



RESEARCH ARTICLE

SMILE REHABILITATION IN ANTERIOR AESTHETIC ZONE USING BASAL IMPLANT

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Abstract

Aesthetics are one of the primary goals of restorative care. Teeth that are traumatized in the anterior maxilla usually avulse or require extraction due to fractures. Rehabilitation is challenging in such a therapeutic state since it presents several anatomical and aesthetic issues. There are circumstances in which traditional implant placement is problematic. There must be enough bone for implant placement to be uneventful and successful. Other surgical therapies may be necessary in addition to implant placement for certain operations, such as extensive grafting, direct or indirect sinus lifts, and nerve lateralization. Certain procedures are required for these operations but are not always achievable. Because single-piece basal implants provide immediate temporization and loading while receiving adequate anchoring from the basal cortical bone, they have been extensively used to rehabilitate resorbed ridges. This case report demonstrates the placement of the basal implant in the anterior zone.

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Introduction:-

Anterior maxilla continues to present with height risk for aesthetic failure, and as a result there is a clear need for modifications that would allow for natural looking restorations that are harmonious with the rest of the mouth. In ancient times, treatment for missing teeth relied on Removable partial dentures or fixed partial dentures. However, the field of dentistry underwent a transformative shift with the advent of dental implants. Despite challenges and complications, dental implants have emerged as a preferred treatment choice. These implants are prosthetic devices made of alloplastic material, placed within oral tissues or bones to support fixed or removable dental prostheses.

The anterior maxilla is important in aesthetics and function and is particularly significant when considering dental trauma and its long-term effects. Consequently, any trauma or damage to this region can have profound psychological and social implications, impacting self-esteem and confidence(1). With excellent long-term outcomes, implant-supported prostheses are now routinely used to rehabilitate partly or completely edentulous patients. The implant must be positioned correctly for the best functional and aesthetic outcomes, which may require sufficient alveolar bone and surrounding soft tissue. When this is deficient due to atrophy (range of remaining bone approximately 3-4 mm), consequences of periodontal disease, traumas, or congenital deformities, bone-grafting procedures, guided bone regeneration, and alveolar bone expansion are all possibilities to restore additional bone volume and keratinized mucosa. However, there are certain circumstances in which this bone grafting is not recommended(2).

Dr. Jean-Marc Julliet was the first one to use single-piece implants in 1972. Dr. Gerard Scortecchi was the first to develop a single-piece implant system named "Diskimplants." Later, Dr. Stefan Idhe pioneered the development of basal osseointegrated implants (BOIs). Basal implants use the basal bone as an anchorage, which is less prone to resorption and infection as compared to the cortical bone utilized by conventional implants. In addition, conventional implants may require additional surgical procedure for augmentation, resulting in increased cost and duration of treatment (3). Although basal implant-supported prosthesis has been well documented in the literature for ridge resorption and complete arch edentulous cases, studies on the use of basal implants in esthetic areas are lacking (4). This case report describes a clinical scenario of the rehabilitation of missing teeth in the anterior maxilla using basal implants with immediate rehabilitation in a young patient undergoing orthodontic treatment.

Case Presentation

A 19-year-old female patient presented to the Department of Periodontology with a chief complaint of missing anterior teeth in the 21 region and expressed a desire to have them replaced. The patient disclosed a history of ongoing orthodontic treatment and loss of the tooth 3 years back due to trauma. The patient expressed urgency in replacing the missing tooth. Intraoral examination revealed the absence of teeth in the 21 region. Various treatment options were discussed with the patient. There was a vertical and horizontal ridge defect at the affected site. A radiographic examination with cone beam computed tomography (CBCT) and clinical examination were performed, and the results are depicted in Figure 1, Figure 2, Figure 3.

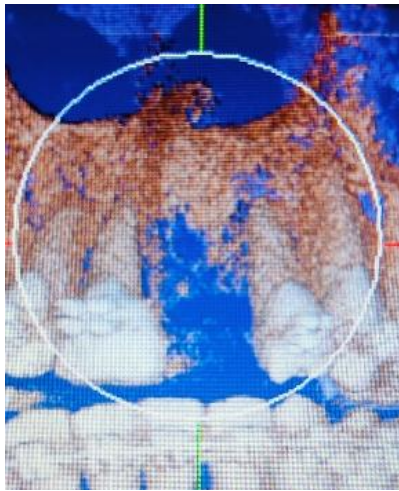


Figure 1:- CBCT of 21 region.

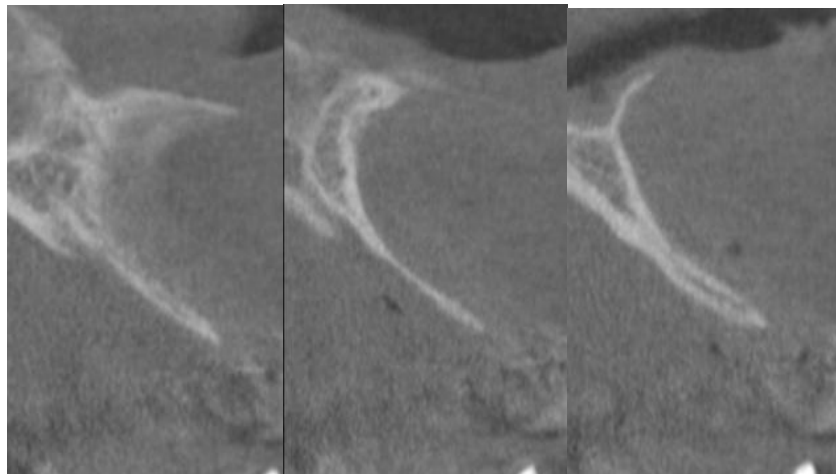


Figure 2:- CBCT sections with respect to 21.



Figure 3:- CBCT showing thin residual bone and minimal basal bone.

Upon evaluation of the CBCT, it was noted that the buccolingual width in the 21 region was approximately 1.38 mm. the apico coronal length of bone in the area was 5 mm. Conventional endosteal implants typically require a minimum bone width of 5 mm, leaving 1 mm of bone around the implant post-placement. The option of an autogenous chin graft was considered; however, due to the patient's immediate need for tooth replacement, both possibilities were ruled out. With the patient's consent, it was decided to place two- single-piece basal implant in the 21 th region with bicortical engagement so that the load is distributed between two implants engaging more basal bone rather than single implant. Pre-surgically the orthodontic wire was removed so as to avoid hinderance with surgical procedure and give ease of instrumentation. Under all aseptic precautions and infraorbital nerve block, local anesthesia was administered in the 21region.,careful flap reflection was done with an objective of coronally advancing the flap to improve aesthetic outcome Figure-5, Twobicortical screw (BCS) 3.6 x 21 mm basal implant was placed, and an angle correction was performed as necessary at the time of placement and flap was sutured at the desired position as shown in Figure-6,Figure-7 depicts basal implant in the 21 region. An immediate post operative OPG was taken(Figure-8)

Surgical photographs-



Figure 4:- Pre-operative clinical photograph..



Figure 5:- Flap reflection for coronal advancement of flap.

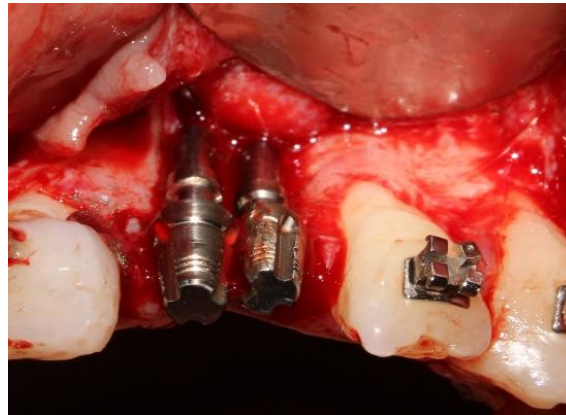


Figure 6:- Two basal implants placed and angulated in position to make a single abutment.



Figure 7:- Abutment modified.



Figure 8:- Immediate post operative OPG.



Figure 9:- Prosthesis delivery within 72 hours and replacement of orthodontic bracket and wire (Smile rehabilitation).



Figure 10:- Smile rehabilitation of patient. (Three month follow up).

After adequate modification of the abutment portion of the implant. The orthodontic brackets were removed from the adjacent teeth , immediately final impression was made using an addition silicon light body and putty. A metal-ceramic crown was fabricated for implantation in the 21region, Within 72 hours, ensuring proper fit and aesthetics. Type 1 luting glass ionomer cement was used for cementation. The orthodontic wire was reattached so as to avoid malalignment of the remaining teeth (undergoing orthodontic treatment). The patient was provided with post-insertion care instructions and a follow-up program. At three-month follow-up appointment, the prosthesis was satisfactory in terms of aesthetics, patient acceptability, and gingival margin position. Figure -9, Figure -10 shows final prosthesis.

Discussion:-

The single-piece basal implants used in this case presented few advantages over conventional implants as they required no bone augmentation, thereby avoiding additional surgical procedure, reducing treatment cost and duration, and facilitating immediate loading using a temporary restoration. However, the use of conventional implant systems could have resulted in even more esthetically pleasing restorations with a better emergence profile and eliminated the need for gingival porcelain using components, such as a gingival former and/or angulated abutments as required. Basal cortical implants are available as single-piece implants. Thus, they eliminate microgaps between the abutment and implant [3]. They gain bone anchorage with the apical blade-like threads achieving greater primary stability than conventional implants. Immediate/early placement of single-piece basal implants following extraction or avulsion of teeth in the anterior esthetic zone provides a scope for immediate loading, thereby maintaining the patient's esthetics using fixed temporary prostheses. Adequately stabilized single-piece implants can be successfully loaded out of occlusion at the time of implant placement and definitively loaded in occlusion three months later without adversely affecting the function or esthetics [4]. Prithivraj et al. suggested that most surgeons preferred immediately loading singlepiece implants [5]. Lazarov et al. reported a cumulative survival rate of 97.5% after four years for basal implants, and they also concluded that the immediate functional loading concept with cortically anchored implants for completely edentulous arches, segments, and single-tooth replacement can be a viable concept even in cases where extractions of teeth were done simultaneously [6]. One-piece implants proved to be useful for tooth replacement in the posterior region and esthetic zone and also demonstrated long-term results of up to 10 years, proving that preserving the crestal bone level and biological width for periodontal stability can be realized [7]. Fadia et al. in their clinical study reported marked improvements in patients' overall satisfaction and specific satisfaction with comfort, esthetics, mastication, and speech [8]. The design of basal implants to achieve cortical bone anchorage indicates their use in challenging clinical scenarios, including rehabilitation of atrophic ridges. Basal implants can play a vital role in the rehabilitation of patients, where compromised quality and/or quantity of bones is present [9]. The literature reports that the use of basal implants has been successful in peculiar clinical conditions, including single-tooth replacement in a patient with hyperdense lesions [10], full-mouth rehabilitation of a patient with cleidocranial dysplasia [11], rehabilitation of a patient who underwent marginal mandibulectomy following oral squamous cell carcinoma [12], and rehabilitation of a patient with gunshot wounds in the mandible [13]. The case reported in this article also involves a clinical scenario of rehabilitating a patient with tooth loss following a trauma to the maxilla due to a train accident with axial basal implants, taking into consideration the patient's affordability, minimal loss of the labial aspect of the crestal bone, and need for immediate temporization. During the five-year follow-up evaluation, there was no bleeding on the probing or probing pocket depth or any other signs of peri-implantitis, and the patient was satisfied with both the esthetics and function of the restoratio

Conclusion:-

In conclusion, the case report presented herein demonstrates the successful placement and rehabilitation of a missing anterior tooth utilizing basal implants in a patient with insufficient buccolingual bone breadth. Traditional implant placement techniques often pose challenges in cases of bone deficiency, trauma, or immediate need for restoration. However, with the advent of basal implants, such limitations are addressed effectively, providing immediate temporization and loading while ensuring adequate anchoring from the basal cortical bone. Despite being less documented in the anterior aesthetic zone, the efficacy of basal implants in such scenarios is highlighted in this report. The utilization of basal implants further enhances patient outcomes by reducing postoperative discomfort, bleeding, and surgical times. With advancements in implant dentistry focusing on immediate loading strategies and prosthetic-driven systems, basal implants offer a promising solution for cases where conventional methods may not suffice. Continued research and documentation are essential to further validate the success and longevity of basal implants in dental rehabilitation, particularly in challenging anatomical and aesthetic contexts.

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