2 Indications

Subapical and segmental osteotomies can be useful for the correction of skeletal and dentoalveolar deformities without, or in combination with, orthodontic treatment.

Typical indications for isolated segmental osteotomies are found:

- In vertical dentoalveolar and/or skeletal disorders, such as frontal open bite deformities and deep bites
- In sagittal dentoalveolar disorders, such as dentoalveolar prognathism

Typical indications for subapical and segmental osteotomies as part of total osteotomies are present when vertical, sagittal, and transverse dentoalveolar problems need to be corrected in addition to basal skeletal disorders.

3 Planning aspects

Anterior maxillary blocks or segments

The correction of vertical disorders needs either impaction or elongation of the anterior block or segment. Impaction can be achieved either by resecting a slice of bone between the apices of the tooth roots and the nasal floor in a block osteotomy, or by moving the nasal floor cranially in a segmental osteotomy. The advantage of the first variation is no change in the position of the anterior nasal spine, and therefore, only little influence on nasal shape. The disadvantages are a greater risk for devitalization of the teeth, especially for the canine tooth, and a more demanding surgical technique. The second variation is technically simpler, but there will be a reduction of airway space and the nasal septum usually must be shortened to prevent deviation. Therefore, an individual decision is needed, depending on the amount of bone and the expected movement in the region of interest.

Elongation procedures can be done using the same type of osteotomies. In case of an intramaxillary block osteotomy, mobilization of the tooth-bearing fragment creates an intramaxillary gap which needs to be filled with a bone graft or bone replacement material, especially if the gap exceeds 1–2 mm.

The correction of sagittal disorders of the dental arch requires ostectomies in dentate areas together with the removal of teeth (unless teeth are missing) or osteotomies and the insertion of a bone graft in case of an advancement.

Lateral maxillary blocks or segments

The typical indication for osteotomies of lateral maxillary blocks or segments is the correction of vertical disorders, mostly through impaction. Very often the question arises if transverse deficiencies can be corrected at the same time. This is feasible but only to a very limited degree, because widening of the maxillary arch with lateral subapical osteotomies mostly needs a corporal movement and not a lateral "swing" and is limited by stretchability of the palatal mucosa.

4 Preoperative preparations

Preoperative orthodontic treatment can be very helpful to open interdental spaces at the sites of the osteotomies. Adjacent teeth should receive a dental root torque away from the osteotomy line. The orthodontic arch wires must be cut at the osteotomy sites to allow the blocks or segments to be mobilized. Based on the preoperative planning, occlusal splints should be available to align the fragments into the desired new position.

5 Surgical technique

5.1 Isolated block or segmental osteotomies

Anterior maxillary segment

Although the procedure is typically performed under general anesthesia, local anesthetics with vasoconstriction are applied prior to incision to prevent excessive bleeding. If preoperative planning includes removal of a tooth, typically a premolar, the tooth extraction is performed first.

The soft-tissue access is chosen according to the planned osteotomy lines. Vertical vestibular incisions are placed in the region of the planned bone cuts. Ideally, the cuts should spare the papillae to prevent gingival recession. If the plan is to include the nasal floor, thus performing a segmental osteotomy, an additional midline incision is frequently necessary to obtain access to the anterior septal base. Careful subperiosteal soft-tissue tunnelling gives access to the alveolar ridge, the anterior antral wall, and the bony nasal aperture.

It is advisable to mark the planned osteotomy lines for symmetry and protection of the dental roots with a small round burr or chisel according to the information on the length of the tooth roots provided by a preoperative panoramic x-ray.

The osteotomies are performed with a microsaw, a piezoelectric device, a burr, a chisel, or with a combination thereof (**Fig 7.3.3-2a**). Care must be taken not to damage the tooth roots and not to cut through the palatal mucosa. It is technically demanding to connect both premolar osteotomies precisely in the palatal midline and to mobilize the anterior segment. To complete the mobilization, it is necessary to sever the nasal septum at its base with the help of an osteotome or scissors (**Fig 7.3.3-2b**). If a corporal movement and a rotation of the fragment are planned simultaneously, full fragment mobilization is mandatory. Only then will proper positioning with use of an acrylic splint be successful. With the acrylic splint in place, occlusion will be stabilized with mandibulomaxillary wires.

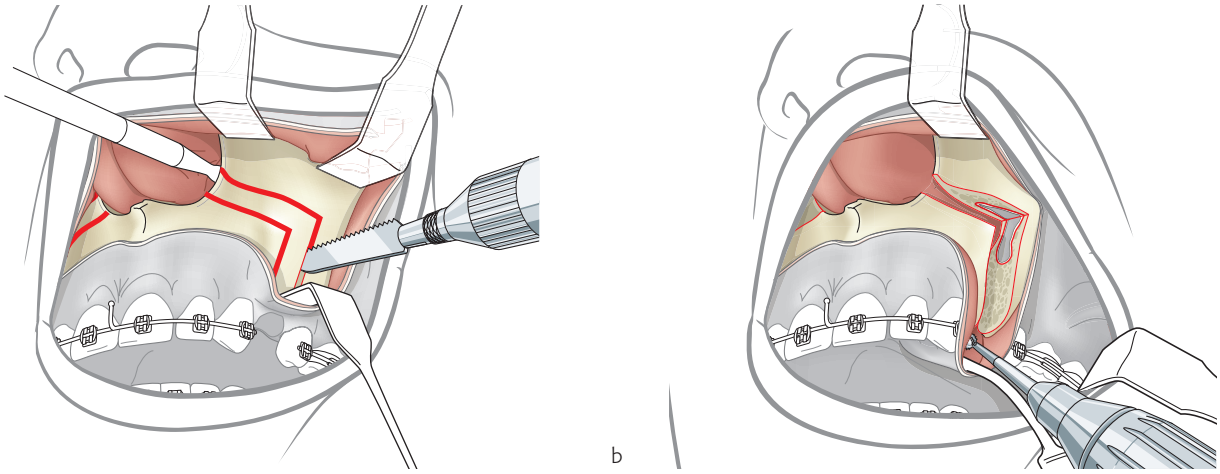

Fig 7.3.3-2a–b Anterior maxillary osteotomy.
a After marking of the osteotomy lines the osteotomy is performed with a microsaw.
b Completion of the palatal osteotomy after L-shaped ostectomy of the facial bony wall.