Major Bone Augmentation
Due to its osteoinductive potential, autologous bone is the gold standard for major bone augmentation procedures. It is very effective in stimulating new bone formation in large-scale defects. But human bone grafts are subject to a certain amount of resorption, which may affect the long-term clinical success of the therapy.

Geistlich biomaterials optimally complements human bone. Thanks to its high resorption stability and osteoconductivity, Geistlich Bio-Oss® protects human bone grafts against degradation. Geistlich Bio-Gide® a native collagen membrane provides a barrier function long enough to protect the newly forming bone from soft-tissue ingrowth and provides support for wound healing.

Overview

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Advantages of Utilizing Geistlich Biomaterials

Higher Patient Satisfaction
- Less invasive surgery
- Fewer complications
- Lower morbidity

Stable Clinical Outcome
- Less bone resorption

Long-term Implant Survival Rate
- Predictable bone gain

A Powerful Combination with Geistlich Bio-Oss® and Geistlich Bio-Gide®

“Human bone grafts are subject to unwanted resorption. Therefore, we always combine Geistlich biomaterials with autologous bone for larger augmentations.”
Prof. Dr. István Urbán

New Bone Formation with Geistlich Biomaterials

Decalcified Histology
New bone (NB) formation surrounding Geistlich Bio-Oss® particles (GBO)

Ridge Width Maintenance (%)

<table>
<thead>
<tr>
<th>Implants</th>
<th>Autologous Block + Particulate Geistlich Bio-Oss® + Geistlich Bio-Gide®</th>
<th>93</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autologous Block + Particulate Geistlich Bio-Oss®</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>Autologous Block + Autologous Bone Chips</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>

Improved Healing with Geistlich Bio-Gide®

Horizontal Ridge Augmentation Utilizing the Sausage Technique
Prof. Dr. István Urbán, Budapest, Hungary

Objectives
- The aim of this procedure is to predictively develop optimal bone width for dental implant placement with a technique which has minimal morbidity and more patient satisfaction

Case Documentation

1. Occlusal view of the thin posterior mandibular ridge. A full thickness, mid-crestal incision is used in the keratinized gingiva. For surgical access, the two divergent vertical incisions are placed, one at the mesio-buccal line angle of the first premolar and an oblique vertical incision was created at the most distal aspect of the crestal incison.

2. Buccal view after application of a 1:1 mixture of autologous particulated bone and Geistlich Bio-Oss® granules. Note that the Geistlich Bio-Gide® membrane is secured on the crest before the application of the graft.

3. Buccal view of a single Geistlich Bio-Gide® membrane, which is fixed with titanium pins. The pins are 1 mm diameter, which are stable in the cortical bone of the mandible. Note that the fixed membrane completely immobilizes the bone graft creating the sausage skin effect.

4. Final outcome 2 years after implant loading.

Horizontal Augmentation Using Geistlich Bio-Gide® and Particulate Bone Graft
Prof. Dr. Robert Carvalho da Silva, Prof. Dr. Paulo Fernando Mesquita, Prof. Dr. Julio Cesar Joly, Sao Paulo, Brazil

Objectives
- Horizontal alveolar ridge augmentation with Geistlich Bio-Oss® and Geistlich Bio-Gide®
- Minimizing autologous bone harvesting and resorption protection

Case Documentation

1. Intra-operative view of the atrophied anterior maxillary site. Tenting screws are placed to support and stabilize the Geistlich Bio-Gide® membrane.

2. A 1:1 mixture of autologous bone chips from the retromolar area and Geistlich Bio-Oss® is applied.


4. Final prosthetic restoration.

Crest Splitting
Dr. Gerhard Iglhaut, Filderstadt, Germany

Objectives
- Crest splitting procedure in combination with Geistlich Bio-Oss® and Geistlich Bio-Gide® for horizontal augmentation
- Preservation of the alveolar ridge volume

Case Documentation

1. Occlusal view of the ridge following flap elevation.

2. The split around the implants is filled with a 1:1 mixture of autologous bone chips from the retromolar area and Geistlich Bio-Oss®.

3. The augmented ridge is covered with Geistlich Bio-Gide® prior to closing of the soft tissue.

4. Occlusal view of the prosthetic outcome.

For additional information on Major Bone Augmentation, please visit the dental professional section of our website: www.geistlich-na.com
Therapeutic Areas

At Geistlich Biomaterials, we are committed to developing treatments that are uniquely matched to the clinical situations you see every day. That’s why we do more than bring you a family of products – we provide proven solutions in specific therapeutic areas.

The recommended Geistlich products below are the ideal biomaterials for use in Major Bone Augmentation procedures.

**Recommended Products for Major Bone Augmentation**

### BONE SUBSTITUTES

- **Geistlich Bio-Oss®**
- **Geistlich Bio-Oss Pen®**
- **Geistlich Bio-Oss Collagen®**

### MEMBRANES

- **Geistlich Bio-Gide®**

For additional information about Major Bone Augmentation, please visit the Dental Professional section of our website: www.geistlich-na.com

**CAUTION**: Federal law restricts these devices to sale by or on the order of a dentist or physician.

For information on indications, contraindications, precautions, and directions for use, please refer to the Geistlich Bio-Oss®, Geistlich Bio-Oss Collagen® and Geistlich Bio-Gide® Instructions for Use at: www.geistlich-na.com/ifu

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