



DENTAL IMPLANTS : THE CLINICAL ASPECTS

Dental Sciences

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ABSTRACT

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 aim of this article is to briefly review the literature available on dental implants and its clinical considerations.

KEYWORDS

Implants, Abutment, Tissue biotype

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. [1]

Components of implant

Fixture or implant: It provides 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. It is usually made up of titanium. [2]

Abutment: It provides support for the crown. It is also the interface between the crown and the implant.

Crown: It is the 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 completed crown is either cemented or screwed onto an abutment. [3]

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. [4]
- 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. [4]
- 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 [5].
- 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:

- 1-Costlier than other prosthesis:** dental implants are costlier than 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 [6].
- 2-Complex clinical procedure:** these are technique sensitive procedures which require proper skill in diagnosis and deciding the treatment plan, the treatment requires multiple visits.
- 3-Contraindicated in medically compromised patients:** uncontrolled diabetes, uncontrolled hypertension, various cardiovascular diseases ,respiratory diseases ,etc. are 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 wait for 4 to 6 weeks for proper osseointegration to occur which is a must for the success of dental implant in the long run.
- 6-Patient compliance:** 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 [6].

Pre-surgical Considerations for successful dental implant

1. 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 [7].

2. 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 [8].

3. Spacing requirements

- 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 [8].

Spacing is required to provide the following:

- a. To allow for 1.5 mm of crestal bone interproximally, this, in turn, will allow for proper development of a healthy papilla.
- b. To develop proper contacts and the contours of the restoration.
- c. To allow for an adequate width of soft tissue between implants and adjacent teeth.
- d. For the prosthetic components not to impact on each other.
- e. For the effective cleaning of the prosthesis by the patient.
- f. To develop harmonious occlusion.
- g. To allow for at least 1 mm space from the implant to the adjacent root. [9].

4. 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

5. 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.

6. Gingival Biotype

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 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 [11]. 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 cemento-enamel junction (CEJ), the normal crest is defined as 2 mm from the CEJ, and the low crest is present in patients with the recession.

7. 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.

CONCLUSION

Dental Implants could be a very good treatment option in replacing missing teeth of patients but all the above mentioned clinical factors should always been taken in consideration to ensure success and better clinical outcome of the procedure.

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