Alveolar Distraction Overview

Surgical Innovation is our Passion
Intraoral Vertical Bone Distraction of the Alveolar Ridge

Introduction

Vertical bone defects of the (partial or total) alveolar ridge have a negative impact in functional and aesthetics.

By performing surgical methods one has to consider the morbidity of the donor site and the postoperative resorption of the bone transplant and the soft tissue.

Based on Ilizarov’s Techique and the pioneering work of McCarthy, Diner and Wangerin we developed a new distraction device for the vertical distraction of the alveolar ridge.

Indications

- Partial defects of the vertical alveolar ridge.
- Orthodontic indications as vertical replacement of tooth segments, therapy of local open bite.

Contraindications

- Cases of inadequate bone volume, especially in the severe atrophic mandible with danger of fractures.
- Osteoporoses.
- General contraindication is the severe diseased system.

Timetable of a distraction:

1. Osteotomy
2. Latency period (3–7 days)
3. Distraction (~1 mm per day)
4. Consolidation period (12 weeks)
5. Removal of the distractor
6. Implants can be placed immediately
Alveolar Distraction

Application

1. For this particular appliance local anaesthesia is recommended in most cases.

2. The vestibular mucosal incision is recommended.

3. The periosteum is released carefully.

4. The vertical distractor is placed into the desired position. The plates are now carefully cut and contoured using the bending pliers (25-486-13) to fit the desired location. Check the correct vector of distraction and avoid interference with the occlusion.

5. In this position one hole is drilled on either side of the micro plates and one screw (4 or 5 mm) is inserted.

6. The distractor is now removed and the osteotomy line is marked by a burr.

7. The buccal-cortical osteotomy is now performed using a Lindemann drill or an oscillating saw.

8. The segment is completely mobilized using fine chisels lingual or palatal.

9. The distractor is then fixed in the same position using the predrilled holes.

10. The additional screw holes are drilled and screws placed, screws are now inserted after drilling the caudal and cranial sides.

11. The correct function of the distractor is now checked insuring there are no boney interferences with the occlusion.

12. The soft tissue is closed. X-ray control postoperatively is recommended.

13. After a 5-7 day latency period, distraction begins at 1mm per day. The device selected will determine the amount of turns. (see pages 4-5 for device listing)

14. An over-correction of 1-2 mm may be considered because of relapse.

15. A minimum retention period of 8-12 weeks is recommended.

16. Implants are to be placed at device removal then a 12 week retention period is recommended.
## Alveolar Distraction

### Track

<table>
<thead>
<tr>
<th>Type</th>
<th>Item No.</th>
<th>Recommended screws</th>
<th>Distraction length/turn</th>
<th>Patient screwdriver</th>
<th>Item No. Patient screwdriver</th>
<th>Designed for:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Micro Track</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mm</td>
<td>51-523-06</td>
<td></td>
<td>1.0 mm</td>
<td>3 turns of 360º equals 1.0 mm</td>
<td>51-525-90</td>
<td>Designed for maxillary and mandibular distraction for single tooth segments.</td>
</tr>
<tr>
<td>9 mm</td>
<td>51-523-09</td>
<td></td>
<td>1.0 mm</td>
<td>3 turns of 360º equals 1.0 mm</td>
<td>51-525-95</td>
<td></td>
</tr>
<tr>
<td>12 mm</td>
<td>51-523-12</td>
<td></td>
<td>1.0 mm</td>
<td>3 turns of 360º equals 1.0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Track 1.0 mm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mm</td>
<td>51-525-06</td>
<td></td>
<td>1.0 mm</td>
<td>3 turns of 360º equals 1.0 mm</td>
<td>51-525-90</td>
<td>Designed for segments up to approximately 20 mm.</td>
</tr>
<tr>
<td>9 mm</td>
<td>51-525-09</td>
<td></td>
<td>1.0 mm</td>
<td>3 turns of 360º equals 1.0 mm</td>
<td>51-525-95</td>
<td></td>
</tr>
<tr>
<td>12 mm</td>
<td>51-525-12</td>
<td></td>
<td>1.0 mm</td>
<td>3 turns of 360º equals 1.0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 mm</td>
<td>51-525-15</td>
<td></td>
<td>1.0 mm</td>
<td>3 turns of 360º equals 1.0 mm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Distractions pictured 1:1 scale unless otherwise noted.
## Alveolar Distraction

<table>
<thead>
<tr>
<th>Type</th>
<th>Distraction length</th>
<th>Item No.</th>
<th>Recommended screws</th>
<th>Distraction length/turn</th>
<th>Patient screwdriver</th>
<th>Item No. Patient screwdriver</th>
<th>Designed for:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Track Plus</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mm, kit</td>
<td></td>
<td>51-524-16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 mm, kit</td>
<td></td>
<td>51-524-19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 mm, kit</td>
<td></td>
<td>51-524-22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 mm, kit</td>
<td></td>
<td>51-524-25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Designed for maxillary and mandibular alveolar distraction for segments up to 35 mm.</td>
</tr>
<tr>
<td><strong>Track 1.5 mm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 mm</td>
<td></td>
<td>51-520-10</td>
<td></td>
<td></td>
<td></td>
<td>51-505-90</td>
<td>Designed for segments up to 55 mm.</td>
</tr>
<tr>
<td>15 mm</td>
<td></td>
<td>51-520-15</td>
<td></td>
<td></td>
<td></td>
<td>51-520-95</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Track 2.0 mm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 mm</td>
<td></td>
<td>51-530-10</td>
<td>A - Transport plate</td>
<td>1.5 mm</td>
<td></td>
<td>51-505-90</td>
<td>Designed for segments up to approximately 60 mm.</td>
</tr>
<tr>
<td>15 mm</td>
<td></td>
<td>51-530-15</td>
<td>B - Base plate</td>
<td>2.0 mm</td>
<td></td>
<td>51-520-95</td>
<td></td>
</tr>
</tbody>
</table>

Distractors pictured 1/1 scale unless otherwise noted.
Alveolar Distraction
Ordering Details:

Additional instruments

- 51-525-80  Plate holding forceps, curved
- 51-525-76  Distraction holding forceps
- 25-435-10  Lindorf plate holding instrument
- 25-486-13  Bending pliers
- 11-875-10  Plate cutter
- 25-492-13  Centre-Drive® screwdriver, 1.0 mm
- 51-525-85  Patient screwdriver, straight
- 51-525-90  Patient screwdriver, combination straight + angled
- 25-430-16  Centre-Drive® screwdriver, 1.5 mm
- 25-441-16  Plate holding forceps
- 25-435-15  Lindorf plate holding forceps
- 51-500-90  Patient screwdriver, standard hex style
- 51-505-90  Patient screwdriver, universal joint hex style
- 25-430-97  Cross-Drive screwdriver, 1.5mm

- 25-660-04  Centre-Drive® micro screws, 1.0 x 4.0 mm
- 25-660-05  Centre-Drive® micro screws, 1.0 x 5.0 mm
- 25-660-06  Centre-Drive® micro screws, 1.0 x 6.0 mm
- 25-661-05  Centre-Drive® emergency micro screws, 1.2 x 5.0 mm
- 25-675-04  Cross-Drive micro screws, 1.5 x 4.0 mm
- 25-675-05  Cross-Drive micro screws, 1.5 x 5.0 mm
- 25-675-07  Cross-Drive micro screws, 1.5 x 7.0 mm
- 25-676-05  Cross-Drive emergency micro screws, 1.8 x 5 mm
Alveolar Distraction

Literature

1. Chin M., Toth, B.A.: 
   Distraction Osteogenesis in Maxillofacial Surgery Using 
   Internal Devices 

2. Hidding, J., Lazar, F., Zöller, J. E.: 
   The Vertical Distraction of the Alveolar Bone 
   J Cranio Max-Fac Surg 26, Suppl 1, (1998), 72-73

3. Hidding, J., Zöller, J. E.: 
   Alveolar Bone Distraction 
   Atlas of Cranio-maxillofacial Osteosynthesis 
   Miniplates, Microplates and Screws 
   Ed.: F. Härle, M. Champy and B. Terry 
   Thieme Stuttgart New York 1999

4. Hidding, J., Lazar, F., Zöller, J. E.: 
   Erste Ergebnisse bei der Distraktionsosteogenese des 
   atrophischen Alveolarkammes 
   Mund Kiefer Gesichtschr 3, Suppl. 1999

5. Hidding, J., Lazar, F., Zöller, J. E.: 
   Knöcherne Regeneration des 
   Unterkieferalveolarfortsatzes mit Hilfe der vertikalen 
   Kallusdistraction 
   Deutsch Zahnärztl Z 54, 1999, 51 - 54

6. Ilizarov, G.A.: 
   Basic principles of transosseous compression and 
   distraction osteosynthesis Ortop Travmatol 
   Protez 32 (1971) 7-15

7. Ilizarov, G.A.: 
   The Principles of the Ilizarov Method. 

8. Ilizarov, G.A.: 
   The tension-stress effect on the genesis and growth of 
   tissues: part I. The influence of stability of fixation and 
   soft tissue preservation. 

9. Ilizarov, G.A.: 
   The tension-stress effect on the genesis and growth of 
   tissues: part II. The influence of the rate and frequency 
   of distraction 

10. Klein, C., Howaldt, H.P.: 
    Lengthening of the Hypoplastic Mandible by Gradual 
    J. Craniomaxillofac. Surg. 23 (2); 68-74, 1995

    Grayson, B.H.: 
    Lengthening the human mandible by gradual 
    Distraction. 
    Plast. Reconstr. Surg. 89 (1992) 1

12. Molina F., Ortiz-Monasterio, F.: 
    Mandibular Elongation and Remodeling by Distraction: 
    A Farewell to Major Osteotomies. 

13. Molina F., Ortiz-Monasterio, F.: 
    Mandibular Elongation and Remodeling by Distraction: 
    A Farewell to Major Osteotomies. 

14. Snyder, C.C., Levine, G.A., Swanson, H.M.: 
    Mandibular lengthening by gradual distraction: 
    Preliminary report. 
    Plast. Reconstr. Surg. 51 (1973) 506-508

15. Wangerin, K., Gropp, H.: 
    Die enorale Distraktionsosteotomie des mikrogenen 
    Unterkiefers zur Besetzung der 
    Atemwegsobstruktion. 