Information brochure

osmed Tissue Expander for dental surgery
Introduction: Self-inflation by osmotic principle

osmed self-inflating tissue expanders are made of a specially developed hydrogel that uses the osmotic principle to gain volume.

Preoperatively osmed hydrogel implants are in their pre-expanded state, and therefore are a small, hard and easy to handle device. After implantation osmed hydrogel implants start to absorb body fluid and grow consistently to a predefined form and size. The increased volume of the implant leads to an increase of soft tissue. The implants uses a perforated silicone shell to reduce the swelling speed and effect a roughly linear growth.

General advantages of osmed tissue expanders are: safe material, low complication rate, low risk of infection, small incision, minimal trauma, controlled swelling and no pressure peaks. A short surgical time creates a benefit in cost, time and less pain.
Tips for success

Use of osmed Tissue Expanders Cylinder Dental and Cupola Dental prior to augmentation of resorbed edentulous ridges

by Dr. Dogan Kaner, Berlin

| Background |

Primary wound closure is essential for successful regeneration of bone. Soft tissue dehiscence and subsequent exposure of bone grafts to the oral cavity are complications of ridge augmentation and are a main cause for insufficient outcomes of reconstructive surgery. Main reason for graft exposure are poor quality and quantity of soft tissue and difficulties in achieving primary closure of the flap.

Tissue expansion improves tissue quality and quantity of soft tissue and facilitates primary wound closure. Closure of the flap is more easily achieved in bone graft surgery. Tissue expansion reduces the incidence of wound dehiscence and exposure of bone grafts.

| Indications |

Tissue expansion prior to extensive bone augmentation surgery, e.g.

- Onlay grafting with bone block grafts
- Other bone regeneration procedures

| Contraindications |

Contraindications normally associated with elective oral surgery should be observed.

General contraindications:

- Systemic disorders such as uncontrolled Diabetes mellitus
- Intravenous medication of bisphosphonates
- Heavy smoking

Local contraindications:

- Untreated gingivitis, periodontitis
- Untreated caries
- Insufficient oral hygiene
- Previous radiation therapy
osmed Tissue Expanders Cylinder Dental are available in 4 sizes (final volume from 0.24 ml to 2.1 ml) and are used for straight edentulous areas.

The osmed Tissue Expander Cupola Dental (final volume 0.35 ml) is used for small (1-2 missing teeth) or curved frontal edentulous areas.
Templates showing initial and final expander volumes are used for selection of the appropriate tissue expander type. During surgery, the templates facilitate correct preparation of the recipient site. The template’s cylindrical part corresponds to the hydrogel core. The distance from the cylinder tip to the bend corresponds to the full length of the expander in its silicone shell.

Perioperative administration of antibiotics is mandatory. Patients should abstain from brushing the treated area. A mouthrinse (e.g. chlorhexidine 0.2%, 2x/d for 1 min) should be used for at least 2 weeks. Removable dentures must not be used during tissue expansion. Temporary fixed partial dentures have to be adjusted regularly according to the increasing tissue volume.

| Anaesthesia |

Local anaesthesia
Surgical procedure

Resorbed edentulous ridge. Vertical augmentation is necessary prior to implant placement.

The template is used for selection of the appropriate expander type. The expander’s final volume has to fit to the designated surgical area. In case of doubt, use a smaller expander.

Starting from a curved incision (1.5 – 2.5 cm), a supraperiostal tunnelling flap is prepared. The incision should be placed at a safe distance from the later position of the expander. The triangular part of the flap allows access for placement of a fixation screw. The periosteum is not mobilized in order to avoid tension and additional bone resorption.
The preparation of the flap is controlled with the surgical template. The flap should easily cover the template. Do not use the expander for preparation control in order to avoid contamination.

Only now, the tissue expander is taken out of the packaging. It is placed under the tunnel flap and secured with a bone fixation screw through the flap. The expander must easily and without wrinkling fit into the prepared flap. During positioning of the expander and suturing, the surgical assistance should take care for a dry operative field in order to reduce contamination of the tunnel and the expander.

Caution: Sharp instruments may damage the silicone shell. Damaged expanders must be discarded.

A two-layer wound closure is performed with monofilament sutures (e.g. 2-3 modified vertical mattress sutures, 5.0; and a continuous suture, 6.0).

Removal of sutures after two weeks.
Usually, tissue expansion and maturation are completed after 8-10 weeks. The expander is removed in the course of augmentation surgery. Incision and flap design are chosen as required for the intended method of bone augmentation. It is possible to cut directly into the expander.

Before surgery

After 8 weeks of expansion, before bone augmentation
Tissue Expander

For dental surgery osmed offers two specialized types of Tissue Expanders:

**Cupola Dental**

Indication for small (1-2 missing teeth) or curved frontal edentulous areas

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Item</th>
<th>Volume</th>
<th>Projection</th>
<th>Diameter</th>
<th>Volume</th>
<th>Projection</th>
<th>Diameter</th>
<th>Swelling time**</th>
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<tr>
<td>400-2035</td>
<td>Cupola Dental 0.35 ml</td>
<td>0.05 ml</td>
<td>3 mm</td>
<td>6 mm</td>
<td>0.35 ml</td>
<td>5.6 mm</td>
<td>9 mm</td>
<td>40 days</td>
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</table>

* without silicone shell  
** in vitro in 0.9% NaCl-Sol.

**Cylinder Dental**

Indication for **straight** edentulous areas **only**

<table>
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<tr>
<th>Order No.</th>
<th>Item</th>
<th>Volume</th>
<th>Length</th>
<th>Diameter</th>
<th>Volume</th>
<th>Length</th>
<th>Diameter</th>
<th>Swelling time**</th>
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<td>Cylinder Dental 0.24 ml</td>
<td>0.045 ml</td>
<td>7.5 mm</td>
<td>3 mm</td>
<td>0.24 ml</td>
<td>12 mm</td>
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<td>20 days</td>
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<td>400-1070</td>
<td>Cylinder Dental 0.7 ml</td>
<td>0.15 ml</td>
<td>12 mm</td>
<td>4 mm</td>
<td>0.7 ml</td>
<td>20 mm</td>
<td>7 mm</td>
<td>40 days</td>
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<td>400-1130</td>
<td>Cylinder Dental 1.3 ml</td>
<td>0.25 ml</td>
<td>13 mm</td>
<td>5 mm</td>
<td>1.3 ml</td>
<td>22 mm</td>
<td>9 mm</td>
<td>50 days</td>
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<td>400-1210</td>
<td>Cylinder Dental 2.1 ml</td>
<td>0.42 ml</td>
<td>15 mm</td>
<td>6 mm</td>
<td>2.1 ml</td>
<td>24 mm</td>
<td>10.5 mm</td>
<td>90 days</td>
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</tbody>
</table>

* without silicone shell  
** in vitro in 0.9% NaCl-Sol.
Publications

Presently available publications with dental background:

- Periosteal expansion of rabbit mandible with an osmotic self-inflating expander
  Abrahamsson, P et al.
  Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery

- Osseous alterations at the interface of hydrogel expanders and underlying bone
  Stuehmer C, et al.,

- Using a novel self-inflating hydrogel expander for intraoral gingival tissue expansion
  prior to bone augmentation

Publications about self-inflating hydrogel tissue expanders treating biocompatibility, safety and indications are listed on [www.osmed.biz](http://www.osmed.biz).