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Case Report

Success Rate of Short and Extra Short Implants Versus Inferior Alveolar Nerve Lateralization Surgery - Comparative Study of Six Cases

Marcelo Yoshimoto[1]*, Jefferson de Oliveira Carvalho[2], Jefferson Pereira Xavier[3], Zilma de Oliveira Souza[3], Marcelo do Lago Pimentel Maia[4] and Irineu Gregnanin Pedron[5]

[1]Professor and Head, Marcelo Yoshimoto Institute of Dentistry, São Paulo, Brazil

[2]Undergraduate student, Universidade Brasil, São Paulo, Brazil

[3]Postgraduate student of Oral Implantology, Marcelo Yoshimoto Institute of Dentistry, São Paulo, Brazil

[4]Professor of Oral Implantology, Marcelo Yoshimoto Institute of Dentistry, São Paulo, Brazil

[5]Professor, Department of Periodontology, Implantology, Stomatology, Integrated Clinic, Laser and Therapeutics, Universidade Brasil, São Paulo, Brazil

***Corresponding Author:** Marcelo Yoshimoto, Professor, Department of Oral Implantology, Marcelo Yoshimoto Institute, São Paulo, Brazil.

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Abstract

The loss of bone volume after exodontia in the posterior region of the mandible can be caused by several reasons. In childhood, early loss may occur due to caries and trauma. In adulthood, tooth loss can be caused by caries, trauma, periapical pathology, periodontal disease or traumatically performed extractions. The loss of the bone structure supporting the implants leads to another problem. In the posterior region of the mandible, the installation implants is made more difficult by the presence of the inferior alveolar nerve. To meet this need, some possibilities of treatment are presented, such as bone block grafts, short implants or inferior alveolar nerve lateralization surgery. The purpose of this article is to compare six cases in which short implants and inferior alveolar nerve lateralization surgery were performed for implant installation.

Keywords: *Short Implants; Inferior Alveolar Nerve Lateralization Surgery; Mandibular Bone Atrophy; Injury to the Inferior Alveolar Nerve*

Introduction

Generally, bone volume loss occurs in the first year ranging from 2.6 - 4.5 mm in thickness, and 0.4 - 3.9 mm in height in healed alveoli [1]. In this respect, it has been found that bone loss in the mandible is approximately four times faster than in the maxilla [2].

One of the most important factors for successful implant installation is vertical bone availability. The installation of implants in the posterior region of the mandible with deficient vertical dimensions is one of the most challenging situations in Implant Dentistry [3].

The technique of inferior alveolar nerve lateralization surgery to install implants was developed in 1987 [4]. However, new techniques and procedures related to Implant Dentistry have been developed as an alternative to the surgical technique of lateralization of the inferior alveolar nerve, such as short implants. These implants refer to dimensions of less than 10 mm in length [5].

Purpose of the Study

The purpose of this article is to compare the surgical results of 3 cases of short or extra short implants versus 3 cases of inferior alveolar nerve lateralization surgery for rehabilitation of atrophic posterior mandible.

Description of Cases

In this study, three cases were compared using the technique inferior alveolar nerve lateralization surgery for the installation of implants and three cases using short implants to avoid injury to the inferior alveolar nerve and compromising the sensitivity of the region.

The mean age of the patients ranged from 43 to 66 years, in an observation and follow-up period of at least 1.5 years and at most 14 years. Implants of various commercial brands were used.

No distinction was made between gender and age. The data of laboratorial exams, general health and clinical exams during the evaluation presented normality pattern.

Results

Twenty-seven implants, installed in six patients, were evaluated. The follow-up ranged from 1.5 to 14 years. Of the total number of patients, 5 underwent inferior alveolar nerve lateralization surgery for implant installation. In case #2, the inferior alveolar nerve lateralization surgery was performed with 8mm long implants. Seven extra short implants were installed in three patients. In case #3, 4 implants were installed with inferior alveolar nerve lateralization surgery in areas of failure of 4 short implants and one regular length implant.

During the study, 6 short or extra short implants, one regular height implant and one regular implant in an area of lateralisation of the alveolar nerve were lost.

During the study, 6 short or extra short implants were lost. In the area of alveolar nerve lateralization surgery, 2 implants were lost.

All patients presented sensorineural alteration due to the injury caused to the inferior alveolar nerve during the nerve lateralization surgery. However, the paresthesia resulting from the injury was transient (in average of 2 months) with spontaneous regression.

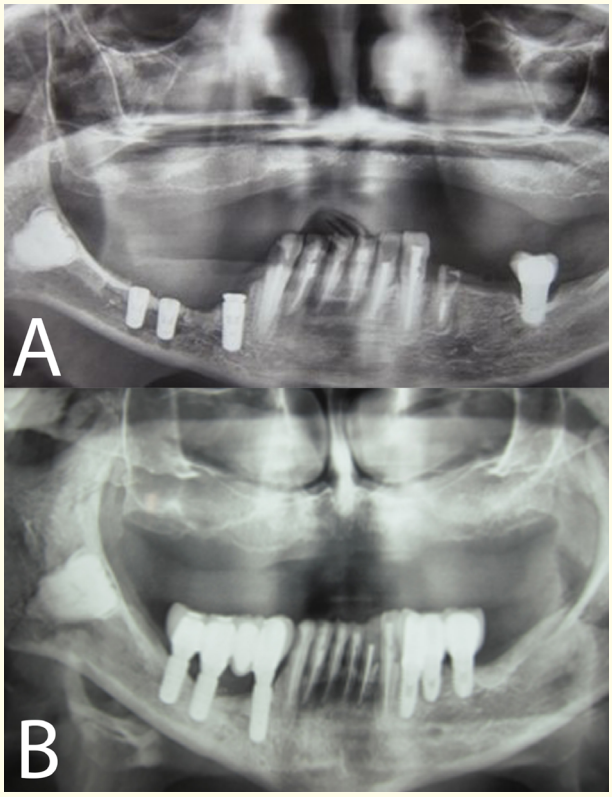


Figure 2

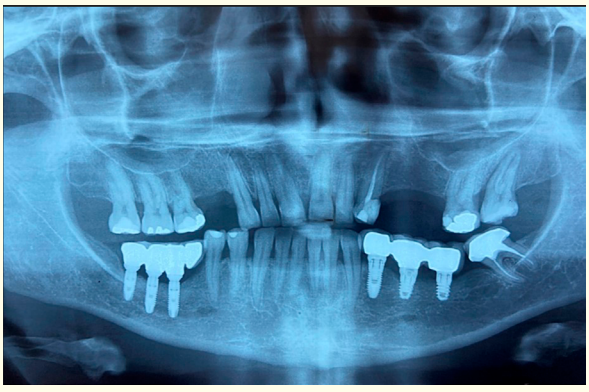
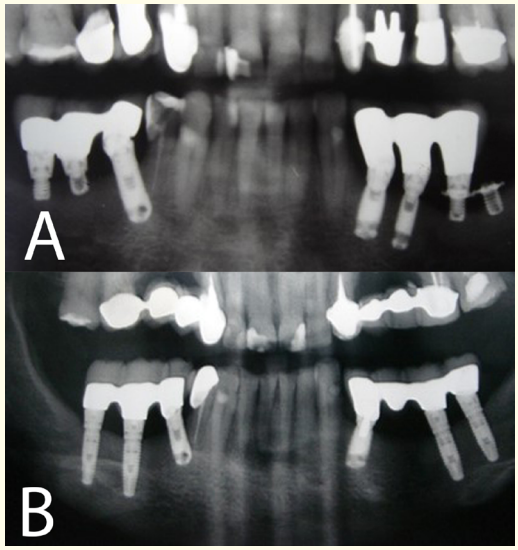


Figure 1



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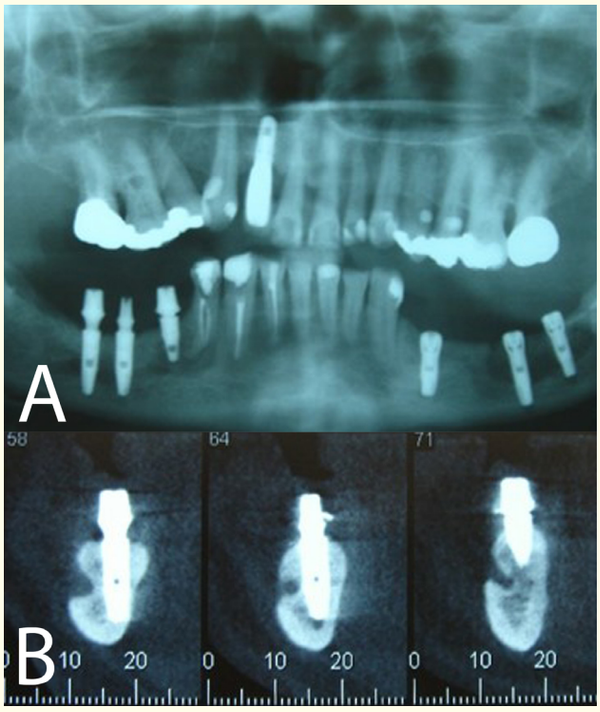

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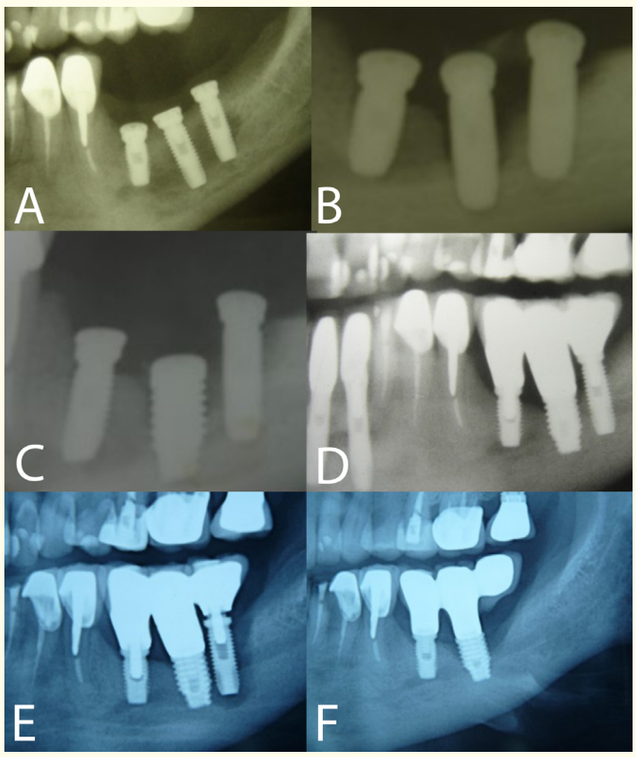

Figure 6

Discussion

Several treatment options for the atrophic posterior mandible have been advocated, including short implants, vertical cortical grafts, tenting grafts, guided bone regeneration and inferior alveolar nerve lateralization surgery. However, several complications have been reported due to these techniques such as donor area morbidity, resorption of the block grafts, neurosensory changes, and the need for another surgery [3].

The literature on success with short implants is ambiguous, presenting both positive and negative results. However, results show that the survival rate (after 90 days) is reduced with short implants compared to regular implants6. The use of short implants has been

Case	Age	Gender	IANLS + implant	SI	Follow-up (years)	Implants Installed	SI loss	IANLS implant loss	Quantity and type of implant lost (regular or short)	Period of implant loss (years)
#1	49	Female	3	3	2	6	0	0	0	0
#2	57	Female	3	4	5	6	2 previous to IANLS	0	2 previous to IANLS	2
#3	62	Female	4	0	3	4	4 previous to IANLS	0	5 (4 SI and 1 regular)	2
#4	43	Male	0	1	1.5	2	1	0	1	1.5
#5	57	Female	3	4	5	4	1 previous to IANLS	0	1 SI previous to IANLS	2
#6	66	Female	3	0	14	3	0	2	2 regular in different periods	3

Table: *IANLS = Inferior Alveolar Nerve Lateralization Surgery; SI = Short Implants.*

advocated by some studies, showing a survival rate similar to that of conventional implants [7-10]. This success rate was also similar between short implants in the mandible and maxilla (94.4% and 92.9% respectively - $p > 0.05$) [11].

In a comparative study between inferior alveolar nerve lateralization surgery and the use of short implants, the difference in implant length was remarkable between the two rehabilitation techniques. After a one-year follow-up, the short implants showed slight but significant bone loss on the mesial surface. In nerve lateralization only two patients presented temporary sensorineural disturbance [12].

In the installation of short implants it seems to be more likely the occurrence of complications, such as neuro-sensitive dysfunction or mandibular fracture. However, inferior alveolar nerve lateralization surgery is a therapeutic option when the position of the mandibular canal also prevents the installation of short implants [12].

Additionally, this study also presented the rate of sensorineural alteration observed in all cases. These alterations presented an average duration of 2 months, being considered tolerable by the patients.

The results presented in our study corroborate the findings of the first part of the study by Abayev and Juodzbalys [13] (2015). Inferior alveolar nerve lateralization and transposition surgery in combination with dental implant installation is sometimes the only procedure that can help patients obtain a fixed partial denture, in the posterior region of atrophic mandible.

As for the sensorineural disorder, in the second part of the article by Abayev and Juodzbalys [14] (2015), 21 studies were included in this review. There were 10 inferior alveolar nerve transpositions and 7 inferior alveolar nerve lateralisations and 4 studies with both techniques. Neurosensory disturbance was present in most patients (99.47%, 376/378) for a period of 1 to 6 months. In 2 procedures (of 378, 0.53%) the neurosensory changes were permanent.

Conclusion

Both techniques are viable for the oral rehabilitation of patients. The use of short implants presents lower morbidity. However, in our observation, they presented a lower survival rate than the conventional length implants installed in the nerve lateralization surgery. However, sensorineural alteration may be an expected consequence, estimating a low rate of irreversibility. We initially suggest that, whenever possible, short implants be installed. In case of failure of these implants, the option is to perform the lateralization surgery of the inferior alveolar nerve with the installation of longer implants.

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