



Original article

Treatment of the posterior atrophic maxilla using a three-dimensional reconstruction technique with sinus lift and a “tunnel” approach[☆]



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ABSTRACT

Purpose: In maxillary defects with a significant vertical component, the reconstruction of the alveolar process is advisable in order to avoid disproportionate long implant supported crowns. This article evaluates the safety and efficacy of the treatment of the atrophic posterior maxilla with the three-dimensional reconstruction technique with autologous bone graft associated to the sinus lift technique in the same procedure. The unique approach for the recipient site was a sub-periosteal mucosal tunnel made through a single vestibular vertical incision. This approach avoids exposure and resorption, the main complications in on-lay grafting.

Materials and methods: This retrospective study included 12 cases of atrophic posterior maxilla treated consecutively with this combined technique between January 2011 and July 2012. The alveolar crest was reconstructed to a minimum width of 6 mm, increasing its height and decreasing the interocclusal distance to achieve the established success criteria of accurate insertion of implants equal or larger than 3.8 mm diameter and 11 mm length.

Results: The average gain in bone height was 4.54 mm. Implant surgery was carried out 4 months after augmentation. A total of 25 implants were inserted with a 96% success. Patients were followed-up for an average of 18 months after grafting.

Conclusions: Treatment of atrophic posterior maxilla with three-dimensional reconstruction, sinus lift and “tunnel” approach, is an effective technique that provides reliable and stable results, enabling dental rehabilitation with suitable implant supported crowns.

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Tratamiento del maxilar posterior atrófico mediante técnica de reconstrucción tridimensional con elevación de seno y abordaje «en túnel»

R E S U M E N

Palabras clave:

Atrofia maxilar
Injerto óseo
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Objetivos: En defectos maxilares con importante componente vertical, es necesaria la reconstrucción del proceso alveolar previamente a la rehabilitación con implantes para evitar una longitud desproporcionada de las coronas protésicas. En este artículo se revisa el tratamiento del maxilar posterior atrófico mediante elevación de seno y técnica de reconstrucción alveolar tridimensional simultánea con autoinjerto óseo. Se utilizó como vía de abordaje un túnel mucoso subperióstico a través de una incisión vertical única para prevenir los principales problemas de los injertos en aposición: la exposición y la reabsorción.

Material y método: Se han evaluado retrospectivamente 12 atrofas maxilares posteriores tratadas con esta técnica de forma consecutiva entre enero de 2011 y julio de 2012. El reborde alveolar se reconstruyó hasta un mínimo de 6 mm de anchura a nivel crestal, incrementando su altura y disminuyendo la distancia interoclusal, para alcanzar el criterio de éxito establecido de fijación segura de implantes de, al menos, 3,8 y 11 mm de diámetro y longitud respectivamente.

Resultados: La ganancia media ósea en altura fue de 4,54 mm. La cirugía de implantes se realizó hacia los 4 meses. Se colocaron 25 implantes con un 96% de éxito. El tiempo medio de seguimiento fue de 18 meses.

Conclusiones: El tratamiento del sector posterior maxilar atrófico mediante reconstrucción tridimensional con autoinjerto óseo, elevación sinusal y abordaje por tunelización es una técnica que proporciona resultados predecibles y estables, permitiendo la rehabilitación con coronas sobre implantes dentales de dimensiones adecuadas.

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Introduction

Sinus lift is a surgical technique indicated for rehabilitation treatment with implants of atrophic posterior maxilla. Long-term studies show a success rate of implants inserted by means of this technique, which is similar to that of non-augmented bone.¹⁻³ When, after the loss of posterior maxillary teeth, besides hyperpneumatization of the sinus, there has been an atrophy of the alveolar process leaving a defect with a significant vertical component, it is necessary to associate sinus lift with the reconstruction of the bone crest to restore the anatomy that has been lost and to avoid disproportionate long implant supported crowns.

Multiple techniques have been described for reconstruction of the atrophic maxillary ridge: corticocancellous on-lay and interposition block bone graft; guided bone regeneration with titanium mesh or membranes; distraction osteogenesis, etc. There is consensus among the authors on the preference for the use of autologous bone, either combined or not with any type of biomaterial, for this augmentation surgery.⁴ Donor areas may be extraoral (mainly the iliac crest and the calvarium) or intraoral (chin and mandibular retromolar area).

The main short-term problem of bone height alveolar reconstruction with block grafting is wound dehiscence, which results in bone exposure, its contamination, and partial or total graft loss.⁵ A way of reducing the incidence of this complication is to avoid crestal incisions that imply surgical wound

closure over the bone graft. The approach consisting of a subperiosteal tunnel through a vertical vestibular incision away from the area subject to reconstruction preserves the mucoperiosteum, which will cover the whole graft intact. Through this single incision, the conventional sinus lift technique may be simultaneously applied.

Another important problem of alveolar reconstruction with on-lay grafting is the high incidence of mid-to-long-term resorption. The larger and more cortical the graft structure is, the slower and more difficult the complete revascularization process of the graft becomes, which causes necrosis of the central areas and its resorption over time.⁶ In the case of the iliac crest, besides, the factor of its endochondral origin leads to a higher resorption rate.⁷

Structurally, the ideal graft would have a thin, though resistant, outer cortical layer and a dominant inner cancellous layer. The three-dimensional (3D) reconstruction technique described by Khoury consists in creating a graft having these characteristics and adapted to each particular case.⁶

In this article, a retrospective evaluation of the treatment of atrophic posterior maxilla with a significant vertical component is made by simultaneously performing sinus lift and alveolar process reconstruction with the 3D technique. For the latter, block bone autologous grafts cut in thin cortical slices and arranged in the shape of a box with particulate bone inside were used. The donor zones used were the mandibular retromolar area and the calvarium, as appropriate. As an approach to atrophic maxilla, the subperiosteal tunnel made through a single vestibular vertical incision was used.

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