

## Comparison of Osseointegration between Traditional and Compressive Implants, after Immediate Implantation

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### Abstract

**Purpose:** Modern dentistry has witnessed, a rapid and continuing evolution. Concerning the implant-rehabilitation protocols, they have been redefined in order to satisfy patient's increasing expectations in terms of comfort, aesthetic and shorter treatment period. The purpose of this review is to explore the Comparison of Osseointegration between traditional and compressive implants, after immediate implantation.

**Materials and methods:** Patients were selected through a clinical examination of patients between the ages of 20-50 years.

**Patient selection criteria:** The absence of general systemic diseases that hinder the surgical work, The patient was not exposed to radiation or chemotherapy during the research phase, The presence of a tooth that needs to be extracted in the jaw area, The patient's consent to conduct the research and his acceptance for follow-up.

**Results:** The clinical success of this technique is highly dependent on many factors: patient selection, bone quality and quantity, implant number and design, implant primary stability, occlusal loading and clinician's

surgical ability. Among these, implant primary stability is undoubtedly the most important.

**Conclusion:** Osseointegration alone determines whether a tissue-integrated implant can replace a lost tooth. Therefore, exploiting every key aspect and enhancing and speeding up osseointegration if we understand the process, its prerequisites, and its promoters and inhibitors has been and will continue to be highly helpful. Self-drilling implants simplify implant insertion and prevent surgical problems.

### Keywords

Comparisons, Osseointegration, Dental implants, Traditional implants, Pressure implants, Dental implants, Immediate implants.

## Introduction

Osseointegration was coined to describe the process of titanium's permanent affixation to bone. Many studies were performed after the advent of osseointegrated implants, which marked the beginning of a new period in oral rehabilitation. The stated success rate is over 90%. In addition, the success rate can be increased to 81% in the maxilla and 91% in the mandible. Stabilizing full prostheses with dental implants has become increasingly common because of the positive effects they have on patients' oral health and quality of life in these areas: bone preservation, function, esthetics, phonetics. Dental implants come in a variety of sizes and can have a number of various surfaces. Dental implants typically have a dimension between 3 mm (narrow diameter) and 7 mm (wide diameter). (wide diameter). The "standard diameter" limit for implants is, however, between 3.7 mm and 4.0 mm [1].

Mini dental implants, also known as small-diameter implants, are increasingly used to secure full dentures, support orthodontic appliances, replace missing teeth, secure surgical guides for permanent implant placement, and hold temporary removable prostheses in place during the final implant fixtures' healing period [2].

One of the factors that determines whether or not osseointegration will be effective in the long run is how well an implant is stabilized. Histologically speaking, osseointegration is the joining of a prosthesis to bone. There can be a clear structural and functional connection between an implanted surface and the bone. The instant mechanical engagement of the implant with the surrounding bone is known as osseointegration, and it is commonly accepted that primary implant stability is an indicator of successful osseointegration. New bone formation, bone apposition, and remodeling at the implant-bone interface occur after insertion, resulting in secondary dental implant stability [3]. Secondary implant stability is determined by bone formation and remodeling at the implant-bone interface, despite the fact that numerous methods and techniques have been proposed for enhancing primary implant stability. These include modifications to implant fixture/thread design, implant surface topography, and surgical drilling protocols. Several clinical parameters, including initial implant torque, resistance to reverse torque, and resonance frequency analysis, can be used to assess implant stability. (RFA). Non-invasive RFA is now widely used to gauge when dental implants are stable enough to support useful loading [4].

Mini dental implants (MDIs) that only require one surgery to insert are gaining in popularity as a means of keeping dentures in place. When compared to traditional devices, MDIs have many benefits. The patient's recovery time is shortened because the procedure is less intrusive than traditional implant surgery. One pilot drill is usually all that's needed for transmucosal placement, and these can be inserted right away. Healing of the gingiva typically occurs within 2–5 days, and a longer recovery time with MDIs is frequently unnecessary. Minimally invasive dental implants (MDIs) are advantageous because their insertion requires less damage to the periosteum than traditional implants, speeding up the osseointegration process and reducing the amount of time required for MDIs. There is no longer any requirement for sutures or extended rest intervals [5]. The procedure can be completed in a single day, and the patient will be able to consume normally that evening. Patients with severe bone loss may benefit from these as an alternative to traditional tooth implants. Patients who are unable to undergo surgery due to physical conditions also have an option in MDIs. MDIs are inexpensive, too. There is a lot of disagreement about the most effective way to track how a tooth implant is doing. The osseointegration of tooth implants has been proven in a variety of ways. Bone implant contact (BIC) measurement, also known as histomorphometry at the light microscopic level, is a common and time- tested technique for assessing the biological responses to an implant. One parameter that has been studied widely to determine how much bone is opposed to implants is bone implant contact (BIC). An implant in the jaw will come into touch with both compact and cancellous bone. Mineralized bone-to- implant contact length often varies along the implant surface due to the different structures of the two kinds of bone. Key features influencing osseointegration, such as implant surface and topography, surface chemistry, charge, and wettability [6]. about four decades ago. Osseointegration appears to benefit from surface roughness and increased area. Screw-shaped implants with a rough surface were found to have better bonding than smooth implants, according to research by Carlsson et al. It appears that a rougher implant surface, indicating a deeper level of integration, is better for osseointegration than a smoother implant surface. 3MTMESPETM MDIs have surface treatment on the bone-contact regions. These MDIs are given a cleaning and passivation with an oxidizing solution after being sandblasted with aluminum oxide particles [7].

The peri-implant bone heals in a variety of designs depending on the design modifications made to the implant fixture or thread. Implants with the right macro geometry can distribute loads evenly, minimizing shear pressures on the bone around them. Furthermore, ideally designed implants would have a micro movement of 50-150 m or less during the bone healing process. It is hypothesized that the implant-bone interface responds and distributes compressive force differently between straight and tapered implants, with the degree of taper being the determining factor. At the implant-bone contact, tapered implants produce more compressive force than cylindrical implants, which produce more shear force. Because the crestal bone can gradually expand and stress at the implant-bone interface is reduced, the geometry of the tapered implants provides a solid foundation for adequate main stability [8]. Higher insertion torques are made possible by the tapered implant's geometry, which typically offers a self-tapping system. Tapered implants put in lower bone density areas, such as fresh extraction sockets, work like an osteotome, squeezing the bone around implant bodies to increase primary stability, as demonstrated clinically by Pozzi et al. The effects of various macro-geometry designs

become more apparent when insertion torque values are used as main indicators of implant stability. Also, the differences between straight and conical implants cannot be clearly demonstrated by the main implant stability determined by implant stability quotient (ISQ) values [9].

The success of osseointegration can be predicted preoperatively by measuring the morphology and characteristics of the cortical and trabecular bone at the wound location. Microstructural bone characteristics did not affect changes in the marginal bone level and ISQ values in clinical trials, but Dias and colleagues discovered that different bone types impact implant stability measured by RFA over time. Implants of both tapered and cylindrical shapes performed similarly biologically in the posterior mandible of a split-mouth clinical study. Both the medullar thickness and the medullar bone percentage at the implant location had significant effects on the insertion torque and ISQ values of these two macro-designed implants. The trabecular bone is more responsive to the tension between implant strands than cortical bone. Bone conditions at implant recipient locations are therefore hypothesized to influence implant stability [10].

## Problem Statement

Despite the advantages of dental implants and the use of implants, there is no evidence of their effectiveness and long-term success. The success of these implants depends on their union with the surrounding bone and osseointegration. New implant systems entering the market with the help of animal models must be studied first, to demonstrate the possibility of osseointegration for their potential success in humans. Therefore, an animal study to explore the osseointegration of these implants is needed to help better understand treatment selection, prognosis, and outcomes for patients. The problem of this research was also represented in the low number of scientific studies and research concerned with discussing the issue of osseointegration between traditional implants and compressive implants after immediate implantation, and this made it difficult to collect research data through scientific references and other studies.

## Search Objective

This research explored the osseointegration between two types of implants after immediate extraction.

## Literature Review

### Implants types

Dental implants are artificial dental roots that are implanted into the jawbone. They attach to artificial teeth by fusing to an abutment. Dental prostheses typically utilize titanium. Dental treatments and implants can vary greatly. Your doctor can help you decide which option is ideal [11].

**Implants, Both Single and Multiple:** One or more teeth can be replaced with dental implants.

- Only one molar is replaced. Your dentist can substitute a missing tooth with an implant and a crown if

- you only need to replace one.
- Several teeth in one implant. If you're lacking several teeth, your dentist may recommend getting implants to replace all of them at once.
- Extensive dental implants. A complete mouth dental implant procedure may be recommended by your dentist if you currently have no teeth [12].

**Basic Types of Implants:** The most common types of dental implants are endosteal and subperiosteal implants. The main difference is how they're attached to your jawbone.

- inserts placed inside the bone: This implant is the standard in the dentistry industry. A small screw, cylinder, or blade outline characterizes its overall form. If you currently use dentures or bridges, your dentist may suggest endosteal implants as a more permanent solution to tooth loss.
- Implants positioned beneath the periosteum: This implant sits atop the bone in your mandible. If you can't wear conventional dentures, you don't have enough jawbone to support an endosteal implant, or you don't want to undergo a bone augmentation procedure to build up the bone, your dentist may recommend a subperiosteal implant [13].

**Other Procedures May Have with Implants:** According to [14], Depending on the condition of your jawbone, the number of teeth that are missing, and any other factors, your dentist will determine whether endosteal or subperiosteal implants are better suited to your requirements.

Other methods consist of:

- Increases in bone mass. Dental implants can fail if your mandible doesn't have enough natural, healthy bone to hold them in place. In order to have healthy bone that can hold implants, your specialist may suggest bone augmentation. Bone supplements and growth hormones could be used for this purpose.
- Sinus drainage. Dental implant placement in the upper back mandible is notoriously difficult. Due to its proximity to the sinus and possible lack of bone quality or amount.
- A sinus lift, also known as a sinus enhancement or sinus elevation, is a procedure your doctor can perform to fix this. This procedure lifts the sinus floor, making space for implant-supportive bone.
- Growth of the ridges. If your mandible is too narrow for implants, your dentist may advise you to have your ridges widened or otherwise altered. In this procedure, bone graft material is added to a tiny area along the ridge (the tip of your jaw).

A ridge modification may be recommended by your doctor if you have jaw deformities in either the upper or lower mouth. The health of your mandible and the aesthetics of your implant may both benefit from this [15].

And [16] he said the dentist will help you select the best tooth implant from among many alternatives.

- Miniature prostheses for teeth (MDIs). The size of a toothpick or the tip of a pencil lead, these devices are incredibly tiny. The inserts are slimmer than the norm. If you need help keeping your bottom denture in place, your dentist may recommend this. Mini dental implants can be put using procedures that are less invasive than traditional dental implant surgery.

- If you've experienced significant bone loss and have little jawbone left over, your dentist may suggest micro dental implants. If your teeth are loose, they may also suggest mini implants. They can hold them steady so they don't move around while you consume or chat.

- Dental prostheses loaded immediately. These allow your dentist to insert both the implants and the temporary dentures at the same time. Same-day implants, or "teeth in a day," are another name for this procedure.

- Same-day implants may be possible for you if you have enough natural, healthy bone and your implant is secure enough to hold a new temporary tooth.

All-on-4. Full arch replacement teeth are a possibility if you need all of your upper or lower teeth replaced.

To begin, your specialist will insert four implants into the bone in your jaw. Then, temporary replacement teeth that can last for just one day will be attached to specific abutments. It takes about 6 months for the gums to recover and the implants to fuse with the patient's bone. In order to speed up the recovery process, your specialist may suggest a specific diet. After waiting for 6 months, you can have irreversible replacement teeth implanted by dentist and return to your regular diet [17].

## Osseointegration

In order for dental implant therapy to last, osseointegration must occur. According to [18], Osseointegration is the process by which an endosseous dental implant forms a direct structural and functional link with the surface of a load-carrying bone to ensure the implant's long-term stability and clinical success. Interactions at the implant-tissue contact tend to be highly dynamic. In addition to concerns over biocompatibility and biomaterial, this interplay also necessitates adjustments to the mechanical setting. Osseointegration begins with the attachment of alveolar bone to the implant body, and continues with biological anchoring via progressive bone apposition and remodeling toward the implant. Bone formation and maintenance at the implant surface is influenced by a wide variety of variables, making the process itself quite intricate.



**Figure 1:** Osseointegration in teeth.

Osseointegration is described as a healing process that takes place over time and allows for the clinically asymptomatic rigid fixation of alloplastic materials in bone while under functional loading. Without any intervening fibrous or connective tissue between the bone and the implant surface, the histological look was similar to that of a functional ankylosis [19].

It is confirmed that the successful outcome of any implant procedure is mainly dependent on the interrelationship of the various components of an equation that includes the following [20]:

- The implant material's suitability for use in the body.
- The implant's microscopic and macroscopic surface and form.
- The condition of the implant bed from a morphologic (bone structure) and health perspective.
- The actual method of surgery.
- A time of rest and recuperation with no interference.
- Conditions of Loading.

The difficulty for the doctor is that all of these variables need to be managed almost simultaneously for a reliable result to be achieved [21]. Experimental data indicate to osseointegration even at the ultrastructural level, while clinical experiences show that the implants were anchored in bone without intervening fibrous tissue. Collagen fibers have been seen very close to the titanium oxide surface, with only a Proteoglycan layer (roughly 20-40 nm thick) separating them. Bone tissue is much more sensitive to heat than was previously thought, as shown by studies on the significance of controlling the surgical technique. Temperature increases of 47 °C, substantially disrupt the subsequent integration of titanium implants into the bone bed. discovered that the bite forces of people who had osseointegrated dental implants were comparable to those of people whose teeth were still in place. discovered a healthy gingival reaction with very few inflammatory cells in response to the mucosa-penetrating abutments. Only about 3% of the microflora were found to have possibly dangerous bacteria like spirochetes, according to the bacteriological analysis. No other dental implant device has been subjected to such rigorous experimental and clinical testing as this one has [22].

As emphasized [23], that the dental implant is an artificial fixture in the jaw, which acts as a replacement tooth root. It is usually made from titanium. During the placement of an implant, the main aim is to achieve immediate close contact with the surrounding jawbone. After a period of healing, teeth implants become anchored and stable, thanks to osseointegration. This is a process whereby jawbone cells grow up to the implant surface to grip it securely. The word osseointegration derives from the Greek word osteon (bone) and the Latin integrate (to make whole).

Osseointegration can take anywhere from two months to a year, based on the quality of the jawbone and how far apart the implants are placed. Temporary molars may be inserted at this time. Permanent replacement teeth are then affixed to the implants or implant supports once they have healed.

Because they act as a foundation and a supportive root-like structure, implants mimic the appearance, feel, and performance of natural teeth. There are typically three parts to a tooth implant restoration.



The root replacement is a tiny titanium nail. The titanium tooth bases integrate with the jawbone to support individual crowns, bridges, and dentures. A dental implant consists of three parts: the implant itself, the abutment (the connection), and the artificial tooth (the crown) [24].

### **Biologically Stable and Robust:**

The human body readily accepts titanium, and bone cells have no trouble attaching to and growing on its surface. In order to facilitate osseointegration, the device is typically roughened or coated. Titanium is non-toxic and easy on the body. It's also very sturdy, so it won't break under the strain of repeated chewing. Titanium is used in artificial joints and other medicinal applications because of its strength and durability [25].

### **A Shocking Realization:**

In 1952, a Swedish orthopedic surgeon named Professor Per-Ingvar Brnemark found osseointegration. A titanium optical tube was inserted into a rabbit's limb so that he could examine microcirculation. Brnemark was shocked to find that he could not separate the titanium from the bone when he attempted to remove the metal tube. Osseointegration is what Professor Brnemark meant when he said, "a direct structural and functional connection between ordered living bone and the surface of a load-carrying implant." He put the first titanium dental implants with the goal of osseointegration in a patient in 1965.

### **Protecting the Jaw:**

Once in place, dental implants actively prevent further mandible bone loss by stimulating bone growth. Implants help the jawbone stay healthy by replicating the effects of natural chewing pressures. When a tooth is missing, the surrounding bone will atrophy because it isn't being stimulated to grow through gnawing. Bone loss or shrinkage can also occur as a result of aging, accident, periodontal (gum) disease, or the use of a traditional denture. Chewing with a denture can cause blood flow to the gums to decrease, which in turn can speed up the bone loss process [26].

### **Implant Success can be Attributed to a Healthy Living**

The Association of Dental Implantology reports that "generally, the success rate for dental implants is around 95%," but that a healthy diet and regular exercise are also crucial to a full recovery. The healing process following the placement of implants is negatively affected by smoking, increasing the likelihood that the implants will fail in the long run. Osseointegration relies on healthy blood flow and the development of bone cells, both of which are negatively impacted by nicotine use. Dental implant health can also be negatively impacted by factors like poor diet, heavy alcohol intake, and inadequate dental hygiene [27].

### **Bone Deficiency:**

Patients who lack sufficient jaw bone can have it enhanced before implants are put. Many different techniques that 'build' bone fall under the umbrella phrase of bone augmentation. Bone grafts, a type of biologic filler, are frequently used to accomplish this. Bone grafting is the process of adding bone to



the mandible in order to support dental implant posts. Animal, human, and synthetic components are all viable options for bone grafts. All of these things serve as a framework for fresh bone to form [28].

### **Traditional Implants**

According to [29], Dental implants are the best treatment choice for patients missing one or more teeth. The gold standard for replacing missing teeth, dental implants consist of titanium screws surgically implanted into the mandible. To replace a complete tooth, they can serve as an anchor for a dental crown, bridge, or denture. Implants are the only method of dental restoration that can replace both the crown and the root. This prevents the jawbone from atrophying due to tooth loss because of the continuous stimulation it receives. There is a lot of confusion among our patients about which implant would be ideal for them. Our oral surgeons in the Montgomery area are glad to address any concerns you may have about the dental implants we offer, whether they be immediate-load, mini, or traditional. Please schedule a consultation with one of our dentists if you are missing teeth and are interested in this highly effective method of tooth replacement [30].

### **Creating a Solid Base**

Mini dental implant screws are less than 3 mm in diameter, while the standard implant screw width is between 4 and 5 mm. Mini dental implants are ideal for supporting a denture or replacing a single missing tooth in a tiny gap, such as a canine or an incisor. Restoration of a larger tooth, such as a molar, or the anchoring of a dental bridge usually calls for the use of traditional dental implants. Traditional implants have more surface area and can withstand more chewing force and are more stable over time, but both kinds of implants provide the required strength to support a restoration [31].

### **Strength and Safety that are Second to None**

Titanium, the material from which dental implants are crafted, is known for its extraordinary durability. When taken care of properly, dental implants have the potential to outlast any other restoration method currently available. Dental implants have the unique advantage of preventing further bone loss in the jaw because they are the only restorative technique that replaces the complete structure of the tooth in addition to restoring function and aesthetics. When a person loses a tooth, the bone around the empty socket usually dissolves. The loss of root stimulation during chewing and consuming triggers this process in the jaw. The stimulation from dental implants helps the jawbone stay dense, healthy, and powerful [32].

### **The Commonly Accepted Schedule for Implants**

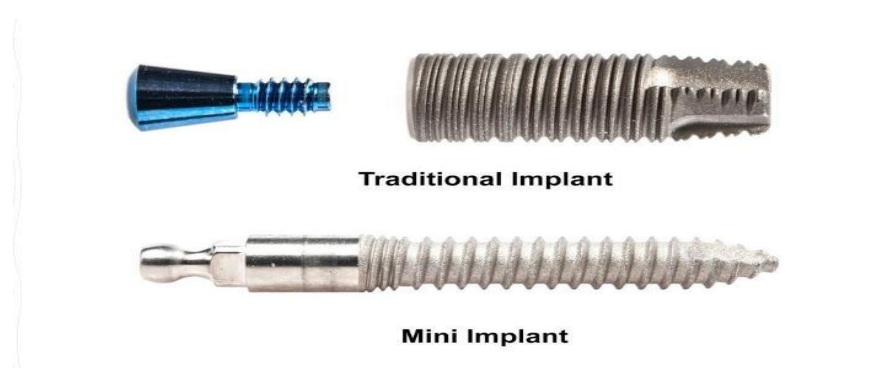
Before a restoration can be placed on a traditional tooth implant, the implant must first integrate with the jawbone. Dental implants involve having a titanium screw surgically implanted into the jawbone below the lips. After that, the implant needs to recover for four to six months so that it can fuse with the bone. Osseointegration is the process that guarantees the implant stays put and permits a successful restoration.

### **Consultation for Dental Implants should be Scheduled**

Contact our office today to set up a consultation for dental implants if you are missing teeth and are

interested in restoring the health and beauty of your mouth. If you have any inquiries or concerns about the various implant options, our physicians are here to help [33].

And when talking about mini dental implants versus traditional dental implants, both indicated [34], [35], [36]. That Both regular and miniature implant supports can be used to restore a smile that has lost a tooth or teeth. Larger than mini implants, traditional implants are the more secure and permanent option. However, adequate jawbone tissue is also necessary to sustain these implants. Patients with jawbone atrophy may need a bone graft before conventional implants can be placed. Mini implants, fortunately, are a reliable substitute. Mini dental implants are smaller in diameter than traditional implants, so they don't necessitate as much healthy tissue to restore a single tooth or a complete dental arch. During your appointment, your dentist can explain how mini dental implants compare to conventional implants [37].



**Figure 2:** Mini dental implants are smaller in diameter than traditional implant posts.



**Figure 3:** A dental implant is embedded in the jaw and can support a crown, bridge, or denture.

Seeing the Variations: Both mini dental implants and conventional implants can be used to restore a smile that has lost teeth. The implant posts serve as artificial tooth roots and promote bone development in the jaw. Both can serve to secure replacement teeth, such as crowns, bridges, or prostheses, with varying degrees of success. Mini implants and traditional implants both help replace missing teeth, but there are significant variations between the two [38].

**Size:** The width of mini dental implants is much less than that of standard posts. Mini implants can be any width between 2 and 3.5 millimeters, while the normal post size is between 3.5 and 6 millimeters. Mini implants cause less damage to the mandible and can be supported by a smaller amount of bone. Smaller

posts shouldn't be relied upon for stability as much as bigger ones. Minis, consequently, can cause a greater chance of implant failure [39].

**Shape:** There are two parts to a standard implant: the post and the abutment. The abutment is used to attach the repair to the implant. In contrast, a mini implant consists of a single metal component. It's made up of a frame with a ball at the top, and it sits proud of the gums. Miniature implants require a restoration with a silicone O ring to fit around the implant's ball [40].

**Candidacy:** Traditional dental implants require a healthy mandible and enough room for the titanium posts to fuse with the bone. Atrophy of the jawbone can reduce the strength of implants or even cause them to malfunction. If your jawbone has deteriorated due to tooth loss, you may need a bone graft before conventional implant therapy can be performed. If bone resorption has reduced the height of your sinus floor, you may also require a sinus lift.

Mini implants may be an option for patients whose mandible is deteriorating: Mini implants can function with significantly less jawbone tissue than their full-sized versions. Mini implants may be an option for patients with a receding jawline who do not require any additional surgery for placement. Minis may not be the best option for people who have problems with teeth grinding and clenching because they are not as sturdy as larger posts. (bruxism). Mini dental implants are susceptible to failure when subjected to the extreme forces generated by bruxism [30].

**Placement:** The placement of mini implants typically only takes one office appointment and does not necessitate sutures. In contrast, the two-procedure process for conventional implants. The initial procedure takes longer than with mini implants because a bigger opening need to be drilled to accommodate the implant posts. The second procedure is minimally invasive and entails exposing the post and cementing the abutment into place.

**Restoration and repair:** It take six to nine months for the jaw to recover after a bone graft or sinus lift before implants can be put. It takes three to six months for the posts of conventional implants to integrate with the jawbone and gums after operation before the restoration can be placed.

Mini dental implants drastically cut down on treatment times because they rarely need any sort of preliminary process. Temporary restorations are often available on the same day as treatment for people who need them. Patients can depart the office with restored dental function and a much-needed confidence boost thanks to same-day restorations [37].

**Cost:** Mini implants, being smaller and manufactured with less material, are typically less expensive than standard posts. Keep in mind that a bigger restoration may require additional mini implants. Therefore, it is essential to factor in the intricacy of the treatment, the materials used, and the expertise of your dentist when estimating the final cost [41].

## Compressive Implants

We have to wait for this implant to be integrated because, according to physics, being a cylinder would

cause all the force that we exert on the upper part to be transmitted to the base and cause the implant to fail. The modern design of the basal implant, the compressive implants, features a conical shape [42]. There is no need for a surgical incision to place the compressive implant. Small drills are used to make tiny holes in the bone and tissue. Since this area of the bone is relatively porous, compacting and hardening it through the introduction of implants up to 5mm in diameter helps preserve a sizable portion of the bone. Because of the conical shape of the implant, the force applied to the prosthetic component is evenly distributed along all the bone's force directions. As a result, everything from a single tooth to the entire jaw can be rehabilitated and immediately loaded [43].

Titanium implants, both basal and compressive, are manufactured in Switzerland and sold all over the globe [44]. Implant surgery has advanced, completely minimizing the aggressiveness, reducing bleeding, and expanding the scope of action in areas where implants could not be placed before or required sinus elevations or lateralization's of the dental nerve, today we can place implants and rehabilitate patients without resorting to such invasive measures [45].



**Figure 4:** Compressive implants.

[44] , said in Advantages of Immediate Loading Implants:

1. Extractions can be done right there and then.
2. Place the implants on the area.
3. When required Filling some of the extraction holes with bone or plasma Placement of the temporary prosthesis.
4. Measurements are taken for the final prosthesis, or we wait 4 to 5 days for the tissues to heal from the extractions done before taking measurements.
5. More than 90% of situations where ground elevations were previously inevitable were resolved without resorting to this option.



**Figure 5:** Basal Implantology.

### Implant Compression

Compressive DSI implants can be placed in a single step of the implantation protocol due to their ease of use. These devices speed up treatment, lessen patient discomfort, and yield a beautiful final restoration. When there is sufficient bone in the maxilla and mandible, DSI compressive implants are typically used for rapid loading multi-unit restorations. It is an implant with a small diameter, making it ideal for use on the laterals or central incisors, where room is at a premium. The exceptional weight capacity is a result of the threads' distinctive design, which increases bone-to-implant contact all the way along the implant body. Adjusting the abutment slope angle by up to 20 degrees is possible with the extra flexing neck, which is especially helpful in tight, non-parallel situations [45].

The highest standards of quality control are applied to all DSI devices. DSI ensures that a sizable fraction of each lot is sampled. Every example is flawless in every way thanks to our rigorous testing procedures. This ensures minimal subsequent denials. The goods adhere to the strictest of global norms. In compliance with ASTM-F136-02, all DSI Implants are crafted from titanium alloy Ti-6Al-4V ELI [1].

### More About This Item

When compared to the conventional two-stage insertion method, the DSI compressive implant offers superior stability by obviating potential complications like micro displacements of the structure or a trapped screw. These implants have been shown to be safe over time, are effective in minimizing both trauma and bone loss, and provide outstanding stability over the long run. The 2.4mm Ultra Slim width is the newest addition to the lineup. Developed to fit snugly between the narrow gaps of your lateral and central incisor teeth [46].

### Benefits:

1. More bone is in touch with the implant all the way along its body thanks to the threads'

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innovative design.

2. Can be used to treat areas where bigger, two-piece implants would be too cumbersome to access.
3. The device can be loaded immediately without compromising the extremely high success rate because of its uniform structure.
4. The abutment's inclination can be altered by as much as 20 degrees thanks to the neck's pliability.
5. Uniquely Designed Compressive Threads.
6. Instantaneous download.
7. Quick and easy prosthesis implantation.
8. Bone condensate style.
9. No sensation of pounding [47].



**Figure 6:** Compressive Implant.

## RBM Surface Modification

Beta-tricalcium phosphate (-TCP) is a resorbable bioceramic that is used in RBM's high-velocity particle bombardment surface treatment. Calcium particles are removed from the surface by using a weak organic solution for cleaning and etching. It achieves a uniform surface with homogenous pore width and a larger BIC without altering the titanium's natural surface pattern. Because of its bioresorbability, - TCP is frequently employed as a synthetic bone grafting substance. It dissolves entirely, to be replaced by bone tissue [48].

## Methodology

### Research Design

The term "research design" is used to describe the broad approach that can be used to logically and consistently incorporate the many parts of the study. This action was taken to guarantee that the research issue was resolved thoroughly. Data collection, measurement, and analysis all follow a predetermined plan known as the research design.

The research design is the overarching method used to integrate the many components of the study in a logical and consistent manner. To ensure that the research problem was adequately handled, this was done. The research design can also be viewed as a plan or road map for data gathering, measurement, and analysis. Commonly, a variety of methods are employed when designing a research study. For instance, reported that the two fundamental approaches to research are quantitative and qualitative.

The "quantitative research employs investigation strategies such as experiments and surveys, and collects data on predetermined statistical data producing tools." The researcher used a quantitative approach since it was appropriate for the study's aim and objectives.

### **Population and Sample Size**

A population is representative of a pool of components or subjects that the researcher considers to hold the requisite information or data, and of specific insinuations that may be made. Population is essentially a category of subjects, such as human beings, with a particular specification that is interesting for experts to focus on. In fact, the resource has certain limitations in terms of financial, time and aim that this matter has a direct impact on the capacity of scholars to reach out to all constituents in the target community.

Sampling is the process of choosing a subset of a population to serve as a proxy for the whole. Research studies rely heavily on sampling because the community of interest typically contains too many people for a manageable number of participants. A sufficient sample size that statistically represents the community of interest is what makes for a good sample. The sample will be selected from among the population of the UAE, which is approximately 10 million people.

### **Sampling Techniques**

Sampling refers to the process of selecting a subset of a target population that is statistically representative. Good samples are statistically representative of their larger populations and are of sufficient size to allow examination of their research questions.

Each member of the community has an equal chance of being selected for the sample if simple random sampling is used. Because this technique of sampling relies solely on randomness to select items, it is sometimes called a "system of chances." Because of its simplicity, simple random sampling can be easily incorporated into more complex sampling strategies. So, the participants in this study were chosen randomly to form the study's sample.

### **Data Collection**

Collecting data entails taking note of and quantifying relevant information about study variables so that researchers examine relationships, and assess results. All data gathering should be done with the end goal



of amassing high-quality evidence that can be processed through a detailed data analysis and used to build a credible and convincing answer to given issues. Validity of a study depends on reliable data collection, which is true regardless of the study's focus or chosen data definition approach (quantitative or qualitative).

**Secondary Data:** The term "secondary data" describes material that has already been compiled. Secondary data are information that has already been gathered by another researcher. In other words, these are publicly available data, such as reports, journals, research papers, and other data relevant to the topic at hand that have already been collected, analyzed, and stored. Information collection has been implemented from secondary resources such as published books and articles.

**Primary Data:** primary information refers to data obtained directly by the researcher on the topic under investigation. They argue that primary data should be collected when secondary data are insufficient to answer the research issues. Various methods, such as surveys, comments, and interviews, can be used to collect primary data. In both quantitative and qualitative techniques, primary data collection methods must be known; nevertheless, the choice of method depends on the objective of the study, the availability of resources, and the skill of the researchers.

Identifies the questionnaire as a common instrument for observing data even though the researcher is geographically confined. The questionnaire translates the overarching aims of the study into manageable, question-and-answer format. Quickly categorize, execute, tabulate, and evaluate any aspect of a successful questionnaire. In order to be effective, a questionnaire needs to be concise, easy to understand, and logically organized. The more difficult queries should follow the easier ones. Since surveys are written and only the respondent's thoughts and experiences are included, their veracity is guaranteed. So, the research's primary source of data was the questionnaire to collect quantitative data.

## Data Analysis

Data analysis is defined as "the process of deriving meaning from data through the detection of patterns and the introduction of inferences". It's been called messy, ambiguous, and time-consuming, but it's also been called creative and thrilling. When taken at its most generic, "data science" refers to the practice of analyzing and theorizing various forms of data to draw inferences about the connections between them. In this study, the data from the questionnaire is analyzed by statistical analysis carried out with the SPSS program.

## Research Validity and Reliability

Regardless of the approach chosen, the principles of reliability and validity must always be considered. The study's validity and reliability must be as high as feasible in order for it to be comprehensive and valuable. The study should also be as generalizable as feasible to apply to as many cases, and organizations as possible.

**Validity:** In data collection and research, validity refers to the data being relevant to the studied topic or phenomenon and measuring what it was intended to assess. To strengthen the validity of the findings and conclusions, it is also critical that they be presented to the reader clearly.

**Reliability:** The statement used to evaluate the consistency of the research findings is referred to as reliability, measurement dependability is determined by assessing the consistency and stability of the data. To assure the accuracy of the research findings, the questionnaire was constructed using a basic, brief structure to reduce respondents' perplexity.

### Ethical Consideration

The rights of the participants will be respected and protected, including their right to self-determination, privacy, anonymity, confidentiality, fair treatment, and safety. Authorization and informed consent were obtained from participants prior to data collection.

### Data Analysis and Results

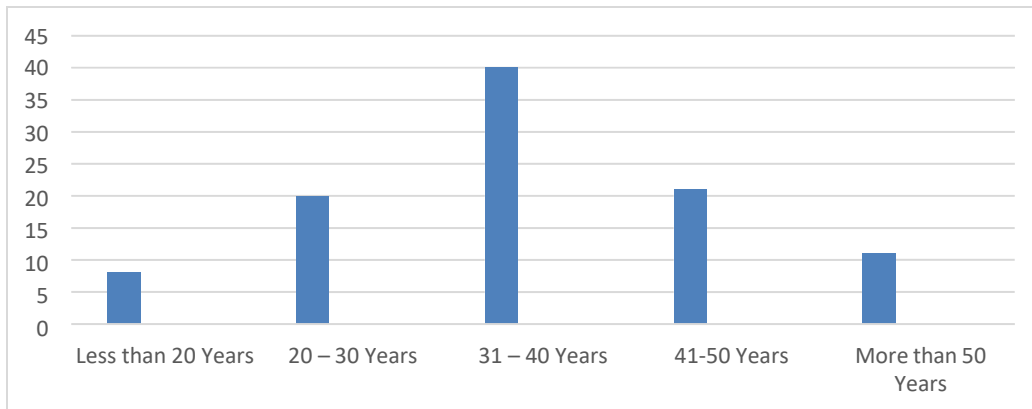
#### Demographic Questions

**Age:** It is evident from the following table regarding the distribution of the study sample according to age, that the highest percentage is (31 – 40 Years) with 40%, followed by (41-50 Years) with a percentage of 21%, (20 – 30 Years) with a percentage of 20% (More than 50 Years) with a percentage of 11% and (Less than 20 Years) with a percentage of 8%.

Age		Frequency	Percent	Valid Percent	Cumulative Percent
-	-				
Valid	Less than 20 Years	8	8	8	8
-	20 – 30 Years	20	20	20	28
-	31 – 40 Years	40	40	40	68
-	41-50 Years	21	21	21	89
-	More than 50 Years	11	11	11	100

-	Total	100	100	100	
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**Table 1:** Age.



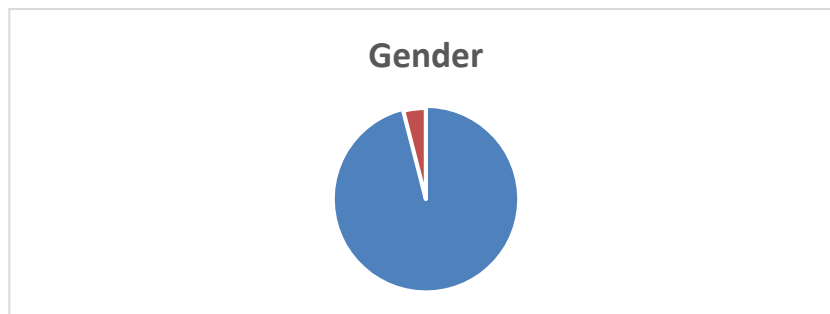
**Figure 7:** Age.

### Gender

It is clear from the following table on the distribution of the study sample by gender that the proportion of females is 96%, and males 4%.

-	Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	4	4	4	4
-	Female	96	96	96	100
-	Total	100	100	100	-

**Table 2:** Gender.



**Figure 8:** Gender.

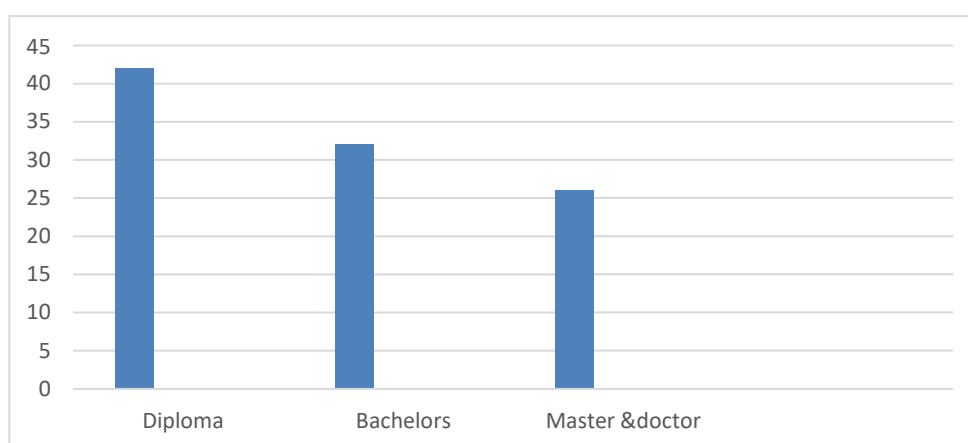
### Qualification

It is evident from the following table regarding the distribution of the study sample according to Qualification, that the highest percentage is (Diploma) with 42%, followed by (Bachelors) with a

percentage of 32%, (Master & doctor) with a percentage of 26%.

-	Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	42	42	42	42
-	Bachelors	32	32	32	74
-	Master & doctor	26	26	26	100
-	Total	100	100	100	-

**Table 3:** Qualification.



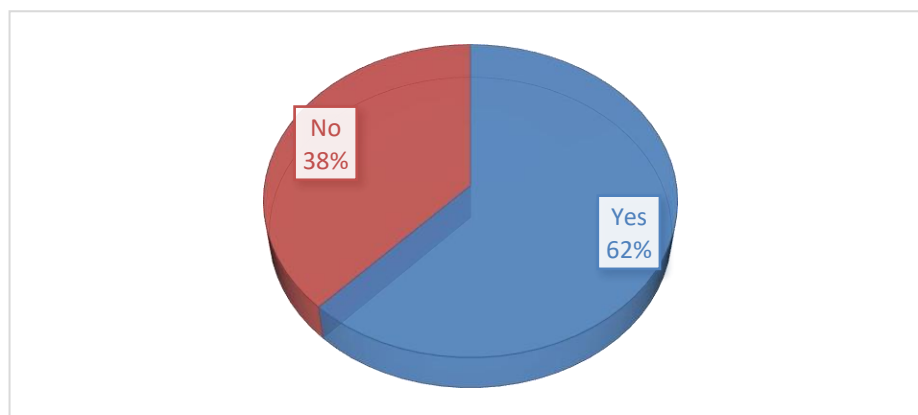
**Figure 9:** Qualification.

### Section A: Level of Information about Dental Implants

Will a dental implant always become attached to the bone after surgery? The study sample agreed to a dental implant always attached to the bone after surgery, and that was 62%.

Will a dental implant always become attached to the bone after surgery?	Frequency	Percent
Yes	62	62%
No	38	38%
Total	100	100%

**Table 4:** Will a dental implant always become attached to the bone after surgery?

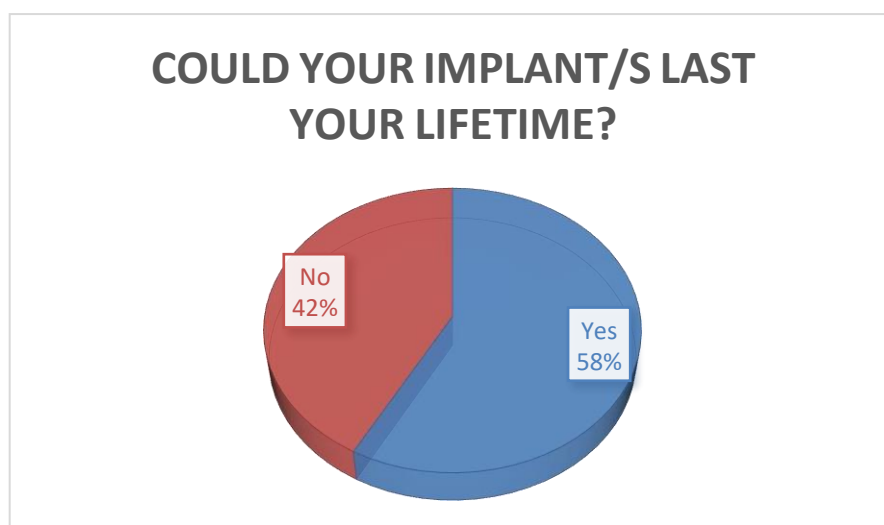


**Figure 10:** Will a dental implant always become attached to the bone after surgery?

Could your implants last your lifetime? The study sample agreed to implant/s last your lifetime, and that was 58%.

Could your implant/s last your lifetime?	Frequency	Percent
Yes	58	58%
No	42	42%
Total	100	100%

**Table 5:** Could your implant/s last your lifetime?

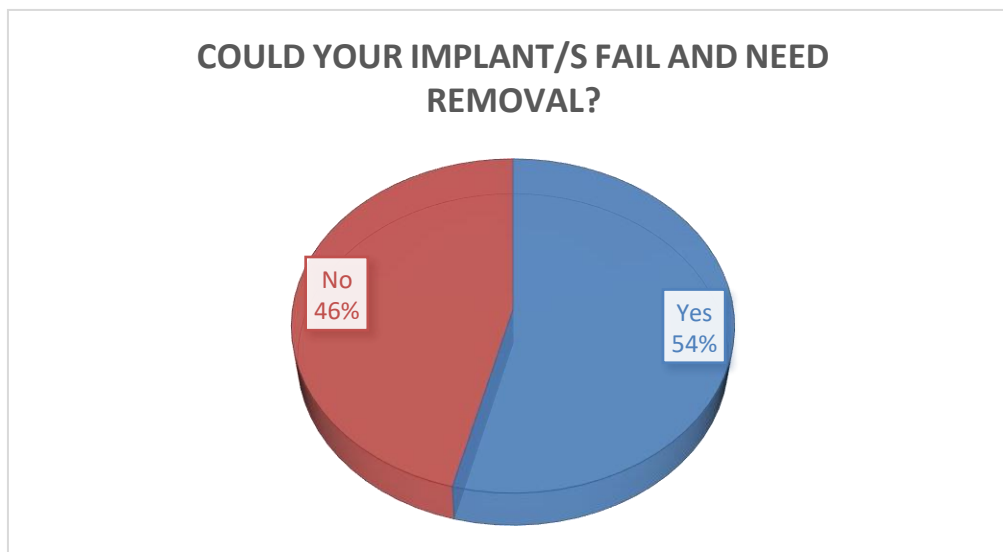


**Figure 11:** Could your implant/s last your lifetime?

Could your implant/s fail and need removal? The study sample agreed to implant/s fail and need removal, and that was 54%.

Could your implant/s fail and need removal?	Frequency	Percent
Yes	54	54%
No	46	46%
Total	100	100%

**Table 6:** Could your implant/s fail and need removal?



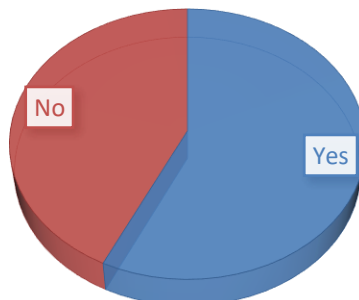
**Figure 12:** Could your implants fail and need removal?

Is there a chance that the false tooth or teeth (such as crown, bridge or denture) supported by the implants may need replacing or adjusting in the short and long term? The study sample agreed to the false tooth or teeth (such as crown, bridge or denture) supported by the implants may need replacing or adjusting in the short and long term, and that was 56%.

Is there a chance that the false tooth or teeth (such as crown, bridge or denture) supported by the implants may need replacing or adjusting in the short and long term?	Frequency	Percent
Yes	56	56%
No	42	42%
Total	100	100%

**Table 7:** Is there a chance that the false tooth or teeth (such as crown, bridge or denture) supported by the implants may need replacing or adjusting in the short and long term?

IS THERE A CHANCE THAT THE FALSE TOOTH OR TEETH (SUCH AS CROWN, BRIDGE OR DENTURE) SUPPORTED BY THE IMPLANTS MAY NEED REPLACING OR ADJUSTING IN THE SHORT AND LONG TERM?



**Figure 13:** Is there a chance that the false tooth or teeth (such as crown, bridge or denture) supported by the implants may need replacing or adjusting in the short and long term?

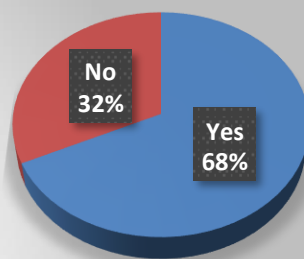
Will regular maintenance and monitoring of the implant of the implant/s by a dentist be needed?

The study sample agreed to regular maintenance and monitoring of the implant of the implant/s by a dentist be needed, and that was 68%.

Will regular maintenance and monitoring of the implant of the implant/s by a dentist be needed?	Frequency	Percent
Yes	68	68%
No	32	32%
Total	100	100%

**Table 8:** Will regular maintenance and monitoring of the implant of the implant/s by a dentist be needed?

Will regular maintenance and monitoring of the implant of the implant/s by a dentist be needed?



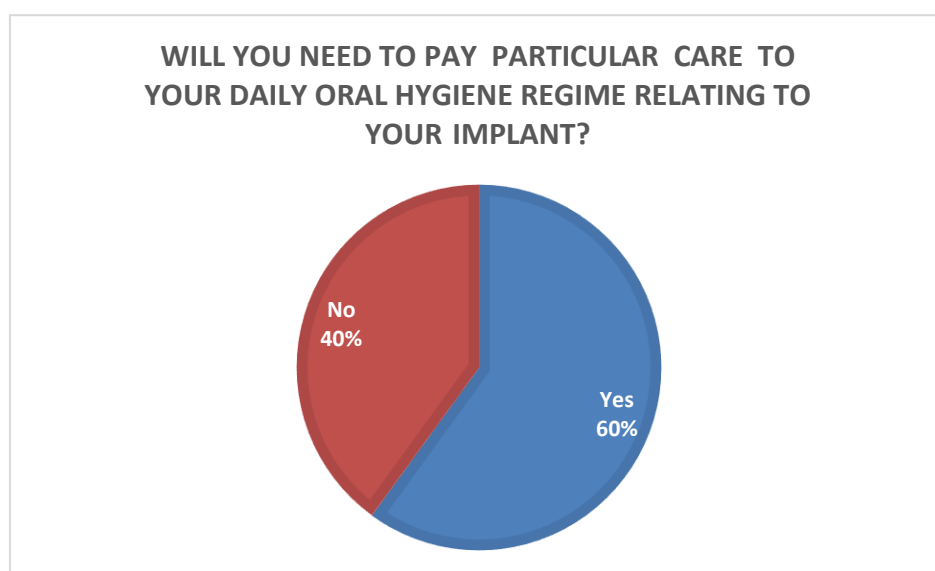
**Figure 14:** Will regular maintenance and monitoring of the implant of the implant/s by a dentist be needed?



Will you need to pay particular care to your daily oral hygiene regime relating to your implant? The study sample agreed need to pay particular care to your daily oral hygiene regime relating to your implant, and that was 60%.

Will you need to pay particular care to your daily oral hygiene regime relating to your implant?	Frequency	Percent
Yes	60	60%
No	40	40%
Total	100	100%

**Table 9:** Will you need to pay particular care to your daily oral hygiene regime relating to your implant?

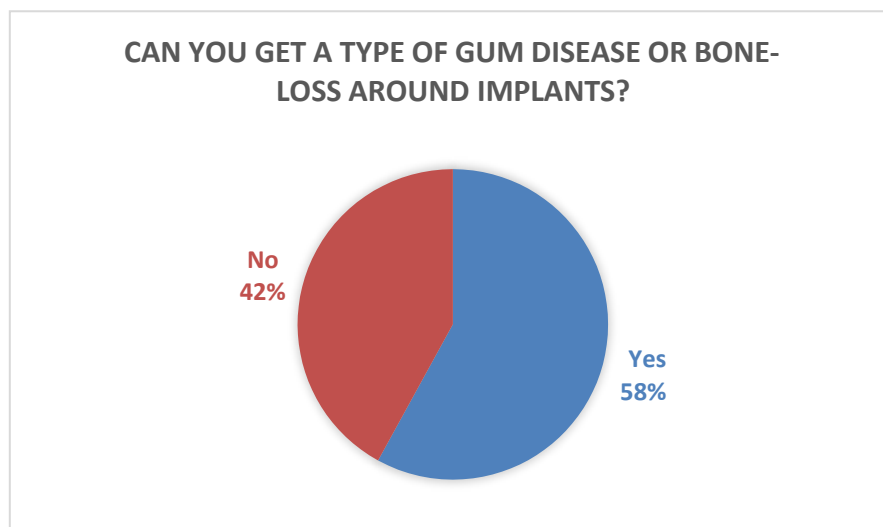


**Figure 15:** Will you need to pay particular care to your daily oral hygiene regime relating to your implant?

Can you get a type of gum disease or bone-loss around implants? The study sample agreed to get a type of gum disease or bone-loss around implants, and that was 58.

Can you get a type of gum disease or bone-loss around implants?	Frequency	Percent
Yes	58	58%
No	42	42%
Total	100	100%

**Table 10:** Can you get a type of gum disease or bone-loss around implants?

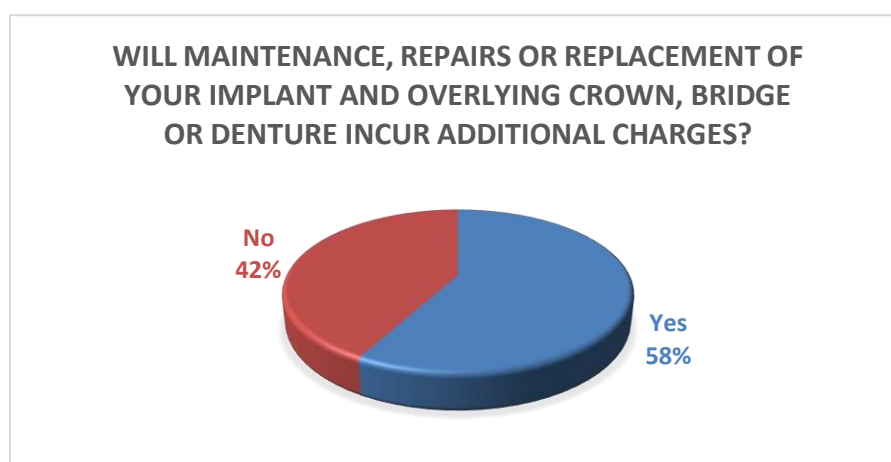


**Figure 16:** Can you get a type of gum disease or bone-loss around implants?

Will maintenance, repairs or replacement of your implant and overlying crown, bridge or denture incur additional charges? The study sample agreed to maintenance, repairs or replacement of your implant and overlying crown, bridge or denture incur additional charges, and that was 58%.

Will maintenance, repairs or replacement of your implant and overlying crown, bridge or denture incur additional charges?	Frequency	Percent
Yes	58	58%
No	42	42%
Total	100	100%

**Table 11:** Will maintenance, repairs or replacement of your implant and overlying crown, bridge or denture incur additional charges?



**Figure 17:** Will maintenance, repairs or replacement of your implant and overlying crown, bridge or denture incur additional charges?

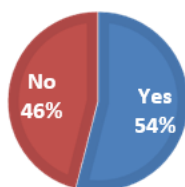
## Section B: Subjective Need for Information

Have you ever obtained information about dental implants? The study sample agreed to obtained information about dental implants, and that was 54%.

Have you ever obtained information about dentalimplants?	Frequency	Percent
Yes	54	54%
No	46	46%
Total	100	100%

**Table 12:** Have you ever obtained information about dental implants?

### HAVE YOU EVER OBTAINED INFORMATION ABOUT DENTAL IMPLANTS?

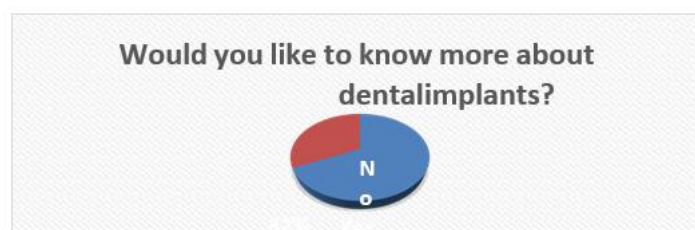


**Figure 18:** Have you ever obtained information about dental implants?

Would you like to know more about dental implants? The study sample agreed to know more about dental implants, and that was 68%.

Would you like to know more about dental implants?	Frequency	Percent
Yes	68	68%
No	32	32%
Total	100	100%

**Table 13:** Would you like to know more about dental implants?

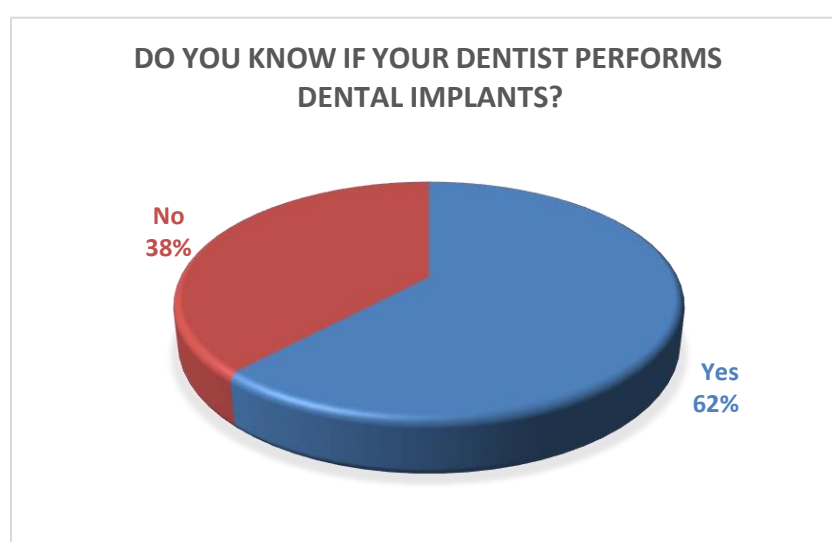


**Figure 19:** Would you like to know more about dental implants?

Do you know if your dentist performs dental implants? The study sample agreed to know dentist performs dental implants, and that was 62%.

Do you know if your dentist performs dental implants?	Frequency	Percent
Yes	62	62%
No	38	38%
Total	100	100%

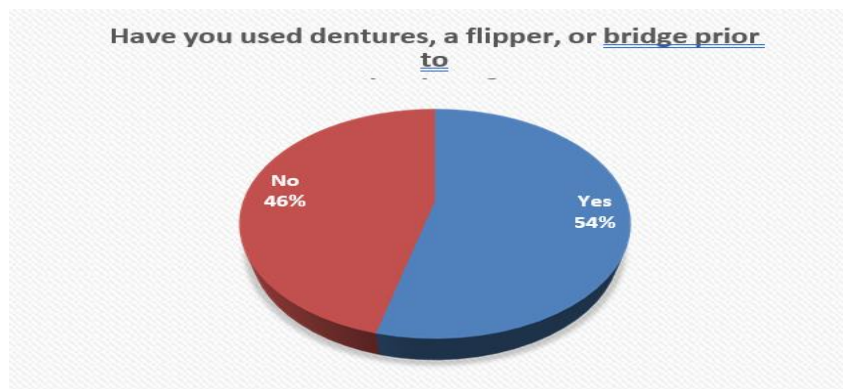
**Table 14:** Do you know if your dentist performs dental implants?



**Figure 20:** Do you know if your dentist performs dental implants?

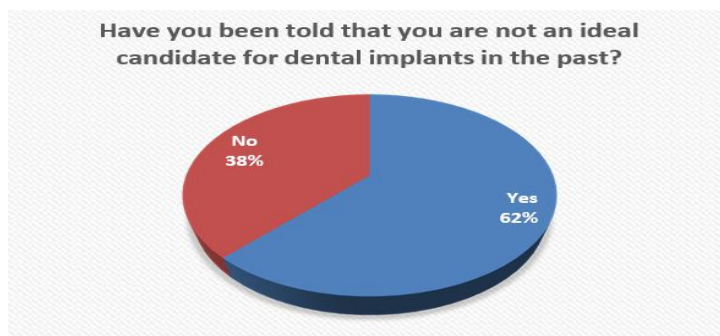
Have you used dentures, a flipper, or bridge prior to implants? The study sample agreed to use dentures, a flipper, or bridge prior to implants, and that was 54%.

Have you used dentures, a flipper, or bridge prior to implants?	Frequency	Percent
Yes	54	54%
No	46	46%
Total	100	100%

**Table 15:** Have you used dentures, a flipper, or bridge prior to implants?**Figure 21:** Have you used dentures, a flipper, or bridge prior to implants?

Have you been told that you are not an ideal candidate for dental implants in the past? The study sample agreed to not an ideal candidate for dental implants in the past, and that was 62%.

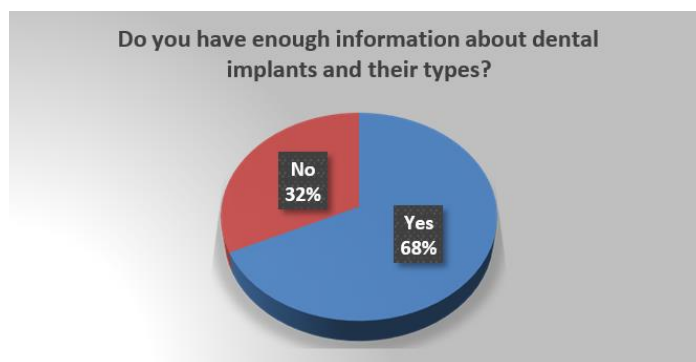
Have you been told that you are not an ideal candidate for dental implants in the past?	Frequency	Percent
Yes	62	62%
No	38	38%
Total	100	100%

**Table 16:** Have you been told that you are not an ideal candidate for dental implants in the past?**Figure 22:** Have you been told that you are not an ideal candidate for dental implants in the past?

Do you have enough information about dental implants and their types? The study sample agreed to enough information about dental implants and their types, and that was 68%.

Do you have enough information about dental implants and their types?	Frequency	Percent
Yes	68	68%
No	32	32%
Total	100	100%

**Table 17:** Do you have enough information about dental implants and their types?



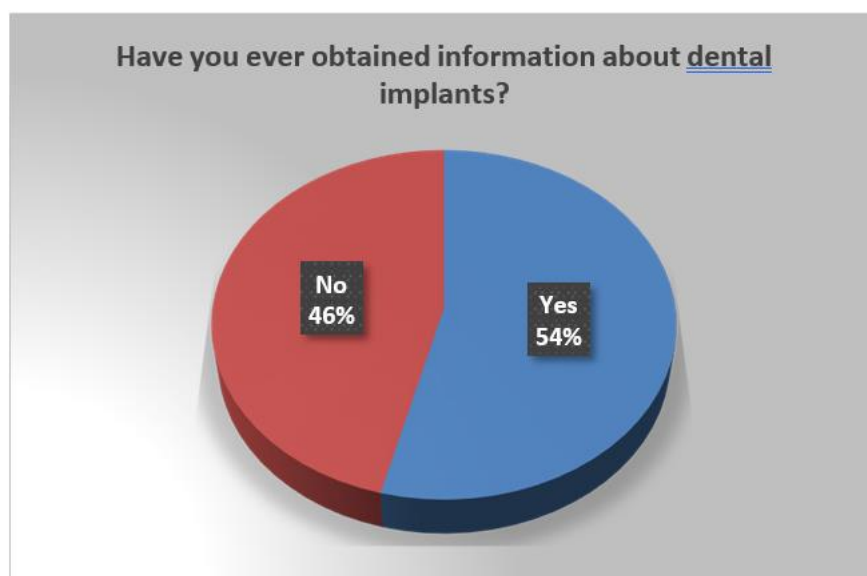
**Figure 23:** Do you have enough information about dental implants and their types?

### Section C: Objective Need for Information

Have you ever obtained information about dental implants? The study sample agreed to ever obtained information about dental implants, and that was 54%.

Have you ever obtained information about dental implants?	Frequency	Percent
Yes	54	54%
No	46	46%
Total	100	100%

**Table 18:** Have you ever obtained information about dental implants?

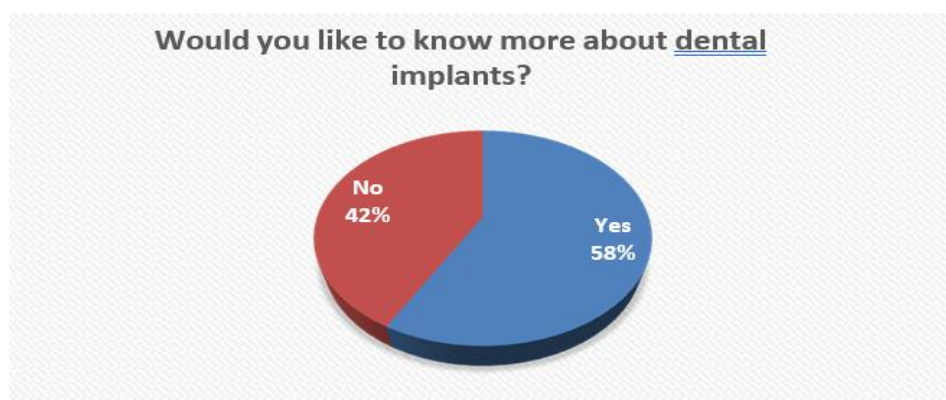


**Figure 24:** Have you ever obtained information about dental implants?

Would you like to know more about dental implants? The study sample agreed to know more about dental implants, and that was 58%.

Would you like to know more about dental implants?	Frequency	Percent
Yes	58	58%
No	42	42%
Total	100	100%

**Table 19:** Would you like to know more about dental implants?



**Figure 25:** Would you like to know more about dental implants?

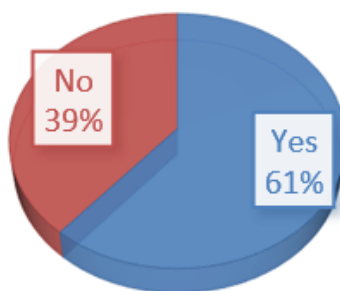


Do you know if your dentist performs dental implants? The study sample agreed to know dentist performs dental implants, and that was 60%.

Do you know if your dentist performs dental implants?	Frequency	Percent
Yes	60	60%
No	38	38%
Total	100	100%

**Table 20:** Do you know if your dentist performs dental implants?

### DO YOU KNOW IF YOUR DENTIST PERFORMS DENTAL IMPLANTS?

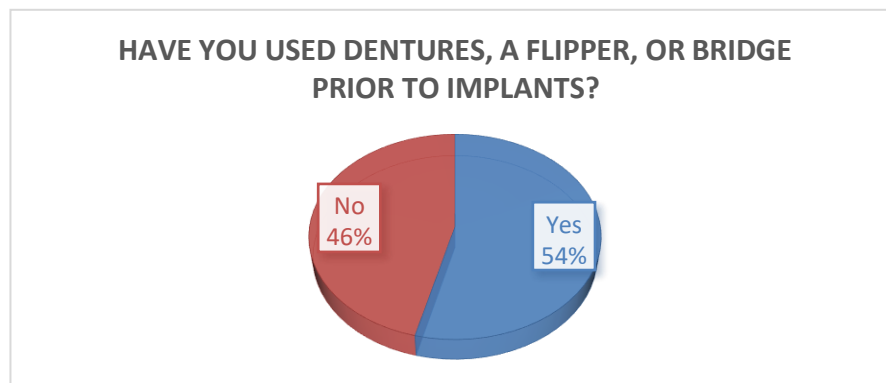


**Figure 26:** Do you know if your dentist performs dental implants?

Have you used dentures, a flipper, or bridge prior to implants? The study sample agreed to used dentures, a flipper, or bridge prior to implants, and that was 54%.

Have you used dentures, a flipper, or bridge prior to implants?	Frequency	Percent
Yes	54	54%
No	46	46%
Total	100	100%

**Table 21:** Have you used dentures, a flipper, or bridge prior to implants?

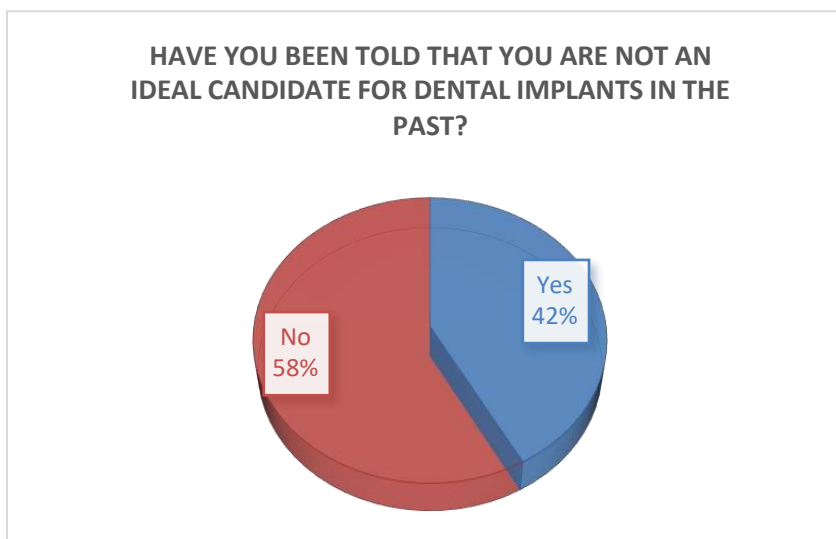


**Figure 27:** Have you used dentures, a flipper, or bridge prior to implants?

Have you been told that you are not an ideal candidate for dental implants in the past? The study sample not agree to ideal candidate for dental implants in the past, and that was 42%.

Have you been told that you are not an ideal candidate for dental implants in the past?	Frequency	Percent
Yes	42	42%
No	58	58%
<b>Total</b>	<b>100</b>	<b>100%</b>

**Table 22:** Have you been told that you are not an ideal candidate for dental implants in the past?



**Figure 28:** Have you been told that you are not an ideal candidate for dental implants in the past?

## Discussion

The study aimed to Comparison of Osseointegration between traditional and compressive implants, after immediate implantation, as it relied on the descriptive approach and used the questionnaire to reach the results, as it was applied to 100 patients, and the study concluded that dental implants will always stick to the bones after surgery, and the study sample agreed to implant /s last your life, in addition to implants failing and needing removal, and that there is a chance that the false tooth or teeth (such as crown, bridge or denture) supported by the implants may need replacing or adjusting in the short and long term, and that regular maintenance and monitoring of the implant of the implant/s by a dentist would be needed Implants, and maintenance, repair, or replacement of the implant, upper crown, bridge, or denture will incur additional costs in Figure 1 to Figure 22 and Table 1 to Table 22.

With regard to the subjective need for information, it was found that they had information about dental implants, and that they had a desire to know more about dental implants, and dentures, fins, or bridges were used before implantation, and it was determined that most of the patients were not an ideal candidate for dental implants in the past. They also had sufficient knowledge about dental implants and their types.

With regard to the objective need for information, the study sample agreed that dental implants last for a long time, and that the study sample have knowledge about dental implant locations, and that dental implants need special care and hygiene compared to natural teeth, and they also have serious thinking about dental implants, but they do not have knowledge Sufficient difference between traditional and pressure dental implants.

## Conclusion

Osseointegration is the single determinant of whether or not a tissue-integrated implant can successfully replace a missing tooth. Therefore, it has been helpful and will continue to be very helpful to exploit every relevant parameter and to enhance and speed up the process of osseointegration if we have a good grasp of the process, its prerequisites, and the factors that promote and limit it Self-drilling implants are a novel method that makes implant insertion more manageable and reduces the risk of complications after surgery.

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