

## **Review: Complication Followed Different Types of Dental Implants**

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### **Abstract**

Dental implant procedure has actually become preferred amongst the dental professionals and also the people. Regardless of high success numbers, numerous risk factors and also problematic cases have been reported in various professional researches. These complications may be medical, mechanical, biological and also aesthetic. In this review we discuss the most popular complications and compare the success and complication rates of 2 types of implants. Comprehensive search method was conducted using several electronic databases including: Medline/PubMed, and Embase, for relevant articles concerning the different types of dental implants and complications post implantation, which were published up to October, 2019. Dental implants are widely utilized and thought about as one of the options through which absent teeth are substituted. They are used successfully to change solitary and a number of lacking teeth as well as an entirely edentulous jaw. The use of teeth implants is increasing and also dental experts are most likely to see individuals who have implant-supported restorations/prostheses. For that reason, fundamental understanding of dental implants is needed for dental care employees. Several factors are known to affect success of any type of dental implant system. These elements may be related to features regionally, such as bone quality and quantity. Other aspects relate to the surgical technique through which an implant is positioned or which relate to the implant system used, such as size and diameter of the implant.

**Keywords:** *Dental Implants; Tooth Decays; Trauma*

### **Introduction**

The most common cause of teeth loss is periodontitis, and various other reasons consist of tooth decays, trauma, developmental defects, and also genetic disorders [1]. The use of oral implants to restore the lack of teeth has enhanced in the last three decades [1]. Before dental implants, dentures and also bridges were utilized, however dental implants have actually come to be a very popular option because of the high success rate and also predictability of the procedure, as well as its fairly less difficulties [1].

Implant dentistry has remained in consistent development considering that the introduction of dental implants by Brånemark in the 1970s [2]. A number of improvements have been seen in many implant-related elements, such as surface areas, thread styles, as well as positioning methods. Nevertheless, two major designs have actually remained clearly differentiated: two-piece implants, introduced and also developed by Brånemark and also colleagues and also one-piece implants, presented as well as established by Schroeder and colleagues in the 1980s [2,3].

Side effects in dental implant surgical procedure are irregular and also generally self-limiting, triggering the method to end up being an almost regular procedure. Nevertheless, immediate blood loss problems have been described which although seldom, might prove significant, particularly in the floor of the mouth. Some cases can even be deadly, requiring emergency treatment on an in-hospital basis [4].

Nowadays, dental implant procedure has actually become preferred amongst the dental professionals and also the people. Regardless of high success numbers, numerous risk factors and also problematic cases have been reported in various professional researches. These

complications may be medical, mechanical, biological and also aesthetic. In this review we discuss the most popular complications and compare the success and complication rates of 2 types of implants.

### Methodology

Comprehensive search method was conducted using several electronic databases including: Medline/PubMed, and Embase, for relevant articles concerning the different types of dental implants, and complications post implantation, which were published up to October, 2019. In our search method a Mesh terms were used included “dental implant” “complication”, “prevention” and “consequences”. We further screened references of included studies in this review for more relevant studies to be included in this review. Restrictions were applied to English language published studies with human subject.

### Discussion

#### Dental implant types

In general, dental implants may be classified as a one- or two-piece implant.

#### The one-piece implant

One-piece implants are generally thought about to be implants where the bone-anchoring section, the soft structure passing through section, and the prosthetic support are done in one piece [5]. However, one-piece implants are likewise defined as implants through which the anchorage system as well as the adjoining transmucosal component are made as one piece [5]. The interpretation is unclear, as two kinds of implants can have a transmucosal abutment as an important part of the dental implant: one-part implants, where there is no space in between the implant body as well as the abutment, and also two- component implants, which have a gap in between the dental implant body and the abutment at the soft tissue level, located around 2 to 3 mm coronal to the alveolar crest. The lack of a microgap between the implant and the prosthetic abutment at the level of the bone crest offers one-piece implants lots of clinical and technological benefits contrasted to two-piece implants. As demonstrated in an animal study by Hermann and co-workers, more crestal bone resorption will certainly occur throughout recovery when the microgap lies at or below the alveolar crest [6]. Around 2 mm of crestal bone is resorbed apical to the microgap adhering to positioning of implants with nonsubmerged healing or adhering to abutment link of implants with submerged recovery [6].

One-piece implants are generally placed in a non- submerged strategy. This indicates that implant placement is performed in a solitary surgery, without any demand for operative resuming. Compared to a 2- stage treatment, the individual has more convenience as a result of the smaller number of surgical procedures and has actually a minimized healing period. From a prosthetic point of view, an implant shoulder at the level of the soft tissue uses many advantages, because it is easily obtainable for prosthetic procedures such as impression taking and also provides an outstanding basis for cemented dental implant remediations [7]. In addition, due to its design, one-piece implants have their transmucosal surface area unchanged during all the prosthetic treatments, considering that abutment reconnection is avoided (one-piece, one-part implants) or it is performed at the supra- or marginal mucosa stage (one- piece, two-part implants). This stay clear of injury to the soft tissue, which can result in an extra apical position of the connective tissue and be in charge of extra marginal bone resorption [7].

#### The two-piece implant

The two-piece implant kind contains a dental implant to which an abutment or a restoration/attachment is connected, generally with a screw. It is extra frequently utilized than the one-piece implant type. With this dental implant kind, both the one- and also the two-stage implant surgical operations method can be applied. Angled implants in which their coronal part is angled in regard to the major implant

body are also offered. These angled implants are useful in the anterior area when placing non-angled implants in their optimum placement is not feasible [8]. It works to make use of when the long axis of a possible dental implant is not along the long axis of the prospective repair.

Implants are likewise readily available as hollow and solid. Hollow implants allow more contiguity with bone however are weaker than solid implants, which makes them a lot more at risk to mechanical failing and break.

Regardless of the dental implant kind as well as for detailed functions, the dental implant typically consists of an implant body and neck. The implant body is the part of the implant that is buried in the osteotomy. The coronal part of the implant is signified as the neck, through which the abutment/attachment is linked to the dental implant. The coronal component might be smooth (one- and two-piece) and also positioned over the crest of the bone, or roughened (two-piece), in which the platform is generally placed below or level with the crestal bone [9]. When the coronal part is smooth and placed above the crest of the bone as well as penetrates peri-implant mucosa, it is known as the transmucosal component. The surface of the transmucosal part is typically highly refined as well as is offered in different sizes. It might also have a straight or a bevel profile and also may be augmented with micro-grooves in order to maximize recovery around the implants.

Placing the smooth (machined) part of the implant beneath the bone crest may lead to its traction [10]. Nonetheless, fewer crestal bone modifications were observed when the smooth part was located over the crestal bone rank, regardless of the dental implant type; one- or two-piece implants [10]. As necessary, it has been advised that the smooth-rough boundary needs to coincide with the alveolar bone crest [10].

**Possible complications of dental implant treatment**

Implant-supported solitary crowns as well as multiple implant-supported bridges may struggle with different mechanical, biologic, or technical complications (Table 1). Inadequate patient choice is just one of the essential elements that detrimentally contribute toward failings in implant dentistry [11]. Broader and also detailed list of most typical complication with their percentage rate were listed in the table 2.

Mechanical complications	Technical complications	Biologic complications
Screw loosening	Fracture of veneering porcelain	Adverse soft-tissue reactions
Screw fracture	Fracture of the framework in implant-supported fixed partial dentures	Sensory disturbances
Cement failure		Progressive marginal bone loss, loss of integration

*Table 1: Complications associated with dental implants [11,12].*

	Number placed/affected	Mean incidence
Implant loss in diabetic patients	1053/93 implants	9%
Acrylic resin base fracture	649/47 prostheses	7%
Neurosensory disturbance	2142/151 patients	7%
Prosthesis screw loosening	4501/312 screws	7%
Fenestration/dehiscence prior to Stage II surgery	3156/223 implants	7%
Phonetic complications	730/51 prostheses	7%
Abutment screw loosening	6256/365 screws	6%

Gingival inflammation/proliferation	17,565/1,060	6%
Implant loss in mandible from radiation therapy	1296/79 implants	6%
Implant loss with maxillary fixed partial dentures	3297/213 implants	6%
Implant loss with mandibular fixed partial dentures	2567/157 implants	6%
Implant loss in nonsmokers	4862/239 implants	5%
Implant loss in Types I-III bone	3192/113 implants	4%
Implant loss with mandibular overdentures	5683/242 implants	4%
Prosthesis screw fractures	7094/282 screws	4%
Metal framework fractures	2358/70 prostheses	3%
Implant loss with longer implants (10 mm)	3015/105 implants	3%
Implant loss with mandibular fixed complete dentures	9991/255 implants	3%
Implant loss with single crowns	1512/42 implants	3%
Abutment screw fractures	13,160/244 screws	2%
Fistulas	11,764/117 implants	1%
Implant fractures	12,157/142 implants	1%
Mandibular fractures	1523/4 patients	0.3%

**Table 2:** Most common implant complications (< 10% incidence) [13].

**Mechanical complications**

Situations regarding an implant as “helpless” are usually related to operative injury throughout osteotomy arrangement with the drill. Ericsson as well as Albrektsson revealed bone resorption occurred at 47°C when drilling was obtained greater than 1 minute in rabbits [14]. The result acquired from this research leads to the conclusion that if temperature or period boosts while drilling in bone, death can occur creating detrimental effects for osseointegration. However, Ercoli, *et al.* later reported that the hazardous temperature just happened when drilling was continuous or when the drill reached past 15 mm during 5 osteotomies [15].

**Lack of primary stability**

Lack of main stability is a surgical issue that needs to be taken care of at the time of implant surgery. An unsteady implant (e.g. a “spinner”) must be gotten rid of or an effort to place a larger diameter needs to be completed. To leave an unsteady dental implant without action can typically bring about fibrous encapsulation that causes dental implant failure [16]. Nevertheless, bone fill will happen in immediate implants positioned into extraction sockets with a low issue lateral to the implant wider than 1 mm but main stability is still a need.

**Mandibular fracture**

The mandible is one of the most regularly fractured facial bone, numerous variables have been proposed to add to the fractures [17]. These include yet are not restricted to site, instructions as well as extent of the force in addition to influence [19]. Efforts to put implants in people with severely atrophic mandibles raises the danger of break, particularly when monocortical grafts and also ridge-splitting surgical treatments are completed. In people who offer with osteomalacia or osteoporosis, dental implant positioning might subject the weak bone to splintering as a result of the loading or frictional pressures [17]. Other reasons for mandibular fracture may consist of making use of the wrong implant (e.g. 10 mm site prep work with intent of placing a 12- or 14-mm dental implant). Examining the dental implant size/diameter before opening up the package is very important. A break of the jaw must be recovered to preserve form and function.

Monitoring should include stabilization with an attempt to also simultaneously get rid of degeneration if indicated. A retrospective study by Eyrich, *et al.* located that treatment for mandibular breaks should be based on the kind and also location of the break, along with the intensity of the degeneration [18]. Therapy choices consisted of utilizing the wiring of a changed prosthesis, lag screws, wires and plates. One of the most appropriate alternatives of dental field includes combined bone augmentation, fixation and also simultaneous implant positioning. Enhancing mandibular height after augmentation may be unpredictable yet using implants concurrently may lower bone resorption. If a dental implant lies in the line of fracture, osseointegration will still occur as long as there is no mobility or infection [19].

### Technical complications

The regularity of occurrences of technical complications is greater in implant-supported FPDs as contrasted to the implant-supported removable prosthesis [20].

### Fracture of the structure

Whenever there is an inflexible link in between the osseointegrated dental implant as well as the fixed succeeding framework, the strains are undoubtedly generated in every part of the structure [21]. The extra functional weight produces extra pressures, which influence the bone-implant-prosthesis setting up. Therefore, the obstacle stays for a prosthodontist to deliver a tolerable prosthesis that does not threaten the endurance of the treatment [22]. Therefore, easy fit of the framework has been advocated as a need for effective long-lasting osseointegration of the implant with the bordering bone.

The trouble of break of structure is reportedly exaggerated in partially edentulous jaws, due to the fact that the implant-abutment interface as well as abutment retention screw are revealed to higher side flexing loads, tipping, as well as elongation as contrasted to bilaterally splinted implants in a completely edentulous jaw [23]. The length of the cast bar or structure span is straight symmetrical to the construction-related distortion, which might obtain aggravated by nonparallel placement of oral implants [23].

### Fracture of veneering porcelain

Metal-ceramic restorations are one of the most typical sorts of reconstructions in healthcare dental care [24]. With the flow of time, esthetic demands of the people have increased and also hence driven the medical professionals to concentrate on all-ceramic remediations [24]. Zirconia reconstructions are promising, and also the product is even being used to produce implant abutments for cement-retained restorations or for direct veneering for screw-retained prosthesis [24].

Fracture of the veneering ceramic is an additional common problem associated with single-implant repairs. Sadid-Zadeh, *et al.* wrapped up that of an overall of 5052 ceramic as well as porcelain integrated to metal reconstructions, 172 fell short because of damaging off, which makes it 3.4% of the difficulties linked, at a mean follow-up of 5 years [25]. The incidence of the fracture of the veneering ceramic can be minimized by adhering to the professional recommendations, that is, by minimizing the occlusal table, avoiding heavy occlusal contacts, keeping shallow cuspal levels, and by giving sufficient thickness of the overlying ceramic.

### Biological complications

#### Peri-implantitis

Peri-implantitis influences the soft tissues around the oral implants together with bone loss which is irreparable in nature [26]. Bone loss in case of periimplantitis is past the physical restrictions of the bone makeover. Discomfort, movement, hemorrhaging on probing, increasing penetrating depths over an amount of time, exudation, recession and also exposed threads of the dental implant are the professional results when it comes to peri-implantitis [26]. Emission around the dental implant for > 2 weeks needs instant intervention. Although, deep probing depth is typically related to the bone loss, lots of dental implants with pocket depths of 4 - 6 mm have actually been

revealed which were inflexible and steady without any future losing of bone [27]. High regularity of peri-implantitis has actually been reported in the clients who smoked consistently compared to the patients that did not have the behavior of cigarette smoking. Other risk variables consist of women sex, age > 60 years, inadequate oral cleanliness, bruxism, diabetes mellitus, osteoporosis, hyperparathyroidism, background of radiation therapy and genetics [27].

Monitoring of peri-implantitis need to be begun as early as it is diagnosed. Therapy can be instituted by local as well as systemic methods. Surgery is called for in couple of cases. Local treatment methods include mechanical debridement, subgingival cleansing utilizing the sterilizing solution such as chlorhexidine and local medication delivery. In unattended serious instances, local treatment needs to be accompanied with systemic antibiotics. Surgical treatment consists of opening the flap for the debridement as well as decontamination of oral implants making use of various pharmaceutical agents. Lasers are likewise used for this purpose [27].



**Figure 1:** Peri-implantitis. Clinical aspect of an implant with advanced peri-implantitis and bone loss [28].

### Comparison of success and complication rates of two types of implants

Two researches concerning one-piece implants compared with two-piece implants racked up a collective survival rate of 100% in both test and control groups [31,32]. Thoma., *et al.* reported one implant failure in the one-piece group as well as none in the two-piece group [29]. Duda., *et al.* reported 9 implant failings in the one-piece group (7 promptly loaded and also 2 delayed loaded), while no implant failing was revealed in the two-piece group [30]. A lot of these failings were taken in due to biological complications (peri-implantitis and lack of osseointegration). On the other hand, Heijdenrijk., *et al.* revealed 2 dental implant failings in the two-piece implants contrasted to no failing in the one-piece team. All the implant failings were documented within the very first year after feature [33].

Just one study included clinical difficulties as an outcome procedure [31]. In this research, Ormianer., *et al.* reported 8 porcelain breaks in the two-piece team and also 4 in the one-piece team [31]. Nevertheless, no statistically substantial difference was found. Lastly, 2 systematic reviews of Barrachina-Díez., *et al.* reported an elevated lasting survival percentage yet also high consistency of technical and also biological issues in one-piece implants, both in one-part as well as two-part styles [34,35].



## Conclusion

Dental implants are widely utilized and thought about as one of the options through which absent teeth are substituted. They are used successfully to change solitary and a number of lacking teeth as well as an entirely edentulous jaw. The use of teeth implants is increasing and also dental experts are most likely to see individuals who have implant-supported restorations/prostheses. For that reason, fundamental understanding of dental implants is needed for dental care employees. Several factors are known to affect success of any type of dental implant system. These elements may be related to features regionally, such as bone quality and quantity. Other aspects relate to the surgical technique through which an implant is positioned or which relate to the implant system used, such as size and diameter of the implant. Additionally, oral implants are impacted by peri-implant illness which, if not dealt with, can trigger the implant to fail. It calls for constant monitoring, routine check-ups and also may require specialist interventions, the time of treatment being vital. A pattern of higher implant failing and prosthetic difficulties were experienced in the one-piece team contrasted to the two-piece group, even if no statistically considerable distinctions were discovered. This remains in arrangement with two systematic reviews by the very same writer which concluded that, despite high lasting prosthetic survival rates, technical as well as biological side effects are constant in one-piece implants independently by the loading procedures, implant surface areas, or sort of edentulism [34,35]. The success of any type of implant-supported restoration/prosthesis hinges on the communication between the patient and also the dental team members.

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