The Egyptian Journal of Hospital Medicine (April 2018) Vol. 71(1), Page 2217-2225

Review on Dental Implantology

Wedad Qassadi[1], Tahani AlShehri [1], Amani Alshehri [1], Kholud ALonazi [1], Ibtihal Aldhayan [2]
1-Alfarabi College of Dentistry, 2- Riyadh College of Dentistry

ABSTRACT

Aim of the work: in this review, we tried to show all details about dental implant, its components, types in the market, usage, case selection and diagnosis, indications and contraindications**.**

Patients and method: Pubmed, Google Scholar have been used to search for papers that addressed dental implantology, preoperative diagnosis of the cases and both of their medical and dental history were considered during searching. **Results:** it was obvious that dental implant has been the first choice by patients for replacing their missed teeth because of their numerous advantages specially in preserving the adjacent teeth and esthetics, but it may be more expensive than fixed bridges or removable prosthodontics. **Conclusion:** dental implant is a root-like structure made of titanium. It is composed of three main parts (fixture, abutment, crown). Case selection is the main point for implant success, so, before implant surgical procedure, the dentist asks the patient for full mouth x-ray, medical history and dental history.

Keywords: implant, types of implants, case selection.

INTRODUCTION

During the last decade, implantology has become an indispensable part of mainstream dentistry, helping dentists to improve the quality of life of large patient populations.While implant treatment could often be a convenient alternative to conventional treatment options, in certain cases, it is the treatment of the first choice for the rehabilitation of severe functional, anatomical or aesthetic problems arising from tooth lost. This is probably most striking in the treatment of the severely atrophic mandible **(1).**

A couple of decades ago implant treatment was reserved for specialist dental teams working at selected universities or specialist centers who treated severely atrophic edentulous patients. In the 90s, indications for implant treatment gradually changed from that of fully edentulous to the partially edentulous cases.

With increasing demand, this has resulted in the process of unprecedented research and development in implantology culminating in rapid technological advances and paradigm changes in implant design, materials and components as well as relative ease of the delivery of treatment across all its stages: the patient assessment and treatment planning, implant placement and integration phase, the restorative treatment and the maintenance phases **(2)**.

Although implant dentistry has evolved to become an important part of clinical practice, unfortunately the coverage of this subject both in the undergraduate and postgraduate curriculum has been rather slowing, unstructured and certainly limited. Lack of recognized academic standards and training pathways has generated obstacles for the majority of the busy dentist practitioners who want to offer implant treatment in their practices. In this review the literature will make an overview on dental implant types, indications and contraindications.

What is dental implant?

A dental implant is a surgical component that interfaces with the bone of the jaw or skull to support a dental prosthesis such as a crown, bridge, denture, facial prosthesis or to act as an orthodontic anchor. The basis for modern dental implants is a biologic process called osseointegration, in which materials such as titanium form an intimate bond to bone. The implant fixture is first placed so that it is likely to osseointegrate, and then a dental prosthetic is added. A variable amount of healing time is required for osseointegration before either the dental prosthetic (a tooth, bridge or denture) is attached to the implant, or an abutment is placed which will hold a dental prosthetic**(3)**.

Success or failure of implants depends on the health of the person receiving the treatment, drugs which affect the chances of osseointegration, and the health of the tissues in the mouth. The amount of stress that will be put on the implant and fixture during normal function is also evaluated. Planning the position and number of implants is play an important role to the long-term health of the prosthetic since biomechanical forces created during chewing can be significant.

The position of implants is determined by the position and angle of adjacent teeth, by lab simulations or by using computed tomography with CAD/CAM simulations and surgical guides

Received: 20/12/2017 DOI: 10.12816/0045293
Accepted: 30/12/2017

called stents. The prerequisites for the long-term success of osseointegrated dental implants are healthy bone and gingiva. Since both can atrophy after tooth extraction, pre-prosthetic procedures such as sinus lifts or gingival grafts are sometimes required to recreate ideal bone and gingiva[(4)] .

The final prosthetic can be either fixed, where a person cannot remove the denture or teeth from their mouth, or removable, where they can remove the prosthetic. In each case, an abutment is attached to the implant fixture. Where the prosthetic is fixed, the crown, bridge or denture is fixed to the abutment either with lag screws or with dental cement. Where the prosthetic is removable, a corresponding adapter is placed in the prosthetic so that the two pieces can be secured together.

The risks and complications related to implant therapy are divided into those that occur during surgery (such as excessive bleeding or nerve injury), those that occur in the first six months (such as infection and failure to osseointegrate) and those that occur long-term (such as peri-implantitis and mechanical failures). In the presence of healthy tissues, a well-integrated implant with appropriate biomechanical loads can have 5-year plus survival rates from 93 to 98 percent and 10 to 15-year lifespans for the prosthetic teeth. Long-term studies show a 16- to 20-year success (implants surviving without complications or revisions) between 52% and 76%, with complications occurring up to 48% of the time [(5)].

Components of implant

1-Fixture or implant: an implant provides the anchor or foundation for a restoration. It is screwed into the bone of the jaw providing a fixed platform on which an abutment can be screwed. Bone tissue can grow around the implant regenerating and strengthening the jaw reducing the bone loss which occurs when natural teeth are lost.

It is made from titanium for biocompatibility with the body [(6)].

2-Abutment: an abutment provides support for the crown .It is also the interface between the crown and the implant. Rotation (twist) is controlled by lugs shaped on the abutments stem. These lugs restrict the abutments rotational placement to set incremental steps. Different manufactures use different systems with more or less adjustment. It has screw that links it to the fixture. It is made from titanium.

3-Crown: crowns are the top part of a restoration and are the part that we see in the mouth. They replicate the original teeth to provide a biting surface and aesthetic appearance. They are hand made by the technician. The supporting substructure for the crown may be handmade or machined (onsite or offsite). The completed crown is either cemented or screwed onto an abutment. It is made from Porcelains (metal supported or metal free) or metal (normally gold) [(6)].

Advantages of dental implant

1-Better aesthetics: dental implants are the best dental procedures available in the market if aesthetics is considered .Dental implants give you natural tooth-like appearance due to its feature of being embedded into the alveolar bone like a natural tooth which has roots for the same purpose for aesthetics reasons. Dental implants can be used in place of anterior central incisors and also for strength can be used in the posterior region of molars because of their property of sustaining sufficient forces seen in the posterior region of the mouth [(7)].

2-Better strength: dental implants are known to have the best strength of all dental prosthesis available at the moment. Due to this superior property, dental implant can be used in the anterior region as well as the posterior region.

3-Preservation of the alveolar bone: By placing dental implant, we will be preserving the alveolar bone as we insert an implant into the bone. With the help of osseointegration, the implant becomes part of the alveolar bone and prevents the disintegration of bone and loss of alveolar arch height [(7)].

4-Best stability, support and retention: stability, support and retention are the 3 mechanical aspects which decide the success of the dental prosthesis, better support helps in maintaining the implant in position to horizontal forces in the oral cavity, better stability prevents the harmful effects of the vertical forces during chewing and better retention is due to the fact that the implant becomes a part of the alveolar bone with the help of osseointegration[(8)].

5-Best prosthesis for long duration: in young adults who have lost their tooth or teeth due to any reason, dental implants are the best prosthesis to replace your missing teeth. Due to its aesthetics, longevity and strength, it is the best suited prosthesis in young adults as they have good alveolar bone support.

Disadvantages of dental implants

With every artificial prosthesis, there are ought to be some disadvantages along with its advantages which is where the expertise of the dentist comes in.

1-Costier than other prosthesis: dental implants are costlier than any other dental prosthesis in use. The cost is high due to many reasons and the better quality and aesthetics it provides, but the price is always a matter of thought for every patient [(9)].

2-Complex clinical procedure: dental implant placement is a complex procedure compared to either bridges or fixed partial dentures, these are technique sensitive procedures which require proper skill in diagnosis and deciding the treatment plan, the treatment requires multiple visits [(9)].

3-Contraindicated in medically compromised patients: medically compromised patients like uncontrolled diabetes, uncontrolled hypertension, various cardiovascular diseases ,respiratory diseases ,etc. are a strict contraindication of dental implant prosthesis, and in the end it is up to the dentist to decide whether to undergo the procedure or not.

4-Anatomical limitations: dental implants placement require proper alveolar bone height to support the implant prosthesis, in old age the lack of bone support is a major hurdle in the dental implant procedure.

5-prolonged procedure time: the procedure time for dental implant is very long because there are many steps in the procedure and after the placement of the implant in the bone ,we have to waite 15-30 days for proper osseointegration to occur which is a must for the success of dental implant in the long run. These steps make it very prolonged procedure which is a disadvantage compared to other techniques.

6-Patient compliance: in any dental treatment procedure, patient compliance plays a major rule in the prognosis of treatment done. It holds the same for dental implant as well. With better patient compliance, the success rate of the dental implant increases. The patient should attend the appointed dates regularly, maintain good oral hygiene, smoking cigarettes is a contraindication during implant placement. The patient has to follow this to get better prognosis [(9)].

Classification of Implants

Dental implants are classified into four categories:

A - Depending on the placement of the tissues
B-Depending on surface texture and crossection
C - Depending on the materials used
D- Depending on their reaction with bone
E- Depending on the treatment options[(10)]

A - Depending on the placement of the tissues:

1- Endosteal dental implant: there are three types of Endosteal implant. There is the blade implant where thin plates are embedded into the jawbone, Ramus frame implant where a horse shoe-shaped device is inserted into the mandible and root form implant that takes on the shape of a normal tooth. The root form implant is the most common of the three, and the implant is positioned in such a manner that it offers directional load distribution **[(11)].**

A-Root form: root form implants are the most common type of implant used to today. Basically, a root form implant is used to replace the root of a missing tooth, and you then get an abutment and a crown over the implant, so it looks like every other tooth in your mouth. Root form implants are made of titanium and are 100% biocompatible with your body. They are the gold standard to replace missing teeth. Root form dental implants have different shapes:

* **Screw or Thread type Implants**

Uses threads primary stabilization. For the placement of the Threaded Implant the osteotomy, the site is tapped or threaded with a former thread bur, to create the threads on the wall of the osteotomy site.

*** Cylindrical or Press fit type Implants:**

Uses friction for primary stabilization. The placement of a cylindrical implant depends on the friction between the Implant surface and the bone. Thus no tapping is required [(12)].

* **Tapered Implants**

Resemble a tooth root, design for both threaded and press fit type implant, initially design for immediate placement into extraction socket [(12)].

B-Blade(plate) form

Blade implants can be used in any alveolar crest, but are particularly useful in the thinnest, where the use of root-form implants is difficult and needs bone regeneration procedures. When the ridge is thin, tricortical anchorage is the most suitable technique. In a study [(13)],this is the implant that is stabilized by press-fit in both the internal and external bone cortex, as well as the deep cortex.

C-Ramus frame dental implant: in which a horse show frame if fixed with the ramus and the loaded.

2-Subperiosteal implant:

This is a type of implant where the artificial tooth is placed beneath the periosteum that overlies the cortex. Here the jaw bone is not necessarily drilled. Much of the support is provided by the gums and how the implant lies on the bony cortex ,it may be unilateral, complete or circumferential**.**[14]

3-Transosteal implant:

This type of implant can, also, be referred to as staple bone implant, mandibular staple implant or transmandibular implant. This type of implant is a combination of both the Endosteal components and those of subperiosteal. The implant penetrates the two cortical plates. It can be staple, single pin or multiple pins [15]**.**

4-Intramucosal dental implants

As the name hints, this type of implant is inserted directly into the oral mucosa. In this case, the mucosa is used as the site for attachment and the metal inserts, usually made from titanium.

5-Fibrointergration implants

This type of implant is a product of recommendations by Dr. CharlseWiess. In this type of implant, the implanted tooth is completely encapsulated by the soft tissue in the mouth.

B-Depending on texture and crossection:

1-Cylindrical dental implants:

The dental implants available come in different shapes, and cylindrical is one of them. The coating and surface condition is what will determine whether or not to use cylindrical dental implants as the coating and the surface provide bonding and microscopic retention with the bone. The cylindrical implant can be conical, straight or tapered and is tapped or pushed into the bone site that has been prepared.

2-Threaded dental Implants

When you look at the surface of the implants, you will see threads. This is where the name of this implant roots from. The main purpose of the threaded surface is to increase the implant's surface area hence providing a more solid contact with the jawbone. The threads result in the implant being in contact and subjected to force over a greater bone volume [16].

3-Vented dental implants

This type of implant is a cylinder that has been coated with hydroxy apatite. They have a vertical groove that connects to the apical veins. This facilitates seating, and the bone growth into the groove prevents rotation[17]**.**

4-Hollow dental implants

The hollow dental implants have a hollow design in their apical portion. There are perforations on the implant's sides that have been arranged systematically. The perforations are meant to increase the anchoring surface and prevent the implant from twisting and moving[18].

5-Smooth, machined, textured and coated surface implants

The smooth surface implants have a smooth surface. Machined surface implants are those whose surfaces have been machined for better anchorage. Textured surface implants have a rough surface for increased surface area, and the coated surface implants are those whose surfaces have been covered by a porous coating, usually titanium or hydroxy apatite[19].

C - Depending on the materials used:

1-Metallic dental implants

These are implants that are made of metal. The most common metallic dental implants today are those made of titanium. However, stainless steel, Vitallium and an alloy of cobalt chromium molybdenum can be used[20].

2-Ceramic dental implants

The ceramics can either be coated or sprayed on the surface of the implant to produce a surface that is bio active. You can also find non-reactive ceramic material[21].

3-Polymeric dental implants

These implants are in the form of polytetrafluoroethylene and polymethylmethacrylate. These have, however, only been used along with implants made from other material as adjuncts stress distribution and not used solely by themselves[22]**.**

4-Carbon implants

These are implants made of a mixture of carbon and stainless steel. They have the same elasticity as the jawbone but are brittle and can fracture much easily as compared to implants made from other material[23].

D- Depending on their reaction with a bone

Based on the ability of the implant to stimulate bone formation, implants can be classified into:

1-Bioactive implants

Surface modifications of titanium dental implants have been studied and applied to improve biological surface properties, which favors the mechanism of osseointegration. Machined implant

surfaces, representing the starting point of implant surface design, were used for decades according to the classic protocols in which several months were essential to achieving osseointegration [(24)].

Consequently, topographic and chemical surface modifications replaced machined surfaces to a great extent in clinical application .Various methods have been developed to increase the surface roughness of dental implants, including blasting with ceramic particles/acid etching, titanium plasma spraying, electrochemical anodization, and calcium phosphate coatings [(25)].

2-Bio-inert implants

The term bioinert refers to any material that once placed in the human body has minimal interaction with its surrounding tissue; examples of these are stainless steel, titanium, alumina, partially stabilized zirconia, and ultra-high molecular weight polyethylene. A fibrous capsule might form around bioinert implants hence its functionality relies on tissue integration through the implant [(26)].

E- Depending on the treatment options:

Misch reported five prosthetic options of implants, of the five the first three, are fixed prosthesis that may be partial or complete replacements, which in turn may be cemented or screw retained. The fixed prosthesis is classified based on the amount of hard and soft tissue structures that are to be replaced. The remaining two are removable prosthesis that is classified based on the support derived [(27)].

FP- 1: Fixed prosthesis; replaces only the crown; looks like a natural tooth.

FP- 2: Fixed prosthesis; replaces the crown and a portion of the root; crown contour appears normal in the occlusal half but is elongated or hyper contoured in the gingival half.

FP- 3: Fixed prosthesis; replaces missing crowns and gingival color and portion of the edentulous site; prosthesis most often uses denture teeth and acrylic gingival, but may be made of porcelain, or metal.

RP-4: Removable prosthesis; overdenture supported completely by the implant.

RP-5: Removable prosthesis; overdenture supported by both soft tissue and implant[(27)].

Pre-surgical Considerations for successful dental implant

***Available bone**

Available bone is that portion of a partially or edentulous alveolar ridge that can be used to insert an endosteal implant. The available bone has three dimensions: Length, width, and depth. Length is the mesiodistal dimension, width is the buccolingual dimension, and depth is measured from the crest of the ridge to the nearest limiting landmark[(28)].

***Available bone length or mesiodistal dimension of the edentulous space:**

Depending on the tooth being replaced, adequate mesiodistal space must be present to provide a restoration that simulates natural tooth contours. It indicates the number of implants that can be accommodated; however, this has to be correlated with the buccolingual width of the bone, diagnostic wax-up of the proposed location, and angulation of the adjacent tooth roots. If inadequate prosthetic space exists, it must be created through enameloplasty of adjacent teeth or orthodontic repositioning [(29)].

* **Spacing requirements**

The following guidelines should be used when selecting implant size and evaluating mesiodistal space for implant placement:

- The implant should be at least 1.5 mm away from the adjacent teeth.
- The implant should be at least 3 mm away from an adjacent implant.
- A wider diameter implant should be selected for molar teeth because of the high occlusal loads[(30)].

Spacing is required to provide the following:

- To allow for 1.5 mm of crestal bone interproximally, this, in turn, will allow for proper development of a healthy papilla.
- To develop proper contacts and the contours of the restoration.
- To allow for an adequate width of soft tissue between implants and adjacent teeth.
- For the prosthetic components not to impact on each other.
- For the effective cleaning of the prosthesis by the patient.
- To develop harmonious occlusion.
- To allow for at least 1 mm space from the implant to the adjacent root.

Considering the above guidelines, a 4 mm regular platform implant will require a 7 mm mesiodistal space between the adjacent teeth at

the coronal region. If an implant is placed too close to the adjacent teeth, compromised contours and unnecessary loss of hard and soft tissue adjacent to the implant will result. Placing the restoration too far from the adjacent tooth also results in unfavorable contours and development of cantilever type forces on the restoration [(30)].

***Available buccolingual bone width:**

The available bone width is measured from the facial cortical plate to the lingual cortical plate at the crest of the prospective implant site. The minimum available bone width should be such that >1 mm of bone should be present on either side of the implant faciolingually to keep the soft tissue levels stable.This is critical on the facial side since any bone resorption, and ensuing change in the position of the gingival margin will be nonesthetic

Considering the above guideline, in an ideal situation the implant diameter chosen should be at least 3 mm less than the available mesiodistal dimension of the bone and 3 mm narrower than the buccolingual dimension of bone[(28-30)].

***Assessment of the available bone width**

The width of the available bone cannot be quantified on intraoral radiographs because they are two dimensional and has to be determined clinically.

Ridge mapping

Ridge mapping is a procedure that allows the implant surgeon to determine the thickness or width of the alveolar bone. In this technique, a needle with an endodontic stopper or a specially designed caliper is penetrated through the soft tissue in the area under evaluation for implants. The soft tissue thickness at the ridge crest, at two points vertically down on the buccal and the lingual areas, is measured. The edentulous area of the diagnostic cast is sectioned perpendicular to the ridge. The tissue thickness is then mapped out on the sectioned diagnostic cast using a pencil. This gives an idea of approximate ridge width as well as a rough estimation of the ridge contour. Even though it gives a better picture of the ridge profile than visual assessment, it is still prone to error [(24)].

Crown Height Space:

Crown height space is considered as the key vertical parameter in treatment planning for the implant restorations. The crown height space is the distance from the occlusal plane to the crest of the alveolar ridge in the posterior region and from the incisal edge of the arch in question in the anterior region. This will influence the type of prosthesis, material choices, and surgical technique that will be used.

This factor is often overlooked until the prosthetic phase. A satisfactory restorative outcome is obtained only if adequate crown height space is available. To provide sufficient room for the prosthetic components, adequate space should be present between the edentulous ridge and the opposing dentition. Ideally, for cement-retained prosthesis 8-12 mm crown height space is needed, measuring from the soft tissue of the edentulous ridge to the occlusal plane at the middle of the implant receptor site.

The ideal vertical dimensions of each region are 3 mm for the soft tissue, 5 mm for the abutment height, and 2 mm for the occlusal metal or porcelain. The screw-retained restorations require lesser crown height space compared to the cement-retained prosthesis since it can screw directly onto the implant body. The consequences of inadequate crown height space include a decrease in abutment height, inadequate bulk of restorative material for strength and esthetics, and poor hygiene conditions[(25)].

If there is inadequate crown height space, the use of metal occlusal surface may be required which may be a least esthetic option. However, when heavy occlusal forces are expected, the metal may be the preferred choice of restoration.

When the available space is inadequate due to over-eruption of the opposing teeth, depending on the extent of available space minimal enameloplasty, orthodontic intervention, elective endodontic, crown lengthening, and crown in the opposing quadrant may be indicated.

Excessive crown height space acts as a vertical cantilever when any lateral or cantilevered load is applied and, therefore, is a force magnifier. As a result, it can increase mechanical complications related to implant prosthesis**.**[(25)]

***Periodontal health**

The periodontal examination includes assessment of both soft and hard supporting tissues of the dentition. An assessment of soft tissue should determine the thickness of the fibrous connective tissue, amount of attached keratinized tissue, and symmetry of gingival scallop.

The tissue biotypes are classified according to how thick or thin the supporting bone and gingival soft tissues are defined. Thick and fibrous tissue is much more forgiving, easier to manipulate, and

provides a more predictable aesthetic outcome, as compared to thin tissue, which is more likely to shrink. Thick and fibrous gingival biotype is considered more resistant to recession and results in more predictable and stable outcome, as opposed to a thin biotype. A thin biotype with a highly scalloped gingival architecture has a reduced soft tissue thickness when compared with a thick biotype featuring blunted contours of the papillae[(26)] .

An adequate collar of keratinized tissue provides a healthy emergence suitable to resist trauma from mastication and allows for more convenient prosthetic procedures and oral hygiene measures.

If periodontal disease is present the attachment level, mucogingival problems and furcation involvement that may alter the prognosis of the remaining teeth need to be assessed. It is crucial to measure the probing depth as well as the level of crystal bone. Kois classified a high crest when the crestal bone level is close to the cementoenamel junction (CEJ), the normal crest is defined as 2 mm from the CEJ, and the low crest is present in patients with the recession[(27)].

***Restorative and Endodontic Status**

A sound dental status must exist before implant placement so as not to risk future implant sites. Existing pathological changes, restorations, and root canal treatment need to be evaluated to determine the long-term prognosis of the tooth [(27)].

.

Indications of dental implant

1-To improve masticatory function. Because teeth perform keys roles in mastication of food, their absence often causes a compromise in chewing function and may also indirectly affect nutritional status by influencing food choices.

2-To improve speech function. The presence of teeth and alveolar structures is critical in the production of certain speech sounds. Their absence can affect speech intelligibility (how an individual can communicate through speech) [(38)].

3-To improve aesthetics [(27)].

4-To regain lost teeth. Loss of a body part (e.g., a tooth) may be associated with a deep-seated desire to replace what is missing, irrespective of the role played by the anatomical part.

5-To avoid tooth preparation and possible sequelae. Removal of tooth structure, the inevitable exposure of cut tooth surface to bacteria in saliva, and other procedures involved in attaching bridge retainers to teeth are associated with a risk of pulp necrosis and the need for either extraction or endodontic treatment.

The 7-mini implant used as an orthodontic anchor. Dental implants are well suited to use as orthodontic anchors because they do not move through the alveolus when subjected to low-level prolonged (orthodontic) forces.

The prosthodontics advantage lies in the ability to use a provisional restoration on an implant as a guide to orthodontic alignment and ultimately to replace the provisional restoration with a definitive one.

Contraindications of dental implant:

There are certain medical **contraindications** to implant therapy, as complications that may arise can be serious or even fatal in certain conditions. Contraindications may be classified into three categories:

- **Absolute** contraindications: dental implants cannot be considered;
- **Relative** contraindications: dental implants may be considered only after a specific problem has been solved;
- **Local** contraindications: dental implants may be considered by taking extra precautions regarding problems involving the mouth or jaws[(28)].

Absolute contraindications

*Recent myocardial infarction
*Valvular prosthesis
*Severe renal disorder
*Uncontrolled diabetes
*Uncontrolled hypertension
*Generalized osteoporosis
*Chronic severe alcoholism
*Radiotherapy in progress
*Heavy smoking (20 cigs. a day) [(29)]

Relative contraindications

The major relative contraindications of implants are the insufficient size of the receiving alveolar bone. Because its recovery is possible. Through bone augmentation techniques, we can obtain predictable results.

The conditions which determine contraindications can impact the longevity of dental implants if specific measures are not enforced. Most relative contraindications are only valid during the period the body is decompensated. After bringing down the parameters to an acceptable level, the implants are inserted. These cases require monitoring programs which involve strict hygiene and constant visits to the dentist for prophylactic sessions[(30)] :

Local Contraindications

1-Lesions in the mouth (dermatosis)

Solutions

- Treat the lesions before the procedure;
- Use strict asepsis during surgery.

2-Poor oral hygiene or tooth infection near the site of the implant ex-failure endodontic treatment.

Solutions

- Treating the infection before the procedure;
- Improving oral hygiene habits before the procedure.

3-Malocclusion

Solutions

- Undergo an orthodontic treatment before the installation of the implant.

4- Unfavorable position of the lower alveolar nerve and other anatomical structures of the mandible

Solutions

- Take extra precautions before inserting an implant in the mandible (use of 3D x-rays and other measurement tools);
- Finding an alternative to conventional dental implants.

5- Insufficient gum quality and quantity (e.g., gingival recession or other periodontal disease)

Solutions

- Performing a gum graft (healing time varies from a few days to several weeks);
- Treating the periodontal or gingival disease to stabilize it or eradicate it;
- Finding an alternative to conventional dental implants.

6-Bruxism

S*olutions*

- Wearing a device to prevent damage to the teeth and implants during the night;
- Finding an alternative to conventional dental implants.

7-Unfavorable maxillary sinus anatomy

Solutions

- Evaluating the position and anatomy of the maxillary sinuses and taking extra precautions when inserting implants in the upper jaw;
- Performing a sinus lift;
- Finding an alternative to conventional dental implants in the upper jaw.

8-Insufficient alveolar bone density or volume

Solutions

- Performing a bone graft or sinus lift before the procedure (healing time varies from a few weeks to a few months);
- Finding an alternative to conventional dental implants

CONCLUSION

A dental implant is a surgical component that interfaces with the bone of the jaw or skull to support a dental prosthesis such as a crown, bridge, denture, facial prosthesis or to act as an orthodontic anchor.Success or failure of implants depends on the health of the person receiving the treatment, drugs which affect the chances of osseointegration, and the health of the tissues in the mouth. The amount of stress that will be put on the implant and fixture during normal function is also evaluated.

ACKNOWLEDGMENT

To Associate professor Dr. Nasser H. Shaheen

REFERENCES

1-Zarb GA(1983): The edentulous milieu. J. Prosthet. Dent., 49: 825-831.

2- Berge Ti and Grønningsaeter A (2000): Survival of single crystal sapphire implants supporting mandibular overdentures. Clin. Oral Implants Res., 11:154-162.

3- John v , Chen s and Parashos p (2007): Implant or the natural tooth – a contemporary treatment planning dilemma. Aust. Dent, J., 52: 138-150.

4- Papaspyridakos P,Mokti M , Chen C J, Benic G I ,Gallucci G O and Chronopoulos V (2013) : Implant and prosthodontic survival rates with implant fixed Complete Dental Prostheses in the Edentulous Mandible after at Least 5 Years: A Systematic Review . Clinical Implant. Dentistry and Related Research, 16: 705–717.

5- Bozini T, Petridis H, Garefis K and Garefis P(2011) :A meta-analysis of prosthodontics complication rates of implant-supported fixed dental prostheses in edentulous patients after an observation period of at least five years. The International Journal of Oral and Maxillofacial Iimplants,26: 304–318.

6- Pye AD, lockhart DEA, Dawson MP, Murray CA and Smith AJ (2009): A review on dental implant and infection.The journal of hospital infection,72:104-110.

7- Fribeg B ,Ekestubbe A ,Mellstrome D and Senerby L (2001): Branemark implant and osteoprosis ,Aclinical exploratory study.Clinical implant. Dent. Res., 3:50-56.

8-**Molly l (2006**): Bone density and primary stability in implant therapy. Clin. Oral Implants Res., 17 : 124-135**.**

9- Goodacre CJ ,Bernal G, Rungcharassaeng K and Kan JYK (2003): Clinical complications with implants and implant prostheses. J. Prosthet. Dent., 90:121-132.

10- Yeshwante B ,patil S , Baig N , Gaikwad S ,Swami A and Doiphode M (2015): Dental implants, classification, success and failure: an overview. IOSR-JDMS., 14:1-8.

11- Linkow LI (1986): The blade vent: a new dimension in endosseous implantology. Dent. Concepts,11:3-12.

12-Schmid MR, Schiel HJ and Lambrecht JT (2002): Torque of endosseous dental screw type implants**.** Schweiz Monatsschr Zahnmed, 112 : 804-813.

13-Viscido AJ (1974): Submerged functional predictive endosteal blade implants. Oral Implanto.,5: 195-209.

14- Weber S (1979): The complete bilateral subperiosteal implant.The Universal Oral Implantol., 8:345-349.

15- Hayward JR (1980): The literature on Staple/Transosteal Implants. P. Schnitman and L. Shulman (eds.) . London.pp:124-126.

16-Lavelle C , Wedgwood D and Love WB(1981): Some advances in endosseous implants. J. Oral Rehab., 8:319-331.

17- Babbush CA (1976): Endosteal blade-vent implants. Quintessence Int. Dent. Dig., 7:9-15.

18- Babbush CA (1986) : Reconstructive implant surgery and implant prosthodontics. Dent. Clin. North Am., 30(1):133-149.

19-Skalak R (1983): Biomechanical considerations in Osseointegrated prostheses. J. Prosthet. Dent., 49(2):843-848.

20- Piliero SJ, Schnitman PA, Pentel L and Dennison TA (1973): Histopathology of oral endosteal metallic implants in dogs. J. Dent. Res., 52(3):1117-1127.

21-Krempien B , Griss P , Heimke G, Andrian-Werburg H V, Hartung J H , Reipa S and Lauterback JH (1974): Remodelling dynamics of cortical bone under the influence of ceramic implants in sheep. Acta Orthop. Belg., 40(1):624-638.

22-Hodosh M, Povar M and Shklar G (1969): The polymer dental implant concept. J. Prosthet. Dent., 22(1):371-380.

23-Grenoble DE and Kim RL (1976): Progress in the evaluation of a vitreous carbon endosteal implant. Arizona State Dent. J., 19(2):12-19.

24- Albrektsson T and Wennerberg A (2004): Oral implant surfaces: part I. review focusing on topographic and chemical properties of different surfaces and in vivo responses to them. Int. J. Prosthodont.,17(5):536–543.

25-Guehennec LL, Soueidan A, Layrolle P and Amouriq Y (2007): Surface treatments of titanium dental implants for rapid osseointegration. Dental Materials, 23(3): 844-854.

26-Sul YT, Johansson C, Byon E and Albrektsson T (2005): The bone response of oxidized bioactive and non bioactive titanium implants .Biomaterials, 26(1): 6720-6730.

27- Misch CE (1991): Prosthodontic options in implant dentistry. Int. J. Oral Implantol., 7(1):17-21.

28- Schincaglia GP and Nowzari H (2001): Surgical treatment planning for the single unit implant in the esthetic area. Periodontol.,27(1):162–182.

29- Teughels W, Merheb J and Quirynen M (2009): Critical horizontal dimensions of interproximal and buccal bone around implants for optimal aesthetic outcomes: a systematic review. Clinical Oral Implants Research, 20(5): 134-145.

30-Mijiritsky E, Mazor Z and Lorean A, (2013): Implant diameter and length influence on survival: Interim results during the first 2 years of function of implants by a single manufacturer. Implant. Dent. , 22(1):394-398.