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DENTAL ABUTMENT LINKS AND ITS STRESSES: A REVIEW

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Abstract: The main function of this paper is to show importance of dental implant. In this paper include different links of abutments, it is also known as tier system of dental implant. Stresses which are the reason to diseases and failure related to dental implant. Whenever there is masticatory forces occur, it act initially directly on the neck of dental implant. There are different types of abutments which are used for fixation or linked of crown in dental implant. The main objective is to give alternative solution to minimize the failure the dental implant which happens due to infection, diseases which are occurring after implant. In dental clinic, the failure of dental implants due to diseases are frequently occur due to stresses which is happens by masticatory force. So analysis of abutment in dental implant is essential to provide solution.

Keywords: Dental implant, stresses, abutment connection

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INTRODUCTION

Dental implant is fabricated supporter which fill the space of real teeth. Dental implant fix where there are teeth is loss due age, accident, diseases, etc. It is surgically implanted into the bone.

There are various types of lengths and diameters used in implant fixtures. There are crown, abutment, abutment screw and implant which make completed to dental implant. An implant post or abutment and implant can be attached in a variety of designs. Dental implant fixed in jaw bone. The root is the part of the tooth that is effectively replaced by an implant. The abutment is fixed by an abutment screw in implant, which is mechanically screwed then crown is fixed in to the abutment.

Dental implant:-

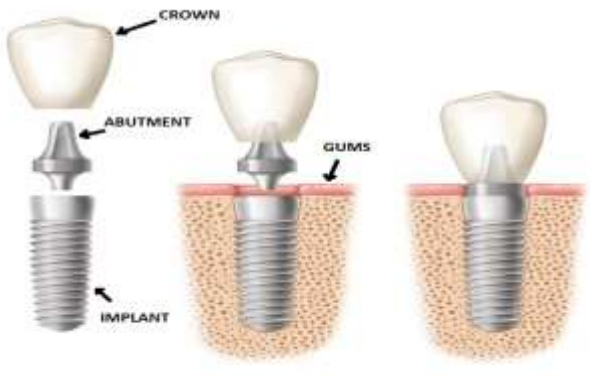
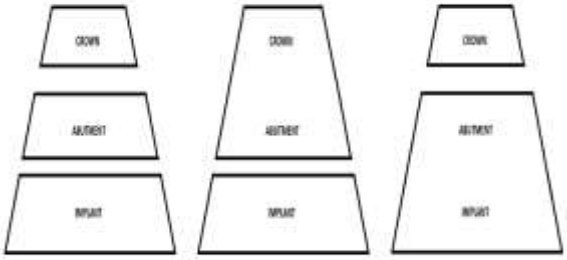


Fig 1.

In the bone, dental implant fixed surgically and the abutment screwd interally into implant which help to fix crown. After fixation of implant and abutment with the help cement crown placed on abutment. In this way dental implant placed which completed the need of real teeth. Figure shows the basic process of dental implant fixation.

Links of dental implant:-

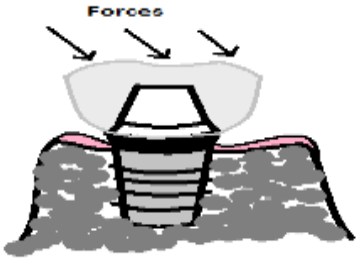


Three tier system Two tier system

Fig. 2

A dental implant with three tier system includes three individual parts like crown, abutment and implant. A dental implant with two tier systems includes two individual parts like crown and abutment form a single part and the implant is a separate part or opposite of that abutment and implant makes a single part and crown is individual in dental implant system. Figure shows in separate form about tier system of dental implant.

Stresses on dental implant:



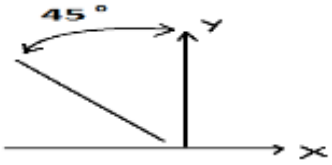


Fig. 3

Investigate the effect of abutment on stress distribution in the bone around an implant under stress, vertical load and combined load of vertical angle of 45°. The implant-abutment was fixed in bone and subjected to load of 200,500,1000N vertically and in angle of 45° of Masticatory force were used.

Problem Statement:-

Study the existing dental implant design and find out the failure due to the stress which occur due masticatory force in those design.

Optimization process:-

The crown is to be fixed directly to the implant by cement. The abutment provides the retention and support to dental implant body. Availability of a maximum number of parts or components of implant body is increases the dentist confusion at the selection process of parts. The method of classification of appropriate abutments for implant body is focused. The links or tier system for selection of dental implant is provided. This tier system is used for the understanding of the best available options of parts or components of implant for the treatment of patients.[1]

If micro gap is occur in the dental implant and bone after fixed it may cause the disease around dental implant. It is an initial stage of diseases and due to micro gap peri-implant hard and soft tissue leads to bone loss and implant failure. There is micro motion at the lower position of abutments. Internal hexagonal connection leads to produce stress of dental implant so it is increases the possibilities to be failure dental implant. The Edges in abutment is used to connect the abutment and implant. Over the abutment crown fixed. These abutment edges are used to fix in system and abutment classified into two types which are the conical type and internal hexagonal type of abutment. Micro gap leads to the infection of tissue due its damage gums and it may cause to the future failure of dental implant. Internal hexagonal connections helps to lock abutment to the implant and it increase the retention. Reduce the gap is increase the durability of implant.[2]

Stresses are generally occur at the neck of the implant as well as around the implant body. When the thickness is reduced, stresses are increase in external thread of dental implant. Masticatory force is found on implant. The stresses changes as different implant thicknesses increases of various diameters. An implant body system includes of an crown, abutment, abutment screw and implant.

The process of assembly is includes screwing the implant in the bone. First implant fixed into the bone then abutment placed into implant. After that crown is fixed on the abutment.[3]

Micro gap between abutment and implant can leads to problems such as peri-implantitis and fatigue failures. This study consist the value of microgap of external and internal connections. The abutment and implant is affected due to the masticatory force by means of chewing and

biting force. There is comparison between the abutment and implant and micro gaps for the two piece kind of abutments as external hexagon joints means external connection and as hexagon anti rotational device means internal connection. To find the level of stress at which the sample supported.

Cases of failure find due to the abutment screw loosening and later fracture. The internal connection had a smaller micro gap than the external connection. Gap leads to disease which may leads to implant fail.[4]

In different bone qualities with angled and straight abutments, comparison of stress distribution around an dental implant is investigate . In three dimensional finite element model with angled and straight abutment of the premaxilla region and 4mm, 3mm, 9mm, 10 mm dimensions of dental implant process were done.

For study an operation done with different bone qualities. A load which is known as static load is applied on each abutment as 178 N.

Around the dental implant values of Von Misses stress were found. If the angle of abutment change then distribution of stresses also changed. In the study found that Von Misses stress found more in straight kind of abutment if the bone quality has changed. In angled abutments high stresses induced.[5]

CONCLUSION:-

From the review of research paper it is concluded that proper implant design is needed to increase durability of implant. The combination of sharp thread and narrow cross section might be delete for fatigue resistance in dental implant. Solution for implant failure is need to find impeccable design of Dental Implant.

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