Application options and results

Epimucosal application

Results

Submucosal application

Incision and osteotomy of the hard palate parallel to the suture

Retention period after distraction

Distraction procedure started, palatal mucosa is closed

Submucosal application of the distractor

Epimucosally placed device after distraction (3 weeks post-op) and start of the orthodontic treatment

Orthodontic treatment during retention period (3.5 months post-op)

Final view after distractor removal (4.5 months post-op)
Ordering Details

The Magdeburg Palatal Distractor

51-545-10 Palatal Distractor, 10 mm
51-545-15 Palatal Distractor, 15 mm

Recommended Instruments

50-900-00 Right angled screwdriver ASD, complete
50-911-22 Angled screwdriver bit Centre Drive® 2.0 mm
50-915-22 Angled screwdriver bit Cross Drive 2.0 mm
50-924-16 Twist Drill for ASD 2.0 mm screws

25-486-13 Modelling pliers
(two recommended)

51-512-90 Patient screwdriver, straight

51-517-90 Patient screwdriver, combination straight + angled

48-350-24 Palatal fin-edge osteotome

Recommended Screws

25-662-05 Centre-Drive® Titanium Mini Screws 2.0 x 5 mm (5 each)
25-662-07 Centre-Drive® Titanium Mini Screws 2.0 x 7 mm (5 each)
25-662-09 Centre-Drive® Titanium Mini Screws 2.0 x 9 mm (5 each)
25-663-47 Centre-Drive® Titanium Mini Emergency Screws 2.3 x 7 mm (5 each)

25-672-05 Cross-Drive Titanium Mini Screws 2.0 x 5 mm (5 each)
25-672-07 Cross-Drive Titanium Mini Screws 2.0 x 7 mm (5 each)
25-672-09 Cross-Drive Titanium Mini Screws 2.0 x 9 mm (5 each)
25-673-47 Cross-Drive Titanium Mini Emergency Screws 2.3 x 7 mm (5 each)

alternative:

25-669-05 Centre-Drive® Titanium Mini Drill Free Screws 2.0 x 5 mm (5 each)
25-669-07 Centre-Drive® Titanium Mini Drill Free Screws 2.0 x 7 mm (5 each)

25-679-05 Cross-Drive Titanium Mini Drill Free Screws 2.0 x 5 mm (5 each)
25-679-07 Cross-Drive Titanium Mini Drill Free Screws 2.0 x 7 mm (5 each)
Distraction Osteogenesis

The Magdeburg Palatal Distractor for surgically assisted rapid maxillary expansion
The Magdeburg Palatal Distractor

Introduction

In surgically assisted rapid palatal expansion, the transversal widening is achieved by using various expansion devices fixated on the lateral teeth following bilateral osteotomy of the lateral maxilla and, if needed, the median palatine suture. Possible complications include tilting or extrusion of supporting teeth, gingiva recession and alveolar process fenestration. Such unwelcome side effects are not to be expected if a bone-supported palatal distractor is used, due to the physical widening of the maxillary halves.

Design of the distractor

The functional component of this bidirectional enoral distractor (ref. no. 51-545-10/-15) consists of a cylindrical body with two longitudinal slide bearings. The cylinder incorporates an angular drive with a central spindle featuring two counteracting threads (a right-handed and a left-handed one). At the beginning of each thread, an offset bar with an internal thread is located. Each of these bars connects to a 4-hole miniplate located at a right angle to the cylinder body.

The distractor is activated transorally, using a special distraction screwdriver (ref. no. 51-512-90 resp. 51-517-90).

One full turn is equivalent to a distraction length of 0.2 mm. A daily distraction distance of 0.4 mm is recommended.

Benefits

- Safe and symmetrical physical movement of the two maxillary halves
- High retention stability, no relapses
- Since the distractor is directly fixed to the palatal bones, root resorption, buccal fenestration and tooth tilting is prevented. Missing lateral teeth are no contraindication.
- Allows simultaneous orthodontic multi-band treatment to form the dental arches; this means a significant further reduction of overall treatment times.
- Easy handling by the patient and great comfort in wearing the device
- High degree of patient safety thanks to non-dividible device design (no loose components)

Indications

- Narrow maxilla (severe cases)
- Disproportion between tooth size and size of maxilla
- Angle class II and III patients
- Cleft patients
- Stenosis of the nasal meati

Contra-indications

- Insufficient bone volume or quality so that a secure planning of the distraction is not possible.
- A general contraindication is a bad health condition: immune deficiency – irradiated patients.

Developed in cooperation with

Prof. Dr. Dr. K.-L. Gerlach, Dr. Chr. Zahl
Dept. of Oral & Maxillofacial Surgery
O-v-G-University Magdeburg, Germany
Surgical approach

• Bilateral vestibular mucosal incision
• Exposure of the facial maxillary sinus walls
• Osteotomy from the piriform aperture to the maxillary tuber
• Weakening the connection between the tuber and the pterygoid process is recommended
• Bilateral osteotomy parallel to the palatal suture (alternatively after elevating the nasal floor mucosa using the fin-edge osteotome ref. no. 48-350-24)
• Either from a nasal approach beyond the piriform aperture or transorally by a direct palatal approach
• Distractor is adapted to the anatomical conditions of the palate.
• Transmucosal fixation of the 2.0 mm titanium screws, either self-cutting with pre-drilling (ref. no. 25-662-05) or self-drilling without pre-drilling (ref. no. 25-669-05)
• Alternatively epimucosal application with 2.0 x 7 or 9 mm titanium screws is possible (ref. nos. 25-662-07/-09 or 25-669-07).
• Following fixation, functional test by activating 2 mm and reset to starting position

Distraction protocol

• Latency period: 6 days
• Distraction of 0.4 mm per day with patient screwdriver (ref. no. 51-520-90), two full 360° turns per day
• Retention period after distraction: 3 months
• Orthodontic multi-band treatment can already be started or continued during retention period.

NOTE: In clinical use, no mucosal pressure necroses have been observed below the base of the plate in any of the cases where the distractor was applied epimucosally.

Application options

This distractor offers three different application options, to be used according to the indication (age of patient, maxillary anomaly, operating space).

1. Submucosal application after stripping the palatine mucosa
2. Epimucosal application
3. Transmucosal application following a short sagittal incision of the palatine mucosal just below the supporting miniplates.
Procedures for children and adolescents

Basically, the distractor can also be used for accelerated palatine suture expansion in children. In this case, however, it is usually preferable to employ the smaller device, which must be applied transmucosally.

The surgically supported widening of the maxilla as described above is a procedure that should only be used after the transitional dentition phase has been completed, as otherwise tooth buds might be damaged. Osteotomies of the pterygomaxillary sutures are usually unnecessary. If palatine suture osteotomy is required, it can always be performed in these cases starting from the nasal aperture after elevating the nasal floor mucosa.

Bending procedure

To avoid distractor plate damage during the bending procedure, please use always two bending pliers ref. no. 25-486-13.

Bibliography


