Vertical downward positioning of the maxilla results in a bone gap between upper and lower part of the maxilla creating the need for bone grafts. These grafts are placed at the piriform rim and zygomaticoalveolar buttress areas. Bone grafts can also be applied in large advancements of 10 mm or more to decrease the gap, increase the bone-to-bone contact surface, and to help project midfacial soft tissues. Vertical movement of the maxilla always introduces mandibular positional changes by autorotation. Maxillary downward positioning elongates the face, rotates the chin point downwards and backwards, and rotates the condyles anteriorly. In contrast, maxillary impaction rotates the mandible upwards while shortening the lower face and brings the chin upward and forward. In cases where rotational movements of the mandible should be avoided, bimaxillary osteotomies (combining a Le Fort I with an osteotomy in the ascending rami of the mandible) are indicated.

Before internal fixation is performed it is important to ensure:

- Passive placement of the teeth into occlusal splint
- Centric position of the condyles
- Correct vertical position of the maxilla through bone-to-teeth measurement

2 Internal fixation

Fixation is typically performed with four miniplates, which must be placed along the four anterior maxillary buttresses and correctly adapted to the osteotomized segments. Typically, L- or Y-shaped plates (right and left) are ideal because they fit the anatomy very well. Internal fixation is performed with the splint and MMF in place (**Fig 7.3.1-6**). Miniplates 1.5 or corresponding Matrix plates are strong enough for internal fixation. However, in cases with large movements and in cases with preexisting scars (cleft cases, secondary osteotomies after trauma) 2.0 plates or stronger Matrix plates and screws are recommended.

Placement of screws must avoid tooth roots, and placement of plates must not interfere with dental prostheses, because compression of mucosa between plate and prosthesis may cause discomfort, pain, and finally hardware exposure.

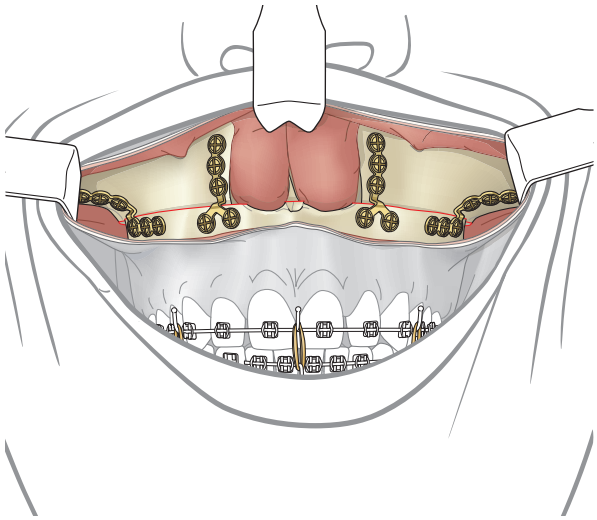

Fig 7.3.1-6 Correct fixation of a Le Fort I osteotomy with L- and Y-plates along the anterior and anterolateral maxillary buttresses.

3 Soft-tissue considerations

It is of major importance to realize that the outcome of orthognathic surgery does not rely only on the movement and fixation of bone fragments. A multitude of changes in the surrounding tissues need consideration to achieve the desired functional and esthetic result.

The nose

Functional restrictions may follow the reduction of the nasal space by impaction of the maxilla. To prevent deviation, the nasal septum must be reduced in height in the same amount as the maxilla is moved cranially. The space between the inferior turbinates and the nasal floor may change, causing airway obstruction. Reduction of the turbinates can help to prevent airway compromise. The bony nasal aperture will become smaller after impaction. Modeling osteotomies may be needed to correct this.

Therefore, esthetically the advancement of the maxilla tends to flatten the nose by widening the nasal base. The use of the alar base cinch suture (**Fig 7.3.1-7a–c**) is helpful to prevent flaring of the alar base and flattening of the nose.

The upper lip

The length of the upper lip can be influenced by additional soft-tissue procedures, typically by V-Y plasty. Short lips, especially after advancements, may need lengthening to achieve a good lip-to-tooth relationship.

The cheeks

Resuspension of the soft tissues may be necessary to prevent sagging, especially in complex (high Le Fort I, Le Fort II, Le Fort III) upper facial osteotomies.

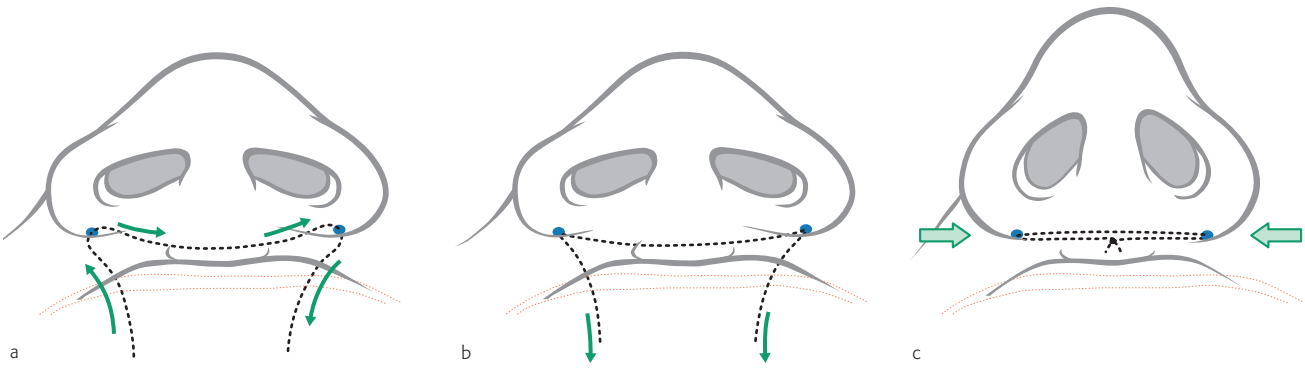

Fig 7.3.1-7a–c Alar base cinch suture for the control of the nasal width after Le Fort I impaction or advancement of the maxilla.

a The alar bases are incised and the nostril sill portions are de-epithelized. A tunnel is dissected through the base of the columella through which afterwards the denuded flaps are passed.

b Diagram showing the alar base cinch suture.

c Final position of alar base and nasal tip after correct closure.