Distraction Osteogenesis

The Bologna Midline Distractor

(BMD)
Introduction

Transverse mandibular hypoplasia (TMH) with crowding of the anterior teeth and a V-shape of the mandible is frequently seen in patients with Class I and II malocclusions and Class III patients requiring decompensation before orthognathic surgery. Traditionally, teeth slicing and teeth extractions with compensating orthodontics, functional appliances or orthopaedic devices have been the first choice of treatment, but have resulted in instability, compromised periodontium and compromised facial aesthetics.

The surgical technique of widening the symphyseal area of the mandible is based upon gradual distraction following vertical interdental symphyseal osteotomy and has proven to be successful. However, the distraction devices used so far are rather bulky with great discomfort for the patients, including mucosal irritations, hyperplasia and pain.

The Bologna Midline Distractor (BMD) is a slim, but very strong alternative.
The Bologna Midline Distractor

BMD

Developed in cooperation with

Dr. Alberto Bianchi, MD; DMD
Oral and Maxillofacial Surgery Unit,
S. Orsola-Malpighi Hospital
University of Bologna,
Bologna, Italy

Indications

- (Extreme) transverse mandibular hypoplasia in non-syndromal and syndromal patients
- Anterior dental crowding
- V-shape of the mandible

Relative contra-indication

- Class II/1 and II/2 deep bite; the deep bite may interfere with the position of the Midline Distractor. This can be overcome by placing the BMD more apically or by wearing an occlusal splint during the distraction and consolidation period.

Advantages

- Easily placed and activated
- Parallel widening due to stiff and resistant device applying a very slim and comfortable distractor
- No mucosal irritation with discomfort and pain
- Allows simultaneous orthodontic treatment with fixed appliances
- Can be removed easily under local anaesthesia
**Intraoperative procedure**

The surgery is performed under general anaesthesia with preferable naso-endotracheal intubation. Via a standard incision in the labial vestibulum easy access is gained to the bony structures of the dental roots in the symphyseal area. The inferior plates of the distractor are bent and adjusted to the form of the mandible. The superior teeth anchoring arms are bent, inserted and fixed with steel wires in the slots of the dental bands, which have been previously applied by the orthodontist. The BMD is fixed with six monocortical screws, placed in the best holes in the plates to avoid the dental roots. The line of the ideal interdental symphyseal osteotomy is marked and the lower part is osteotomized with a saw. A possible interference of the distractor with the upper incisors is checked. The distractor is removed and the osteotomy is completed with a chisel. Now the distractor is refixed in a final manner. To check undisturbed distraction the distractor is slightly activated and deactivated. The mucosa is primarily closed. Complete healing of the mucosa without irritation during distraction can be observed.

**Oral hygiene**

The design of the Bologna Midline Distractor is based on a hyrax-appliance and therefore food remnants are not likely to stick in the device. Patients must be instructed to routinely clean the device at least twice per day thoroughly. Visit of an oral hygienist is recommended on a regular base.
Distraction protocol

**Latency phase:**

Once the Bologna Midline Distractor has been implanted, a latency period of approx. 5-7 days (depending on the patient) must be observed before starting the distraction process.

**Distraction phase:**

Active distraction is performed with a patient activating wire (ref. no. 51-509-90-07, see page 7). The distractor features an arrow to indicate moving direction.

One complete movement with the activating wire (90°) equals 0.25 mm. The recommended distraction length per day is 0.5 mm (two movements) to 1.0 mm (four movements) based on the general patient considerations.

**Consolidation phase:**

The consolidation phase lasts approx. 10-12 weeks. In order not to jeopardize the distraction result, the distractor must be left in situ until complete osseous consolidation has been achieved. Orthodontic treatment can already be started during this phase.

**Removal of the distractor:**

At the end of the consolidation period the distractor can be removed in an outpatient clinic. The mucosa surrounding the distractor is infiltrated with local anaesthesia including a vasoconstrictor. A mucosal flap is raised and the screws including the distractor are removed. The mucosa is primarily closed. The healing of the mucosa is normally restored within one week.
Clinical examples

Case 1

Fig. 1: Pre-OP

Fig. 2: Pre-OP

Fig. 3: Complete osteotomy and fixation with monocortical screws

Fig. 4: Intraoperative activation

Fig. 5: During active distraction

Fig. 6: After orthodontic treatment

Case 2

Fig. 1: Pre-OP

Fig. 2: End of distraction

Fig. 3: After orthodontic treatment

Case 3

Fig. 1: Pre-OP

Fig. 2: End of distraction

Fig. 3: After orthodontic treatment
## Ordering Details

### Distractors
- 51-508-10-09 Bologna Midline Distractor, 10 mm (incl. activating wire)
- 51-508-15-09 Bologna Midline Distractor, 15 mm (incl. activating wire)

### Recommended Screws (Centre Drive® or maxDrive®)
- 25-872-05-09 maxDrive® Mini Screws 2.0 x 5 mm
- 25-872-07-09 maxDrive® Mini Screws 2.0 x 7 mm
- 25-662-05-09 Centre Drive® Mini Screws 2.0 x 5 mm
- 25-662-07-09 Centre Drive® Mini Screws 2.0 x 7 mm
- 25-672-05-09 Cross Drive Mini Screws 2.0 x 5 mm
- 25-672-07-09 Cross Drive Mini Screws 2.0 x 7 mm

### Recommended Instruments
- 25-407-04-04 Screwdriver handle
- 25-486-97-07 maxDrive® screwdriver blade 2.0 mm
- 25-540-98-07 Centre Drive® screwdriver blade 2.0 mm
- 25-540-97-07 Cross Drive screwdriver blade 2.0 mm
- 25-449-05-91 Twist drill 1.5 x 50 mm, 5 mm stop
- 25-449-07-91 Twist drill 1.5 x 50 mm, 7 mm stop
- 25-516-13-07 Modelling plier (2 recommended)
- 25-441-18-07 Plate holding forceps
- 25-435-20-07 Lindorph plate holding instrument
- 25-407-04-04 Screwdriver handle
- 25-486-97-07 maxDrive® screwdriver blade 2.0 mm
- 25-540-98-07 Centre Drive® screwdriver blade 2.0 mm
- 25-540-97-07 Cross Drive screwdriver blade 2.0 mm
- 25-449-05-91 Twist drill 1.5 x 50 mm, 5 mm stop
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- 25-441-18-07 Plate holding forceps
- 25-435-20-07 Lindorph plate holding instrument

### Optional Instruments
- 51-509-90-07 Patient activating wire (spare part)
- 38-846-20-07 Smith Spreader
- 48-160-12-07 Osteotome

### Storage
- 55-962-08-04 Insert module, purple, w/o lid and inserts
- 55-963-17-04 Lid for distraction module
- 55-962-18-04 Storage module, purple, w/o lid and inserts
- 55-963-09-04 Lid storage module
- 55-964-24-04 Insert empty, 2 sections
- 55-964-17-04 Insert universal

## Literature
- **Guerrero CA, Bell WH, Contasti GI, Rodriguez AM**
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- **Mommaerts MY, vande Vannet B.**
  Dental tours de force 5. Bimaxillary transverse distraction osteogenesis.

  Anterior transmandibular osteodistraction: clinical and model observations.

- **Triaca A, Antonini M, Minoretti R, Merz BR**
  Segmental distraction osteogenesis of the anterior alveolar process

- **Tae KC, Kang KW, Kim SC, Min SK**
  Mandibular symphyseal distraction osteogenesis with stepwise osteotomy in adult skeletal class III patient.

- **Profitt WR**
  Penny Rudolph, Mosby, Inc, St Louis, USA
# KLS Martin Group

Karl Leibinger GmbH & Co. KG  
78570 Mühleim · Germany  
Tel. +49 7463 838-0  
info@klsmartin.com

KLS Martin GmbH + Co. KG  
79224 Umkirch · Germany  
Tel. +49 7665 9802-0  
info@klsmartin.com

Stuckenbrock Medizintechnik GmbH  
78532 Tuttlingen · Germany  
Tel. +49 7461 165880  
verwaltung@stuckenbrock.de

Rudolf Buck GmbH  
78570 Mühleim · Germany  
Tel. +49 7463 99516-30  
info@klsmartin.com

KLS Martin France SARL  
68000 Colmar · France  
Tel. +33 3 89 21 6601  
france@klsmartin.com

KLS Martin Italia S.r.l.  
20871 Vimercate (MI) · Italy  
Tel. +39 039 605 6731  
italia@klsmartin.com

KLS Martin Nederland/Marned B.V.  
1270 AG Huizen · The Netherlands  
Tel. +31 35 523 45 38  
nederland@klsmartin.com

KLS Martin UK Ltd.  
Reading RG1 3EU · United Kingdom  
Tel. +44 1189 000 570  
uk@klsmartin.com

Nippon Martin K.K.  
Osaka 541-0046 · Japan  
Tel. +81 6 62 28 9075  
nippon@klsmartin.com

Gebrüder Martin GmbH & Co. KG  
Representative Office  
Dubai · United Arab Emirates  
Tel. +971 4 454 16 55  
middleeast@klsmartin.com

Gebrüder Martin GmbH & Co. KG  
Representative Office  
121471 Moscow · Russia  
Tel. +7 499 792-76-19  
russia@klsmartin.com

Gebrüder Martin GmbH & Co. KG  
Representative Office  
201203 Shanghai · China  
Tel. +86 21 2898 6611  
china@klsmartin.com

Gebrüder Martin GmbH & Co. KG  
A company of the KLS Martin Group  
Ludwigtaler Str. 132 · 78532 Tuttlingen · Germany  
Postfach 60 · 78501 Tuttlingen · Germany  
Tel. +49 7461 706-0 · Fax +49 7461 706-193  
info@klsmartin.com · www.klsmartin.com