

Development of emergence profile and soft tissue contour with a customised healing abutment at the time of implant placement: A case report.

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Abstract

An optimal implant restoration should restore the white as well as pink aesthetics of a tooth. The soft tissue contour should be maintained and restored during implant placement and its healing. There are various approaches to develop the soft tissue contour around implants that include the usage of healing abutments, temporary crowns and gingival formers. This case report describes a technique that allows chair side fabrication of customized healing abutments using acrylic denture tooth and composite resin. The customised abutment will maintain the gingival contour and will also load the implant immediately. The final prosthesis was fabricated with G-Cam (Graphene) discs and was layered with composite resin after three months of implant placement.

Key words: - Immediate loading, customised healing abutment, graphene.

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Introduction

A successful implant restoration is a combination of aesthetically pleasing prosthesis and adequately surrounding peri-implant soft tissue architecture. The natural tooth defines the shape of the surrounding soft tissues. The soft tissue contour collapses and changes upon removal of the tooth because of lack of support initially.^[1] Soon afterward, the healing process by biological cascade remodels the tissue and contours it. The soft tissue which covers the underlying bone also reduces gradually during the healing process. To create a dental implant-supported crown with a natural appearance, maintaining or reconstructing the original soft tissue contours is very essential. Various hard and soft tissue augmentation techniques have been described in the literature. In addition, an aptly fabricated interim crown or

healing abutment can add to the maintenance and preservation of the soft tissue contours in immediate implant placement and in healed sites.

There are various approaches to develop the soft tissue contour around implants that include the usage of healing abutments, temporary crowns and gingival formers.^[2] This case report describes a technique that allows chair side fabrication of customized healing abutments using acrylic denture tooth and composite resin. The use of rubber dam prevents unpolymerized composite resin material to be in direct contact with the surgical sight, reducing the introduction of contaminants into the wound, which might have negative biological effects. The major advantage of the proposed workflow is reduced number of appointments as it

eliminates the requirement for second stage surgery.

Case Report

A female patient, age 30 yrs reported to the department of Prosthodontics with a chief complain of decayed teeth in lower left back region of teeth since 3 years. Intraoral examination revealed superficial root stumps seen with 36 (Fig 1a). Radiographic examination revealed no evidence of periapical pathology (Fig 1b). The proposed treatment plan was immediate implant placement and loading with 36 along with customised healing abutment. Extraction was done with 36 under local anaesthesia and granulation tissue was removed (Fig 2a). Osteotomy was performed using successive drills of Bioline implant kit (Fig 2b) and an implant of 11.5 x 5mm (Bioline) dimensions was placed (Fig 2c). Abutment was tightened with rubber dam sheet beneath it (Fig 3a). Flowable composite was placed near the collar of the abutment to simulate the bony and soft tissue contour and replicate it in the healing abutment (Fig 3b). An Acrylic denture tooth was modified according to the dimensions of the future socket using the diagnostic cast and an access hole was prepared in the centre. The provisional crown was placed over the flowable composite and relined with acrylic to adjoin the abutment near the access hole (Fig 3c). Then the customised provisional crown was unscrewed and polished to enhance the emergence profile and gingival contour (Fig 4). This prosthesis will act as a customised healing abutment and will also function as a provisional crown loading the implant immediately. The provisional prosthesis was tightened and two sutures were placed (Fig 5a). The provisional prosthesis was fabricated to follow the concept of non-functional immediate loading,^[3] wherein it was placed out of occlusion with a clearance of 1-1.5mm from the opposing tooth (Fig 5b).

The provisional prosthesis was removed after three months post-operatively. An excellent buccal and lingual emergence profile along with a contoured gingival healing was obtained (Fig 7a,b&c). Closed tray impression coping was placed and impression was made with addition silicon impression material (Fig 8). Lab analog was tightened to the coping and impression was poured. The final prosthesis was fabricated with G-Cam (Graphene) discs and was layered with composite resin (Fig 9).

Discussion:

A satisfying and pleasing aesthetic result is a key element in modern implantology. Correct 3D implant positioning together with adequate quality and quantity of peri-implant hard and soft tissues are essential prerequisites for the aesthetic expectations of patients. Moreover, the emergence profile plays a key role in the achievement of a satisfying aesthetic result. Janakievski in 2007 stated that standard circular healing abutments are not able to create a natural profile and support peri-implant soft tissues.^[4] The absence of temporization, in the case of thick biotypes might cause difficult crown insertion. Ischemia can be caused due excessive compression and constitute a risk factor for future recession in such cases. To create an ideal soft tissue profile a personalized healing abutment may be useful for definitive crown sitting.^[5]

In 2015, Raj et al. incrementally added fluid composite to a standard healing abutment customize it.^[6] This conditioned the soft tissue profile in such a way that proper insertion and adaptation of the definitive crowns was possible without using temporary ones. In 2016, Alshhrani et al. personalized a healing abutment by novel digital procedures by means of a scanner, the CAD/CAM method and a virtual diagnostic wax-up.^[7] In 2016, Joda et al. individualized

the profile of the healing screws relying on the contra lateral teeth acquired from cone beam computed tomography CBCT images. The Digital Imagine and communication in medicine DICOM files of the CBCT scan were overlapped with the STL files of the intraoral digital impression after implant placement. The virtual segmentation of the digitally inverted tooth was transferred to CAD/CAM processing to obtain the customized healing abutment. No further conditioning was necessary and the obtained aesthetic result proved to be optimal.^[8]

The technique described in this case report consists of various steps that can be readily performed in a clinical set up without the need of laboratory assistance or any expensive armamentarium. The use of rubber dam will prevent any unpolymerised composite or acrylic to flow into the surgical site, preventing any contamination. The polished tissue surface of the prosthesis will help in creating an emergence profile similar to natural tooth and the resultant final prosthesis will have excellent gingival adaption.

Graphene is a newly material which has been recently adapted in dentistry. Graphene is an allotrope of carbon arranged in 2 dimensional honeycomb like structure. It is available in millable G – Cam disc which is a nano reinforced bipolymer of graphene.^[9] The crowns are milled from different chromatic disc that have an extremely natural aesthetic appearance. Graphene is incorporated into autopolymerising acrylic resin for use in dentistry. It can be used for fabrication of all types of prosthesis such as single crown, bridges, veneers and implant prosthesis. It has high abrasion resistance and tensile strength. Its flexible nature can act as shock absorber especially in implant prosthesis.^[10] The most beneficial quality of grapheme is its easy and simple repair with composite resin that can be even performed intra-orally.

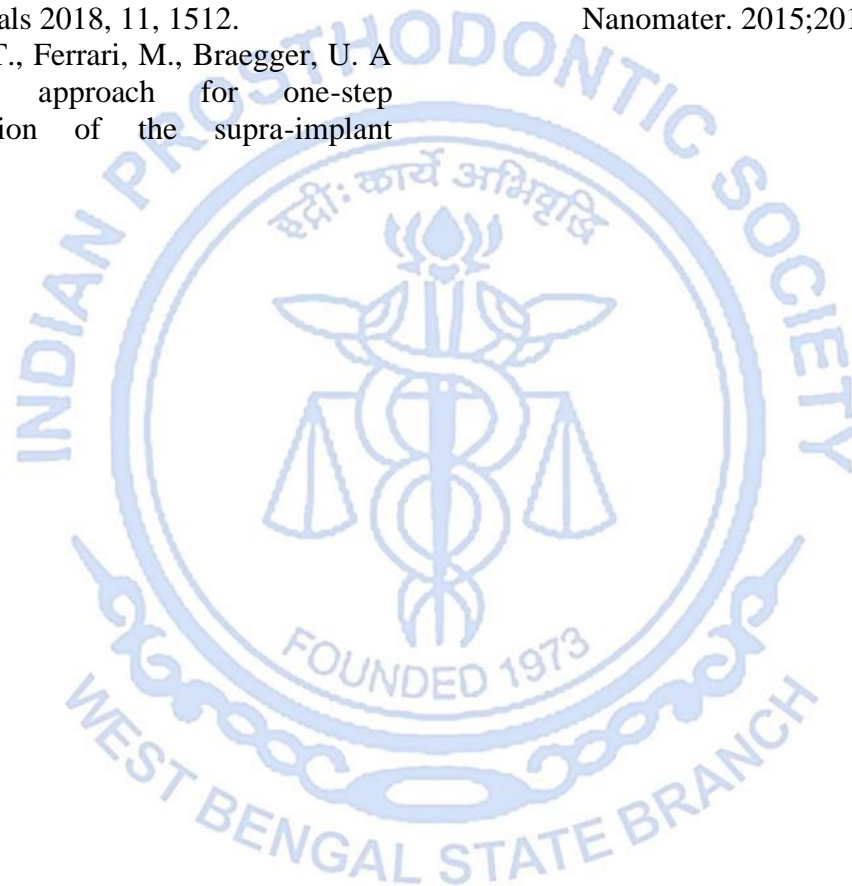
Conclusion:

Ideal soft tissue contours around dental implants allow for more natural appearance and function. Establishing these contours with a customized healing abutment guides augmentation procedures and subsequent soft tissue healing. Because the implant position and soft tissue contours are established at the time of surgery, customized impression copings can be used to acquire all information at that time. The definitive restoration can thus be delivered upon maturation of the hard and soft tissues. This workflow will reduce the number of patient visits required and will aid in enhancing pink esthetics of the implant prosthesis.

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FIGURES:



Fig 1a: Preoperative photograph showing root stumps with 36

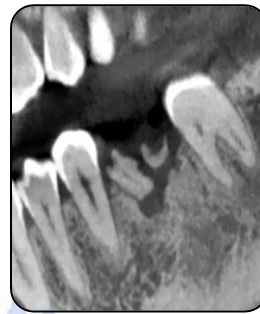


Fig 1b: Pre-operative CBCT



Fig 2a: Osteotomy preparation



Fig 2b & 2c: Implant placement



Fig 3a: Abutment tightened along with rubber dam



Fig 3b: Flowable composite applied



Fig 3c: Acrylic provisional crown placed



Fig 4: Customised Provisional Crown & healing abutment



Fig 5a: Provisional crown tightened and suture placed



Fig 5a: Non-functionally loaded provisional prosthesis



Fig 6: Post operative Radiograph



Fig 7a,b&c: Emergence profile and gingival contour obtained after 3 months



Fig 8a: Closed tray impression coping



Fig 8b: Impression made



Fig 9: Graphene Prosthesis

