OROANTRAL FISTULA CLOSURE — using the modified roll envelope technique

Introduction
Oroantral communication is an abnormal connection between the oral cavity and the maxillary sinus, and mainly arises as a complication of exodontia of maxillary molars with roots too close to the sinus or unsuccessful sinus lift procedures with rupture of the Schneiderian membrane. There is a relatively low risk of oroantral communication after exodontia of maxillary posterior teeth, ranging from 0.31% to 4.7%; however, an oroantral fistula (OAF) may be a source of chronic infection in the maxillary sinus and is of great discomfort to the patient.

OAFs with diameters smaller than 2mm have been reported to close spontaneously; however, the extent of the fistula may then become difficult to establish clinically. Patients with larger fistulas or those with healing impairment require surgical repair techniques. Common techniques may be used, such as deepithelialization of the edges of the fistula and suturing, bone regeneration techniques using bone particles and membranes, the use of the Bichat’s fat pad combined with mucogingival flaps, as well as periodontal plastic surgery using pedicle flaps, all of which should be considered based on factors such as the size of the defect and duration of the infection. Surgical interventions that permit future implant rehabilitation should be considered when selecting the ideal method.

The literature highlights simplicity and predictability as being paramount in the choice of the periodontal plastic surgical technique, such as the pedicle palatal flap, which allows for ample thickness of keratinized tissue in the periimplant mucosa. Yet, the use of the modified roll envelope technique has not been reported as a treatment option for OAF repair. The purpose of this study was therefore to describe a surgical technique to repair an OAF using the modified roll envelope technique and report on its effectiveness as a possible treatment option.

Clinical case report
A 52-year-old Caucasian female patient and a smoker presented in October 2010 with three OAFs measuring 6mm, 4mm and 2mm in the edentulous maxillary right premolar and molar regions (Fig. 1), two months after curettage of the maxillary sinus, which was prescribed after an unsuccessful maxillary sinus lift for implant treatment. The OAF treatment reported in this article was only begun after the patient had signed an informed consent form.
The surgical procedures were preceded by extra- and intra-oral decontamination using 2% and 0.12% chlorhexidine digluconate, respectively. A no. 15c scalpel blade was used to make a supra-crestal partial incision (not touching the bone) palatally (Fig. 2). The palatal soft tissue was dissected using the trapdoor technique until the extension into the connective tissue was sufficient to cover the area of the fistulas (Fig. 3). Subsequently, two further incisions were made at the ends of the flap and one at the base of the dissected connective tissue with the blade at a right angle to the palatal bone (Fig. 4).

A full-thickness connective tissue flap was then raised and placed buccally. Using the no. 15c blade, a further straight partial incision was made buccally to allow the flap to fold under and cover the defect (Figs. 5a and b). Tetracycline diluted in saline solution (50 mg/ml) was used to irrigate and decontaminate the area (Fig. 6).

Careful suturing of the pedicle flap using biodegradable polyglactin sutures (5-0; Vicryl, Ethicon) was performed in order to stabilize the graft (Fig. 7). Finally, the openings of the fistulas were deep-ithelialized and sutured to achieve a complete seal (Figs. 8 and 9).

Six-month follow-up found complete sealing of the fistulas and the area showed considerable improvement in tissue quality, including an increase in keratinized tissue (Fig. 10).

Discussion
This clinical case report with a six-month follow-up presented a modification of the roll envelope technique for connective tissue grafting in a surgical model for OAF repair. Radiographic examination confirmed adequate tissue quality with complete closure of the defect and no relapse.

Lesions that connect the oral cavity with the maxillary sinus usually occur after exodontia of maxillary posterior teeth whose apices are located very close to the membrane lining the maxillary sinus. The size of the tract may result in an OAF. The literature reports that lesions smaller than 2 mm in diameter may resolve spontaneously in the presence of a blood clot; however, difficult visual access to the area for inspection may create an obstacle to measuring the clinical extent of the fistula, which, when present in a patient with healing impairment, will require surgical intervention.
Several techniques describe possible ways to repair an OAF, leaving the surgeon to decide on the most appropriate method for each case, taking into consideration factors such as the size of the fistula and the duration of the infection. Alongside the development of periodontal plastic surgery, new techniques have been reported in the literature for the closure of OAFs using a cutaneous flap from the angular artery, grafting of polyurethane foam-based biodegradable materials and resorbable root analogs. The buccal pedicle flap technique combined with the Bichat’s fat pad has shown good functional results; however, it causes loss of buccal sulcus depth, which may interfere with future prosthetic rehabilitation.

Among the periodontal plastic surgeries that aim to increase tissue volume in the edentulous alveolar ridge is the roll envelope flap described by Abrams et al. This procedure entails the preparation of a pedicle flap on the palatal aspect of the ridge with the same dimensions as the defect to be corrected. The epithelium is removed and the pedicle flap is tucked into the pocket created between the connective tissue and the periosteum of the buccal region, which is then stabilized with sutures. Considering the need to preserve the donor site, which is left exposed, Scharf et al. described a modification of this technique that preserves the epithelium of the donor site via dissection of the palatal flap. This allows tissue coaptation and suturing of the donor site after flap tucking. This modification reduces the morbidity associated with the original technique and improves postoperative masticatory capacity.

It is, however, important to highlight that in order to achieve a good postoperative outcome, surgical techniques involving pedicle flaps are strictly dependent upon the skills and dexterity of the surgeon, who must be meticulous during tissue manipulation. Therefore, the use of this modified roll envelope technique may be regarded as a feasible approach that allows for a less morbid postoperative recovery owing to flap coaptation without areas of exposed connective tissue. Reduced graft healing time is another factor that improves the quality of the grafted area, with reduced risk of loss of buccal sulcus depth, which in the present case report led to adequate implant-supported prosthetic rehabilitation.

Conclusion
The clinical analysis confirmed adequate tissue quality with complete closure of the OAF, with no relapse and no loss of sulcus depth or keratinized tissue.