

CASE REPORT

The removal of a malpositioned implant in the anterior mandible using piezosurgery

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In oral, cranio, and maxillofacial surgery, a close relationship among the bone, nerves, and blood vessels can be regularly observed. Surgical procedures for the removal of dental implants have the potential to cause vascular injury and bleeding in the floor of the mouth and internal anterior region of the mandible. Furthermore, conventional osteotomy techniques always require extensive protection of adjacent soft tissue because cutting is not limited to bone and could easily affect other tissues when applied improperly. We report the removal by means of piezosurgery of a malpositioned osseointegrated implant that had previously caused a sublingual hematoma during its insertion. The postoperative course was uneventful, no bleeding, infection, or hematoma formation was noted and the patient reported 100% resolution of all symptoms. (Oral Surg Oral Med Oral Pathol Oral Radiol 2013;115:e1-e5)

In oral and maxillofacial surgery, osteotomy often must be performed in close proximity to neurovascular tissue, with the potential risk of neurologic injuries, profuse bleeding, and hematoma formation. The anterior region of the mandible is considered a rather safe area for implant surgery, because of excellent bone density and the absence of main neurovascular structures; however, several reports indicate that the anatomical location, course, and arrangement of branches of the mental vascular network should be given more attention when planning dental implant placement or removal.¹⁻³

Surgical procedures for the removal of dental implants have the potential to cause vascular injury and bleeding in the floor of the mouth and internal anterior region of the mandible. The removal of osseointegrated implants has to be the least traumatic, to limit the decay of the implant site, avoiding the risk of fracture of the peri-implant osseous walls during the operation.

Traditional tools, such as rotating drills and oscillating saws, are highly effective in cutting bone tissue but are not selective for bone, and thus can produce significant harm to surrounding soft tissues. In such delicate situations, the rotational spin of burs or trephines may even preclude a precise osteotomy from being performed at the intended ideal lines.

In recent years, in line with the modern tendency toward minimally invasive surgery, the use of ultrasonic waves for bone cutting has been introduced in oral and maxillofacial surgery, with the general result of a lack of visible injury to the adjacent soft tissues from the generated micromovements.⁴ The piezosurgery (Mectron Medical Technology, Carasco, Italy) device with the adequate insert can be used safely in many of the osteotomies routinely performed on the maxillofacial skeleton. We report the removal by means of piezosurgery of a malpositioned osseointegrated implant that had previously caused a sublingual hematoma during its insertion.

CASE REPORT

In March 2010, an 85-year-old woman with a significant medical history for cerebral ischemia presented at the office of her dentist for placement of dental implants in the anterior region of the mandible. Four 1-piece implants were installed in the anterior mandible under local anesthesia by her dentist. Immediately after, 4 ball attachments were placed in the inferior removable prostheses of the patient so as to anchor it to the implants. After returning home, about 5 hours after the implant surgery, the patient's tongue began to swell, protrude, and become elevated. The patient began to have difficulty in swallowing and breathing, so she called her dentist and was then referred to a nearby local hospital. The upper-airway obstruction was caused by the development of a delayed hematoma within the floor of the mouth. This injury probably occurred during drilling of the implantation site or final positioning of the implant. Oral intubation was performed, and prophylactic antibiotics and steroids were administered. The swelling began to steadily resolve during the next 4 days and the patient was discharged from the hospital 1 week after implant surgery. Her 7- and 14-day follow-up examinations

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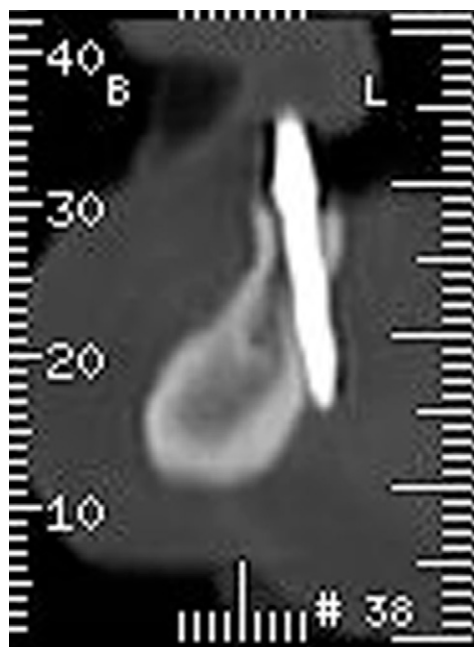


Fig. 1. CT cross-sectional axial image of the mandible demonstrating the malpositioned implant.

showed continuing resolution of the hematoma, and no further postoperative complications.

In June 2010, the patient presented in our office, exhibiting difficulty in swallowing and pain in the anterior portion of the mandible. The patient was scheduled for fixture removal for the presence of a malpositioned implant in the mandible. She was taking 100 mg of cardioaspirin (acetylsalicylic acid) per day on a long-term basis as a secondary preventive drug for cardiovascular or peripheral vascular disease. The preoperative protocol included routine blood tests and electrocardiogram to evaluate the general health of the patient. The routine blood tests comprised a complete blood cell count (including platelet count), prothrombin time, fibrinogen level, partial thromboplastin time, and bleeding time. Clinically significant alterations were not detected. The radiological study included a panoramic X-ray and computed tomography (CT) to assess the position of the 4 implants and their relationship to neighboring structures (Figures 1 and 2). The extraoral examination showed a light swelling of the anterior portion of the submental region with evidence of cutaneous ecchymosis. Examination of the oral cavity showed the presence of 4 one-piece implants placed in the intraforaminal region (Figure 3, A), signs of swelling, hemorrhage, or infection were not noted. It was possible to appreciate the malpositioned fixture by digital palpation. Two removal methods were considered. A method in which a trephine is used to circumferentially cut the implant from the surrounding bone was avoided. We chose to remove the fixture by means of piezosurgery so as to preserve the maximum bone and to produce minimal trauma to the neighboring structures. Cardioaspirin was interrupted 4 days before surgery. She received 500 mg amoxicillin clavulanate (Augmentin) 1 hour before surgery. Presurgical patient preparation included rinsing with 0.12% chlorhexidine for 1



Fig. 2. Transverse dental CT scan showing a bone channel (arrow) at the mandibular midline; please also note the close proximity of the fixture to the channel.

minute. Bilateral mandibular nerve blocks were performed using mepivacaine without vasoconstrictor, then the same local anesthetic with 1:100,000 epinephrine was administered in the buccal and lingual regions of the surgical area. A midcrestal incision without releasing incisions was made and a full-thickness mucoperiosteal flap was raised to ensure direct observation and protection of the lingual structures. A circumferential osteotomy was performed with piezosurgery using an EX1 insert (Figure 3, B) (Mectron Medical Technology); the device was used in “BONE” mode and with maximum irrigation of saline solution. The insert was used working at the bone-implant interface so as to break it down by means of the ultrasonic waves. The handpiece was guided around the implant firmly, but without excessive force. The sound of the instrument was used as an acoustic feedback for the force to be used. After removal of the implant (Figure 3, C), attention was focused on hemostasis, the residual perforation was sealed with fibrin glue (Figure 3, D), then the site was reconstructed using hydroxyapatite plus fibrin glue (Figure 4). The flap was closed using a 4-0 polyester suture with an interrupted suturing technique (Figure 5). The surgery lasted 20 minutes. The patient was placed on antibiotics (Augmentin 500 mg, 2 times a day for 5 days after surgery), an anti-inflammatory (Synflex 275 mg 2 times a day for 3 days after surgery), and cardioaspirin starting the fourth day after surgery. Rinses with 0.12% chlorhexidine digluconate twice daily for 2 weeks were prescribed. The patient was given steroids (dexamethasone 4 mg intramuscularly every 8 hours for 3 days) to prevent the postoperative swelling. Clinical evaluation was carried out 2 days, 7 days, 4 weeks, and 12 weeks after implant removal to assess complications at the surgical site, hematoma formation, and the integration and resorption of the graft. The postoperative course was uneventful, no bleeding, infection, or hematoma formation was noted and the patient reported 100% resolution of all symptoms.

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