

Abstract

Orthognatic surgery deals with congenital and acquired dentoalveolar or skeletal deformities of the face. An unfavourable downward rotation of a mandible and posterior vertical maxillary excess cause an anterior open bite, which is characterized by excessive anterior facial height in the lower third, a gap between the incisors in maximal occlusion and a large mandibular angle.

Osteotomy (mainly Le Fort I osteotomy or bilateral sagittal split osteotomy of the mandibular ramus - BSSO), ostectomy or distraction osteogenesis are performed to correct the orthognatic deformities. Osteosynthetic materials based on titanium or bioresorbable materials are used in the form of miniplates with monocortical screws, or bicortical screws are utilized to fix the bony fragments.

Stability of the new jaws position is the main criterion for success. Relapse causes a loss of occlusion and consequently functional and aesthetic disorders. Relapse consists of skeletal and dental factors. Skeletal relapse is usually divided into early and long-term relapse.

BSSO with counter-clockwise (CCW) rotation of the occlusal plane alone was traditionally considered to be the least stable treatment method. Some authors suggest the use of two miniplates on each side of the osteotomy, but we have not found scientific proof of the benefits of this fixation.

We designed a study to compare early vertical and transversal stability of a simple mandibular advancement (group A), mandibular advancement with CCW stabilized with one miniplate (group B) and two miniplates (group C) on minipig mandibles. Two miniplates significantly increased resistance to vertical bite forces. On a 100-N load, a dislocation of 0.53 mm was achieved in group A; 0.46 mm in group B; and only 0.23 mm in group C. In transversal direction on a 100-N load, a dislocation of -0,04 mm was achieved in group A; 0.04 mm in group B; and only -0.02 mm in group C. The results of transversal displacement were not statistically significant probably due to 3 cases of extreme dislocation. The increase of transversal stability is crucial in long-term relapse prevention. The use of two miniplates in larger shifts increases the stability in the vertical direction.