

INFLUENTIAL FACTORS OF THE SUCCESS AND/OR FAILURE OF DENTAL IMPLANTS

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ABSTRACT

Aim and objective of the study. Dental implants have emerged as new treatment modality for the majority of patients and are expected to play a significant role in oral rehabilitation in the future. The present study was conducted to assess various factors affecting the survival rate of dental implants.

Objective: Evaluate the factors that influence the success and/or failure of dental implants.(5)

Material and methods. This research is framed within a systematic bibliographic review.

Results. The factors that have the greatest influence and affect the immediate result are heavy smoking, implant placement under a torque of less than 15 Nm, overheating of the site, lack of primary stability at the time of implant placement, premature loading or microbiological contamination that alter the normal healing process of the soft tissues and prevent the intimate union between the bone and the implant from forming.(5)

Within the limitations of the present prospective clinical comparative study, peri-implant probing depth and marginal bone level around dental implants placed in edentulous sites in molar/premolar region were affected by different neck designs. Patients who received implants with rough wide-neck design presented lower probing depth and minor marginal bone loss compared to patients with rough reduced-neck implants.

Reduced-neck implants showed a tendency to lose comparatively more bone over time if compared with wide-neck implants.

However, dental implants' survival rate was acceptable and satisfactory for both groups of patients and showed no differences at the two-year follow-up. (4,19)

Conclusions. Dental implants are not always successful. There is a 5–10% chance that they might fail.

Among the many factors that can cause an implant to fail, some common ones are health conditions, age, smoking habits, poor oral hygiene, and insufficient jaw bone.

Taking care of your oral health and following your dentist's advice can help you avoid some complications.

Careful planning helps to reduce the risk of post-surgical implant failures.(6,15)

Success and failure are dynamic conditions linked to time and require periodic evaluation. The main criteria to evaluate the quality of health of the dental implant are mobility and pain, the presence of any of them compromises the implant to a great extent. Non-osseointegration and peri-implantitis were the most frequent causes of failure in the initial phase of the treatment. Regarding the anatomical regions of the oral cavity, the failure rates were low and the survival and success rates were high.(1,15)

Key words: dental implants, smoking, biological contamination, cicatrization, failure

INTRODUCTION

Dental implants represent pure titanium fixtures that are placed in the maxillary or

mandibular bone in order to replace the roots of missing teeth. This consists of the direct union of an inert material to the bone tissue and is achieved through a careful surgical

installation, as well as a prolonged healing period and an adequate distribution of forces when the implant comes into operation.(7)

This rehabilitative alternative allows the natural tooth to be replaced by an artificial one with better functionality. Despite being a scheduled surgery, it is not exempt from failures and complications occur in any of the phases of implant treatment.(7,16)

This paper aims to identify the criteria for success and failure of osseointegrated implants through a systematic and bibliographic review.(7)

Implants are pure titanium fixations that are placed in the maxillary or mandibular bone in order to replace the roots of missing teeth, which allows the natural tooth to be replaced by an artificial one with better functionality, but despite being a scheduled surgery it is not exempt from failures and the complications occur in any of the phases of implant treatment.(7)

At the present time, implant techniques offer numerous possibilities of treatment, whose good results can be predicted with great certainty based on their functionality, comfort, beauty, quality and duration; however, the failure of the procedure can occur during the surgical phase or once the prosthetic rehabilitation has been carried out, due to systemic and psychosocial factors of the patient such as iatrogenic factors, deforming habits or dental implant design, among others. However, currently some believe that implant failure after the osseointegration process is mainly due to bacterial infection and not to "rejection" when implants of proven quality are placed, although it is also attributed to specific characteristics of the patients and to the skill of surgeons. Dental implant failures constitute an outstanding health problem in many parts of the world due to their frequency and the aesthetic, facial and psychological alterations they cause in those who do not function

favorably.(8,17)

The surgical success of the implants is directly related to a process of interaction with the bone (osseointegration), but, when the procedure has failed, an alteration occurs during the initial phase and a formation of fibrous scar tissue occurs between the surfaces of the implants and the surrounding bone. It is known that there are many factors that can contribute to the success or failure of implants, from the condition of the patient to the surgical and prosthetic protocols performed by the operator.(7)

MATERIAL AND METHODS

What causes dental implant failures?

Broadly speaking, implant failure risks fall into two broad categories: intrinsic and extrinsic.(9)

Among the exogenous factors are those related to the experience and skill of the operator and to the characteristics of the implants. Among the local endogenous factors, the characteristics of the bone are of great importance (since poor-quality bone will have a higher probability of rejecting an implant), as well as whether the site has received radiation treatment in the head and neck area, since it modifies the vascularity of the bone, making it unsuitable for any intervention. The amount of bone in the place where the implant will be placed should also be considered, as a lack of bone will lead to placing an implant in the wrong position, compromising the final restoration and subjecting the implant to inadequate forces, or this will lead to choosing a smaller size implant, which may affect its stability and survival.(7)

Implant loss is the most serious complication in dental implants. They can occur within 6 months of their placement (early loss) or later (late loss). The growth of healthy bone around the implant — a process known as osseointegration — is the standard

measure of implant success. The following factors can interfere with the process and lead to implant failures.

Health conditions. Uncontrolled diabetes is a major cause of dental implant failures within the first year of implant placement.

Age. People over 60 are prone to implant failures due to existing diseases, decreasing jaw bone density, and slow healing rates. Talk to your dentist/implantologist to know if an implant suits your age.

Smoking. Smoking reduces the blood supply to the oral tissues and slows down healing. Smoking for a long time can also increase the risk of periodontitis and gum infections, increasing the chance of implant failure. Implant failure rates are high among smokers — 11% compared to 5% for non-smokers.

Oral hygiene status. Poor oral hygiene results in plaque buildup. Gum infections and periodontitis raise the risk of implant failure. Peri-implantitis, an inflammatory condition surrounding the implants, is often linked to poor oral hygiene. It's important to clean the interdental areas regularly to maintain the implants for a long time.

Jaw bone quality and density. Jaw bone density reduces as we age. A minimum of 1 mm strong bone on all sides is needed to support a standard implant. Diseases like osteoporosis and habits like bruxism can eat away at the jaw bone and increase the risk of implants failing.

Radiation. Cancers are often treated with irradiation therapy. Radiation can block the blood supply to the jaw bones and cause damage to their structures. Research reveals that the success rate for implants placed in bone undergoing radiation is only 70%, compared to a 90–95% success rate for normal bones.

With so many factors linked to the success of implants, it's natural that all implants don't last forever. Studies highlight a failure rate of up to 5–10%, either early or in the late stages. Keeping the factors and failure rates in mind, it's important to plan an implant placement carefully. An experienced implantologist is the right person to guide you on this.(10)

The placement of an implant foresees the activation of a biological response that leads to the repair of damaged tissues and the integration of the implant. Then, the same sequence of biological events that occurs in traumatic injuries to bone tissue occurs, whatever their origin, that is, bone formation involves a cascade of cellular events.(11)

Osseointegration of an implant in the bone is defined as the close apposition of newly formed bone in congruence with the implant, including surface irregularities; even, microscopically, interposed connective or fibrous tissue is not observed and, furthermore, the direct structural and functional connection is established, with the capacity to support normal physiological loads, without excessive deformation and without initiating rejection mechanisms. Light microscopy and transmission electron microscopy analyzes have shown an excellent fit between the implant and the bone.(11)

The proportion of direct bone-material contact of the implant varies according to implant material and design, host condition, surgical technique, loading conditions and time. A good description for this interface would be to describe it as a discontinuous interface, a term that reflects the trend towards understanding osseointegration as a process and not as a result.(11)

Proper implant prosthetic treatment planning is essential for long-term success. Obtaining information from a careful medical history is crucial as the first step in treatment

planning. For Bascones, the information obtained through the interview and the clinical history, together with the evaluation of the risk factors, are key to assessing the probability that the implant has to osseointegrate.(11)

Generally, the ideal conditions that allow the achievement of an implant-supported rehabilitation are those that promote the function, phonetics and aesthetics of the patient.(11)

Various authors have proposed criteria to determine the success of osseointegrated implants: Schnittman and Schulman, Cranin et al, McKinney et al, Albrektsson et al., and Smith and Zarb. The criteria proposed by Albrektsson are widely used nowadays. According to this author, the success criteria of an implant are the following: (11)

- a. The implant is immobile when clinically evaluated.
- b. There is no evidence of peri-implant radiolucency evaluated on a distortion-free radiograph.
- c. The average vertical bone loss is less than 0.2 mm per year after the first year of service.
- d. There is no pain, discomfort or infection attributable to the implant.
- e. The design of the implant allows the placement of a crown or prosthesis with a satisfactory appearance for both the patient and the dentist.

By applying these criteria, a success rate of 85% at 5 years of observation and 80% at 10 years of observation is expected to classify the implant within the minimum levels of success.(11) However, these criteria describe an ideal quality implant for a clinical study or report but do not address individual

implants that may have a stable condition in the mouth after a brief period of bone loss.(11)

It should be taken into account that the criteria that are commonly cited in clinical reports refer to the survival percentage, this means if the implant is physically in the mouth or if it has been removed. Critics argue that implants that must be removed for either pain or disease may also be retained and misclassified as successful.(11)

There are other terms that have been suggested for implant success over time, such as early successful implant for an implant that has 1 to 3 years of service, intermediate successful implant for 3 to 7 years, and successful implant at a long-term for the implant that is older than 7 years.(11)

Systemic diseases can affect oral tissues by interfering with healing or increasing the risk of other diseases. In addition, these diseases must be treated with medication or other therapies that could affect the tissues near the implants and the osseointegration process. In the reviewed literature, systemic conditions are established that may not make the use of dental implants recommendable or, at least, question the success of this treatment. However, with the available evidence, it is not sufficient to contraindicate implant placement in these patients. According to the American Association of Anesthesiology (ASA), patients who are going to receive dental implants must be in one of the first two physical status categories corresponding to ASA I: healthy patient, or ASA II: patient with mild systemic disease. Patients with compromised conditions or any patient who is in another of the categories should arrive at ASA II to be treated.(12)

The risk of infection in immunosuppressed patients is one of the main considerations when placing implants in these patients. Antiretroviral therapy postpones the

appearance of AIDS in patients infected with the HIV virus and also reduces the manifestations and appearance of opportunistic infections.(12)

Many case reports have demonstrated successful implant rehabilitations in immunocompromised but stable patients. The recommendation is to extend the follow-up time of these patients after the integration of the implants. Strietzel in 2006 exposes a series of cases with one hundred percent survival of implants placed in patients with HIV, it is not specified whether antibiotic therapy is used, but the use of 0.2% chlorhexidine daily.(12)

Baron et al., published the rehabilitation of a patient with 12 implants and the follow-up with clindamycin antibiotic medication.(12)

According to the above, this condition is not contraindicated for the placement of implants as long as they are medicated and stable patients. In addition, as mentioned, the recommendation is to extend monitoring times after implant placement.(12)

Among the systemic factors that put the implant at risk are smoking, which compromises healing, some medications such as bisphosphonates that inhibit bone regeneration and give rise to osteonecrosis and are indicated mainly in patients with osteoporosis, the older age of the patients and the presence of systemic diseases such as diabetes, or heart and immune diseases, among others. Smoking is a risk factor for general health and oral health, causing diseases such as oral cancer and periodontal disease.(13)

In this study, heavy smoking (>10 cigarettes per day) was found to be a contributing factor to early failure. Several studies have reported similar results. DeLuca et al., found a failure rate of 23.08% in patients who smoked during treatment, and

observed that the greater number of cigarettes increased the failure rate (Fig 1 & 2).(13)

Figure 1 Results of all the procedures and characteristics of the implants.(13)

Datos del paciente	Tabaquismo <10 cigarrillos/día: 40 implantes >10 cigarrillos/día: 9 implantes	Periodontitis 60 pacientes con periodontitis controlada	Riesgo periodontal (implantes) Bajo: 72 Medio: 129 Alto: 170
Tiempo de colocación	Inmediato: 54 implantes Temprano: 28 implantes Tardío: 296 implantes	Elevación de seno Previo: 15 Simultáneo: 15	Injerto particulado Previo: 18 Simultáneo: 29
Procedimientos adicionales en el sitio de colocación	En 232 implantes se realizaron procedimientos adicionales	Bloque hueso En 25 implantes Zona: 19 de rama mandibular	Exodoncia Previo: 83 Simultánea: 54
Características del procedimiento	Indicación protésica Unitario: 106 Parcial: 188 Total: 77	Colgajo No: 94 Si: 277	Torque >15 Nm = 342 <15 Nm = 29
Protocolos de carga	Inmediata: 3 implantes	Tardía: 368 implantes	Pilar de cicatrización 148 Tornillo de cierre 210
Complicaciones quirúrgicas	39 casos tuvieron complicaciones quirúrgicas	Falta de cierre primario 3 implantes	Exodoncia 3 implantes
Seguimiento postoperatorio	Exposición de tornillo 14 implantes	Inflamación/infección 14 implantes	Dehiscencia/fenestración 5 implantes
Características del implante	Marca: Nobel 180 IMTEC 5 BBW 83 MIS 83 Straumann 20	Díametro de la plataforma Estrecha: 100 implantes Regular: 192 implantes Ancha: 68 implantes	Longitud Promedio de 11,04 mm

Caso	Edad	Género	Diente	Condición sistémica	Tabaquismo	Periodontitis	Factor de riesgo periodontal	Hubo operaciones en el sitio de colocación
4	52	Femenino	24	0	0	0	Alto	No
5	52	Femenino	26	0	0	0	Alto	No
19	45	Femenino	27	0	Alto	Controlada	Medio	Si
27	52	Masculino	25	0	0	Controlada	Alto	Si
51	53	Femenino	36	0	Bajo	Controlada	Medio	Si
57	72	Femenino	13	0	0	0	Bajo	Si
58	72	Femenino	23	0	0	0	Bajo	No
112	64	Masculino	16	0	0	Controlada	Alto	Si
117	52	Femenino	13	0	0	Controlada	Alto	Si
123	61	Masculino	16	0	Alto	0	Medio	No
126	61	Masculino	25	0	Alto	0	Medio	No
130	63	Masculino	21	0	0	0	Alto	No
179	56	Masculino	15	0	0	0	Medio	Si
221	49	Masculino	15	0	0	0	Medio	Si
242	52	Femenino	45	Diabetes controlada	0	0	Medio	Si
268	60	Femenino	45	0	0	0	Medio	Si
278	70	Femenino	35	0	0	0	Alto	Si
298	35	Femenino	22	0	0	0	Medio	Si
303	43	Femenino	23	0	0	0	Alto	Si

Caso	Elevación de seno	Bloque autólogo	Injerto de hueso particulado	Exodoncia	Expansión de cresta
4	0	0	0	0	0
5	0	0	0	0	0
19	0	0	Previo	0	0
27	0	0	Simultáneo	0	0
51	0	0	0	Previo	0
57	0	0	Simultáneo	0	0
58	0	0	0	0	0
112	0	0	Simultáneo	0	0
117	0	0	Simultáneo	0	0
123	0	0	0	0	0
126	0	0	0	0	0
130	0	0	0	0	0
179	0	0	0	Previo	0
221	0	0	Simultáneo	0	Simultánea
242	0	0	Simultáneo	0	Previo
268	0	0	Simultáneo	0	0
278	0	Mezón	0	0	0
298	0	0	0	0	Simultánea
303	0	0	Simultáneo	0	Simultánea

Caso	Indicación protésica	Tiempo de colocación	Colgajo	Torque	Tipo de hueso	Tornillo de cierre o pilar de cicatrización	Carga
4	Unitaria	Tardía	No	30	3	Pilar	Tardía
5	Unitaria	Tardía	No	30	3	Pilar	Tardía
19	Parcial	Tardía	Si	35	3	Tornillo	Tardía
27	Unitaria	Tardía	Si	40	3	Pilar	Tardía
51	Unitaria	Temprana	No	45	3	Pilar	Tardía
57	Total	Tardía	Si	25	4	Tornillo	Tardía
58	Total	Tardía	Si	25	4	Tornillo	Tardía
112	Parcial	Tardía	No	0	4	Tornillo	Tardía
117	Parcial	Inmediata	Si	0	3	Tornillo	Tardía
123	Total	Tardía	No	35	2	Pilar	Tardía
126	Total	Tardía	No	35	2	Pilar	Tardía
130	Parcial	Tardía	No	35	2	Pilar	Tardía
179	Unitaria	Temprana	Si	0	3	Tornillo	Tardía
221	Unitario	Inmediata	No	10	3	Pilar	Tardía
242	Parcial	Tardía	Si	35	2	Tornillo	Tardía
268	Parcial	Tardía	Si	25	2	Tornillo	Tardía
278	Parcial	Tardía	Si	10	3	Tornillo	Tardía
298	Unitaria	Inmediata	No	15	3	Pilar	Tardía
303	Parcial	Inmediata	Si	30	3	Tornillo	Tardía

Caso	Complicaciones quirúrgicas	Marca	Longitud	Díametro	Seguimiento postoperatorio
4	0	Nobel	13	4	Movilidad
5	0	Nobel	10	5	Movilidad
19	0	Nobel	10	5	Exposición de tornillo, Pérdida ósea periimplantaria, infección
27	0	ByW	11	4	Pérdida ósea periimplantaria e infección
51	0	Nobel	10	5	Pérdida ósea periimplantaria e infección
57	Fenestración	ByW	10	4	Pérdida ósea periimplantaria e infección
58	0	ByW	11	4	Pérdida ósea periimplantaria e infección
112	Falta de torque	ByW	13	5	Dehiscencia/fenestración
117	Fenestración y falta de torque	ByW	13	4	Pérdida ósea periimplantaria
123	0	Nobel	13	4	Tornillo
126	0	Nobel	13	4	Tornillo
130	0	Nobel	13	3	Tornillo
179	Falta de torque	MIS	13	4,2	Inflamación e infección
221	Falta de torque	MIS	11,5	3,75	Pérdida ósea periimplantaria e infección
242	0	Nobel	10	3,5	Pérdida ósea periimplantaria e infección
268	0	MIS	10	3,75	Exposición de tornillo, pérdida ósea periimplantaria, dehiscencia/fenestración y movilidad
278	Otra	Nobel	10	3,5	Exposición de tornillo, pérdida ósea periimplantaria, dehiscencia/fenestración y movilidad
298	Falta de cierre y falta de torque	MIS	16	3,75	Exposición de tornillo, pérdida ósea periimplantaria, dehiscencia/fenestración y movilidad
303	0	MIS	11,5	3,75	Exposición de tornillo, pérdida ósea periimplantaria, dehiscencia/fenestración y movilidad

Figure 2 Characteristics of failed implants(13)

The behavior of the patients is decisive in the appearance of peri-implant pathologies. It is possible that unconscious manifestations such as bruxism, stress, or undiagnosed malocclusion problems favor treatment deterioration. But above all, it is the

careless attitude towards dental health that leads to new failures. People forget that the placement of implants is the result of the deterioration of natural parts. After an implantology treatment, if they continue to

Complications of dental implant failures

Complications can be in the early or late phase. You should keep a watchful eye in case you experience any symptoms.

Early phase complications

Early phase complications related to dental implants can occur **within 1 day to 6 months** of implant placement. Here are some early phase complications you might face:

Lack of implant stability. An unstable implant becomes mobile. Two key causes behind implant instability are trauma, insufficient healing time, and placing an artificial tooth over it immediately after the implant is placed (immediate loading).

Infections at the site. At times, the implant can get infected and in severe cases can attack the supporting jaw bone. The bone structures degenerate gradually, and the implant loses its supporting base.

Implant-associated allergy. Titanium, often used in dental implants, can cause an allergic reaction. If you already have an allergy to titanium, don't forget to mention it to your dentist.

Late phase complications

Late phase implant failures can occur **after 6 months** and are common within 1 to 3 years after the implant is placed.

Implant rejection. Dental implants can act as a foreign material, and the body can reject it. Though such cases are rare, they can happen.(18,19)

Nerve damage. An implant, if placed too close to a nerve, can cause temporary or

incur in a lack of oral hygiene, or in harmful habits such as smoking and poor nutrition, it is very likely that they will suffer from implant diseases.(14,16)

permanent damage to it. If you are numb around the lips, gums, or tongue, chances are a nerve has been damaged.

Intrusion into the sinus. Placing the implant in the upper jaw, especially in the back, can be challenging. Slight displacement during surgery can lead to intrusion into the maxillary sinus cavity, complicating the process.(10)

Signs of a failing implant

When an implant fails, you might experience **pain, discomfort, bleeding, and swelling in the area.** Chewing food can become difficult, and the gums can recede away from the site. The implant can become loose. A dentist can diagnose whether the implant is failing from these clinical signs.

Often they recommend x-rays to detect peri-implantitis and the surrounding bone condition. A combined evaluation of medical history, clinical signs, and x-rays helps a dentist arrive at the final diagnosis.

A yearly maintenance visit to your dentist's office is recommended to evaluate oral hygiene status, implant margins, and implant stability. This helps detect signs of possible complications before it's too late.(10)

Ways to prevent implant from failing

You can take precautions to lower the risk of implant failures. Here are what dentists usually recommend:

1. Keep your mouth clean by brushing and flossing regularly.

2. Maintain clean interdental spaces in between teeth, especially at the surgical site.

3. Try to chew foods on both sides of your mouth, as this takes off excess pressure from the implants.

4. Visit your implantologist regularly.

5. Opt for a healthy lifestyle, so it's advised to quit smoking and drinking.

6. If you experience any unexpected symptoms, talk to your dentist.

A large part of the fate of your implant depends on careful planning before the surgery, the expertise of the implantologist, and your determination to follow instructions. While complications can still occur, it's best to be prepared to face any challenging situation.(10,15)

There is little data available on relative success/failure rates for different types of implants or those from different manufacturers. It appears overall, however, that implant height (i.e., body length), implant type (cylindrical or tapered) and one-stage or two-stage placement has no statistically significant effect on success or failure although many studies directed at these effects were not well controlled. Nevertheless, the literature indicates that modern implants with tapered bodies and roughened surfaces exhibit higher success rates than the early smooth surface implant bodies.

It should be mentioned here that mini-implants, i.e., those with narrower diameters and platforms are recommended for very limited sites, i.e., those with minimal access or close spacing between remaining teeth. The corollary to this is that the mass of implant osseointegrated with bone is less than that with a conventional implant. Due to these factors, mini-implants should be used with caution.

Failure of implant hardware is unusual, if not comparatively rare. An interesting example is the following. An implant was restored using a custom milled Ti base/zirconia restoration, (Fig. 3).

The patient complained that the restoration appeared to be loose and the dentist simply torqued it back in place. When the restoration crown loosened again, clinical examination indicated that the "hex" of the titanium implant body had fractured off and the anti-rotation protection was lost (Fig. 3,a,b) (9)

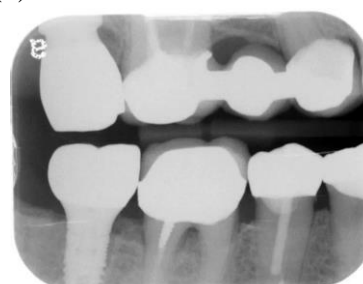


Figure 3 Radiograph of a restored Atlantis Ti-base implant restoration

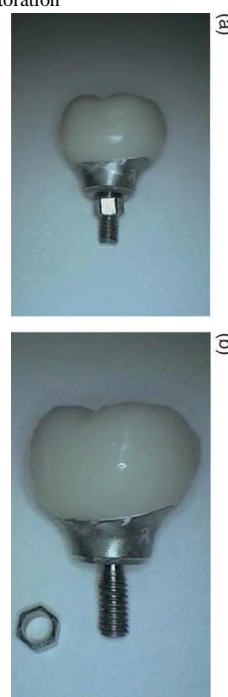


Figure 4 (a) Fractured hexagonal internal connection. (b) Restoration showing fractured hexagonal internal connection. (9)

RESULTS AND DISCUSSIONS

There were 371 implants placed in 123 patients that were evaluated, with an average of 3 implants per patient. There were 33 men with 94 implants (25.3%) attended and 91

women with 277 implants (74.7%). The average age of the patients was 55.1 years old. (Table 2)(13)

According to their systemic condition, diseases that could influence the prognosis of the implant were identified. A patient with osteoporosis was treated, 4 patients who had received medication with bisphosphonates, who suspended their treatment and waited the time indicated by their treating physicians before starting the dental treatment for dental implant placement, and 7 patients with controlled diabetes. No implant failures were observed in these systemically compromised patients.(13)

It is observed that the first molars are the most replaced by each quadrant. Dental units 16 and 46 are the most replaced, with 29 implants each of the implants placed, 19 (5%) failed and 352 (95) were successful.(13)

We conclude that the factors that have the greatest influence on the evolution of the implants and affect the immediate result are heavy smoking, implant placement under a torque of less than 15 Nm, and in a flapless surgery. Therefore, the hypothesis is discarded.(13)

The fact that early failure occurs is usually due to causes such as overheating of the site, lack of primary stability at the time of implant placement, a premature loading or microbiological contamination that disrupts the normal healing process of soft tissues and prevents the intimate union between the bone and the implant from ever forming.(7)

Fixtures made of titanium grade 4 had a standard length (≥ 10 mm) and a diameter of 3.8 and 4.2 mm for wide-neck implants and 4.2 and 5.0 mm for reduced-neck ones. Dental implants received the same subtraction procedure, according to the Zir-Ti full-surface treatment (Zirconium Oxide Sand-Blasted

and Acid Etched Titanium). The apical portion was tapered with 50° accentuated triangular threads and four longitudinal incisions, to increase penetration ability and anti-rotation features. Fifty patients formed Group A (rough wide-neck design) and received 59 implants. Group B (rough reduced-neck design) was composed of forty-eight patients, who received 63 implants.

The two groups were compared at one-year and two-year follow-ups. Survival rate, probing depth, and marginal bone loss were recorded through clinical and radiological checkups. Radiological records for different dental implants placed in Group A and B patients are shown in Figure 3 and Figure 4.

Figure 4 Periapical X-rays showing marginal bone level of CSR dental implant with a reduced neck. (a) Pre-operative X-ray; (b) post-operative follow-up at 12 months; and (c) post-operative follow-up at 24 months.

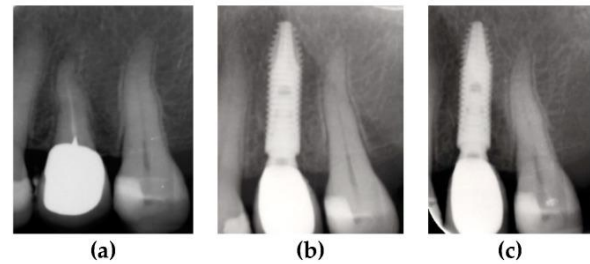
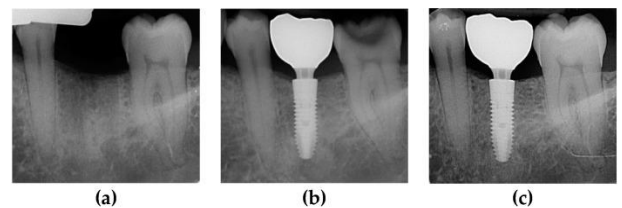


Figure 5 Periapical X-rays showing marginal bone level of CSR dental implant with a wide neck. (a) Pre-operative X-ray; (b) post-operative follow-up at 12 months; and (c) post-operative follow up at 24 months.



Age	No of implants	Failure	%
<40	19	1	5,3

Sex	No of	No of	%
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40-59	221	10	4,5
>60	131	8	6,1
Total	371	19	5

Table 1 Failure percentage according to age (13)

	patients	implant	
Women	91	277	74.7
Men	33	94	25.3
Total	123	371	

Table 2 Number of patients with dental implant

NO OF IMPLANTS					
FAILED		SUCCESFULL		TOTAL	
NUMBER	%	NUMBER	%	NUMBER	%
19	5	352	95	371	100

TABLE 3 PERCENTAGE OF FAILED AND SUCCESFUL IMPLANTS

CONCLUSIONS

1. The success criteria for dental implants are difficult to describe. Exogenous and endogenous factors are established, related to the surgeon's experience, as well as the presence of bone reabsorption or the need for bone grafts. But it is also true that they have been changing over time and perhaps it is more correct to speak of an implant health quality scale and relate the categories of this scale with the prognosis of existing conditions in our patients.
2. Radiation, smoking, cardiovascular disease and HIV do not represent contraindications for implant placement, but cases should be analyzed and the risks of the procedure explained to the patient.
3. Success and failure are dynamic conditions linked to time and require periodic evaluation. The main criteria to evaluate the quality of health of the dental implant are mobility and pain, the presence of any of them compromises the implant to a great extent and in many cases its removal is indicated. Implant failure is easier to describe and leads to the analysis of a series of clinical parameters and indices. The presence of pain, mobility, progressive uncontrolled bone loss and peri-implant radiolucent image confirm implant failure in most cases.
4. Within the limitations of the present prospective clinical comparative study, peri-implant probing depth and marginal bone level around dental implants placed in edentulous sites in molar/premolar region were affected by different neck designs. Patients who received implants with rough wide-neck design presented lower probing depth and minor marginal bone loss compared to patients with rough reduced-neck implants.

Reduced-neck implants showed a tendency to lose comparatively more bone over time if compared with wide-neck implants.

However, dental implants' survival rate was acceptable and satisfactory for both groups of patients and showed no differences at the two-year follow-up.

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