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Review Article

A literature review on dental implants

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ABSTRACT

In a daily routine practice dental implants has been widely used and dental implants are considered as one of the good treatment option in replacing the single tooth in the oral cavity or replacing the multiple teeth in the oral cavity. With the use of dental implants, a dentist can replace the single tooth or multiple teeth or with the help of dental implants one can provide the whole full arch implant supported prosthesis. The survival rate of the implants are dependent on so many conditions, like patient systemic condition, bone quality and amount of bone available, sterilization protocol during the placement of the implant. In some cases failing of implant were also seen due to systemic condition, due to mechanical failure such as loosening of the implant, loosening of the screw. So a dentist should have a basic knowledge of the implant along with its all components, causes of implant failures and how to avoid the causes of implant failure as well as how to manage.

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1. Introduction

Dental implants are considered to be an important contribution towards the dentistry as it provides various as well as promising treatment modality for the replacement of single tooth or for the replacement of multiple teeth or for the replacement of whole arch. The one of the most important thing on which the success of the dental implant depends is the osseointegration of the dental implant with the alveolar bone as well as with the surrounding tissue. Now the process of osseointegration depends on various conditions like systemic condition of the patient, quality of the bone, amount of bone available for the placement of the implant, material of which implant is fabricated, whether the

implant surface is treated for better osseointegration or not, the loading protocols for the implant prosthesis, whether the implant prosthesis is loaded immediately or delayed or conventional, whether the implant prosthesis loaded is in function or in non function, these factors also determine the process of osseointegration of the implant prosthesis with the surrounding alveolar bone.¹

The peri implant soft tissue surround the implant as it surrounds the natural teeth. The peri implant soft tissue consists of mucosa which is soft and hard bony tissue. It also consists of junctional epithelium which is attached to the surface of the implant or to the surface of the abutment with the help of attachments from hemi desmosomes. For any implant prosthesis to be successful in the treatment required good close contact between the implant and the alveolar bone which is known as osseointegration and is defined as

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a direct structural and functional connection between the living alveolar bone and the surface of the load carrying implant. Under the process of direct microscopy, the well osseointegrated dental implant reveals direct apposition of the alveolar bone over the implant surface. There are various factors that play an important role in the osseointegration of the dental implant, for e.g. if the bone quality is poor, there will be high chances for the failure of the implant prosthesis as compared if the bone quality of the underlying bone is good.²

Now the dental implant can be placed by two different methods, one is the one stage protocol and the second one is the two stage protocol. In one stage protocol, which is also known as the non submerged method. In the method the incision is given over the edentulous site, the flaps are raised to get the accessibility for the alveolar bone, after the bone is visible clearly with the naked eyes, preparation of the osteotomy started up to the desired level in accordance to the amount of bone available and in accordance to the length of the implant, the osteotomy is prepared according to the above mentioned points, now the implant is placed in the prepared osteotomy, the implant is tightened to the desired torque. In one stage protocol the coronal part of the implant is kept above the crest of the alveolar bone, coming out from the surrounding soft tissue and during the period of healing stage it is exposed to the outer oral environment. In one stage implant placement protocol, the prosthesis can be attached immediately (Immediate loading of the implant) or the prosthesis can be loaded over the implant in the conventional manner.²⁻⁴

Advantages of the single stage surgery protocol:

1. No need for second stage surgical procedure (second stage surgical protocol is avoided)
2. There will be less crestal bone resorption.
3. Less chair time is needed in the prosthetic part, as there is no 2nd stage is required.
4. All three types of protocols can be implemented in single stage surgical procedure, like immediately loading of the prosthesis can be done, conventional loading of the prosthesis can be done and delayed loading of the prosthesis can also be done in single stage surgical protocol.

Second type of surgical protocol is known as the submerged technique of implant placement. In second stage surgical protocol implant is placed in the osteotomy prepared, implant is placed below the crestal bone level and a cover screw is tighten over the implant placed in the alveolar bone and then the raised flap is sutured for at least 8 to 10 weeks depending on the type of the alveolar bone and depending over the amount of the alveolar bone. After 8 to 10 weeks the second stage surgical procedure is carried out, incision is given over the implant placed earlier, the flap is raised, cover screw is removed after than healing cap is placed over

the implant for a week after than impression is done and the final prosthesis is cemented over the implant.^{5,6}

Some of the factors that affects the osseointegration of the dental implant are as follows:

Bone quality as well as quantity of the alveolar bone, if the quality of the bone is not good like if the alveolar bone is of D4 type, than the osseointegration between the dental implant and the alveolar bone should not be of satisfactory, and there will be more chances of less survival rate of the implant placed in the D4 bone type as compared to the other types of bone i.e. D1, D2 or D3, and if the quantity of the alveolar bone is not abundant, means if the alveolar bone is not having abundant height and width, there will be less survival rate of the implant. To increase the survival rate of the implant, the outer surface of the implant is treated to create the surface roughness to achieve the better osseointegration of the dental implant with the surrounding alveolar bone. Bio compatibility of the material of great use in achieving the osseointegration of the dental implant, like now a days implants are fabricated from pure titanium material and shows best biocompatibility with the alveolar bone and its surrounding.^{7,8} Implant stability, primary implant stability is very much required for the good prognosis of treatment, if the primary stability of the implant is good, than the osseointegration between the implant and the residual alveolar bone is also good. It should also be noted that generation of the heat during the placement of the implant also affects the surrounding alveolar bone and inversely affects the osseointegration between the alveolar bone and the implant. If the heat generated is more during the surgical protocol, there are chances of bone necrosis that will ultimately leads to failure of the implant, so during implant placement this is very much required to be taken care of using copious amount of saline during the surgery to avoid the heat generation.^{9,10}

1.1. Types of dental implants

1. One piece dental implant
2. Two piece dental implant

1.2. One piece dental implant

In one piece dental implant, the implant and the abutment is formed as a single unit. In One piece dental implant, it provides advantage of no loosening of screw joint, as it is fabricated from only one piece. One piece implant also provides the advantage of no micro motion movement between the abutment and the implant because it is of only one piece. One piece implants are most commonly used when only narrow implants are indicated for e.g. in the region of the maxillary lateral incisor. One piece implants are used only with one stage surgical procedure or protocol.⁹⁻¹¹

1.3. Two piece dental implant

Now a days most commonly used types of implants are two piece dental implants, that are having two piece i.e. one is the implant and on to which the abutment is attached. This is the most commonly used types of dental implant systems now a days.¹² This system has a disadvantage of screw loosening as well as fracturing of the screw. Apart this, two piece implants are most commonly used in now a days as they come in different diameters with different length, they can be used in anterior region as well as posterior region of the oral cavity.¹³

1.4. Cementation procedure

Cementation of the crown can be done by two different methods, one is the cement retained crowns and the other one is the screw retained crowns. In cement retained crowns, the abutment is tightened with the help of torque ratchet (torque giving device) after than the abutment is blocked to avoid the cement to go inside the abutment and it will block the abutment permanently. After than the permanent luting cement of choice is mixed and the crown is cemented with the cement over the abutment.^{14,15} Excess of cement is removed and it is cross checked with the rvg. The second protocol is screw retained prosthesis, in which the crown is tightened to the abutment with the help of the screw after than the abutment is blocked and a restoration is given over the open access area of the crown, to make it esthetically more acceptable.

2. Conclusion

Dental implants are the most common in thing now a days, and are the most promising treatment modality in the replacement of the missing teeth. Dental implants are used to replace the single tooth as well as multiple tooth in the arch or the full arch. One should have an adequate knowledge regarding the implants and regarding the case selection after thorough history taking, history related to medical problem, and have proper diagnostic radiographic imaging before the placement of the dental implant to avoid any further complication to the patient.

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None.

4. Conflict of Interest

None.

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