal bone wall replaced by Geistlich Bio-Gide®.
- 5 Filling with Geistlich Bio-Oss® (small granules 0.25–1 mm).
- 6 Geistlich Bio-Gide® is sutured with a cross-suture.
- 7 Clinical situation after 6 months of healing.
- 8 CBCT 6 months post-extraction before implant placement.
- 9 Flapless implant installation procedure 6 months after tooth extraction.
- 10 Implant in place 6 months after tooth extraction and Ridge Preservation procedure.
- 11 CBCT immediately after implant placement.
- 12 Abutment connection.

#### Material selection



Geistlich Bio-Oss® small granules (0.25–1 mm)  
Geistlich Bio-Gide® (25 × 25 mm)

# Ridge Preservation for delayed implant placement



Dr. Ham Byung-Do | Kainos Dental Clinic, Seoul, Korea

**“After 6 months the defect was completely filled with newly-formed hard tissue.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input type="checkbox"/> Intact immune system (non-smoker)	<input checked="" type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input checked="" type="checkbox"/> Thick “low scalloped”	<input type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input checked="" type="checkbox"/> Vertical defect

## Objectives

- › Reconstruct alveolar bone with severe vertical loss from chronic periodontitis at the lower left second molar
- › Investigate the clinical and histological result by using Geistlich Combi-Kit Collagen after tooth extraction.

## Conclusions

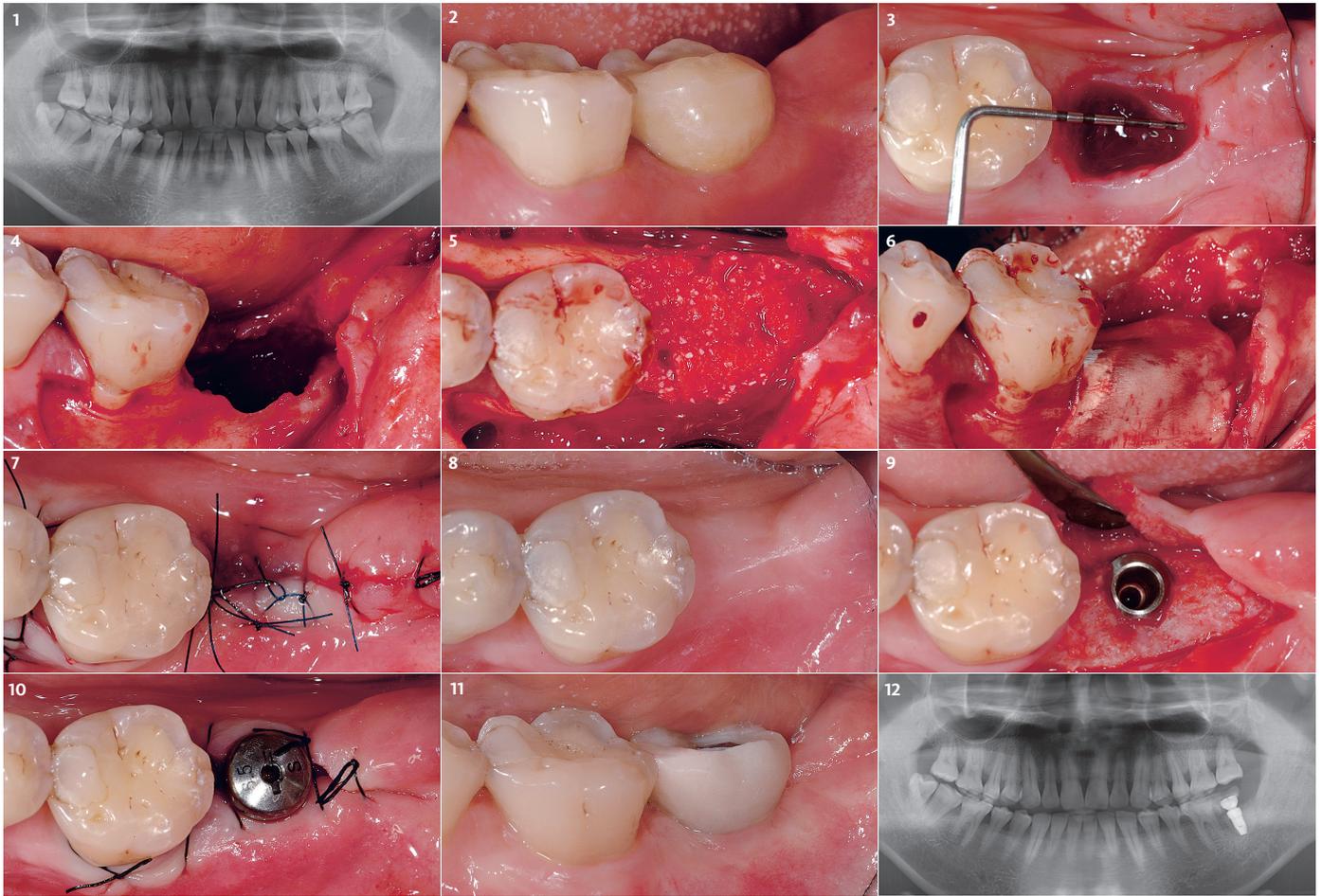
- › The defect was completely filled with newly-formed hard tissue after 6 months
- › Histomorphometric analysis revealed 45% of the hard tissue area including bone substitute material and 28% of the soft tissue area.

Before extraction.



9 months after extraction.





1 Radiological status prior to extraction. Initial smile.

2 Starting situation.

3 Status following atraumatic extraction of tooth 17.

4 A flap is raised.

5 Filling of the extraction socket up to the level of the crestal bone level using Geistlich Bio-Oss® Collagen.

6 Insertion of the Geistlich Bio-Gide® membrane over the defect.

7 Closure of the extraction socket with a mattress suture.

8 Situation 6 months post-op.

9 Newly formed hard tissue. Geistlich Bio-Oss® Collagen is not obvious.

10 One stage protocol with healing abutment.

11 Provisional prosthesis.

12 Radiological view after implantation.

#### Material selection



**Geistlich Combi-Kit Collagen:**  
 Geistlich Bio-Oss® Collagen (100 mg)  
 Geistlich Bio-Gide® (16 × 22 mm)

# Delayed implant placement with a thin and defective buccal bone wall



Dr. Daniele Cardaropoli | Torino, Italy

**“Geistlich Bio-Gide® Shape is a really user-friendly product that can easily be used in the management of post-extraction sites for ridge preservation.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input checked="" type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input checked="" type="checkbox"/> ≤ 5 mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input type="checkbox"/> 1 tooth (≥ 7 mm)	<input checked="" type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input checked="" type="checkbox"/> Vertical defect

## Objectives

- › Delayed implant placement to restore tooth 34
- › Minimally invasive procedure without mobilization of the flap to cover the graft: healing by secondary intention (open healing).

## Conclusions

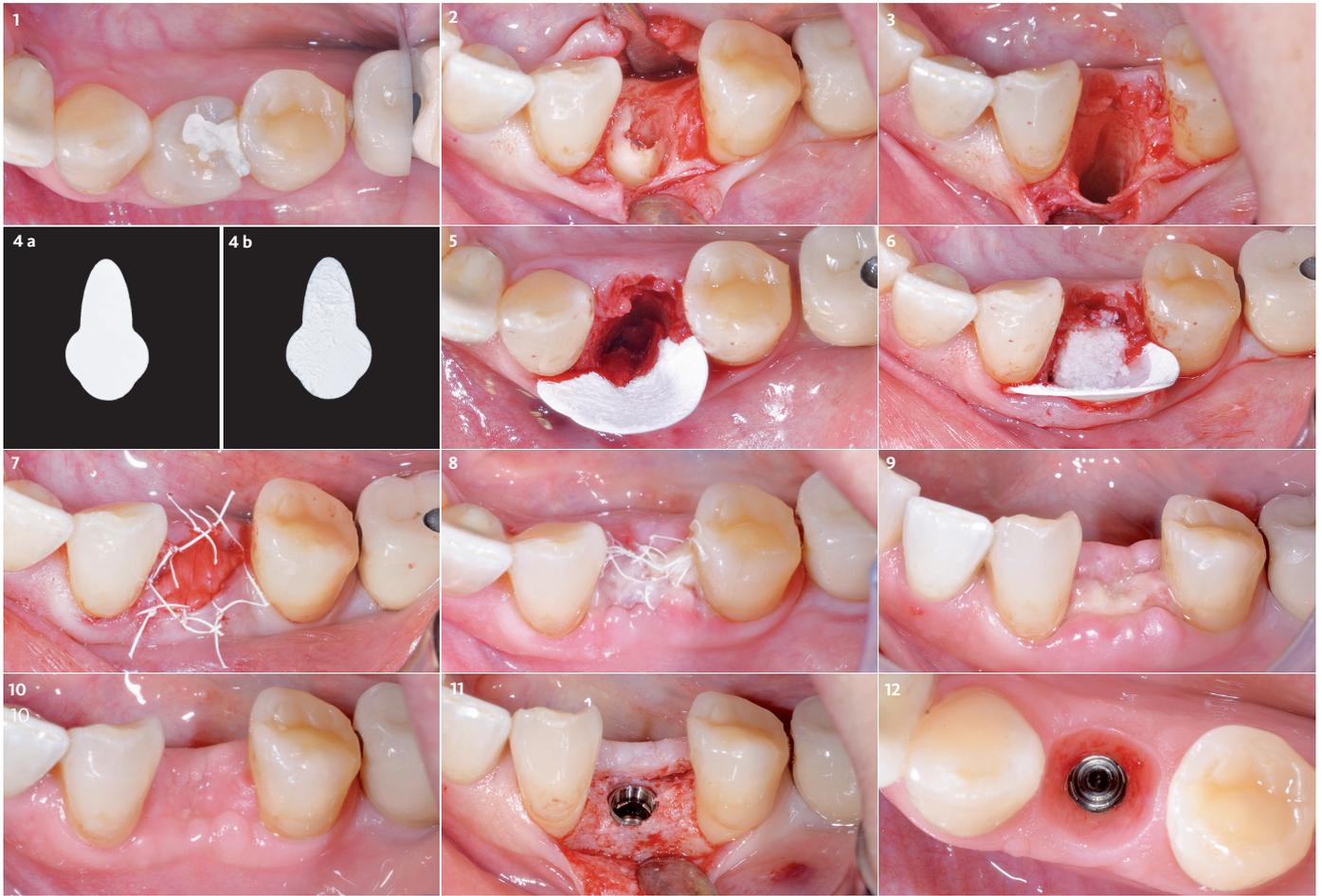
- › Geistlich Bio-Gide® Shape in combination with Geistlich Bio-Oss® Collagen preserved largely the ridge dimensions after tooth extraction.
- › Implant can be placed without need of a second bone grafting at time of implant placement.

Before extraction.



12 months after extraction.





1 Pre-surgery occlusal view.

2 Raising of a flap was necessary to remove the tooth because of the internal root resorption (34).

3 Empty alveolus with a thin and defective bone wall.

4 Geistlich Bio-Gide® Shape a) with the smooth side (outwards) and b) the rough side (inwards).

5 Geistlich Bio-Gide® Shape in place, applied dry within the alveolus.

6 After application of the collagen membrane, the alveolus is filled with Geistlich Bio-Oss® Collagen.

7 Suturing with 3 single knots each on buccal and lingual site to fix the bone graft and one additional suturing to maintain the papillae.

8 Clinical situation 1 week after extraction. Geistlich Bio-Gide® was left exposed and the wound heals uneventfully by secondary intention.

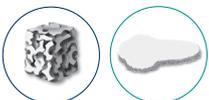
9 Clinical situation immediately after suture removal 2 weeks after extraction.

10 Follow-up 4 weeks after tooth extraction.

11 Ridge preservation provided an optimal ridge width for implant placement without re-grafting 5 months post-extraction.

12 Soft-tissue conditioning 9 months after tooth extraction.

#### Material selection



Geistlich Bio-Oss® Collagen (100 mg)  
Geistlich Bio-Gide® Shape (14 mm × 24 mm)

# Ridge Preservation for implant supported bridge



Dr. Jeffrey Ganeles | Boca Raton, USA

**“This treatment is ideal for extraction sockets to preserve esthetic contours when there are limited bony defects.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input checked="" type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input checked="" type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input checked="" type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Maintain alveolar contour, which is a combination of hard and soft tissue under pontics.

## Conclusions

- › Geistlich Mucograft® prevents particulate graft from leaking out of the socket before being incorporated into healed tissue.
- › Alveolar contour was largely maintained with Geistlich Mucograft® and Geistlich Bio-Oss®.

Before extraction.



11 months after extraction.





**1** Radiographic findings prior to implant placement in teeth 12 and 22.

**2** Clinical initial situation prior to implant placement in teeth 12 and 22.

**3** Maxillary central incisors scheduled for extraction due to recurrent endodontic infections 2 months after implant placement in lateral incisors.

**4** Extraction sockets grafted with Geistlich Bio-Oss®. The bone substitute fills the socket up to slightly above the bone crest.

**5** Geistlich Mucograft® is placed over the occlusal surfaces as a socket seal.

**6** Provisional restoration.

**7** Provisional restoration contoured to maintain Geistlich Mucograft® in place, taking care not to compress the grafted site.

**8** Vascularisation and integration of Geistlich Mucograft® after two weeks.

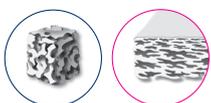
**9** Clinical situation 1 month post-op.

**10** Occlusal view at 9 months with the final restoration (11 months after teeth extraction).

**11** Buccal view at 9 months with the final restoration (11 months after teeth extraction).

**12** Radiograph showing integration of the graft material in the sockets. Final restoration in place.

#### Material selection



Geistlich Bio-Oss® small granules (0.25–1 mm)  
Geistlich Mucograft® (15 × 20 mm punch 8 mm diameter)

# Ridge Preservation in multiple extraction sockets



Dr. Philipp Grohmann | Berikon, Switzerland

**“In complex cases, I don’t want to experiment with materials. So I took here the proven Geistlich Biomaterials.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input checked="" type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input checked="" type="checkbox"/> Rectangular		<input type="checkbox"/> Triangular
Infections at implantation site	<input checked="" type="checkbox"/> None	<input type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input type="checkbox"/> 5.5–6.5 mm from contact point	<input checked="" type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input type="checkbox"/> Intact		<input checked="" type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input checked="" type="checkbox"/> No defect	<input type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Ridge profile maintenance under full arch bridge.
- › Flapless procedure.

## Conclusions

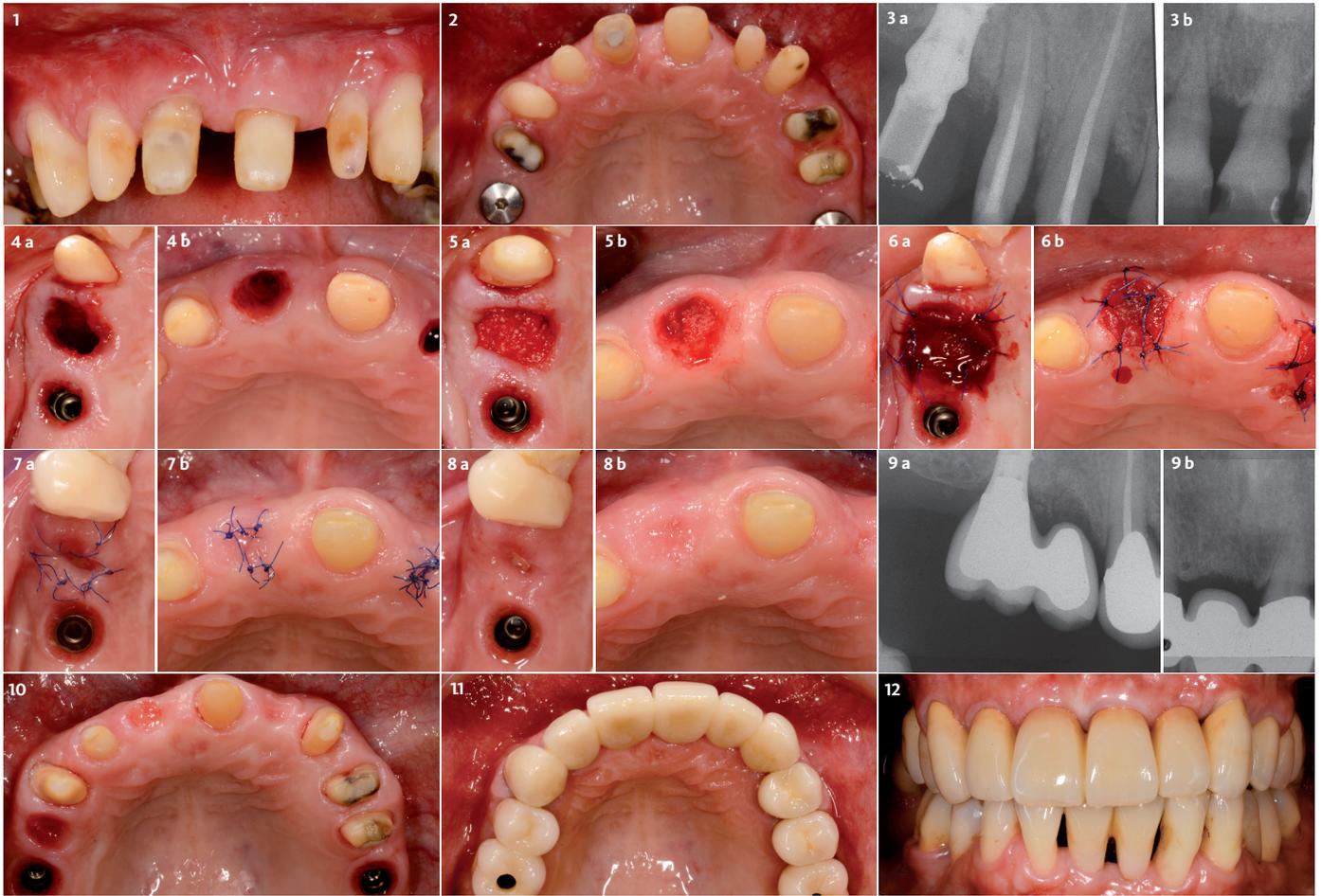
- › Good and quick soft-tissue healing during the early healing phase.
- › Bone volume has been largely preserved with a minimally invasive approach.

Before extraction.



12 months after extraction.





1 Initial situation before extraction of teeth 11 and 14.

2 Occlusal clinical view showing the ridge profile.

3 X-ray findings prior to extraction of teeth a) 14 and b) 11.

4 Empty extraction sockets of teeth a) 14 and b) 11.

5 Extraction sockets filled with Geistlich Bio-Oss® Collagen.

6 Geistlich Mucograft® Seal adapts well to the defects and is sutured with single interrupted sutures.

7 Occlusal view before removal of sutures, 1 week after teeth extraction.

8 Occlusal view shows nice early healing of the soft-tissues, 1 week post-extraction.

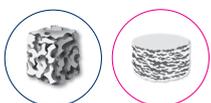
9 X-ray findings 12 months post-extraction. Regions a) 14 and b) 11.

10 Clinical situation of the conditioned soft tissues 12 months post-extraction.

11 Final restoration 12 months after extraction (occlusal).

12 Final restoration 12 months after extraction (buccal).

#### Material selection



Geistlich Bio-Oss® Collagen (100 mg)  
Geistlich Mucograft® Seal (8 mm diameter)

# Ridge Preservation for preserving the red white esthetics for late implant placement

open-healing approach



Dr. Marco Zeltner | Horgen, Switzerland

**“Preservation of red-white esthetics by alveolar Ridge Preservation measures for a late implantation.”**

Esthetic risk factors	Low risk	Medium risk	High risk
Patient's health	<input checked="" type="checkbox"/> Intact immune system (non-smoker)	<input type="checkbox"/> Light smoker	<input type="checkbox"/> Impaired immune system (heavy smoker)
Patient's esthetic requirements	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Height of the smile line	<input type="checkbox"/> Low	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> High
Gingival biotype	<input type="checkbox"/> Thick “low scalloped”	<input checked="" type="checkbox"/> Medium “medium scalloped”	<input type="checkbox"/> Thin “high scalloped”
Shape of dental crowns	<input type="checkbox"/> Rectangular		<input checked="" type="checkbox"/> Triangular
Infections at implantation site	<input type="checkbox"/> None	<input checked="" type="checkbox"/> Chronic	<input type="checkbox"/> Acute
Bone height at adjacent tooth	<input type="checkbox"/> ≤ 5 mm from contact point	<input checked="" type="checkbox"/> 5.5–6.5 mm from contact point	<input type="checkbox"/> ≥ 7 mm from contact point
Restorative status of adjacent tooth	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Restored
Width of tooth gap	<input checked="" type="checkbox"/> 1 tooth (≥ 7 mm)	<input type="checkbox"/> 1 tooth (<7mm)	<input type="checkbox"/> 2 teeth or more
Soft-tissue anatomy	<input checked="" type="checkbox"/> Intact		<input type="checkbox"/> Defective
Bone anatomy of the alveolar ridge	<input type="checkbox"/> No defect	<input checked="" type="checkbox"/> Horizontal defect	<input type="checkbox"/> Vertical defect

## Objectives

- › Augment the bone tissue and preserve the soft tissue for implantation at a later point in time.
- › The goal is to attain an appealing esthetic result for the mid-term temporary reconstruction.

## Conclusions

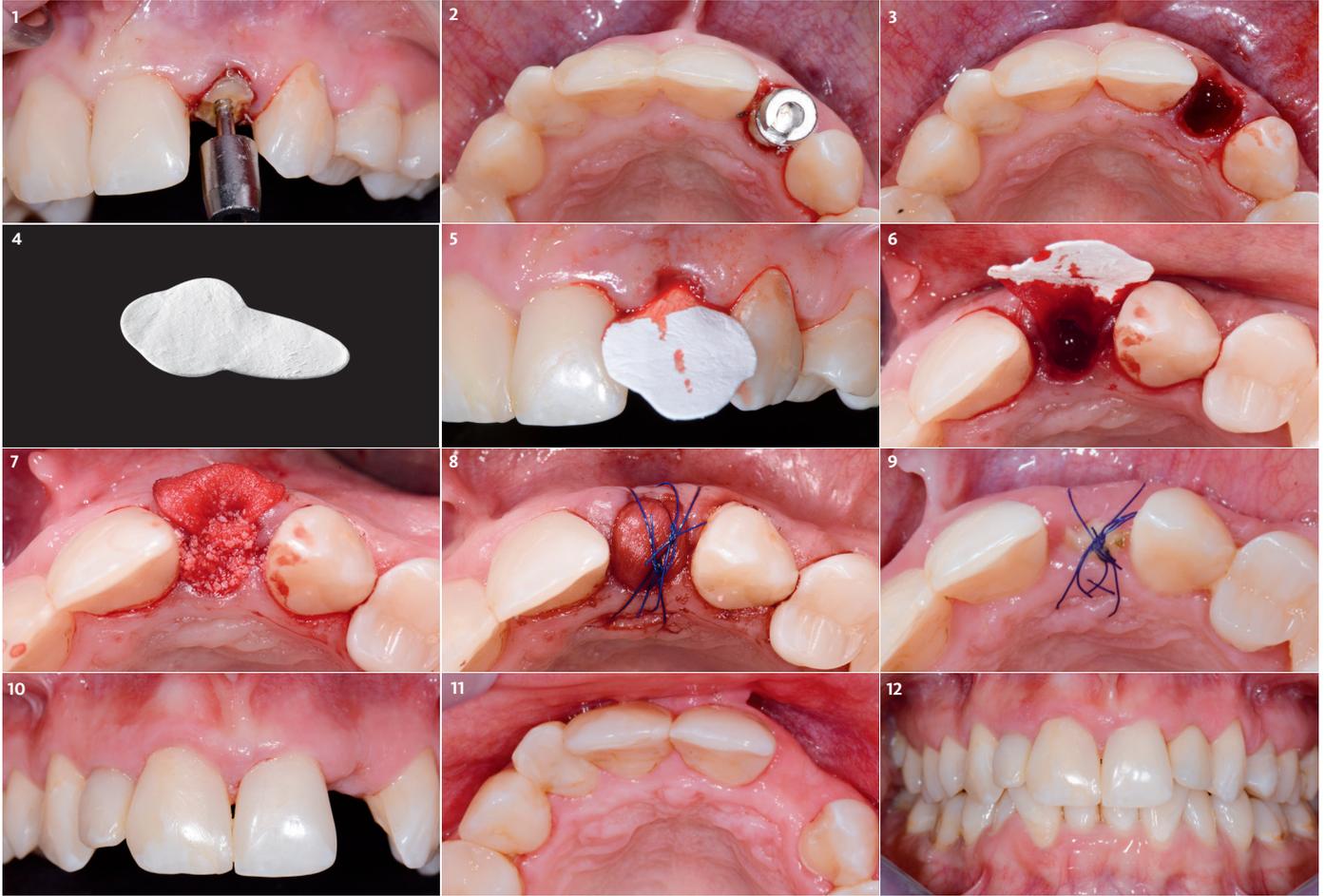
- › Minimal horizontal bone loss and widening of the keratinized gingiva thanks to Ridge Preservation with Geistlich Bio-Oss® Collagen and Geistlich Bio-Gide® Shape.
- › On the regenerated side 3 months postoperative the red white esthetics are just as good as on the natural tooth side.

Pre-extraction view of region 22.



3 months follow-up.





1 Initial situation of tooth 22.

2 Atraumatic removal of tooth 22 with Benex® extraction kit.

3 Inspection of the extraction socket shows a buccal bone defect.

4 The preformed Geistlich Bio-Gide® Shape reduces the preparation time for cutting to size.

5 Geistlich Bio-Gide® Shape is placed buccally on the inner socket wall.

6 Geistlich Bio-Gide® Shape protrudes slightly above the crestal bone.

7 Geistlich Bio-Oss® Collagen fills the socket up to the crestal bone height. It can be beneficial to divide up the Geistlich Bio-Oss® Collagen and then introduce it into the socket portion by portion.

8 Geistlich Bio-Gide® Shape covers the bone replacement material and is pushed under the soft tissue at the edge of the socket. Fixation of the augmentation without stress using cross suture. Single sutures are possible.

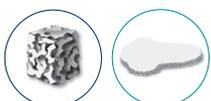
9 Ten days follow-up with good wound healing by secondary intention.

10 Good pink esthetics at three months follow-up.

11 Minimal horizontal bone loss.

12 Restoration with a mid-term temporary adhesive bridge.

#### Material selection



Geistlich Bio-Oss® Collagen (100 mg)  
Geistlich Bio-Gide® Shape (14 mm × 24 mm)

# Technical Guidelines



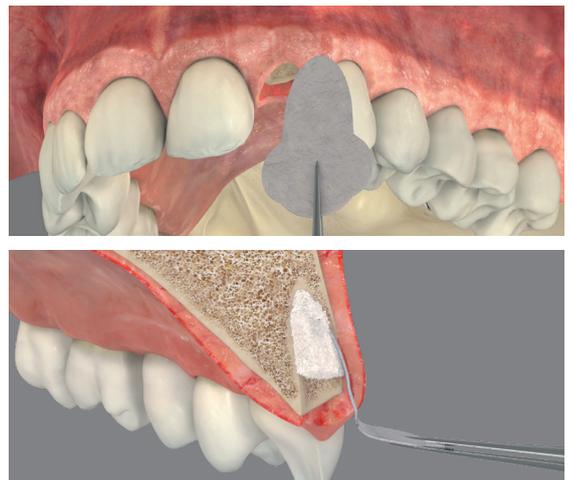
## Geistlich Bio-Oss® Collagen

- › Can be applied both dry, as well as moistened with saline solution or blood.
- › Can be cut to size and carefully introduced into the socket with a forceps.
- › Can be packed into the socket with a bone graft plugger (or similar), taking care not to compress it too strongly.



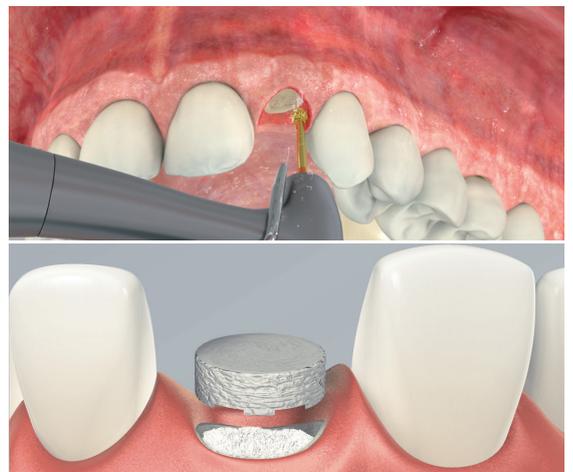
## Geistlich Bio-Gide® | Geistlich Bio-Gide® Shape

- › Should be cut dry.
- › Should be applied dry with the smooth side facing the oral cavity.
- › Can be applied inside the alveolus on the defect area or alternatively be inserted between the periosteum and the soft tissue.
- › The wings of Geistlich Bio-Gide® Shape can be tucked under the sulcus.
- › Can be left for open healing or can be submerged by tension-free closure of the extraction socket
- › Has to be used with an alveolar filling material (e.g. Geistlich Bio-Oss® Collagen).



## Geistlich Mucograft® Seal<sup>1</sup>

- › Has to be used with an alveolar filling material (e.g. Geistlich Bio-Oss® Collagen).
- › Should be applied after de-epithelialisation of the adjoining soft-tissue margins.
- › Should be adapted to the defect size and applied dry.
- › Has to be applied with the spongy framework (marked with grooves) facing towards the extraction socket.
- › Should be sutured with non-resorbable suture and not glued.
- › Should be sutured with single-interrupted sutures (recommended: 5.0 or 6.0), double interrupted sutures or cross sutures (recommended: 5.0), depending on the defect.
- › Should be tension-free and closely adapted to the de-epithelialised marginal soft-tissue border.



<sup>1</sup> Adapted from Geistlich Mucograft® Seal Advisory Board Meeting Report 2013. Data on file, Geistlich Pharma AG, Wolhusen, Switzerland.

# Product range

## Geistlich Bio-Oss®



Small granules 0.25 g, 0.5 g, 1.0 g, 2.0 g (1.0 g ≈ 2.0 cm<sup>3</sup>)  
Large granules 0.5 g, 1.0 g, 2.0 g (1.0 g ≈ 3.13 cm<sup>3</sup>)

The small Geistlich Bio-Oss® granules are recommended for smaller 1–2 socket defects and for contouring autologous block grafts. The large Geistlich Bio-Oss® granules enable improved regeneration over large distances and provide enough space for the ingrowing bone.

## Geistlich Bio-Oss Pen®



Small granules 0.25 g, 0.5 g (0.5 g ≈ 1.0 cm<sup>3</sup>)  
Large granules 0.5 g (0.5 g ≈ 1.5 cm<sup>3</sup>)

Geistlich Bio-Oss® granules are available in an applicator. It allows the bone substitute material to be applied faster and more precisely to the surgical site. Geistlich Bio-Oss Pen® is available containing both the small granules and the large granules.

## Geistlich Bio-Oss® Collagen



Geistlich Bio-Oss® (small granules) + 10% collagen (porcine)  
Sizes: 50 mg (2.5 x 5.0 x 7.5 mm), 100 mg (5.0 x 5.0 x 7.0 mm), 250 mg (7.0 x 7.0 x 7.0 mm), 500 mg (10.0 x 10.0 x 7.0 mm)

Geistlich Bio-Oss® Collagen is recommended 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®



Bilayer collagen membrane  
Sizes: 25 x 25 mm, 30 x 40 mm, 13 x 25 mm\*

Geistlich Bio-Gide® stabilizes the grafted area and protects bone particles from dislocation for optimal bone regeneration.<sup>10</sup> The natural collagen structure allows homogeneous vascularization, supports tissue integration and wound stabilization.<sup>5</sup> The combination of flexibility, good adhesion, and tear resistance contribute to easy handling, in turn saving time, and simplifying the surgical procedure.<sup>20</sup>

## Geistlich Bio-Gide® Shape



Pre-shaped, bilayer collagen membrane  
Size: 14 x 24 mm

New shape specifically designed for ridge preservation and minimally invasive procedures. Geistlich Bio-Gide® Shape is pre-cut for easy handling, reduced preparation time and application comfort.<sup>20</sup>

## Geistlich Combi-Kit Collagen



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

When used in combination, the system has optimised properties for Ridge Preservation and minor bone augmentations according to the GBR principle.

## Geistlich Mucograft® Seal



Collagen matrix  
Sizes: 8 mm, 12 mm diameter

Geistlich Mucograft® Seal consists of a compact structure that gives stability while allowing open healing, and a spongy structure that supports blood clot stabilisation and ingrowth of soft-tissue cells.

\* Product availability may vary from country to country

# Your Worldwide No. 1 Reference<sup>12,13,21-25</sup>

Geistlich Biomaterials is constantly working to offer you solutions for easy, predictable and successful management and regeneration of extraction sockets. The company's own research departments along with global experts develop the product portfolio, and try new techniques and applications for existing products. In more than 15 worldwide Round Table Meetings\*, expert clinicians and Geistlich Biomaterials cooperate on the aim of promoting discussion and evolving a consensus on the treatment concepts for extraction sockets. These Round Table Meetings help to define what is the current published clinical evidence and where research still needs to be done.

## Unique biofunctionality<sup>26,27</sup>

The excellent results of Ridge Preservation with Geistlich Biomaterials are largely due to their unsurpassed bio-functionality: Geistlich Bio-Oss® with its porous structure<sup>1</sup> serves as guide rail for the in-growing blood vessels<sup>2</sup> and integrates into newly formed bone<sup>3</sup>, while the unique bilayer Geistlich Bio-Gide® prevents soft-tissue ingrowth<sup>5,14,16,18,19</sup> supports vascularization<sup>5,17</sup> and wound healing<sup>4,18,19</sup>. The collagen matrix of Geistlich Mucograft® Seal facilitates soft-tissue cells ingrowth<sup>6</sup> and may enhance early wound healing<sup>7</sup>.

### Clinically relevant

- › Geistlich Biomaterials are perfectly suited to combined use for treatment of extraction sockets
- › Geistlich Bio-Oss® Collagen combined with Geistlich Bio-Gide® preserves up to 93 % of the ridge width<sup>8,9</sup> and they promote more new bone formation vs. no membrane<sup>10</sup>
- › Geistlich Bio-Oss® Collagen combined with Geistlich Mucograft® Seal increases preserved bone volume when compared to spontaneous healing<sup>11</sup>

1 Weibrich G et al., Mund Kiefer Gesichtschirurg 4, 2000; 148-152. (Pre-clinical study)  
2 Degidi M et al., Oral Dis. 2006 Sep; 12(5): 469-475. (Clinical study)  
3 Artzi Z, et al. J Periodontol. 2001 Feb;72(2):152-9. (Clinical study)  
4 Becker J et al., Clin. Oral Implants Res. 2009; 20(7): 742-93. (Clinical study)  
5 Rothamel D et al., Clin. Oral Implants Res. 2005;16:369-378. (Pre-clinical study)  
6 Ghanaati S, et al. Biomed Mater. 2011 Feb;6(1):015010. (Pre-clinical study)  
7 Thoma DS, et al. J Clin Periodontol. 2012 Feb;39(2):157-65. (Clinical study)  
8 Cardaropoli D, et al. Int J Periodontics Restorative Dent. 2012 Aug;32(4):421-30. (Clinical study)  
9 Cardaropoli D, et al. Int J Periodontics Restorative Dent. 2014 Mar-Apr;34(2):211-7. (Clinical study)  
10 Perelman-Karmon et al. Int J Periodontics Restorative Dent. 2012 Aug;32(4):459-65. (Clinical study)  
11 Jung RE, et al. J Clin Periodontol. 2013 Jan;40(1):90-8. (Clinical study)  
12 US market report suite for dental bone graft substitutes and other biomaterials, iDATA\_USDBGS19\_MS, Published in January 2019 by iData Research Inc., 2019. (Market Research)  
13 Europe market report suite for dental bone graft substitutes and other biomaterials, iDATA\_EUDBGS19\_MS, Published in July 2019 by iData Research Inc., 2019. (Market Research)  
14 Schwarz F et al. Clin. Oral Implants Res. 2006;17(4):403-409. (Pre-clinical study)  
15 Zitzmann NU et al. Int J Oral Maxillofac Implants. 12, 1997;844-852. (Clinical study)  
16 Rothamel D et al. Clin. Oral Implants Res. 2004;15:443-449. (Pre-clinical study)  
17 Schwarz F et al. Clin. Oral Implants Res. 2008;19(4): 402-415. (Pre-clinical study)  
18 Tal H et al. Clin Oral Implants Res. 2008; 19(3) : 295-302. (Clinical study)

Your Worldwide  
No. 1 Reference<sup>12,13,21-25</sup>

Unique  
Biofunctionality<sup>26,27</sup>

Outstanding  
Quality<sup>28-31</sup>

## Outstanding Quality<sup>28-31</sup>

Quality and safety are high priorities at Geistlich Pharma. At Geistlich Pharma everything is done under one roof: from the selection and control of the raw material to production and storage until dispatch, and all steps are taken seamlessly and meet the company's high standards of quality and safety.

19 Zitzmann NU et al. Int J Oral Maxillofac Implants. 12, 1997;844-852. (Clinical study)  
20 Data on File. Geistlich Pharma AG, Wolhusen, Switzerland. (Pre-clinical study)  
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