Inferior Alveolar Nerve Medialization for Dental Implant Placement: Case Report with the Introduction of a New Technique

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Inferior alveolar nerve repositioning is an option for treating the edentulous posterior mandible with insufficient bone height above the inferior alveolar canal. This report presents a case in which inferior alveolar nerve medialization was performed for placing dental implants. In the second postoperative week, mandibular fracture occurred after biting on a relatively solid piece of food, which was treated conservatively.


Keywords: implants, inferior alveolar nerve medialization, mandible fracture, paresthesia

Severe resorption of the alveolar ridge in the edentulous posterior region of the mandible and the presence of the inferior alveolar nerve present a challenge to clinicians during implant placement. Numerous surgical techniques have been developed to overcome this problem including vertical distraction osteogenesis,\textsuperscript{1} onlay bone grafts,\textsuperscript{2} placement of short implants, and lateralization and transposition of the inferior alveolar nerve.\textsuperscript{3}

Lateralization and transposition of the inferior alveolar nerve for placement of longer dental implants in the posterior mandible were first introduced in 1977 by Alling.\textsuperscript{4} Since then, multiple modifications have been developed by different surgeons to improve the efficacy of the technique and to reduce complications.\textsuperscript{3} In nerve lateralization and transposition, the inferior alveolar neurovascular bundle is retracted laterally with or without transposition of the mental foramen, and dental implants are inserted in a lingual position relative to the bundle. In some patients, the inferior alveolar neurovascular bundle is positioned far too lingually in mandible, and thus, lateral distraction of the bundle is either impossible or subjects patients to the risk of nerve tearing and permanent neurosensory loss. In this report, a technique for inferior alveolar nerve medialization is presented, which was followed by implant insertion in a patient with a lingually positioned inferior alveolar neurovascular bundle.

CLINICAL REPORT

A woman aged 48 years was referred to the Department of Oral Implantology of Tehran University of Medical Sciences, Tehran, Iran for rehabilitation of an edentulous posterior mandible. The patient was a nonsmoker in good health without any parafunctional habits. The posterior region of the mandible was partially edentulous and severely atrophic. In a cone beam computed tomography (CBCT) scan, the remaining bone height above the inferior alveolar nerve was lower than 5 mm in most areas. According to CBCT, the inferior alveolar neurovascular bundle was positioned in close contact with the lingual cortex of the mandible in the site of the first and second molars (Fig 1).
Considering the clinical and radiographic situation of the patient, inferior alveolar neurovascular bundle medialization was selected as the procedure of choice, and the risk of transient or permanent neurosensory loss was discussed with the patient.

Following the patient’s agreement to performance of the surgery, an operation was scheduled for her under general anesthesia. During surgery, a crestal incision with anterior releasing was performed, and a full-thickness mucoperiosteal flap was elevated. A bony ledge was present on the crest of the ridge with lingual projection, which would limit access to the lingual side of the mandible (Fig 1). The bony ledge was removed to increase access to the osteotomy site. Cortical bone covering the inferior alveolar neurovascular bundle was removed from the lingual side with a round diamond bur, and the bundle was exposed by removing cancellous bone with fine curettes. Then, the bundle was retracted lingually and two implants (3.4/11.5 mm, SIC) were placed in the site of the first and second molars. Another implant (4/9.5 mm, SIC) was inserted at the site of the second premolar without any interference with the neurovascular bundle. All implants were inserted with a torque of 30 Ncm. After implant placement, cover screws were inserted, and the inferior alveolar neurovascular bundle was released to return to its original position.

Since a small amount of bone was removed for nerve exposure and implants were completely surrounded by bone, there was no need to use any bone graft material. The wound was irrigated with saline and was closed with 4-0 vicryl sutures.

The patient was discharged from the hospital the next morning and was instructed to have a soft diet. Amoxicillin (1 capsule of 500 mg every 8 hours for a week) and ibuprofen (1 tablet of 400 mg every 6 hours for 3 days) were prescribed for the patient, and she was advised to use chlorhexidine mouthwash twice daily. At the postoperative follow-up visit at 7 days, the patient reported partial loss of sensitivity of the lower lip and no sensitivity loss in the tongue and sublingual area.

In the second week after surgery, the patient returned reporting pain on the left side of the mandible. She stated that pain started after biting a relatively
hard piece of bread. On clinical examination, the mucosa overlying the posterior implants was tender, and radiographic examination revealed a fracture line starting from the mid-body of the middle implant extending to the apex of the posterior implant (Fig 2). Since fractured segments were not displaced, it was decided not to remove any implants, and she was treated conservatively with 1 month of maxillomandibular fixation followed by 1 month of liquid diet. After 3 months, the fracture line healed completely, and the patient reported significant improvement in sensation of the lower lip and chin. After 6 months, implants were exposed to set the healing caps, and the patient was referred to a prosthodontist for prosthetic rehabilitation.

At the 2-year follow-up, there was no sign of peri-implantitis or any other problems (Fig 3), but a small area on the left side of the chin measuring 1 cm² remained paresthetic.

DISCUSSION

The most important keys to the success of oral rehabilitation with dental implants are the precise diagnosis and accurate design of the treatment plan. Surgeons have multiple rehabilitation possibilities in dealing with the inferior alveolar nerve in an atrophic posterior mandible, and they must choose the most appropriate treatment for each patient considering the anatomical limitations. Inferior alveolar nerve repositioning is a common and successful way to place dental implants in mandibles with compromised height in the posterior region, presenting a good success rate ranging from 93.8% to 100%, but in the case presented herein, it was decided to reposition the inferior alveolar nerve lingually during implant placement since as a result of the close proximity of the inferior alveolar neurovascular bundle to the lingual cortex, lingual traction of the nerve would be less traumatic.

In spite of the fact that the amount of nerve retraction was small and surgeons did their best to cause the least amount of trauma, the patient still had some paresthetic area in the chin after 2 years. Thus, one important aspect to be considered before choosing the treatment is to clarify and explain to the patient about the probability of neurosensory changes of the lower lip and chin. However, in some investigations, it has been shown that the risk of permanent damage to the inferior alveolar neurovascular bundle in nerve repositioning procedures is small.

Mandible fracture after inferior alveolar neurovascular bundle repositioning is a rare complication, with only seven cases reported in the literature so far. In the case presented here, although a small amount of bone was removed to expose the nerve, fracture of the mandible occurred after biting on a relatively hard piece of bread, so one important point is to emphasize keeping a nonchewing, soft diet in the first few months of the postoperative period.

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REFERENCES