CASE REPORT

Oral Sciences

Migration of a dental implant into the maxillary sinus: a case report

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ABSTRACT: Migration of dental implant into the maxillary sinus is an uncommon occurrence but possible complication in clinical practice and should be addressed without delay. This is a case of a 61 year old man; hypertension controlled who presented with a migrated dental implant into maxillary sinus which was removed by Caldwell-Luc approach successfully. This case report comes to express a problem that is beginning to arise more often in clinical practice. This complication is closely related to the surgical planning and the growing number of dentists with different levels of training involved with implant placement.

KEYWORDS – Maxillary sinus, dental implant, Caldwell-Luc procedure.

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Introduction

Dental implant has become a routine practice and has a predictable outcome with a long term survival rate. However, anatomical limitations can compromise the rehabilitation with dental implants especially in resorbed maxilla. The edentulous posterior maxilla can be affected by the presence of bone deformities left by alveolar trauma, traumatic extractions, congenital absence of teeth, infections and diseases. Oftentimes, the posterior edentulous maxilla is a challenging supporting an implant adequately due to the limited amount and quality of the available bone, as well as the presence of maxillary sinus pneumatization (1, 2).

The placement of dental implants in aforementioned area, without careful appraisal and surgical experience, can lead an unpleasant surprise in clinical practice. The displacement of dental implant is an accident that can arise during the placement, or shortly thereafter, whilst the migration of dental implant is a complication that involves the healing process (1). The incidence of this occurrence remains unknown because of the lack of cohort studies (3). Any of the events, may be followed by signs or symptoms of inflammation and/or infection besides presenting the possibility of oro-antral communication (2). Therefore, this issue requires an early removal of the dental implant to rule out more serious complications such as meningitis or brain abscess (4).

The main treatment modalities for dealing with this complication include the removal of dental implant through functional endoscopic sinus surgery (FESS) (5, 6) or by Caldwell Luc procedure (3, 7, 8). Occasionally, it is necessary to combine these approaches along with its variations (2).

The aim of this article is to bring into focus an issue which is arising more frequently in clinical practice.

Case report

A 61 year old man, hypertension controlled, was referred by his dentist to our dental service for evaluation of a cone-beam computed tomography (CBCT) and removal of the migrated dental implant into the maxillary sinus. The patient was under rehabilitation program with dental implants in both arches. Four month earlier, the dentist had placed 2 implants on the right side of the maxillary at premolars region and the procedure was uneventful.

When the patient returned for the second stage surgery, one of the two implants placed distally to the right canine could not be seen clinically and a CBCT revealed the implant into maxillary sinus (Fig. 1).

The patient had no sinus symptomatology or discomfort on palpation. Intraorally, were observed five dental implants placed on maxilla, four dental implants on mandible and a reasonable oral hygiene. There was no evidence of inflammatory reaction such as an oro-antral

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communication (OAC). The CBTC showed a dental implant nearby to the ostiomeatal complex in right maxillary sinus and no thickening of the mucous lining. A panoramic radiograph was got in order to check the position of the dental implant, and indeed, was observed (Fig. 2).

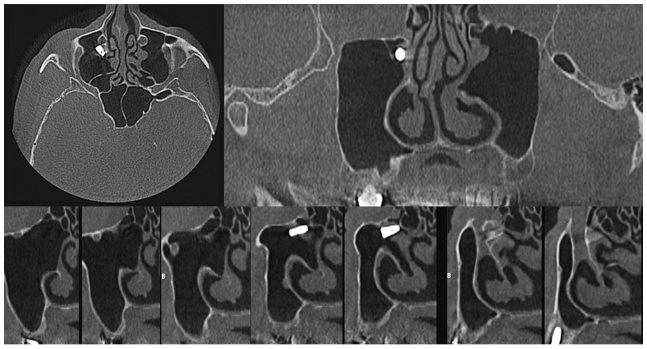

Fig 1. Cone-beam computed tomography (CBCT) in identifying the implant into maxillary sinus.

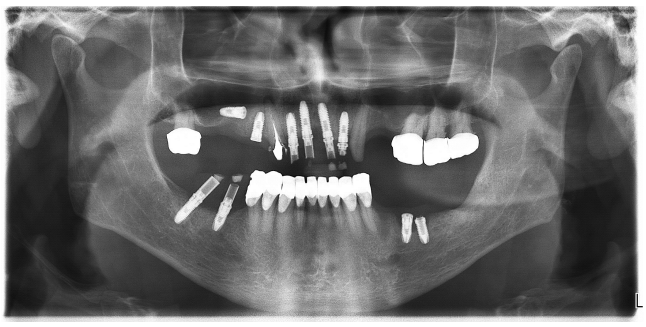

Fig 2. Panoramic radiograph showing a dental implant into the right side of the maxillary sinus.

Therefore, a surgical removal of the dental implant from the maxillary sinus was proposed and patient accepted the planning after receiving all necessary information. His medical history revealed hypertension and its control by medication. Furthermore, he did not smoke and/or drink.

Initially, the patient received antibiotic prescription, two oral tablets (Clavulin® amoxicillin 500mg and clavulanate potassium 125mg, oral tablet, Glaxo Smith Kline Brazil Ltda., Rio de Janeiro, Brazil) and one oral tablet of dexamethasone 4 mg (Decadron® Lab. Achè, Guarulhos, SP, Brazil) an hour prior to the surgical procedure. The dosage of the antibiotic was maintained during 10 days, one oral tablet each eight hours. Thirty minutes previously, the patient received a midazolam maleate oral tablet 15mg MDZ (Dormonid® 15 mg tablets, Roche, Rio de Janeiro, Brazil). A preoperative periapical X-ray was taken at the time of surgery (Fig. 3).

The asepsis of perioral area was carried out with chlorhexidine gluconate 10mg/mL (Asseptcare® Lab. Neo Quimica Com. e Ind. Ltda., Anapolis, GO, Brazil) whilst, oral asepsis with chlorhexidine gluconate 0.12% (Colgate-Palmolive®, São Bernardo do Campo, SP, Brasil). The procedure was performed under local anesthesia with Articaine hydrochloride 4% with epinephrine 1:100.000 (Articaine® DFL Indústria e Comércio Ltda., Rio de Janeiro, RJ, Brasil). It was infiltrated to the right infraorbital area, on the buccal mucosa of the first molar and greater palatine nerve on hard palate.

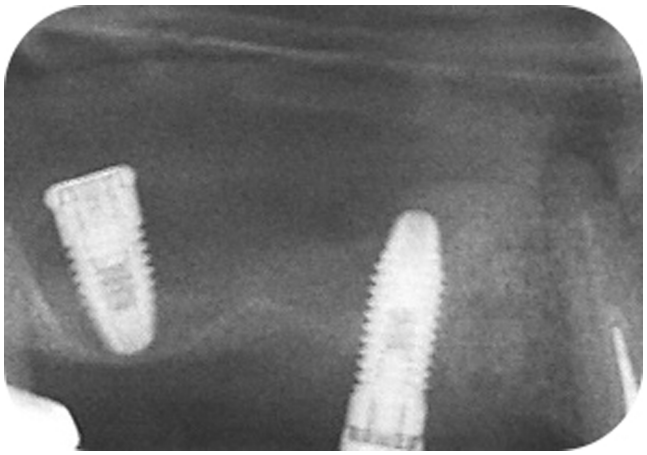

Fig 3. Preoperative periapical X-ray.

A trapezoidal full thickness flap was elevated on the buccal aspect to gain access and exposure of the maxillary sinus bony wall from the canine to the molar region. A nº 8 carbide round burr (komet®, Santo André, SP, Brazil) mounted in a low speed straight handpiece with abundant sterile saline irrigation was used to prepare an elliptical bone window. The procedure created a bone lid attached to the Schneiderian membrane that was fractured inward. A carefully handling to prevent tearing of the Schneiderian membrane was necessary. Then the sinus curettes were used to gently lift the membrane of the sinus floor (Quinelato® Schobell Industrial Ltda. Rio Claro, SP, Brazil), and elevated upward in order to explore the maxillary sinus. The thickness of the sinus mucosa not showed any presence of pus and/or phlogistic signs. At this moment, the patient was positioned slightly reclined on his right side. An 8.5mm length dental implant was found slightly posterior-laterally to the sinus and was retrieved with a curved Kelly hemostat (Quinelato® Schobell Industrial Ltda. Rio Claro, SP, Brazil).

Thereafter, it was performed a copious irrigation with saline solution and a LUMINA-COAT collagen resorbable membrane (Critéria Biomateriais, São Carlos, SP, Brazil) covered the osteotomies. The surgical flap was carefully replaced and the wound was closed with 4-0 Vicryl suture (Ethicon®, Johnson & Johnson, São José dos Campos, SP, Brazil). The patient was instructed in how to cough and sneeze to prevent any disturb. Moreover, the consumption of carbonated beverages was avoided.

Postoperatively, the patient received prescription of analgesic (Dypirone - Eurofarma Laboratórios Ltda., SP, Brasil), 30 drops 4 times daily for 72 hours, as well as nasal spray decongestant (Rinosoro® Farmasa, SP, Brasil) 4 times a day for at least 7 days.

The patient was advised to avert mouthwashes but perform the oral hygiene using a 20 mL disposable syringe loaded with Chlorhexidine gluconate 0.12% to irrigate the wound two times a day for two weeks. The sutures were removed 15 days after surgery and recovery was uneventful. In addition, the patient routinely returned for follow-up appointments.

Currently, more than twenty-four months after surgery, the patient is under outpatient follow-up with good clinical outcome and has already completed his oral rehabilitation with his dentist (Fig. 4).

Fig 4. Panoramic radiograph twenty-four months after surgery.

Discussion

Migration of the dental implant into maxillary sinus is the movement related to the healing period and occurs between two and eight weeks after the surgical procedure or in the late stage (4). There are cases in which the quantity and quality of bone is normally scanty and it is at highest risk for implant failure related complications (1, 2). Although apparently uncommon issue in clinical practice, it is difficult to estimate based on case series published in the literature (3). Nevertheless, the incidence of implant migration in the maxillary sinus seems to be low and sporadic perhaps because it is underestimated (2). In this sense, Galindo-Moreno *et al.* (9) showed that the treatment was incorrectly planned for 80% of the sites and highlighted the lack of knowledge to make a proper clinical judgment and surgical performance. Furthermore, this complication was more common when cylindrical implants were used in the posterior maxilla as compared to conical ones, narrower implants, and when implants were placed in smokers (7, 9). This complication has also been found in others structures such as ethmoid or sphenoid sinus, orbital and cranial fossae more rarely (5, 10-12).

Generally, the presence of the dental implant in the maxillary sinus will act as a foreign body leading to impair mucociliary physiology. This event can block the ostiomeatal complex or causes a tissue reaction that may trigger an inflammatory and/or infectious course (7, 8), whereas in others, remain asymptomatic (13, 14).

Whatever the circumstances, the migrated dental implant to maxillary sinus should be diagnosed and removed as soon as possible in order to avert further serious complications.

The etiology of this complication remains unclear. Several hypotheses have been proposed to explain such occurrence, and include autoimmune reactions, inappropriate distribution of occlusal forces, lack of primary stability, severe pneumatization of maxillary sinus with absence of bone quantity and quality, changes in intra-sinusal and nasal pressures that provoke a suction effect, anatomic variances, previous infection, osteopenia or osteoporosis, as well as poor surgical technique along with the inexperience of the surgeon (1, 3, 7, 13, 14).

In this case, the migration of dental implant into maxillary sinus occurred during the healing process without any pain or infection. Probably, the lack of supporting alveolar bone and insufficient primary stability allied to the poor surgical planning and/or unsatisfactory performance at the time of dental implant placement were the reason of this complication. The rule of thumb for implant placement is to ensure primary stability on an adequate bone support.

Based on the image was possible evaluate the limited amount of bone volume available for implant placement. The remaining alveolar bone could be compensated with the use of surgical techniques that requires planning for maxillary sinus augmentation to allow favorable situation or even the use of short-length implants. Hence, each one of the procedures requires an accurate training.

Basically, the main treatment modalities proposed for this type of occurrence are directly through the oral cavity by the Caldwell Luc approach (3, 7, 8) and / or the endoscopic technique (5, 6, 10, 11). At present, the recommended treatment to remove an implant that migrated into the maxillary sinus is the functional endoscopic surgery of the paranasal sinuses (FESS) by the benefits that technique promotes besides low level of complication (2, 5, 6). This technique, in addition to removing the implant that migrated to the maxillary sinus, provides adequacy of ostiomeatal complex, recovery of sinus function and reaches 96% of success. Thus, if the ostiomeatal complex is compromised and the maxillary sinus affected pathologically, the FESS should be the elective technique (2, 5).

Furthermore, there are circumstances that endoscopic technique should be combined with oral access by a necessity (2). However, when such complication is followed with or without the oro-antral communication, but free of sinus pathology or impairment of ostiomeatal complex, the intraoral maneuver through Caldwell Luc technique is suitable for the removal of dental implant. Although it is not the first choice procedure to solve this type of occurrence but still is the best technique known by dentists. However, complications rate related with Caldwell Luc procedure are relatively high and have been reported between 10-40% of the cases (15). Even so, it has occasional

indications and has a guideline on how to minimize or prevent possible complications (16).

In this case report, at least four reasons drive us to opt for Caldwell Luc technique. First of all, the patient had absence of sinus symptoms, second, the image showed no thickening of the sinus membrane, third, the sinusal function was not affected and finally, the size of dental implant.

Therefore, we agree with the idea that all foreign body should be removed from maxillary sinus, even regardless of symptoms, in order to avoid any possible sinus pathology. Furthermore, it should not be postponed the retrieval of dental implant due the possibility of migration to other structures (5, 10-12). For instance, as initially observed in this case report, the tomographic image revealed the dental implant nearby to the osteomeatal complex.

It is worth noting that this complication will increase over time owing to the growing number of dentists with different levels of training involved with implant placement (2, 9).

Conclusion

The migration of dental implant into maxillary sinus is an uncommon, undesirable but possible occurrence and should be addressed immediately. It is essential obtain appropriate information about the oral structures to evaluate, carefully, the clinical and imaging features of each patient prior to implant placement. The anatomical knowledge and heedful surgical planning should be priorities to preventing such complication.

Resumo

CAVEZZI JÚNIOR, Orlando. **Migração de um implante dentário para o seio maxilar: um relato de caso.** Oral Sci., jan/dez. 2015, vol. 7, nº 1, p. 3-6.

A migração do implante dentário para o seio maxilar é uma ocorrência incomum, mas uma complicação possível de ocorrer na prática clínica e deve ser abordada sem demora. Este é um relato de caso clínico de um homem de 61 anos portador de hipertensão controlada que apresentou um implante dentário migrado para seio maxilar e removido pela técnica de Caldwell-Luc com sucesso. Este relato de caso vem expressar um problema que está surgindo mais frequentemente na prática clínica. Esta complicação está intimamente relacionada ao planejamento cirúrgico e ao crescente número de cirurgiões dentistas com diferentes níveis de treinamento envolvidos na colocação de implantes.

PALAVRAS-CHAVE: Seio maxilar, implante dentário, procedimento Caldwell-Luc.

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