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## **MANAGEMENT OF IMPLANT COMPLICATIONS AND FAILURES**

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### **ABSTRACT:**

With the increasing popularity and use of dental implants the presence of implant complications and failures are not uncommon.<sup>[1]</sup> In dental practice, implant surgery complications are frequently occurring and knowledge in the management of these cases is essential. Questions like causes of implant surgery complications, prevention of them and how to best manage them still linger in the minds of most clinicians. This review aims to provide an overview of the most commonly encountered implant complications, etiology as well as to provide guidelines to achieve satisfactory treatment outcome of the same.

**KEY WORDS:** dental implant, implant complications, implant failures, management.

**INTRODUCTION:** According to a retrospective study by McDermott *et al*,<sup>[2]</sup> 677 patients (2379 implants) were investigated, and an overall frequency of complications was 13.9%. Operative complications made up a mere 1% of the overall figure, whereas inflammatory and prosthetic complications were 10.2% and 2.7%, respectively. In order to know what are implant complications and their management it is essential to know what defines implant success and implant failure. According to Albrektsson *et al*<sup>[3]</sup> implant success is defined when, implant is immobile when tested clinically, that a radiograph does not demonstrate any evidence of peri-implant radiolucency, vertical bone loss is less than 0.2 mm annually following the implant's first year of service, individual implant performance be characterized by an absence of persistent and/or irreversible signs and

symptoms such as pain, infection, neuropathies, paresthesia, or violation of the mandibular canal. In this context, a successful rate of 85% at the end of a 5-year observation period and 80% at the end of a 10-yr period is a minimum criterion for success. Ailing implant is a term put forth during early 1990s in the North American literature which refers to clinically stable implant affected by bone loss with pocketing.<sup>[4]</sup> A failing implant displays features similar to the ailing implant, but is refractory to therapy and continues to become worse. A failed implant is one that is fractured, has been totally refractory to all methods of treatment, or demonstrates clinical mobility or circumferential periimplant radiolucency. The common complications are outlined in this review. They are as follows:

#### Treatment plan-related complication

##### 1. Improper angulation:

Proper angulation should be determined according to the future prosthesis with the consideration of bucco-lingual, apicocoronal, and mesio-distal positions. Surgical guides and proper treatment planning can potentially prevent angulation problems. The use of angulated abutments, and multiunit abutments can correct the angulation of the implant in most of the cases. If the angulation cannot still be corrected, then the implant should not be restored, should be left buried or even explanted and replaced appropriately.

##### 2. Improper Implant Location

Adjacent teeth should be at least 1.5 mm from the implant body<sup>[5]</sup> and a gap of 3 to 4 mm between adjacent implants is required to prevent horizontal bone loss as well as to preserve esthetics (papilla).<sup>[6]</sup> Preoperative measurements like interocclusal, interdental, ridge height, and ridge width should always be recorded. If more than one implant is to be placed, a diagnostic wax-up and/or surgical guide should be used to determine the correct implant locations. At least, drawing and measuring on the stone casts would allow for calculations and treatment planning.

Anatomy related factor:

##### 3. Nerve injury:

Proper radiographs like computer tomography (CT) scan should be taken to know the proper location of the nerves, foramen, sinus, vital anatomic structures, etc. An informed consent should include the potential risks and complications of injury or damage to these vital structures to avoid liability in cases of lawsuits. Some clinicians suggest local infiltration instead of a mandibular nerve block, in order to circumvent trauma to the inferior alveolar nerve (IAN). This is a safety precaution to avoid drilling too close to the canal.<sup>[7]</sup> However, if nerve injury does take place, treatment should include neuronal anti-inflammatory drugs such as clonazepam, carbamazepine or vitamin B-complex,<sup>[8]</sup> According to Hegedus and Diecidue<sup>[9]</sup> follow-up appointments should take place at 4, 8, and 12 weeks after placement and subjective symptoms, oral/facial function and atrophic/cutaneous changes should be documented on each visit. The patient should then be referred for microsurgery if total anesthesia persists, or if after 16 weeks dysesthesia is on-going.<sup>[8]</sup>

#### 4. Cortical Plate Perforation:

The buccal cortical plate varies in thickness throughout the mouth. While preparing osteotomy sites or placing implant fixtures in areas with minimal labial plate thickness, or if the implant is placed too buccally, a fenestration or dehiscence implant defect is a common finding. Tinti *et al*,<sup>[10]</sup> further classified these defects as Class I if the implant was within the envelope of bone and Class II if it was left staying outside the envelope. Immediate correction with particulate bone grafting with or without a membrane during the time of implant placement, can be done as long as primary stability has been achieved.

#### 5. Haemorrhage:

Severe haemorrhage can be associated with dental implant surgery. Goodacre *et al*,<sup>[11]</sup> found haemorrhage-related implant complications had a high incidence of 24%. Potential causes include incision of arteries in soft tissue, lateral wall sinus lift, and osteotomy preparation. Haemorrhage treatments at implant osteotomy sites include compression, finger pressure, vasoconstriction, cautery, bone graft, bone cement, and ligation of arteries.<sup>[12]</sup>

#### 6. According to origin of infection:

Peri-implant diseases present in two forms: peri-implant mucositis and peri-implantitis. Peri-implant mucositis has been described as a disease in which the presence of inflammation is confined to the soft tissues surrounding a dental implant with no signs of loss of supporting bone following initial bone remodelling during healing. Peri-implantitis has been characterized by an inflammatory process around an implant, which includes both soft tissue inflammation and progressive loss of supporting bone beyond biological bone remodelling.<sup>[13,14]</sup> Thorough debridement is indicated using hand or ultrasonic plastic instruments in non surgical management of periimplant diseases. Metallic instruments are avoided to minimize surface damages and roughening, which can favour plaque adhesion. Hydrogen peroxide & chlorhexidine digluconate can be used as an adjunct to mechanical debridement to improve clinical outcomes. Local & systemically administered antibiotics were used along with local debridement and was found to be effective in several cases. Local application of minocycline or doxycycline as an adjunct to mechanical debridement and irrigation with an antimicrobial agent may be effective. However, there is insufficient data to allow any firm specific recommendations for the use of these drugs.<sup>[15]</sup>

If results are not obtained with Non surgical therapy, surgical therapy should be followed. It includes elevation of mucoperiosteal flaps, and removal of peri-implant granulation tissue. Mechanical, chemical, photodynamic measures or combinations of all three can be used to eliminate infection. Various regenerative approaches include use of bone grafts & barrier membranes.

#### 7. Restorative & Prosthesis related problems:

Restorative problems like screw loosening and improper fit can be seen. Long-term success of implant depends on bone-implant contact hence short implant will lead to higher stress concentration. Use of more number of implants decreases the number of pontics and the associated mechanics and strains on the prosthesis. It dissipates stresses more effectively to the bone structure. A framework should have greater dimension occluso

gingivally. Occlusal forces should be shared evenly by all implants. Laboratory technique should minimize casting shrinkage and inaccuracies. A non-passive framework try-in technique will achieve a stable and passive fit. Fit of the components must be checked before taking the impression. Thorough knowledge about type of prosthesis will prevent the prosthesis related failures of implants. Occlusal overload should be identified and occlusal adjustment should be carried out periodically.

## CONCLUSION:

As stated earlier implant complications are not uncommon and should be addressed immediately. Basic anatomy should be thoroughly revised by clinicians. Adequate time should be spent in implant “planning” stages, such as tracing preoperative radiographs, measuring models, taking CT scans and making proper surgical guides. Regular maintenance plays an important role in the prevention of implant complications, hence post operative instruction should be given and recalls should be done regularly. Clinicians should be fully aware of the signs and symptoms of complications and should also be able to treat/manage them as early as possible.

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