

## Complications Related to Implant Supported Prosthesis in Geriatric Patients - Review

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### Abstract

Over the last 25 years, dental implants have changed the face of dentistry. Dental implants, like most other therapeutic techniques in dentistry today, require not just scientific discovery, study, and understanding, but also clinical application. Because implants are so successful in the field of dentistry, they are also associated with several difficulties especially with elderly patients. There are two components to these problems. The first portion discusses oral soft tissue issues, while the second half discusses hard tissue issues. Difficulties can occur at any point of the process, but the goal of this review is to describe the complications in implantology that may arise during the prosthetic phase of the creation of a fixed implant retained prosthesis.

**Keywords:** Geriatric Patients, Edentulous Patients, Implant Supported Prosthesis

## Introduction

Regardless of stomatognathic system atrophy, disease, or injury, the goal of modern dentistry is to restore normal contour, function, comfort, aesthetics, speech, and health. Humans have attempted to restore lost or sick tissue with natural or manmade substances throughout history. A dental implant is a prosthetic that replaces a tooth's root or roots. Because implants are so successful in the field of dentistry, they are also associated with several difficulties. There are two components to these problems. Hemorrhage, neurosensory abnormalities, tissue emphysema, infections, wound dehiscence, aspiration or swallowing of surgical equipment, and postoperative discomfort are covered in the first part. Hard tissue issues are addressed in the second segment, which includes periapical implant pathosis and endodontic considerations, as well as a lack of primary teeth [1].

In the Western world, there is a clear tendency toward an increase in the population of people above the age of 80. Between 2005 and 2050, Sweden's population of this age group is expected to grow by 87%. Another finding is that patients in higher age groups had more surviving teeth, implying that elderly people will require more dental care. As a result, it's likely that when teeth are lost, these senior patients may request more fixed restorations, both supported by adjacent teeth and implant-supported restorations [1].

Reports on implant function in older patients are mixed, with Salonen and colleagues suggesting that advanced age is a factor in implant failure, which is backed up by Brocard and colleagues. Furthermore, Sundén Pikner and colleagues found that the older the patient, the more bone loss there was. In contrast to these studies [2]. Bryant and Zarb and Engfors and colleagues found that implant treatment in older patients produced equivalent or better results than in younger edentulous individuals [3]. However, because most of the implant research on older patients have focused on edentulous patients, it is still unclear whether the outcomes of implant treatment are comparable for edentulous and partially edentulous patients.

The aim of this review article is to determine different complications related to implant supported prosthesis in elderly patients aged 80 years or more.

## Review of literature

Mechanical problems have been documented in high numbers, including the following, listed in order of reported frequency: Overdenture clip/attachment fracture (17%); porcelain veneer fracture of fixed partial dentures (14%); overdenture fracture (12%); opposing prosthesis fracture (12%); acrylic resin base fracture (7%); prosthesis screw loosening (7%); abutment screw loosening (7%); abutment screw loosening (7%); abutment screw loosening (7%); abutment screw loosening (7%); abutment screw loosening (7%); abutment (1%) [4].

In six investigations, 30% of implant overdentures developed issues related to loss of retention, and they required to be adjusted to promote retention [5-11]. The incidence of resin veneer fractures on implant-supported partial dentures was studied in five trials. A total of 144 prosthesis out of 663 were found to have resin fracture (22%). Relines were required for a substantial number of implant overdentures (mean of 19%, range of 7% to 44%) either during prosthesis implantation or during postplacement sessions. The retentive mechanism utilised with overdentures was fractured in ten tests. A total of 80 out of 468 prosthesis were affected (17%) [12-16].

When porcelain was employed as a veneering material, 36 of 258 implant fixed partial dentures (14%) cracked, according to three studies [6,15,17]. In ten trials, it was discovered that 69 of the 570 implant overdentures (12%) cracked [5-8,18-23]. In 12% of the prostheses, the opposing prosthesis was found to be cracked (20 of 168 prostheses fractured in 3 studies) [6,7,24]. The percentage of fractures ranged from 4% to 40%. The majority of the fractures (12 out of 20) were found to be in resistance to implant overdentures, while the rest were found to be in opposition to implant fixed complete dentures (8 of 20).

Fracture of the acrylic resin base overlying the metal framework of a fixed complete denture or fracture of the implant overdenture occurred in 7% of the prostheses with a range from 3% to 24% [6-8,25,26] of 649 prostheses evaluated in 6 studies, 47 fractured. The fractures occurred with both overdentures and fixed complete dentures. When the data from 12 studies were combined, a mean prosthesis screw loosening of 7% (312 of 4501 screws fractured) was calculated with a range from 0.0% to 38% [7,13,17,25-31].

The loosening of the abutment screws was found in 6% of the prosthesis (365 out of 6256) [12,32]. With implant single crowns, it was shown to be as high as 45 percent [33]. With implant single crowns that used early screw designs, the average loosening was 25% [32,33]. When the results of six recent trials were merged, the average incidence was 8%, demonstrating that new screw designs have made a significant improvement. Implant overdentures accounted for 3% of the total. With implant-supported partial dentures, 4% was recorded [34-39].

Fixed complete dentures (3%) and fixed partial dentures (3%) had nearly identical rates of screw fracture (5%) [6,12]. The average incidence rate was 4%, although it ranged from 0.0% to 19%. Two hundred and eighty-two of the seven hundred and ninety-four screws examined broke [6,40]. Thirteen studies found metal framework fractures [5,24-26,28,40-45]. There were 2358 fixed complete dentures and overdentures assessed, with 70 shattered prosthesis (3%). The percentages ranged from 0.0 and 27%. In one study, the incidence of fractures associated with fixed partial dentures was studied (0.5%).

## Discussion

Dentists' toolkit for replacing missing teeth has grown with the introduction of dental implants, but implant rehabilitation is no longer limited to restoring function. Bone augmentation, soft tissue management, and aesthetic restorations have propelled dental implants into a multibillion-dollar market. Implants have been a popular treatment option in the recent decade, thanks in large part to Branemark's work. Biological failures (connected to biological processes) and component mechanical failures are the two types of failures (including fractures of implants, coatings, connecting screws and prostheses). An iatrogenic failure is defined as an implant that is stable and osseointegrated but is unable to be employed as part of the anchoring unit due to malpositioning [46].

## Prosthetic Complications

### Complications related to immediately loaded dental implants

#### A. Material failure

It should be understood that if tapered or wide platform implants are driven into dense bone without sufficient osteotomy preparation, there is a risk of alveolar injury. It's possible to over-torque implants to the point that the added pressure causes

crestal bone necrosis and defect formation, which prevents normal healing. Forcing implants into poorly prepared locations increases the likelihood of biological issues such as compromised healing or implant failure, as well as implant material failure [48].

#### B. Gingival recession, blunted papillas, incomplete regeneration

When implants are quickly put and repaired in healed ridges, good aesthetic results and dimensionally stable tissues can be achieved. When bone and soft tissue grafting is required, immediate restorations may not be compatible with extensive alveolar site development. Sockets should be evaluated and classified carefully. This can be done either preoperatively with a CBCT scan of the buccal plate or clinically with periapical radiographs and probing measurements [48].

#### C. Occlusal mismanagement

Implant failure might result from complications with the interim restoration. Provisional restorations are frequently shaped and modified to avoid direct occlusal contact when single teeth or short portions are quickly repaired. If the implant has no movement, the occlusion offered will be implant protected occlusion, which should be monitored for another 1–2 months before ultimate restoration. Splinting was done within 2–4 weeks of implant placement and loading if it was movable [48].

#### D. Inadequate support, improper design, loss of retention

In full-arch immediate loading instances, in addition to splinting implants and reducing movement, the temporary restoration must be constructed to accommodate direct occlusal forces. Implant failure can occur if a provisional loosens from the supporting implants too early in the healing phase, or if the implant support and restoration are poorly constructed [47].

#### E. Incompletely seated prosthetic components

It is possible for ledges of bone to inhibit complete abutment seating during flap surgery. Using the implant manufacturer's crestal bone milling equipment to remove away spicules of bone that could interfere with abutment seating could have prevented these situations. By collecting periapical radiographs soon after abutment connection, the difficulties could have been recognised during surgery. In addition, an incompletely seated abutment may operate as a bacterial reservoir, causing crestal

bone loss, and may not transmit load to the underlying implant, causing subsequent implants to become overloaded [47].

#### **F. Adjustment to the tissue-fitting surface of the prosthesis**

It's difficult to prevent this issue. On radiographs, determining the thickness of the mucosa is challenging. As a result, the contact pressure between the soft tissue and the prosthesis must frequently be adjusted. It is difficult to prevent this problem, and it is vital to notify the patient before to treatment of the necessity for adjustments after prosthesis placement. Prior to fabricating the final restoration, it is critical to resolve this issue in the provisional restoration. At this stage, communication between the patient, the restorative dentist, and the dental technician is crucial [47].

### **Overdentures**

#### **A. Inadequate crown height space (CHS)**

In compared to porcelain-to-metal fixed prostheses, when sufficient CHS is lacking, the prosthesis built over it is more prone to component fatigue and breakage, as well as having greater problems. In cases with low CHS, the lowest profile attachment should be utilised to fit within the curves of the restoration, offer more acrylic resin bulk to avoid fracture, and allow optimum denture tooth position without weakening the resin base's retention and strength [47].

#### **B. Poor osseous angulation (C-A)**

The implants may perforate the lingual plate and irritate the tissues of the mouth floor if the doctor is ignorant of this angulation. If the implants are placed inside the boundaries of the bone, they may enter the crest of the ridge at the mouth's floor, making restoration very impossible. The implants are removed, followed by bone grafting and the implantation of fresh implants in a better position. Surgical cover screws are used to "sleep" the implants, which is followed by the creation of a standard prosthesis [47].

#### **C. Non-ideal implant positioning**

The most available bone height in an edentulous mandible is usually found between the mental foraminae in the anterior area. Hard and soft tissue issues, prosthesis dissatisfaction or breakage, and dubious long-term implant health are all caused

by improper implant location. To avoid this, all five implant sites should be perfectly positioned at the time of treatment planning and surgery, regardless of the treatment modality being used [47].

#### **D. Retention loss over time**

The loss of retention is the most common issue with dental implant attachments over time. This is highly varied and reliant on numerous elements depending on the situation. Mastication wear and insertion-removal wear are two factors that tend to loss of retention and wear. One of the most essential factors that helps to prevent retention loss is implant parallelism. Axial and paraxial forces should be reduced [47].

#### **E. O-ring failure**

O-rings frequently fail in their applications due to a combination of stress and environmental factors (i.e., friction, heat, and swelling). Incorrect O-ring size, faulty laboratory procedure, installation damage during final component assembly, and inability to properly maintain or lubricate the O-ring can all exacerbate such environmental issues. Using a stronger O-ring material or installing a suitably sized O-ring is the clinical remedy for extrusion and nibbing problems [47].

#### **F. Bar try in resulting in pain**

During the try-in of the bar, the patient may experience discomfort that originates from various areas in certain clinical conditions. It could be due to a variety of factors, including a non-passive prosthesis, inappropriate placement of the bar where deep sulcular tissue exists, resulting in the bar not seating properly, a loose abutment, inadequate bone – implant interaction, and tissue impingement. To avoid this, always tighten abutments before trying in, making sure there is no tissue collapse that might obstruct placement. The bar should be tested in the correct order [47].

#### **G. Gingival inflammation around bar**

Gingival hyperplasia can occur when a bar is constructed and put too close to the tissue. This may result in a persistent inflammatory consequence that may be unpleasant and result in bleeding as well as probable bone loss, which is caused mostly by direct contact of the bar with the mucosa, producing compress-

sion. A minimum of 1 to 2 mm space between the bar and the soft tissue is required to avoid this problem. This will allow the area to self-clean while also reducing the risk of tissue inflammation and discomfort [47].

#### **H. Prosthesis with lack of soft tissue support in removable prosthesis (RP-5)**

The clinician must be aware of the distinction between RP-4 and RP-5. Because the RP-5 is soft tissue supported, appropriate flange support is required, particularly in principal stress bearing locations. If the support is insufficient, the implants will be overstressed, resulting in increased morbidity and bone loss. The horizontal plate of a maxillary prosthesis should have optimal principal stress bearing coverage and be a complete coverage prosthesis. The buccal shelf should be sufficiently covered for mandibular prosthesis [47].

#### **I. Overdenture fractures**

Excessive occlusal force and a thin acrylic base could be the cause. It's crucial to have perfect occlusion and an even distribution of forces. Acrylic or meshwork can be used to strengthen the denture base. Always make sure there is enough place for attachment or a bar with enough acrylic thickness when making an overdenture.

#### **J. Food impaction**

Food impaction is a typical complaint of mandibular overdentures. Opening allows food to accumulate under the prosthesis since the flange of the prosthesis does not extend to the floor of the mouth in the rest position. Because less food will tend to accumulate, the prosthesis's borders should be highly polished. During rest, the flange of the prosthesis should extend to the floor of the mouth.

### **Conclusion**

Although major issues are rare, dental implant placement in elderly patients is not without risk, as problems can arise at any time. Inflammatory complications account for 10.2% of all cases, followed by prosthetic (2.7%) and surgical (2.7%) complications (1.0%). The majority of the implants that were linked to problems (62%) did not fail. It's important to be aware of the

potential issues associated with implant implantation so that the patient is fully informed. To avoid postoperative complications, early detection of a growing problem and careful management are required.

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