



## Complications in implant dentistry: A review of literature

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### Abstract

Once an adult tooth is misplaced or lost, a patient may search for its replacement in order to restore his or her esthetics and function. Clinical dentistry, in the last few decades, has remarkably developed and enhanced in accordance with the evolution of scientific disciplines and individual's requirements and demands. Traditional choices in dentistry for replacing a missing adult tooth involve the demountable partial denture, resin-bonded dental bridges, and full or partial coverage dental bridges. Implants have achieved wide acceptance and demand over time because they have the ability to restore function to almost normal in complete and partially edentulous arches. With considerable studies available, implants are highly admitted as a good treatment choice for the substitution of missing teeth these days. While implants are widely becoming an effective choice for missing tooth replacement, the complications and risks related to them are also progressively appearing.

**Keywords:** Implant; Complication; Osteonecrosis; Esthetic

### 1. Introduction

Knowledge of tooth loss patterns in a general population, aids in describing the status of oral health treatment being given, which differs ethnically and geographically between regions. Various studies have shown that periodontal disorders and tooth decay are common causes for the extraction of teeth. [1,2,3,4] Once an adult tooth is misplaced or lost, a patient may search for its replacement in order to restore his or her esthetics and function. Clinical dentistry, in the last few decades, has remarkably developed and enhanced in accordance with the evolution of scientific disciplines and individual's requirements and demands. Traditional choices in dentistry for replacing a missing adult tooth involve the demountable partial denture, resin-bonded dental bridges, and full or partial coverage dental bridges [5].

An appealing substitute for traditional bridges and dentures became accessible with the introduction of dental implants into prosthodontics [5, 6]. Presently, both implant-retained fixed partial dentures and single-crown short implants are accessible choices. Osseointegration is regarded as the foundation for dental implants, where bone cells develop and directly fuse with the surface of the dental implant invasively deposited within the alveolar process [6]. Implants have achieved wide acceptance and demand over time because they have the ability to restore function to almost normal in complete and partially edentulous arches [7].

While endosseous fixtures are widely becoming the substitute for missing teeth replacement, the difficulties related to them are gradually appearing too. Dental implant-supported bridges and single implant-supported crowns may endure different technical, biological, and mechanical complications. [8,9] Patient selection is also known as one of the major elements that contribute detrimentally to dental implant failures in dentistry [10]. Other statistically examined factors related to implant failure include smoking, age, gender, location of the implant, systemic disorders, quality and quantity of bones, genetic, and immunological factors. The major aim of this review of literature is to address particular complications related to dental implants [11].

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## **2. Discussion**

This review aimed to briefly describe the present complications and aesthetic considerations associated with implant placement. Another considerable goal of this article is to expand the body of present literature by exploring different important objectives related to the esthetic features of implant placement.

### **2.1. Risks of implant placement and osteonecrosis**

The probability of emergence after dental procedures such as periodontal procedures and dental implants is equivalent to the probability related to tooth extraction [12]. Various authors demonstrated implant placement in individuals who were given IV or oral bisphosphonates as precarious, in spite of the low probability for medication-related osteonecrosis [13].

Dental implants placed in individuals receiving medicated therapy with bisphosphonates underneath five years can be regarded as safe for medication-related osteonecrosis. Nevertheless, bone tissues are routinely regenerated due to the coordinated function of osteoblasts, but osseointegration in dental implants can be influenced by different antiresorptive agents [14, 15].

In regard to the probability of developing osteonecrosis after the placement of implants, Tanaka et al. (2013) attempted to examine the effect of head and neck irradiation therapy with implants, emphasizing that risk determinants are multidimensional and probable for implant failure in these individuals. The advantages of utilizing implant-supported dental prostheses instead of traditional dentures should outweigh the hazards, however, and the planning should be carefully done [16].

There are several etiological possibilities for osteonecrosis, and implant placement fits as an exaggerating factor. The most efficient ways to decrease the possibility of osteonecrosis are: (1) professional awareness about patients health; (2) strict standards for dental examinations in individuals viable for neck and head RT, along with individuals with antiangiogenic and antiresorptive agents therapy; and (3) eradication of all types of dental disorders and enhancement of dental health to avoid future surgical therapies. For individuals already being cured with these therapies or who have already received RT in the neck and head, it is recommended that the manipulation of bone be prevented and integrated with intimate clinical monitoring [17].

### **2.2. Surgical consideration of implant placement**

#### *2.2.1. Execution and planning*

Tooth decay is induced by various factors, including gingival recession, and has a significant impact on the patient's wellbeing [18–20]. Therefore, implant placement is a significant, complicated, and modern approach that requires considerable preoperative planning and precise surgical implementations subordinated to a restoration-driven outlook [21].

#### *2.2.2. The choice of patients*

The choice of individuals is important in achieving the goal of esthetic dental therapy. During the esthetic treatment of risky patients, a brief risk examination (such as smoking, medical disorders, susceptibility to periodontal disorders, and others) should be conducted with precaution [21].

#### *2.2.3. The selection of a dental implant*

The kind and size of dental implant should be in compliance with the site anatomy and the planned restoration. Inappropriate choice of implant body and shoulder proportions can result in hard and/or soft tissue conditions such as an uncovered implant collar at the shoulder junction. To control this, the platform switching approach has evolved to produce or preserve the tissues surrounding the implants and reduce the possibility of an unattractive metal display. Despite the fact that body tissues are constantly generated, platform switching can safeguard soft and hard body tissues and also produce effective biological, aesthetic, and mechanical results [22,23].

### **2.3. Surgical consideration on posterior region of maxilla**

For various dental health providers, the posterior maxilla region is regarded as a unique clinical threat during the treatment of dental implants, mainly due to insufficient quality of bone, a depleted alveolar ridge, bristly ridges, sinus pneumatization, and undercuts after tooth loss. Different applications have been generated and are presently utilized

to prevail over these issues; two of these are bone augmentation and sinus lift [24]. Maxillary sinus floor elevation was first presented by Boyne et al. [25]. After these findings, various methods were proclaimed for effective elevation of the sinus floor, such as transalveolar and crestal approaches [24–26]. A crestal application utilizes the osteotome method established by Summers [27]. Nowadays, an endodontist utilizes two major techniques of sinus floor elevation for implant placement: a dual-phase technique utilizing the lateral sinus window design approach and a single-phase method utilizing a crestal approach. The utilization of suitable surgical techniques aids in providing stable implant fusion and decreasing the possibility of post-operative complications [24].

#### **2.4. Esthetic consideration of implant crowns**

Various types of proportions (e.g., the golden proportion, the golden mean, and the Preston proportion) are utilized to examine facial attractiveness or dental aesthetics [28, 29, 30]. Implant crowns are considered the visible component of the implant. It plays an important role in rebuilding the function and esthetics of the lost tooth. The esthetic application of dental implant crowns is an important feature of prosthodontics that needs special consideration from dental practitioners.

The esthetic result of dental implant crowns is affected by different factors, such as the preferred material of the crown, implant placement, and the connection between the abutment and implant [31]. Implant placement plays an important role in demonstrating the final esthetic result of the dental implant crown. The placement of the implant must be arranged in such a manner that the dental implant appears from the gums at the perfect angulation and height to attain the best possible esthetic outcomes [32]. Improper placement of the implant may lead to an ineffective esthetic outcome, resulting in suboptimal emergence of the dental implant crown.

The connection between the abutment and implant also plays an important role in the aesthetic results of implant crowns [31]. The kind of implant-abutment connection utilized can also influence the contour and appearance profile of the dental implant crown, which is considered important for obtaining optimal esthetics. Research has revealed that a specific implant-abutment connection, including the Morse taper, can lead to a greater esthetic outcome as compared to other types of connection [31].

The choice of crown material is another important thing that affects how implant crowns look. Crown materials, including zirconia and porcelain, are mainly utilized in dental crowns to attain a good appearance. The material choice should be determined by the individual's esthetic requirements, location of the implant, and occlusal requirements [33, 34, 35].

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### **3. Conclusion**

There is a need to learn more about possible risk factors that can affect implant treatment and make people more aware of them. This can be attained through frequent dental awareness workshops and programs. Routine evaluation of the practical and theoretical understanding of implant treatment is crucial to enhancing the patient's implant experience.

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### **Compliance with ethical standards**

#### *Disclosure of conflict of interest*

There is no conflict of interest between the authors.

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