The Use of Oxidized Regenerated Cellulose (Surgicel®) in closing Schneiderian Membrane Tears during the Sinus Lift Procedure

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ABSTRACT

During the sinus lift procedure, undesirable perforations of the Schneiderian membrane can occur in up to 58% of cases. Several methods for their closing exist. This article presents a method of covering the perforation with a strip of oxidized regenerated cellulose (Surgicel®). One or two layers of material swell after being saturated with blood, turning into a gelatinous mass and forming a tight and mechanically resistant seal. This simple method has been successfully tested on 223 perforations of the Schneiderian membrane that occurred over a period of 58 months.

El uso de Celulosa Oxidada Regenerada (Surgicel®) Para Cerrar las Roturas de la Membrana de Schneider Durante el Procedimiento Quirúrgico del Levantamiento del Seno

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RESUMEN

Durante el procedimiento quirúrgico del levantamiento del seno, pueden producirse perforaciones indeseables de la membrana sinusal, hasta en el 58% de los casos. Existen varios métodos de cierre. Este artículo presenta un método para cubrir la perforación con una lámina de celulosa oxidada regenerada (Surgicel®). Una o dos capas del material se hinchan luego de ser saturadas con sangre, transformándose en una masa gelatinosa, y formando así un sello consistente y mecánicamente resistente. Este método simple ha sido probado con éxito en 223 perforaciones de la membrana de Schneider ocurridas en un período de 58 meses.

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INTRODUCTION

Using dental implants in the posterior maxilla is usually complicated by an expanded maxillary sinus. However, insufficient residual alveolar bone height can be compensated for by the sinus lift procedure. During this treatment a bone window is created in the lateral wall of the maxilla. Through this window the Schneiderian membrane is dissected from the bone of the alveolar process of the maxilla and is dislocated upward (1). The newly-formed space is filled with grafting material which creates favourable conditions for insertion of an implant.

Dissection of the Schneiderian membrane from the bone base is technically difficult and perforation can occur if the membrane is thin or if bone septa are present. The frequency of this complication can reach 58% (2). Perforations of only 2–3 mm in diameter are easily managed without intervention because, as the membrane is elevated, it folds on itself (1, 3). Holes of greater diameter must be closed to prevent extrusion of particulate grafting material into the mucosal envelope of the sinus (1).

The treatment of membrane perforations is not clearly defined in the literature (1). A wide range of methods are used. Suturing the membrane with a resorbable material (4, 5), covering the perforation with collagen tape (5), collagen membrane (1, 6), collagen sheet (3) or resorbable barrier membrane (5) have all been described. Fibrin glue (3), Gelfoam (8), freeze-dried human lamellar bone sheet (5) or autogenous bone lamella (3, 5, 8) are also used.

METHODS

To close Schneiderian membrane, Surgicel® (Johnson & Johnson) is used in the Department of Stomatology, University Hospital Hradec Kralove, Czech Republic. Surgicel®

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is a sterile, fully resorbable knitted haemostatic agent prepared by the controlled oxidation of regenerated cellulose. After discovering a perforation of the Schneiderian membrane, its dissection is completed as planned (Fig. 1). A strip

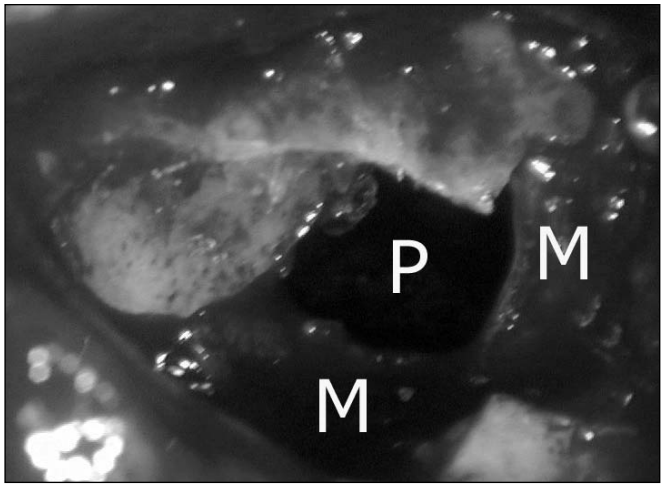

Fig. 1: Perforation (P) of 6x5 mm, which occurred during the dissection of the Schneiderian membrane (M).

of Surgicel® 1.25 x 5 cm is cut transversely into two equal parts. The first part is used to cover the tear in the sinus membrane so that the material extends no less than 3 mm beyond the perforation. Special fixation is not necessary. As soon as Surgicel® has become saturated with blood, it swells into a gelatinous mass and becomes mechanically resistant to movement and almost gives a hermetic seal. After about 20 seconds the patient is asked to carry out the Valsalva maneuver, which tests the quality of the seal. In the case of larger perforations or insufficient functioning of the first layer, the other half of Surgicel® can be used as a second layer (Fig. 2). Then graft material is applied in the usual way.

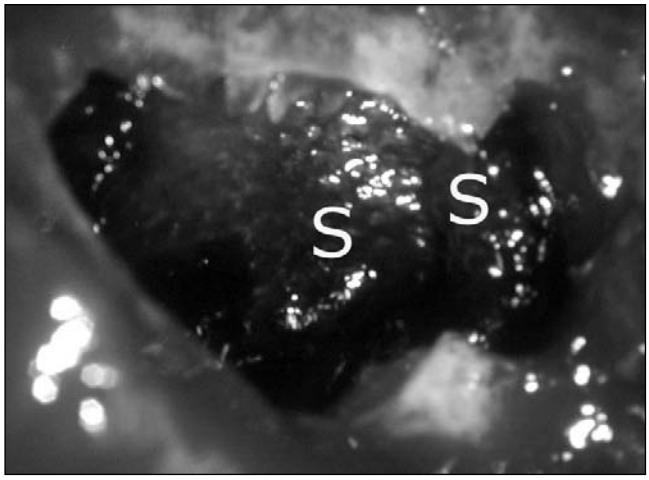

Fig. 2: Perforation closed by covering with two layers of Surgicel® (S).

This method was tested on 223 sinus lifts complicated by a tear in the Schneiderian membrane, from January 1998 to November 2003. Two graft materials, ß-tricalciumphosphate (Cerasorb® 1–2 mm, Curasan Pharma) or deproteinized bovine bone (Bio-Oss® Spongiosa Granules 1–2 mm, Geistlich) were used. Every perforation up to the size of 1x1.5 cm was closed.

DISCUSSION

The sinus lift procedure was prolonged no more than a few minutes. The frequency of non-osseointegration of implants here (1.25%) was similar to the frequency of the same complication (1.32%) in 213 sinus lifts without sinus mucosal tears carried out over the same period. In one case maxillary sinusitis developed, probably from an infection of the graft material. However, no evidence of an aetiological connection with an imperfect closing of the perforation was found.

In the literature Surgicel® is reported only twice in relation to sinus lifts. Smiler mentions it briefly among materials that can be used to close perforations of the Schneiderian membrane (8) and Gray used it in one case report as a graft material (9).

The authors find the Surgicel® method to be technically simple, fast, reliable and economical. The oxidized regenerated cellulose shows limited bactericidal qualities and has no contraindications in the maxillary sinus.

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