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Case Report

Inferior Alveolar Nerve Lateralization: A Case Report

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Abstract

Introduction: The implant based prosthetic rehabilitation in the posterior mandible may become a challenging procedure for occasionally the practitioner may handle a case in which there is no enough height for the insertion of dental implants due to the short distance between the crest and the alveolar inferior canal due either to the post dental extraction alveolar bone resorption or an upper position of the inferior alveolar canal. The aim of this paper is to present a case report in which the posterior region of the mandible - namely the first and second left molars - was rehabilitated with implant-based prosthetics by means of the alveolar inferior nerve lateralization surgery technique. Method: One 3.5 x9 mm and one 4.0 X 7 mm dental implant were immediately inserted in the left inferior molars area by means of the inferior alveolar nerve lateralization surgery technique. The prosthetic rehabilitation can be conducted six months after the surgery. Conclusion: The alveolar inferior nerve lateralization surgery technique has proven to be useful and predictable for cases in which there is no enough height to place dental implants due to the upper position of the inferior alveolar canal which is the result of an anatomical variation or the resorption of the edentulous bone at the posterior mandible.

Keywords: Inferior Alveolar Nerve; Lateralization; Implant

Introduction

Dental loss is always followed by alveolar crest resorption. Consequently the implant based ptosthetic rehabilitation in the posterior mandible may be jeopardized by anatomical limitations like vertical and horizontal osseous deficiency as well as the presence of the inferior alveolar nerve canal. Through the past decades these issues have been worked out by means of surgical techniques such as inlay and onlay grafts, osteogenic distraction, short implants or inferior alveolar nerve lateralization [1].

Alling reported the first lateralization case in 1977. Janson and Nock narrated a technique modification in1987 named inferior alveolar nerve transposition, in which the lateral osteotomy encompassed the mentual foramen and the incisive nerve section. The main difference in both techniques is that the former needs no incisive nerve section while in the latter it is mandatory. As consequence the transposition technique presents a higher complication risk than the lateralization [2].

Some authors recommend the use of short implants to avoid any inferior alveolar nerve disturbance. Others favor the use of osseous guided regeneration prior to implant instalation [2].

The disadvantages of the lateralization may include anesthesia, hypoesthesia or paresthesia of the inferior alveolar nerve besides

an increased risk of mandibular fracture when bicortical implants are inserted [3].

Case Report

A 37-year-old female patient was referred to SOEP Implantology School ambulatory for prosthetic implant-based rehabilitation. She had her first and second left inferior molars missing. It was noticed either through CT scans and intra oral examination that the partially edentulous area was severely atrophic (Figure 1,2).

Figure 1: 3-d reconstruction of the edentulous area.

Figure 2: Panoramic CT image of the inferior molar area, left side.

The CT scans of the first molar area revaeled a 3.36 mm width crestal bone and a 6.89 mm hight (Figure 3) whereas in the second molar area a 6.72 mm width and a 4.97 mm hight was observed (Figure 4). Hence, the use of short implants was not indicated.

The patient presented a bad position of the inferior alveolar nerve due to the osseous resorption caused by the dental losses.

Figure 3: CT image of the first inferior molar area.

Figure 4: CT image of the second inferior molar area.

She learned of the options available for the given case, i.e., bone block graft, guided regeneration or inferior alveolar nerve lateralization. The most predictable and cost effective for her was the last option.

She was given Amoxicilyn 1gram P.O. and 8 miligrams dexametason P.O. preoperatively besides 0.12% Chlorexidin rinse.

The surgery was performed with local anesthesia and the anesthetic of choice was Articaine 4% and epinephrine 1:100.000.

To perform the technique, a mucoperiosteal crestal incision at the retromolar region was made with the aid of a 15 scalpel, which was conducted until the mesiobuccal edge of the canine where a vestibular oblique incision was performed.

After the detachment of the mucoperiosteal flap, the mental nerve was dissected and degloved in order to avoid any iatrogenic lesion and to better expose the surgical field (Figure 5).

Figure 5: Detached flap and mental nerve bundle.

Osteotomies were porformed in order to expose the inferior alveolar nerve. The first osteotomy was conducted horizontally in a superior fashion (Figure 6) followed by vertical proximal osteotomies. All of them performed with the aid of a #702 handpiece bur. The inferior horizontal osteotomy was made with a diamond disc bur (Figure 7).

Figure 6: Horizontal superior osteotomy.

Figure 7: Completed osteotomy.

Given the osteotomies, the rectangular shaped bone block was detached from the mandible dy using a root elevator (Figure 8). The detachment of the cortical bone granted the visualization of the medular bone (Figure 9), which was curetted with a Lucas curette until the inferior alveolar nerve could be spotted. Then the nerve was gently detached from the cancellous bone and the infeior alveolar canal by means of curette and a blunt tip probe (Figure 10).

Figure 8: Removal of the bone block with the aid of a root elevator.

Figure 9: Surgery site with the bone window.

Figure 10: Inferior alveolar nerve retraction with the aid of a blunt tip probe.

A rubber band retractor made out of a surgical glove was improvised aiming to keep the nerve retracted from the bone. This way the nervous structure could be retracted and protected during the implants installation (Figure 11).

Figure 11: Inferior alveolar nerve retraction with a rubber band.

Two Due Cone - Implacil implants were inserted in the rehabilitation area. At the first molar spot, a 3.5 x 9 mm implant was inserted and at the second molar spot, a 4.0 x 7 mm implant inserted as well (Figure 12). These implants were inserted without intercurrence and the torque was set below 20Ncm.

Figure 12: Tunnel checks to certify the right angle of the implants insertion.

The osseous window created was filled with particled autogenous bone (Figure 13) as well ase xenogenic graft (Lumina bone Porous - Criteria), 1:1 proportion (Figure 14-16). Above that, a colagen membrane was put down (Figure 17,18).

The flap was repositioned and sutured with vicryl 5- 0 suture (Figure 19).

Figure 13: Bone block to be milled and grafted.

Figure 14: Autogen e xenogen particulated grafts, 1:1 ratio.

Figure 15: Particulated grafting.

Figure 16: Surgery site filled with particulated graft.

Figure 17: Insertion of collagen membrane.

Figure 18: Membrane properly set to protect the grafted area.

Figure 19: Flap repositioned and sutured.

The patient reported a slight sensorial disturbance 4 months after the surgery in a small area at the chin, on the left but without any functional disturbance. The second stage surgery was performed 5 months post operatively in order to install abutments and provisional crowns (Figure 20-22).

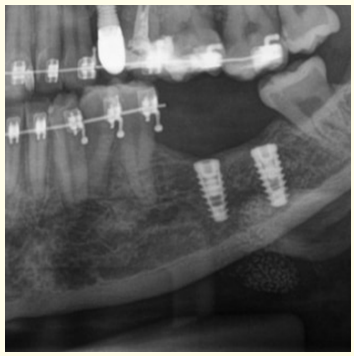

Figure 20: Immediate post operative panographic view.

Figure 21: Post operative tomographic view.

Figure 22: Post operative tomographic view.

Discussion

Despite the potential complications of the inferior alveolar nerve lateralization technique, it provides solid advantages compared to another surgical techniques, like decreased surgical time, more cost effective and the possibility to install long implants that will provide a bicortical anchorage, increasing its primary stability and allowing a more biomechanicaly favorable root/crown ratio [1].

Vetromilla., *et al.* (2014) performed a systemic literature review about Inferior alveolar nerve lateralization. A total of 123 patients were evaluated after the procedure. Out of this total, 118 (95,9%) reported sensorial disturbances. At the final follow up, 4 patients out of 118 (3,4%) still reported disturbances. The rate of osseointegration success with this technique ranged from 93,8 to 100%. Concerning the use of biomaterials as barriers between the dental implemt and the alveolar inferior nerve, the literature is conflicting, since some authors state the use of resorbable membranes to be helpful whereas others point out a faster healing process of the bone without any barrier [4].

Rathod., *et al.* (2018) submitted ten patients to inferior alveolar nerve lateralization. They were all assessed regarding neurossensorial disturbances, on the first post operative day, at the first post-operative week and then, after that, monthly until the remission of such symptoms. On the first post operative day, all the patients reported neurossensorial disturbances. After a 2-month follow-up, 2 patients reported full recovery of the symptoms. Within 3 months, six patients reported full recovery whereas two cases took 4 months for full recovery [5].

The Inferior Alveolar nerve lateralization technique has been through many modifications to mitigate the sensory dysfunction. It was reported that when piezoelectric tips were applied for bone removal, 93.3% of the patients did not describe any sensorial disturbance within 8 week post operative follow up. No kind of sensorial disturbance was found when bone expanders were applied to remove the vestibular bone cortical with the neurovascular bundle [6].

There are few reports from the literature regarding mandibular fractures as consequence of nerve lateralization, according to Losa., *et al*. (2015). These authors reported 3 cases of mandibular fractures and spotted 4 other cases of published cases. The treatment modalities ranged from ostheossynthesis to conservative ones [7]. The same way, Dos Santos., *et al*. (2013), described a case of an incomplete mandibular fracture that took place after a lateralization procedure, which was treated conservatively. These authors suggest the implants instalation to occur 3 months after the lateralization procedure [8].

As a conclusion, as far as the post operative complications are concerned, the most noticeable one is the sensorial disturbance either in chin and inferior lip. However, the literature indicates a good prognosis for the remission of the symptoms in the medium and long term [4-6].

Conclusion

The inferior alveolar nerve lateralization technique has proven to be a viable choice in cases of vertical deficiency in posterior mandible since it is predictable, cost effective and grants the installation of the dental implants concomitantly, leading to a shorter treatment time.

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