

Implant in Medically Challenged Patients: Myth Vs Facts

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Abstract

Background: Dental implant is a part of the standard of care of dental treatment and it have been utilized since 1965 and the treatment had been done on healthy patient and medically compromised but certain diseases and conditions had to have meet certain requirements so the treatment can be successful but with advanced technologies and technique now we want to find has the standards and requirements been affected or they are the same as they have been from the start in medically compromised patients.

Materials and Methods: So in this study we will search the Literature and gather, analyze and interpret the data from different studies that has been done on dental implant treatment and we will focus on the survival, success and failure rate and we will distinguish the significant variables that will affect the implant treatment in medically compromised patients mainly (Cardiovascular Diseases, Diabetes, Hypothyroidism, Bone Disease, Head and neck cancer, Immuno compromised).

The literature search was limited to English language articles published from 1989 to 2018

Results: A total of 25 papers met the inclusion criteria for this study.

Conclusion: Literature search showed that failure rate ranged between (0.7%) and (15%) and the success ranged between (75%) and (99.3%) furthermore we noticed as time goes by and the surgical techniques improved and the technologies of implant manufacturing advanced the success rate increased and the failure rate decreased. As for the significant variables today we have a wider range to work with like for example the diabetic patients were no more likely to experience implant failure than the nondiabetic patients if they were controlled and insulin won't have an effect on osseointegration.

Keywords: Dental implants; Artificial root; Implant prosthodontic unit

Introduction

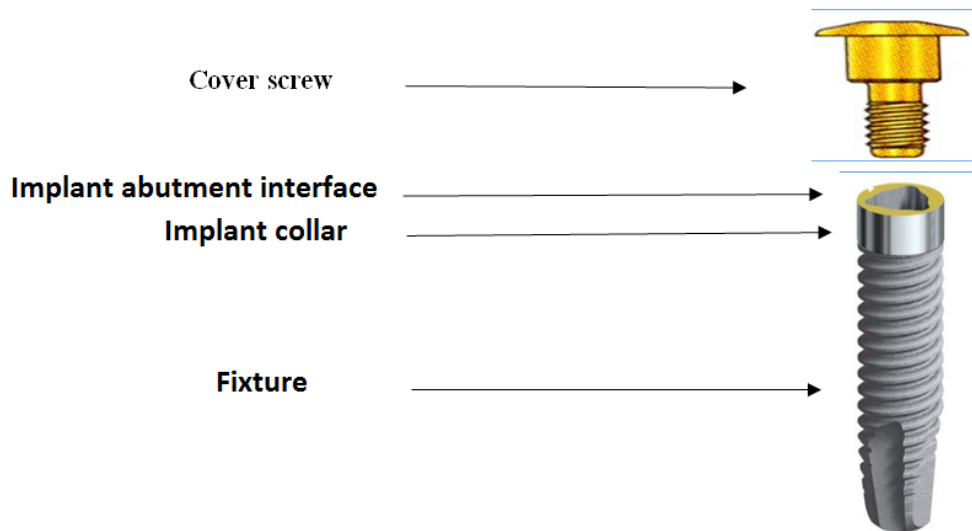
Dental implants Is an artificial root that replaces the natural tooth root.

Now is used in clinical routine and have allowed for important progress in maxillofacial and oral surgery. However, implant failures still occur and remain difficult to anticipate. Dental implant stability, which is determinant for the surgical success, is determined by the quantity and biomechanical quality of bone tissue around the implant. Two kinds of implant stability may be distinguished. The primary stability occurs at the moment of implant surgical insertion within bone tissue. Dental implant primary stability should be sufficiently important in order to avoid excessive micromotion (higher than around 50 µm) at the bone-implant interface after surgery, but the pressure on the alveolar bone should not be too high in order to avoid bone necrosis that is related to bone tissue overloading. Secondary stability is obtained through osseointegration process, a complex phenomenon of a multi-time and multiscale nature, which strongly depends on primary implant stability, but we won't be treating completely healthy patient most of the time so we will need to know and establish fact and guidelines on how to treat patient that suffer from diseases and condition that will affect the success and survival of treatment and we will need to distinguish between the facts and myths.

A medically compromised patient (MCP) can be described, as the one who has a distinctive physical or mental feature regarding the people of the same age. In this sort of patients there is a higher risk of interactions between their disease and the implant surgery, implying a higher medical risk. This group need, therefore, to fill in a medical questionnaire and to undergo a previous exhaustive medical examination, which will help not only to determine the specific measures that must be adopted.

Materials and Methods

Part of implant



The purpose

Our aim of the article review we review implant prosthodontic unit (IPU) studies about on the conceivable effect of certain foundational conditions, including osteoporosis, cardiovascular diseases, diabetes mellitus, and hypothyroidism. Additionally smoking conduct and any other condition or disease that effect the success or survival of dental implant in patient that have been treated with dental implant in these studies.

Cardiovascular Diseases

Numerous cardiovascular diseases, including hypertension, arteriosclerosis, vascular stenosis, coronary artery disease, and congestive heart failure, can jeopardize blood flow and lower oxygen tension and nutrient supply to tissues. They might therefore be expected to compromise the outcome of osseointegration and affect the initial stability of dental implant and for an example of clinical study on cardiovascular subjects:

We concluded that patients with controlled cardiovascular diseases are not at higher risk of osseointegration failure than patients without such conditions.

And we will list the study and results on (Table 1) to conclude the fact about the effect of cardiovascular diseases on implant success

Author and year	No. of implants	No. of patients	Failure rate%	Success rate%
Khadiji V, Anderson J, zarb GA 1999 [1]	246	246	12.2%	87.8%
Alsaadi G 2008 [2]	1344	393	6.5%	93.5%
Moy PK 2005 [3]	50	42	15%	75%

Table 1: Study and results about the effect of cardiovascular diseases on implant success

Diabetes Mellitus

According to the world health organization Diabetes mellitus is a chronic disease caused by inherited and/or acquired deficiency in production of insulin by the pancreas, or by the ineffectiveness of the insulin produced. Such a deficiency results in increased concentrations of glucose in the blood, which in turn damage many of the body's systems, in particular the blood vessels and nerves.

Diabetic patients have a wide range of defects that delay the healing process and that increase their susceptibility to infection [4,5].

In table 2 we have an example of studies that we will use to conclude the facts about implant in relation to diabetes.

Diabetes mellitus is the most prevalent endocrine disorder. When the patient is well-controlled, implant survival is comparable to that of healthy subjects; peri-implant health is good and peri-implant bone loss is comparable to controls.

In subjects with hyperglycemia, that is, less well-controlled diabetics, the risk of developing peri-implantitis has been shown to be increased, although other studies did not observe such an effect. Antibiotic prophylaxis is recommended in diabetic patients, in particular for patients with higher glycemic levels [6].

Author and year	No. of implants	No. of patients	Failure rate%	success rate%
Balshi TJ 1999 [7]	227	34	5.7%	94.3%
Alsaadi G 2008 [2]	1412	411	6.6%	93.4%
Fiorellini JP 2000 [8]	215	40	14%	76%

Table 2: Studies used to conclude the facts about implant in relation to diabetes

Hypothyroidism

According to WHO hypothyroidism also called underactive thyroid or low thyroid, is a disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone.

Hypothyroidism decreases recruitment, maturation and activity of bone cells, leading to decreased bone resorption and formation [9]. Thyroid hormone exerts a direct effect on bone to increase production of both insulin-like growth factor-I (IGF-I) and IGF binding protein II [10]. IGF-I increases the number of osteoblasts, enhances osteoblast differentiation and increases bone remodeling, but the levels of circulating IGF-I are decreased in hypothyroidism [11]. Experimental evidence [12] has suggested that hypothyroidism may inhibit fracture healing and impair the mechanical properties of fracture callus, which indicates that thyroid hormone is a critical factor in fracture healing. Attard N [13] investigated the survival of dental implants in hypothyroid patients receiving thyroid hormone replacement therapy.

We found that medically controlled hypothyroid patients are not at higher risk of implant failure than matched controls.

In table 3 we have an example of studies that we will use to conclude the facts about implant in relation to hypothyroidism.

Author and year	No. of implants	No. of patients	Failure rate%	success rate%
Attard N 2001 [13]	464	27	5.8%	94.2%
Alsaadi G 2008 [2]	1309	387	6.7%	93.3%

Table 3: Studies used to conclude the facts about implant in relation to hypothyroidism

Bone Diseases

The use of dental implants in patients with osteogenesis imperfect, polyarthritis, and enclosing spondylitis. In rheumatoid arthritis patients, the results of implant treatment are also favorable. More common disease affecting bones is osteoporosis. Generally speaking, there is no contraindication to apply dental implants in osteoporosis patients; the implant survival rate is comparable to that observed in healthy controls.

However, the rate of peri-implant bone loss might be slightly higher in osteoporosis patients, but this observation is in need of long-term follow-up. A recent study showed that irrespective of the area where the implant was placed, marginal bone loss was comparable in diabetic patients and controls. As the bone density in osteoporosis patients is lower, a longer healing time has been recommended before starting to fabricate the superstructure. A problem with regard to the risks accompanying dental implant treatment are drugs used to treat osteoporosis or bone metastasis. The use of antiresorptive drugs, such as bisphosphonates and denosumab, is accompanied by an increased risk of developing so-called medication-related osteonecrosis of the jaws (MRONJ), in particular when given intravenously or combined with glucocorticoids. Not only does implant surgery increase the risk on MRONJ, but also the presence of the dental implant and suprastructure in the oral cavity is contributory [6].

Author and year	No. of implants	No. of patients	Failure rate%	success rate%
Andy T 2016 [14]	140	48	0.7%	99.3%
Joem 2016 [14]	160	73	0%	100%

Table 4: Studies used to conclude the facts about implant in relation to bone diseases

Head and Neck Cancer

Dental implant treatment is a great benefit to head and neck cancer patients as surgical resection of the tumor can result in a compromised oral status that makes oral habilitation with conventional means very difficult. Moreover, besides better oral functioning, also oral health-related quality of life benefits increase from dental implant treatment.

While the application of chemotherapy does not affect implant survival and peri-implant health, the result of implant survival and peri-implant health in head and neck cancer patients treated with radiotherapy is controversial. Some authors indicate that implant survival and peri-implant health are comparable between controls and irradiated patients, but most studies show that implant survival and peri-implant health are worse in irradiated patients and worse in the maxilla than the mandible.

As placement of implants after radiotherapy is associated with an increased risk on developing osteonecrosis, it is recommended to insert dental implants concomitant with ablative surgery.

It has been mentioned that the use of hyperbaric oxygen might be beneficial when placing implants in irradiated jaws. Again, this information is contradictory; some studies indicate that administration of hyperbaric oxygen indeed might reduce the risk of implant failure, while a randomized clinical trial did not show such a beneficial effect. However, without doubt, dental implants should be placed in irradiated head and neck cancer patients under antibiotic coverage [6].

Author and year	No. of implants	No. of patients	Failure rate%	Success rate%
Pieter J 2006 [15]	103	72	7.1%	93.9%
P.J.Schoen 2007 [16]	124	50	3%	97%

Table 5: Studies used to conclude the facts about implant in relation to Head and Neck Cancer

Immunocompromised Patients

It is reasonable to assume that dental implant treatment might be contraindicated in patients undergoing immunotherapy or in immunocompromised patients and that specific precautions should be taken [17-20].

With regard to immunotherapy, implant treatment can usually be postponed until end of immunotherapy as immunotherapy can be accompanied by a great variety of, often temporary, side effects. In immunocompromised patients, various case reports and case series have shown that implant treatment is feasible in immunocompromised patients when proper precautions are taken, mostly being antibiotic prophylaxis. The largest series were performed in Sjögren's patients.

With regard to the use of biologicals, whose use is quite common in immunocompromised patients, it is advisable to discuss with the treating physician whether the administration of the biological has to be modified or specific precautions have to be taken. Biologicals can be accompanied by a variety of oral side effects [21-24].

Results

A total of 25 papers met the inclusion criteria for this study.

Conclusion

Condition	Myth	Fact
CVD	CVD can jeopardize blood flow and lower oxygen tension and nutrient supply to tissues. They might therefore be expected to compromise the outcome of osseointegration	Patients with controlled cardiovascular diseases are not at higher risk of osseointegration failure than patients without such conditions and initial stability will be effected if the patient is not controlled by small percentage
Diabetes	The healing process will be delayed and that increase the susceptibility to infection and decrease the initial stability and insulin will effect inflammatory response to dental implant	The diabetic patients were no more likely to experience implant failure than the nondiabetic patients if they were controlled and insulin won't have an effect on osseointegration
Hypothyroidism	Hypothyroidism decreases recruitment, maturation and activity of bone cells, leading to decreased bone resorption and formation and that will effect survival rate of dental implant	That medically controlled hypothyroid patients are not at higher risk of implant failure than matched controls
Bone Disease	Dental implant treatment is contraindicated and the survival rate is very low	Dental implant treatment can be done but the alveolar bone loss is higher in those patients before implant placement and the success rate will decrease in patient taken medication like bisphosphonates and denosumab
Head and Neck Cancer	Head and neck cancer patient can't do implant treatment because the pre-implant and implant health will be compromised by the radiotherapy and chemotherapy	Head and neck cancer patient will be affected by radiotherapy chemotherapy but they can do implant treatment under antibiotic course
Immunocompromised	Dental implant treatment might be contraindicated in patients undergoing immunotherapy or in immunocompromis	The implant won't be effected if the patient took the proper precotions before treatment like antibiotic prophylaxis

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