

ENDOSCOPIC RETRIEVAL OF A DENTAL IMPLANT INTO THE MAXILLARY SINUS: A CASE REPORT

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SUMMARY

Purpose. In this article the Authors show a safe and predictable technique to remove displaced implants from the maxillary sinus.

Materials and methods. A 49-year-old female was referred, to this centre by a general dentist, for the retrieval of the ectopic dental implant. After a preliminary clinical and radiological evaluation of the case the surgical procedure was performed. A loco-regional anesthesia was carried out and then the Maxillary Sinus Retrieval Device (MSRD), proposed in this study, was inserted in the canine fossa, via a circular antrostomy 5,5mm wide, previous execution of a mucoperiosteal flap. The MSRD is a trocar, modified with a funnel-shaped cannula in order to allow the easy access of both an endoscope and a suction cannula or, in alternative, a straight forceps. The implant was easily found and retrieved thanks to the endoscopic control. The postoperative was uneventful and no nasal bleeding was reported by the patient.

Conclusion. The Authors recommend the use of the MSRD in order to minimize the biological sacrifice consequent to the implant retrieval in the maxillary sinus.

Key words: sinus lift complications, implant migration, maxillary sinus, endoscopy, implant retrieval.

Introduction

Tooth replacement by means of dental implant is considered to be a predictable procedure in modern Dentistry, with high rates of success for both aesthetics and function (1).

Even for the rehabilitation of edentulous distal areas of the maxillae affected by severe bone atrophies, several standardized and reliable regenerative techniques had been developed (2).

Nevertheless, several complications can occur. These can be divided into failure in osseointegration, bone loss, peri-implant soft-tissue disease, mechanical problems, aesthetic/phonetic issues and migration of the dental implant (3-7).

Implant displacement in the posterior maxilla usually occurs during surgery, but it can also occur months or even years after prosthetic finalization (8-10). In addition, oral mucosal lesions such as periodontal disease, mucosal atrophy, lesions of gastroesophageal reflux or oral lichen planus may favour implant displacement (11-16).

The resorption of the alveolar ridge and the progressive pneumatization of the maxillary sinus reduce the height of the edentulous posterior maxilla. Inadequate bone height and the presence of type-IV alveolar bone are the primary causes of implant displacement in the posterior maxilla (8-10).

The following is a case report of a surgical retrieval of an ectopic implant, displaced into the maxillary sinus, by means of a new surgical device especially performed for this purpose, the

procedure was carried out with a modified Caldwell-Luc approach and endoscopically assisted.

Case report

A 49-year-old female was referred, to this centre by a general dentist, for the retrieval of the ectopic dental implant. The medical history did not reveal any systemic diseases and the patient confirmed to not take any kind of medication. A panoramic X-ray was performed to confirm the position of the ectopic implant into the left maxillary sinus combined with the presence of a large crestal defect in the area of first upper left molar (2.6) (Figure 2a). The patient also reported she had undergone, in another dental clinic, a first stage multiple surgical implants placement on the upper jaw. During the surgery she also underwent to a sinus lift with crestal approach on the left side. Four months later the second stage surgery was performed and during the screwing procedure, of the healing cup screws, the implant, placed in the area of 2.6, was accidentally dislocated into the sinus. The patient was left in this condition for 7 days prior to our observation. There was no history of pain or symptoms of sinus infection due to an oroantral communication (OAC). At the intraoral examination granulation tissues was evident in the area of 2.6 without evidence of OAC (Figure 2b). Cone beam computerized tomography (CBCT) was performed, to assess the maxillary sinus morphology, in particular in the area of 2.6, and the possible presence of bone septa and/or inflammatory sinus pathology. No signs of inflammation of the schneiderian membrane were observed as well as bone septa. The patient gave her informed consent for the surgical removal of the ectopic implant.

The surgical device

The Maxillary Sinus Retrieval Device (MSRD), proposed in this study, is conceptually similar to

that (Antral Retriever) proposed by Mantovani et al. in the 2011 (16). The SCR is a modified trocar: its pyramidal tip has a diameter of 6mm; the trocar cannula is funnel-shaped in order to allow the easy access of both an endoscope and a suction cannula or, in the alternative, a straight forceps; the tip of the trocar cannula is beveled with an outer diameter of 6,5mm; the trocar cannula has an handle to facilitate the hand grip; the inner diameter of the trocar cannula (6mm) has been chosen in order to facilitate the instrumental maneuvers as well as the easy removal of large implants and foreign objects dislocated in the sinus (Figure 1a-d).

Surgical procedure

An antimicrobial prophylaxis was administered with amoxicillin clavulanate (Clavulin, Glaxo-SmithKline, Italy), 1 g every 8 h for 7 days, starting 3 h before the operation, after an initial 1 min rinse with chlorhexidine digluconate 0.2% (Corsodyl Mouthwash, GlaxoSmithKline, Italy) to disinfect the mouth. In both the areas of implant surgery and endoscope insertion, loco-regional anesthesia was performed with articaine hydrochloride 4% with epinephrine 1:100,000 (Citocartin, Molteni Dental, Italy). Since the implant appears to be distant from the nasal cavity, it has been chosen to use the intraoral approach, according to the Caldwell-Luc technique, to retrieve the implant (17, 18) with the difference that the antrostomy is smaller and the optical access it is not direct but mediated by an endoscope, that is inserted through the trocar, which is applied on the antrostomy, in order to make the most conservative surgery.

Although the intraoral placement of trocar, in the maxillary sinus endoscopy, is usually a flapless procedure, in our case the large diameter of the MSRD's tip leads us to recommend the adoption of a flap approach to prevent the subsequent OAC. A vertical incision was performed over the canine fossa and the mucoperiosteal flap was retracted exposing the underlining bone (Figure 2c).

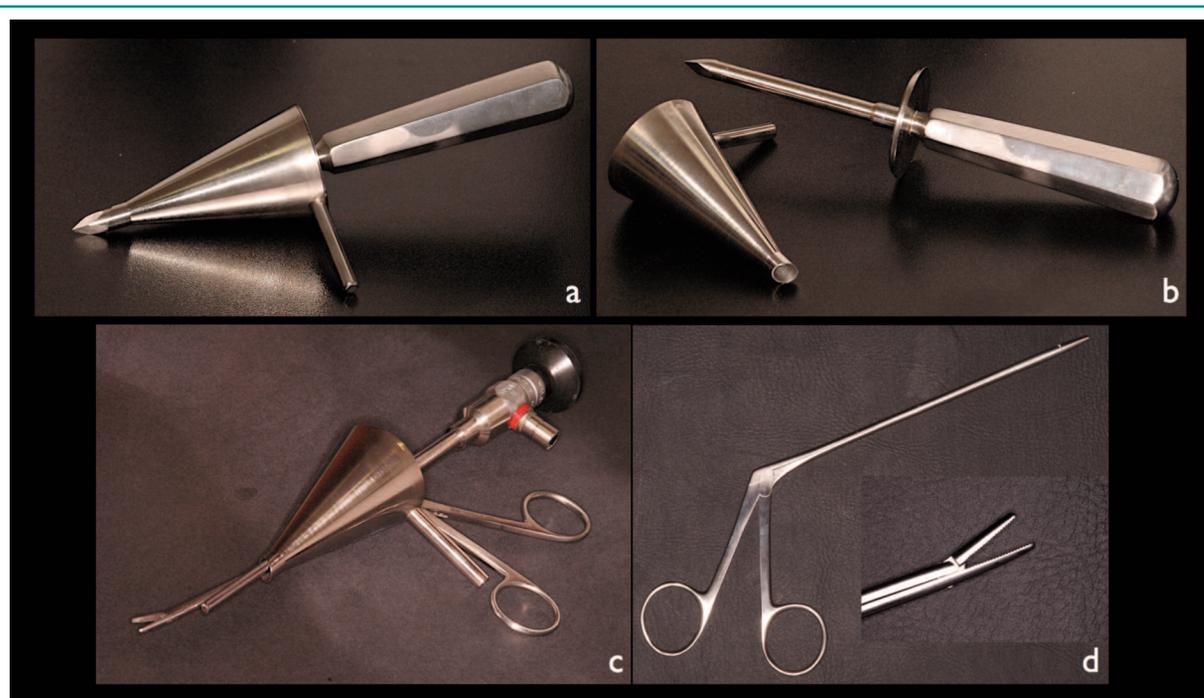


Figure 1
 a) The Maxillary Sinus Retrieval Device (MSRD) assembled; b) the components of MSRD the trocar and its funnel-shaped canula, equipped with a handle in order to facilitate the hand grip; c) the particular shape of the trocar cannula allows the easy access of both an endoscope and a suction cannula or, in the alternative, a straight forceps; d) a straight forceps for otolaryngology can be advantageously used for the implant retrieval procedure.

Then the osteotomy was performed using implant drills, of progressively increasing diameter (up to Ø5.5mm) (Figure 2d). Then the trocar was placed in the canine fossa, to make access in the maxillary sinus. Subsequently the tip was removed (Figure 2e) and the endoscope inserted (Figure 3d). Both a portable 5 W white LED light source and a camera capable of recording Full HD videos (Samsung NV24HD, Seoul, South Korea) were mounted on a 30° endoscope, provided with a 4mm wide optics (28721BWA, Karl Storz GmbH & Co. KG, Tuttlingen, Germany). The ectopic implant was situated in the posterior recess of the antrum (Figure 3a). Alongside the endoscope was possible to insert a small suction cannula (SC) through the antrum (Figure 3b, c, d), to retrieve the implant from the sinus (Figure 3e, g). Alternatively to the SC the use of a straight forceps for otolaryngology is recommended (Figure 1d). After the implant removal the antral space was washed with saline solution, in order to remove

any possible debris, and subsequently endoscopically controlled (Figure 3f) prior to suture the flap. Ibuprofen (Brufen 600mg, Abbot, Italy), every 8-12 hours for 5 days was administered to control postoperative pain and edema. Rinses with chlorhexidine digluconate 0.2% (Corsodyl Mouthwash, GlaxoSmithKline, Italy) were prescribed for the disinfection of the surgical wound, 2/3 times/day for 7 days. After 14 days the sutures were removed and oral hygiene instructions were provided. As referred by the patient the postoperative was uneventful and no nasal bleeding was reported, thus she was directed to her referral clinic for the completion of therapy.

Discussion

The increasing use of dental implant, even for the rehabilitation of posterior edentulous areas

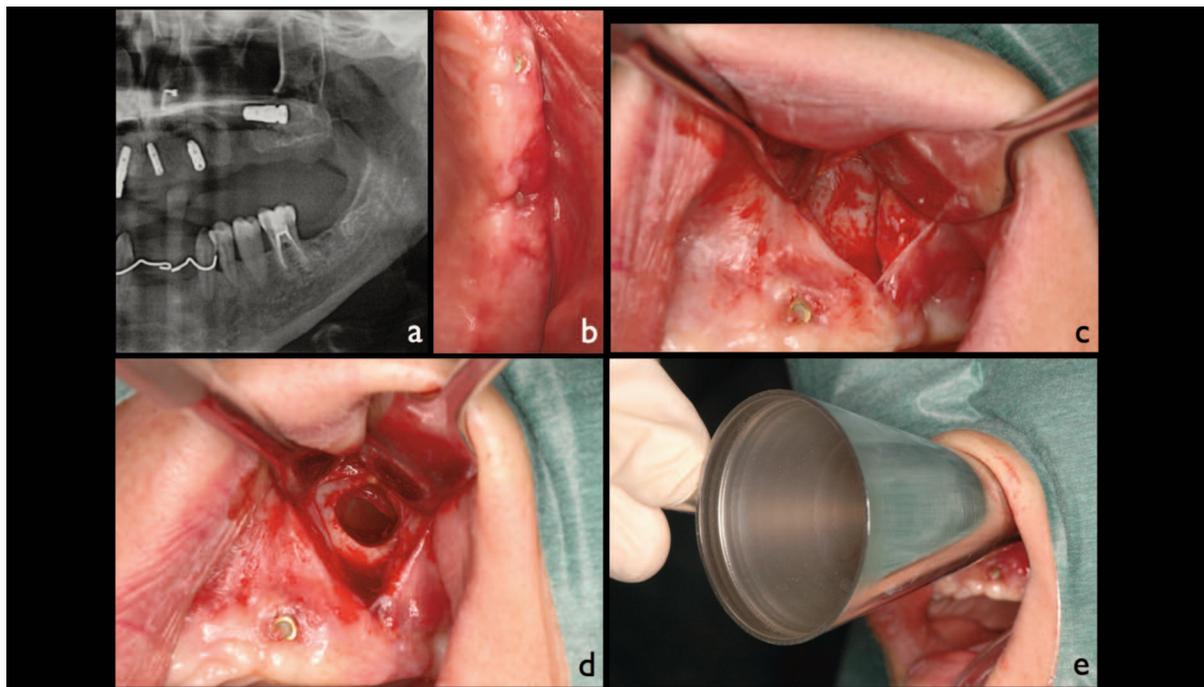


Figure 2
a) The panoramic X-ray showing the ectopic implant; b) the preoperative intraoral condition; c) a mucoperiosteal flap is retracted; d) the circular antrostomy is performed; e) the trocar cannula in place.

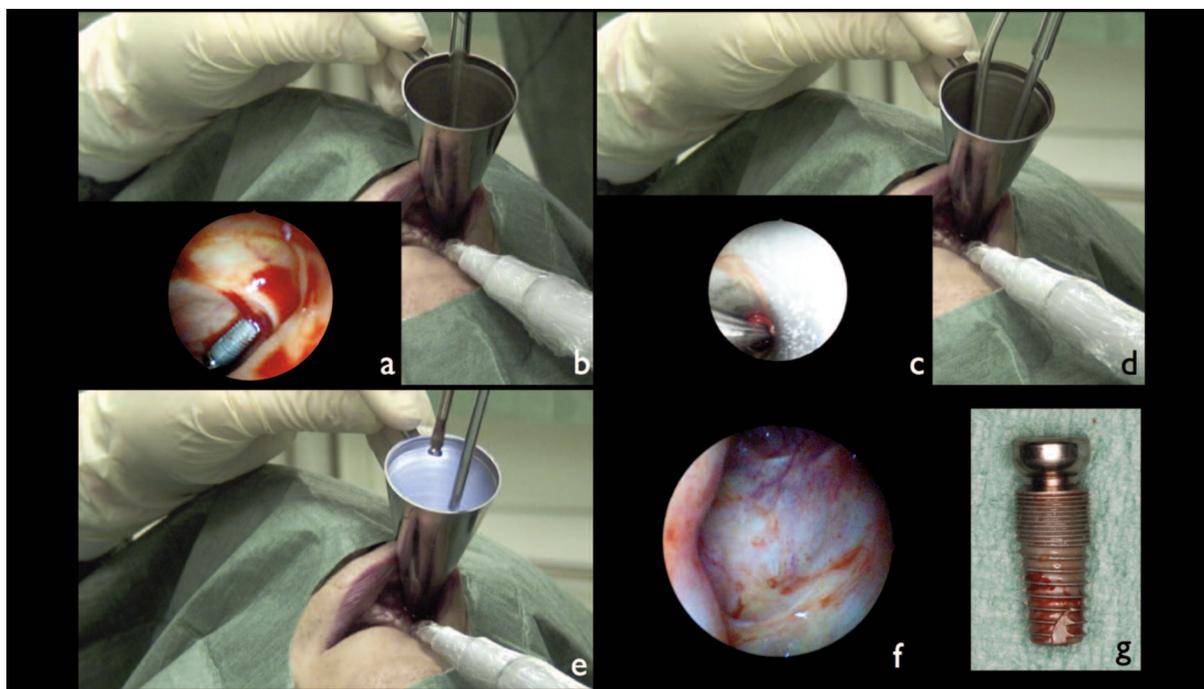


Figure 3
a) The implant is easily found with the endoscope; b) the endoscope inserted into the trocar cannula; c) the suction cannula is inserted more deeply and laterally to the endoscope; d) both the instruments are placed in the trocar cannula; e) the implant is retrieved with the suction cannula; f) the absence of debris, into the antrum, is verified before suturing the flap; g) the implant retrieved.

of the maxillae affected by severe bone atrophies, has made the implant migration into maxillary sinus a more common occurrence (9, 10). The causes of dental implant displacement have not been fully identified yet, but definitely the main causes are poor bone quality, untreated membrane perforation, and the use of excessive force during installation (9, 19). Other complications could be the presence of such diseases like oral mucositis, oral dysplastic lesions, and burning mouth syndrome that may favor implant displacement (20-22).

The displacement may occur either during implant insertion or during prosthetic functional-loading period.

Although some patients develop sinusitis, which may lead to other major complications, the persistence of an implant in the maxillary sinus may not manifest pathological symptoms or signs of inflammation.

Treatment selection is primarily based on the presence of signs of pathology or inflammation associated with the migration, but even in these asymptomatic cases, different Authors in literature suggest that the implant removal should not be postponed, since it may result in sinusitis complications or in migrations of implant into distant spaces, such as nasal cavity (23), sphenoid sinus (24), ethmoid sinus (25), orbit (26) or even anterior cranial fossa (27).

There are three main surgical techniques used to remove displaced implants, depending on the location of the ectopic implant and the symptoms manifested: via transnasal approach, via transoral approach through the canine fossa or via transcresal direct approach. Only in the first two techniques the use of an endoscope is recommended.

In recent years, endoscopic approaches for the removal of implants have become more widely used, especially the use of transnasal endoscopy. This approach has the advantages of a low morbidity, rapid recovery, and it allows to treat both the ostium and affected paranasal sinuses at the same time (28).

However, transnasal approach has several limitations: the location and size of the implant that

has to pass through the ostium, the requirement of a specific equipment, specialized surgery rooms and often general anesthesia. Endoscopic retrieval of a dental implant into the maxillary sinus is also affected by prosthetic (29-33) and endodontic clinical outcome (34).

Transoral surgical techniques can be easily performed under local anesthesia, in dental private practice, requiring a small antrostomy to access the sinus. A transcresal approach limits access to the antrum and does not allow the endoscopic approach. The Caldwell-Luc technique diminishes the integrity of the lateral wall of the maxilla, and the access window may not completely reossify.

Although retrieving displaced implants from the maxillary sinus via transnasal approaches should be preferred, when the ectopic implant is in accessible positions, transoral approaches are suitable in most cases, allowing a better visibility combined with the ability to remove even large implants. The proposed technique limits the biological sacrifice consequent to the creation of a traditional antrostomy that, in order to achieve a sufficient visibility, must be often enlarged. Also the flap proposed is less extended, in comparison to the traditional flap adopted for the Caldwell-Luc technique. This more conservative approach limits the arising of both postoperative complication and patient's discomfort. Although this method involves the use of specific instruments, it shows various advantages that support its use in the clinical practice.

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