



Implant placement in anterior region and its esthetic consideration, a review of literature

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Abstract

Esthetics denotes "natural charm", an attribute that comes naturally. It can also be determined as a scientific term related to beauty that is used in nature and art. Imparting an implant restoration for esthetic outcomes in the anterior zone has been widely used. During the process of implant restoration, different tooth and patient-associated factors should be taken into account. This review aimed to provide a brief summary of all the esthetic considerations significant for the restoration of a dental implant.

Keywords: Implant; Smile design; Complication; Periodontium

1. Introduction

Esthetics denotes "natural charm", an attribute that comes naturally. It can also be determined as a scientific term related to beauty that is used in nature and art. Ever since dental implants have been utilized as a significant treatment alternative for displacement of one or multiple missing teeth, their outcomes have been considered effective both with regard to esthetic results and stability. In the anterior region, the favorable aesthetic outcomes of treatment are, for various people, as significant as the rate of implant survival. Different factors are responsible for these favorable outcomes and can be considerably evaluated. These comprise the individual's healing potential, the condition and extent of the existing hard and soft implant tissues, as well as the final and provisional restorations. Furthermore, aesthetic perception is also considered an important factor in achieving these favorable outcomes [1]. This article contributes to the increasing number of existing studies by inspecting various significant problems associated with the aesthetic features of maxillary anterior implants and their significant role in dentistry.

2. Optimal conditions for esthetic treatment results

The restoration of an esthetic implant is similar to that of a naturally existing tooth in all respects. [2] Both gingival and dental esthetics work together to produce a balanced smile. The physician must be familiar with all the parameters associated with gingival dimension, morphology, representation, color, and texture. The anticipation of esthetic outcomes for a dental implant restoration is influenced by different variables, such as:

2.1. Patient's smile line

In a mediocre smile, almost 75–100% of the interproximal gingiva and maxillary incisors are exposed. Considerable changes are posed by smile lines when preparing for implant restorations in the anterior region because the gingival tissues and the restoration are thoroughly displayed. Low smile lines do not cause critical changes because the interface of implant restoration will be concealed behind the lip. [3]

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2.2. Tooth position

The tooth requires assessment in all three planes of space prior to extraction: faciolingual, mesiodistal, and apicocoronal. In the case of a periodontally hopeless tooth located apically or exquisitely that is removed, the terminal edge of gingiva is expected to migrate unconventionally. [4] A tooth located excessively distantly facially generally leads to the generation of very thin labial bone. A tooth located slightly lingually would benefit from the existence of an elevated number of facial bones [5].

2.3. The shape of the tooth and periodontium biotype

Periodontal biotypes are parameters used to determine the morphological characteristics of the osseous architecture and interdental gingiva. These are: 1) thick, flat periodontium 2) a thin scalloped periodontium. [6] The thick biotype is an ideal feature that will beneficially influence the esthetic results of a dental implant—aiding restoration—because it is highly resistant to surgical and mechanical degradation, not much susceptible to recession, and has greater prosthetic manipulation volume.

The morphology of teeth also seems to be associated with the quality of soft tissue. [7] The triangular shape of the tooth corresponds to a thin and scalloped periodontium. The area of contact is situated in the coronal third part of the crown, underneath a thin and long papilla. The flat and thick periodontium combines with the quadrilateral anatomic crown structure. The area of contact is situated at the medial third, bearing a wide and short papilla. Lack of interdental tissue in the occurrence of a trilateral tooth shape will show a broader black trigonal structure than in a case where a quadrilateral tooth is present.

2.4. The bone anatomy at the implant site

For good outcomes of esthetic implant restoration, the bone anatomy should have a three-dimensional configuration that allows placement of a dental implant in a curatively good position. Two anatomic frameworks are significant in establishing the predictability of periodontal soft tissues after the placement of implants. One is the thickness and height of the facial bone wall, while the other is the bone height associated with the coronal part of the alveolar process in the interdental areas. [8]

2.5. Thickness and length of the facial bone wall

A survey was conducted by Kois et al. [9] and categorized individuals as having low, medium, or high crests. This was established on the perpendicular space of the periodontal osseous crest towards the free marginal gingiva. The greater the proximity between the free marginal gingiva and the osseous crest, the higher the possibility of tissue damage after a surgical procedure [9].

3. Discussion

This review is intended to briefly acknowledge the recent esthetic considerations for implant placement in the anterior region. The secondary aim of this review is to contribute to the expanding body of current literature by inspecting several significant matters associated with the esthetic aspects of implant placement.

Surgical consideration of implant placement in the anterior region

3.1. Preparation and execution

Tooth loss is caused by different factors, such as gingival recession, and has a profound effect on an individual's life. [10-12] Hence, the placement of an implant in the anterior region is regarded as a complex, significant, and advanced technique and needs extensive preoperative preparations and accurate surgical execution subjected to a restoration-driven perspective. [13]

3.1.1. The selection of patients

It is significant in achieving esthetic dental treatment outcomes. During esthetic therapy for high-risk individuals, an extensive risk evaluation (including smoking, medical conditions, periodontal susceptibility, and others) must be undertaken with caution. [13]

3.1.2. Implant selection

The size and type of implant must be in accordance with the planned restoration and the site anatomy. Unsuitable selection of the implant shoulder and body dimensions can lead to soft or hard tissue disorders, including an exposed metal collar at the junction of the implant shoulder. To prevail over this, the platform shifting method has been established to generate or protect the inter-implant tissues and prevent an unappealing metal display. Although tissues in our body are continuously generated, platform shifting can protect hard and soft tissue and may also generate good mechanical, esthetic, and biological outcomes. [14,15]

3.2. Esthetic considerations of implant crowns on anterior teeth

Different proportions are used in aesthetic dentistry, such as the "red" and golden proportions. [16-1] Furhauser et al. introduced the pink aesthetic score, which helps to evaluate the soft tissue esthetics in the region of implant placement [20]. This attempt was supervised by Belser et al., who established the white aesthetic tool that indicates the esthetic outcomes with respect to the implant crown quality [21]. These assessment techniques have been used by scientists who want to report and assess the esthetic results of implant restoration in the anterior zone in a more thoughtful manner. These techniques are also useful in assessing the implant crown quality.[22]

Connecting the dental implant to the distal end of the tooth to decrease the number of implants needed to obtain optimal support in the anterior region. To achieve a solid bond, three-unit porcelain-fused-to-metal dental implant-supported prostheses made of zirconia polycrystalline are used [23,24].

3.3. Risks of implant placement and osteonecrosis

Dental implants are useful for individuals with tooth loss due to their high survival rate. Regardless of good survivability, complications due to peri-implant disorders are persistent. Peri-implantitis is considered an irreversible, progressive tissue disorder in the region of implant placement and is often accompanied by decreased osseointegration, bone reabsorption, increased pocket formation, and purulence [6, 8]. Furthermore, exaggerated deep implant insertion may result in bone loss and BOP. Furthermore, type and shape of the implant, connection type, superstructure material of the implant, and implant abutment can also lead to tissue damage.

4. Conclusion

Implant restoration in the esthetic region is a complex and demanding dental therapy because of the exigency to acquire a maximum esthetic outcome. According to current literature, surgical and esthetic considerations are significant for dental implant restoration. Although osteonecrosis and peri-implantitis may dictate the success of a dental implant,

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest between any of the authors.

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