CORRESPONDENCE

Intraoperative Computed Tomography Ensures Inferior Alveolar Nerve Safety During Orthognathic Surgery

Damage to the inferior alveolar nerve (IAN) is a major complication of orthognathic surgical procedures and accounts for the majority of postoperative complications of bilateral sagittal split osteotomy (BSSO).¹ Inferior alveolar nerve injury during surgery largely results from manipulation of the nerve or structures surrounding the nerve, or from direct injury to the nerve during the operation,² and because of piercing of the nerve with osteosynthesis screws (Fig. 1A).

Here we elucidate the importance of intraoperative computed tomography (CT) as an aid for ensuring IAN safety during BSSO by confirming that there is no piercing of the IAN by osteosynthesis screws during the procedure.

This study included 2 patients who underwent BSSO. Both patients were treated for orthognathic reasons. The BSSO surgical technique was previously described in detail.³

The patients underwent CT with an Artis Zeego multiaxis system (Siemens AG, Healthcare Sector, Henkestrasse 127 D-91052 Erlangen, Germany) at the beginning of the operation and immediately after placement of the osteosynthesis plates and screws (Fig. 1B).

Immediate image generation enabled visualization of the state of the mandibular bone and the depth of the screws in the region of the osteosynthesis (Fig. 1C).

Proper localization of the IAN before the procedure is an essential preventive step. Although conventional radiography is most commonly used for this localization, cone-beam computed tomography (CBCT) enables nerve assessment in 3 dimensions. New surgical techniques such as safe surgical access to the mandibular nerve at the infratemporal fossa,⁴ as well as modifications of existing surgical techniques, for example to control the lower border cut, are important for reducing the occurrence of postoperative complications of BSSO.

Because severe nerve injuries are often the result of drilling too deep (past the bone and into the nerve) or placing the osteosynthesis screw itself upon a nerve (Fig. 1A), the accurate measurement of available bone can assist the surgeon in choosing the correct osteosynthesis screw length, thereby preventing over-penetration. The use of intraoperative CT during BSSO allows intraoperative evaluation of osteosynthesis screw penetration and depth, making it possible to modify the treatment if necessary.

Based on the aforementioned advantages, the use of intraoperative CT/CBCT is beneficial and thus recommended. More common use could be expected with technological improvements leading to an affordable, less bulky, and easier to handle intraoperative CT/CBCT equipment.

FIGURE 1. A, Inferior alveolar nerve damage by osteosynthesis screw during BSSO. B, Artis Zeego CT machine. C, Immediate CT image generated in the region of the osteosynthesis.

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