



A LITERATURE REVIEW ON VARIOUS RISK FACTORS ASSOCIATED WITH FAILURES OF IMPLANTS IN DENTISTRY.

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Abstract : -

An implant is a prosthetic device, which is made up of an alloplastic material and is considered as the prime alternative in the replacement of the missing teeth. Dental implants are implanted in to the alveolar bone, beneath the periosteal layer, and provide support to the fixed dental prosthesis. Implants are found to be the best replacement option for the totally edentulous patient as well as to the partially edentulous patient, as implant prevent the bone loss. Dental implants are found to be the closet analogue to the natural as well as to the healthy tooth. Placing the dental implant is a very technique sensitive procedure. The primary reasons to consider the dental implant as a prime treatment modality in the replacement of the missing tooth or teeth is , it helps in maintaining the level of the alveolar bone. Implant failures in clinical implant dentistry occurs either due to poor selection of the patient, due to improper treatment planning, due to poor surgical execution.

Keywords: Implants, implant failures, osseointegration, peri implantitis.

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Introduction : -

One of the most common technique, which is used as a restorative manner in the replacement of the missing single tooth in the partially edentulous span or in the replacement of the full arch in the completely edentulous arch is the dental implant . Dental implants are found to be the strongest device available for the replacement of the missing tooth or the teeth. The success of the dental implant is totally dependent over the successful osseointegration of the dental implant. Implants are the inert and alloplastic material , which is most commonly made up of titanium or alloys of titanium or vitalinium. Depending on the placement of the dental implant in to the alveolar bone, they are classified as epiosteal dental implants, endosteal dental implant, transosteal dental implant. Placement of the implant in to the alveolar bone is under two surgical protocols, i.e. single stage surgery and the second one is two stage surgical protocol. In single stage surgical protocol, after the placement of the implant in the alveolar bone, healing collar is placed over the implant, which remains out side in the oral cavity, and in two stage protocol, after the placement of the implant , cover screw in attached over the implant and the flaps are approximated closely to avoid the contact of the implant with the outer environment.

Although there is advancement in the materials of the implants, advancement in the implant design and advancement in the techniques, still failure of the implant is of significant concern to both, dentist as well as to the patient also.

Oral implants has been introduced in to the dentistry by Branemark in 1960`s . Dental implants has been considered as effective prosthetic oral rehabilitation option in terms of function, in terms of mastication, in terms of speech and also in terms of esthetics. A stable , long lasting and firm connection is provided and dependent on the process of osseointegration, between the implant and the surrounding alveolar bone, which is much necessary for the survival of the dental implant prosthesis. And in case if the osseointegration between the implant and the surrounding alveolar bone is not achieved, it will lead to failure of the dental implant prosthesis in terms of stability .

Diagnostic criteria for the evaluation of the failure of the implant : -

Signs of infection like pain in the region of the placement of the implant, inflammation at the implant site, radiographic signs of infection

around the implant, which includes development of sinus or fistulas in the later stages, and may lead to osteomyelitis . Biologically increase in the clinical probing depth around the implant, bleeding on probing around the implant can be seen, bone loss around the implant which lead to mobility of the implant, and the microbiota mainly consisting of gram negative anaerobic microorganisms around the implant. Signs of early infection are more critical as compared to later stage, because early infection may cause disturbance in the osseointegration phase , which may lead to failure in the primary stability of the implant . Different types of mobility movements can be noticed around the implant like rotational mobility of the implant , lateral or horizontal mobility of the implant, axial mobility in the vertical direction. Hence mobility is found to be the clinical sign of the implant failure. Radio graphically implant failure can be diagnosed by the presence of radiolucency around the implant , which revealed that, there is absence of direct contact between the implant and the bone, increased in marginal bone loss around the implant. Dull sound on percussion over the implant, along with increased in the angular bone loss, long standing infection near or around the implant results in the sloughing of the adjacent soft tissue.

Risk factors for failure of dental implant : -**Diabetes : -**

It is a chronic metabolic disease that causes hyperglycemia. The patient who is suffering from diabetes experiences more bone loss as compared to the normal individual, increased chances of periodontitis as compared to the normal individual, patient also suffers with the complication of delayed healing of the wound along with decreased host response against the infections. According to some studies success rate of the implants between the diabetic and the non diabetic patients are equivalent to each other . The success depends on the good hyperglycemic control , maintenance of good oral hygiene.

Patient suffering from HIV :-

Immune system is totally impaired by the infection of the HIV, infection particularly impairs the functioning of the CD⁴⁺ T-cells, leading to resistance of the host against various pathogens. There found increase risk of complication in oral surgical procedure and the HIV infection, that ultimately adversely affects the long term survival of the implant. According to lemos et al investigated survival of dental implant in hiv infected patients and revealed that,

success rate and mean survival rate was reported to be 93.81% and 94.76%. They also concluded average marginal bone loss of 0.99 mm at the level of the implant and 0.83 mm at the level of the patient. Therefore it has been concluded that the patients who are having normal CD4+ count and are having controlled associating risk factors, can go for implanted supported fixed prosthesis rehabilitation procedure. According to Ata – Ali et al, stated that, no impact of HIV infection was found on the osseointegration of the dental implant.

Smoking :-

Smoking is the other contributing factor, that can have negative impact over the success rate of the implant. The impact of the smoking is dose related, and smoking is having a negative impact on peri implant bone loss and also on the osseointegration of the dental implant. Nicotine in the smoking contributes to the main pathogenesis of all the diseases and mainly mediates the hemodynamic effects of the smoking and also found to be the main component resulting to the addiction of the smoking. A person who smoke have higher incidence of poor periodontal health as compared to non smokers. More number of missing teeth can be found in smokers, along with more incidence of gingival recession and more chances of loss of soft tissue attachment are found in smoker patients as compared to non smoker patient. It has been found that, the process of bone healing is totally undermined by the process of the smoking. Smoking results in inhibiting the proliferation of the precursor cells, that are important and plays a major role in the in the bone remodeling and finally result in delay of the healing process of the bone.

The bone healing process can be hampered by the chemicals of cigarette i.e. by nicotine, aldehydes, benzenes, carbon monoxide, hydrogen cyanide. In a study done by bezerra et al stated that, implant retrieved from a smoker patient revealed presence of marginal bone loss, along with presence of fibrous tissue, and presence of gap is evaluated. Smoking also hinders the healing phase of the wound after implant placement.

Osteoporosis :-

Osteoporosis is found to be a common disease affecting the humans. Osteoporosis is characterized by low density of the bone tissue, which results in the reduction of the bone quality as well as quantity and ultimately hampers the process of the bone remodeling. Osteoporosis most commonly affects the female after the

menopause. Osteoporosis resulted in the reduced bone quality as well as bone quantity of the individual and also reduces the remineralization of the bone. Different studies revealed that implant placed in a patient, who is having osteoporosis, ultimately leads to failure of the implant.

Radiotherapy :-

In the radiated area of the bone in oral cavity, chances of failure of the implants are much greater, because of the reason that there is progressive fibrosis of the soft tissue along with the vessels, which results in reduced capacity of the bone to heal as well as there is reduced vascularity of the bone which totally hinders the process of bone remodeling and ultimately hinders the process of osseointegration which leads to the failure of the implant prosthesis.

Surgical site :-

A clean surgical site which is totally sterile plays an important role in the success of the dental implant prosthesis. Maintaining all the surgical protocols, by using all the sterile equipment's in the surgery to avoid contamination at the implant surgical site is very much helpful in the long term success of the dental implant. If no sterile environment were maintained during the time of implant placement, it may lead to infection at the surgical site and ultimately leads to the failure of the dental implant. Surgical factors include over heating of the alveolar bone during the process of preparation of the osteotomy. Heating of the alveolar bone more than the temperature of 47 degree Celsius results in the death of the cells of the bone, along with denaturation of the collagen, which hampers the process of osseointegration.

General health :-

General health of the patient plays an important role in the success of the dental implant prosthesis. In general health, evaluation of systemic diseases, that might hamper the prognosis of the implant treatment is done. if the patient is healthy and not having any systemic disease, the prognosis of the dental treatment is excellent as compared to the patient having systemic diseases like diabetes, osteoporosis. Systemic diseases have some adverse effects on the prognosis of the implant treatment, that too especially auto immune diseases and the chronic diseases of the oral cavity like lichen planus, sjorgrens syndrome, stomatitis, aphthous ulcers. Some patients having para functional habit like bruxism, in these patients there is continuous force acting on the implant prosthesis and results in high occlusal forces over the implant, leading to

fracture of the implant or crown and finally ends up in the failure of the implant.

Alveolar bone :-

Type of alveolar bone matters a lot. Alveolar bone has been classified in type I to type IV according to the amount of bone available in terms of bone width and bone height. Type I bone is highly mineralized bone and is desired for the placement of the implant. Type I bone is having adequate bone height and width, which is required for the placement of the implant. Type II bone is found to be the best bone for the process of osseointegration of the dental implants. It provides good anchorage which is best for primary stability of the dental implant. Type III and type IV are not advised for the implant placement, as it does not able to provide adequate anchorage for the primary stability of the dental implant.

Fracture of the implant :-

Fracture of the implant component due to high masticatory or occlusal forces ultimately leads to the failure of the implant prosthesis. Fracture of the component of the implant like abutment screw or fracture of the prosthesis over the implant can lead to the exposure of the implant to the outer environment and finally leads to the failure of the implant prosthesis.

Conclusion :-

Today's time, the use of implants is widespread and likely to increase over the next years, which suggests that dental professional will deal with implant failure and with the consequences which are associated with it. One must identify the cause to treat the current condition and gain knowledge for future therapies. To avoid the complications routine checkups of the patient should be done regularly and the patient is advised to maintain good peri implant health.

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