1.2 Vertical ramus osteotomy

Historically, vertical ramus osteotomies were widely used in cases with Class III malocclusion and prognathic mandibles. The method was preferred to BSSO for the lower incidence of nerve injuries. The fragments were usually left without any fixation and a long period of MMF was used. Nowadays, the operation is rarely performed, but may be useful in cases with asymmetry and if vertical movement of the ascending ramus is needed. It can be used in combination with some other type of osteotomy, ie, body step osteotomy on the same side or sagittal osteotomy on the other side. If the planned retrusion is very large, the coronoid process may hit the condyle, and coronoidectomy should be carried out. The whole surface of the lateral cortex of the ramus is exposed, usually from a transoral incision, and a 6–7 mm deep cut is performed with an angle-bladed oscillating saw. The cut is made posterior to the mandibular foramen, keeping the antilingula of the buccal plate as an anatomical landmark (**Fig 7.2-13a–b**). The cut is completed from the posterior aspect of the sigmoid notch to the antegonial notch area at a distance of 7 mm anterior and parallel to the posterior border of the ramus. After the osteotomy is completed, the proximal fragment is usually displaced laterally. It can be pulled more laterally with an elevator, and the medial pterygoid muscle and the periosteum are stripped from the most anterior part of the medial surface to allow the fragments to overlap and have bone-to-bone contact. It should be remembered that the remaining part of the muscle acts as a pedicle to the proximal fragment and maintains the superior seating of the condyle and should not be totally stripped.

After the osteotomy is made, some interference between the two fragments can usually be observed. A good approximation is ensured by smoothening the interfering areas with a large rounded burr. The soft tissues are protected. A gap of more than 1 mm leads to fibrous tissue formation between fragments. Bony union is more likely to occur if decortication of the gap areas and rigid fixation is used. If rigid fixation is performed, a percutaneous trocar should be

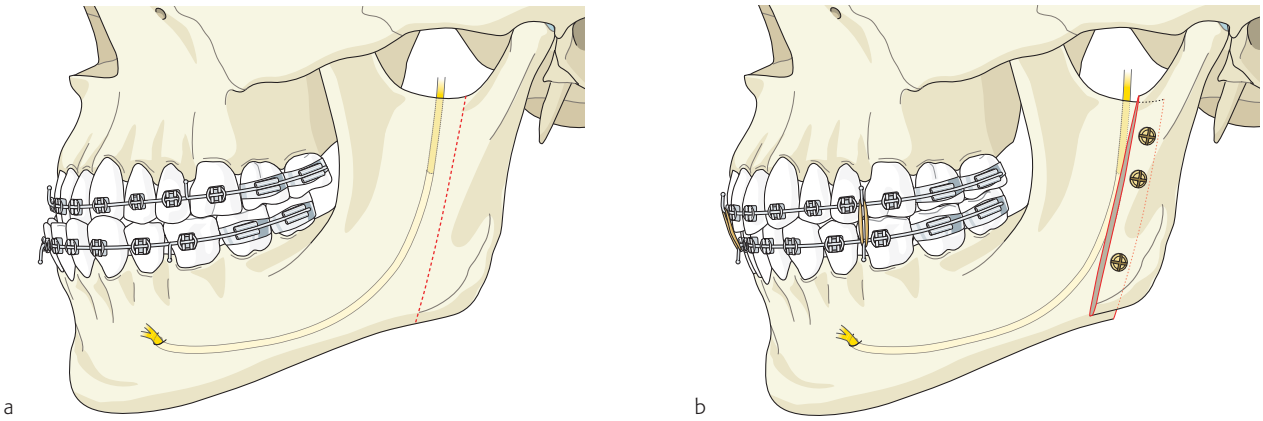

Fig 7.2-13a–b

a Marking of vertical ramus osteotomy posterior to the mandibular foramen and parallel to the posterior border.

b Mandibular setback after a vertical ramus osteotomy. The proximal fragment is displaced laterally. Fixation with screws.

used for appropriate screw placement. Two or three screws can be applied in a linear fashion. The osteotomy is performed like previously mentioned. Correct seating of the condyle in the glenoid fossa may be difficult. Instead of screws, L- or T-shaped miniplates can be used. The demand for rigidity is obvious when vertical movements of the distal fragments are produced. The placement of any fixation hardware should be passive to avoid unwanted movements of the condyle. It should be remembered that the buccal plate in the area of the nerve entrance can be extremely thin, and the nerve can easily be injured.

1.3 Inverted L-osteotomy

The inverted L-osteotomy is carried out in the same way as the vertical ramus osteotomy. It can be approached transorally. The lower cut is made with an oscillating saw with angled blade. The lower part of the cut is exactly the same as in the vertical ramus osteotomy, but the upper cut is bent anteriorly in the horizontal plane above the mandibular foramen and is performed with a reciprocating saw. Care should be taken when separating the segments to avoid fracturing the cut into the sigmoid notch. In that case, the situation would be the same as carrying out a vertical ramus osteotomy with coronoidectomy.

The indications for this procedure are the same as for the vertical ramus osteotomy. When retruding the mandible, the proximal segment is pulled laterally to allow overlapping of the segments. The segments can be left without any fixation but a long period (6–8 weeks) of MMF is then required. Some anterior movement by sliding is possible without any bone grafting. Miniplates can be used with transbuccal screw placement (**Fig 7.2-14a–b**).

A bone graft can be positioned between the segments at the horizontal or at the vertical osteotomy, depending on which dimension needs to be increased. If an increase is needed in both dimensions, eg, in case of a "bird face," L-shaped or multiple bone grafts can be positioned between the segments. The procedure is then approached trancutaneously and rigid fixation is performed.

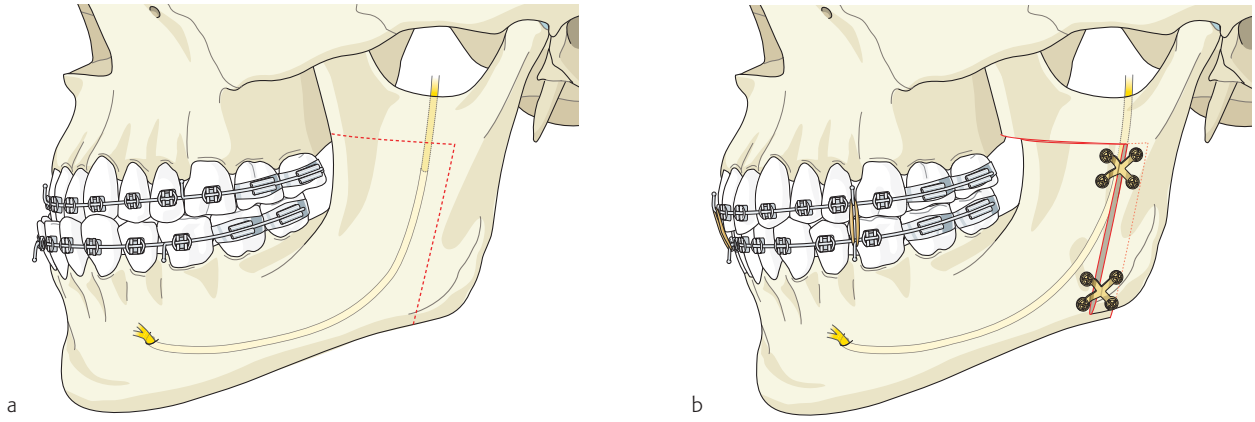

Fig 7.2-14a–b

a Marking of an inverted L-osteotomy-vertical cut as for the vertical ramus osteotomy. Horizontal cut above the mandibular foramen and below the sigmoid notch.

b Situation after mandibular setback. The proximal fragment is displaced laterally and fixation is done with two miniplates.