An insight into Complications of Implant Dentistry

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ABSTRACT

Keeping in view, the importance of oro-dental rehabilitation, application of dental Implants in partially edentulous and fully edentulous patients has seen a tremendous rise in the past few decades. The success rate of above 90% has benefited millions of dental patients. However, complications relating to Implant Dentistry are not rare. Most of the complications are mostly preventable with proper treatment planning and execution of implant placement, while few require post-surgical intervention. This paper aims to illustrate the complications associated with implant dentistry.

KEYWORDS: Implant Dentistry, Implant complications, peri-implantitis

INTRODUCTION

The present oral health status, need of any rehabilitative treatment is well determined by the pattern of tooth loss. Since time immemorial, Dental Caries, Periodontal diseases have proved as the major reasons for tooth loss.1,2,3 In order to fulfill the patient’s demand of dental rehabilitation of missing teeth, Prosthodontics has played a significant role in developing rehabilitations options for patient satisfaction, involving removable partial denture, resin-bonded bridgework and full coverage bridge prosthesis.4 With the demand for better biocompatibility prosthesis and patient comfort an alternative to conventional dentures and bridges was introduced i.e Dental implants. Implants have been effectively put to use since past few decades and are used as single crown implants and implant-supported fixed partial dentures.5 Dental implants function on the principle of Osseointegration, where its titanium surface gets integrated with the growing osteoblasts of the alveolar bone.6 Numerous studies have depicted high survival rate of around 10 years for both single unit and multiple unit implant-supported FPD’s.7 But, the high success rate is not free from implant complications. The aim of the review article is to discuss enumerate the various implant related complications, its Management and prevention.

DENTAL IMPLANT COMPLICATIONS

Implants both, single crown implants and implant supported fixed partial dentures may face various complications like:

- Mechanical
- Technical
- Biological complications8

Mechanical complications: These complications can be majorly attributed to Biomechanical overloading, which may be caused due to poor implant position or angulation, insufficient posterior teeth support due to partially edentulousness, inadequate and inappropriate bone, excessive force exertion due to parafunctional habits.10

These include:

- Screw loosening
- Screw/implant fracture
- Cement Failure

Screw loosening: Excessive load on implants/Overloading may lead to fracture of various components of Implants. It has been stated that, prosthetic screws have witnessed more screw loosening than abutment screws.11 Multiple implants/restored units have been proved to have better stability in terms of screw loosening, when compared to single crowns.12 Moreover Screw Loosening affects mandibular molar implant restorations than maxillary molar implants. The incidence of screw loosening was found to be 59.6% during 15 years follow-up in a study.13 Rate of abutment or screw loosening ranged from 0.62% to 2.29%.14

Occurrence of Screw loosening can be managed by increasing the joint clamping forces thereby reducing joint separating forces which include excursive contacts, interproximal contacts, cantilevered contacts and non-passive frameworks.15 With time, many manufacturers revised the conventional implant components to reduce the incidents of screw loosening.16

Screw/implant fracture: This is basically caused by Biomechanical overloading and peri-implant vertical bone loss that extends to the apical limit of the screw, design and manufacturing flaws.17,18 The most commonly encountered fracture of implant involves separation of head from the main body of the screw and this occurs...
mostly when the screw is loose, making it exposed to excessive sideward load. 19 Implant fracture occurs mostly when the lateral forces exceed 370 N for the abutments with joint depth of atleast 2.1 mm and 530 N with a joint depth of 5.5 N, rather than forces within the range of 200-300 N. 20

Patients with implant fracture need to change the prosthesis. 21 It has also been studied that, implants with smaller diameter are more prone to fractures than with the greater diameter. Implants with diameter of 6mm is six times stronger and with a diameter of 5 mm is three times stronger than a 3.75 mm implant. 19 Reduction of incidence of Screw/ Implant fracture and loosening need careful treatment planning, understanding of the occlusal scheme, tightening the implant to the recommended torque, and routine follow-up appointments and sometimes change of prosthesis. 22

Cement Failure: This is witnessed due to biomechanical overload, resulting is poor prosthesis attachment. It can be treated by recementation procedure. 23 With the development of better luting agents, the incidence of decementation has decreased, resulting in greater dentist and patient satisfaction in this regard.

Technical complications: These are more prevalent in implant-supported FPDs as compared to the implant-supported removable prosthesis. 23 These include:

- Fracture of the framework
- Fracture of veneering porcelain

Fracture of the framework: This usually occurs when the connection between the fixed framework and the osseo-integrated implant is rigid. This leads to induction of excessive inevitable strains and the development of additional functional load produces supplementary strains in each component of the framework. 24 Hence, it has been advocated to provide passive fit of the framework, for long term stability of bone-implant-prosthesis assembly. 25 Fracture of the framework is seen in partially edentulous arches because, lateral bending loads, tipping forces are exerted on the implant-abutment interface and abutment retention screw, unlike completely edentulous arches with bilaterally splinted implants. Corrections of the abutment-implant misfit can be done but separating/cutting the framework and welding/soldering the sections, but this may impair the original fit. So, this may be avoided, by improving and delivering proper original fit of the case framework. 26

Fracture of veneering porcelain: With the increase in demand for esthetic prosthetic materials, Zirconia restorations have been effectively used as the material to fabricate implant abutments for cement-retained restorations or for direct veneering for screw-retained prosthesis. But, the single implant restorations are often associated with fracture or chipping off of the veneering ceramic. 27 These complications can be reduced by reducing the occlusal table, preventing heavy occlusal contacts, keeping shallow cuspal heights, and by providing adequate thickness of the overlying ceramic.

Biological Complication: These include the following types:

- Bacterial infections,
- Microbial plaque buildup,
- Progressive bone loss, and
- Sensory disruptions

Biological complications further sub-divided into:

Early biological failures
- Late implant failures,

Late implant failures: The most common complication in this group is Peri-implantitis. Peri-implantitis is defined as the inflammatory pathological change that takes place in the soft and hard tissues surrounding an osseo-integrated implant. 31 The peri-implant disease occurring after successful implant- osseo-integration, is due to the interaction between host-defence and increasing bacterial load. 32 The clinical signs and symptoms of peri-implant diseases may take around 5 years to develop. 33 The condition can be assessed during routine follow-ups, recognition of which can be done by radiographic and clinical analysis and the condition can be treated if detected early. Unequal occlusal load distribution may lead to loosening of the superstructure, infection of the surrounding area, resulting in peri-implantitis. 34 Certain systemic conditions like uncontrolled diabetes mellitus, osteoporosis, smoking, long-standing treatment with steroids, uncontrolled periodontitis, radiation therapy, and chemotherapeutics increase the chances of Peri-implant disease occurrence. 35 Management of the condition includes nonsurgical mechanical debridement, local antimicrobial delivery in periodontitis and peri-implantitis, and surgical debridement with bone grafting. More than 60% of bone loss following peri-implantitis should be indicated for removal. 36

CONCLUSION

Dental implants have proved as a boon to the field of oral rehabilitation. However, its associated complications have made its application a challenging task for both dentists and patients. Most of the complications can be avoided if done under experienced professionals, when
dentists post-op instructions are rightly followed and when complications are detected earlier.

REFERENCES


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