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Prosthetic Rehabilitation Of Anterior Teeth With Smile Design - A Case Report.

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ABSTRACT-Prosthodontic rehabilitation not only involve rehabilitation of form and function but also the esthetics . This case report describes the prosthetic rehabilitation of maxillary and mandibular teeth using PFM crowns along with correction of some smile aspects. It also explains the components of smile design and its importance in esthetics. Though dentistry has evolved to more conservative and esthetically pleasing restorative materials , PFM still being the gold standard for many cases specially where strengthening of remaining tooth structure is involved and where discoloration of tooth cannot be corrected by other method.PFM being less cost effective still hold position in esthetic dentistry, where indicated.

KEYWORDS- Anterior teeth, PFM crowns, Esthetics, Smile design.

I. INTRODUCTION

Esthetic problems with anterior teeth are a major concern now days. Apart from developmental and congenital abnormalities, carious lesion can also lead to noticeable disfigurement in ones smile.Restoration of these defects is important not only because of esthetic and functional concerns but also because of the psychological impact this improvement effects. The appearance of a disfigured smile negatively affects the psychoemotional development of children, increasing their problems with social relation [2].Modern dentistry has moved beyond simply being concerned with teeth and gums, requiring clinicians to integrate the smile with the "frame" of the overall face .The smile disharmony that in many cases is associated with the asymmetry and/or disproportionality among the teeth, periodontal and orofacial structures is the main reasons why patients seeking for clinical procedures in esthetic dentistry. To promote a desirable esthetic outcome, a pleasing smile involves, besides restorative material placement, the multidisciplinary among areas of dentistry, such as the gingival tissues. Gingival exposure higher than 3 mm may compromise facial harmony and the relationship between white esthetics (teeth) and pink esthetics (gingiva) . Therefore, a multidisciplinary approach is essential for an accurate esthetic diagnosis and to attain an adequate treatment plan in order to achieve satisfactory results and restore oral health pragmatically and conservatively [1]. For many years, the most predictable and durable aesthetic restoration of anterior teeth has been achieved with full-coverage PFM crowns. Even though cutting of the tooth substance is more and metal display is concern, porcelain fused metal restoration has many advantages related to recovering esthetics of the grossly carious and discolored teeth which requires reinforcement along with esthetics. They demonstrate excellent clinical performance in terms of strength, longevity, and biocompatibility and most importantly affordable to most patients.This case report aimed to present a multidisciplinary approach with an integrated treatment related to functional, aesthetic and conservative restorative procedures.

II. CASE REPORT

A, 24 year old female patient reported to the department of prosthodontics with the complaint of poor appearance of her anterior teeth. The main intention of the patient was to rehabilitate her smile with esthetics and function, regardless of the restorative technique to be employed. A thorough examination and investigation was done to evaluate the clinical situation of the patient. [Fig. 2,3]

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Fig.1 Preoperative extraoral view showing carious teeth with malalignment and gummy smile.

On clinical examination, in maxillary arch both central and lateral incisors were carious. Central incisors were tipped palatally and lateral incisors tipped labially [Fig.2]. Patient also shows gummy smile with disharmony in gingival zenith.In mandibular arch incisor root stumps and carious canine were present.

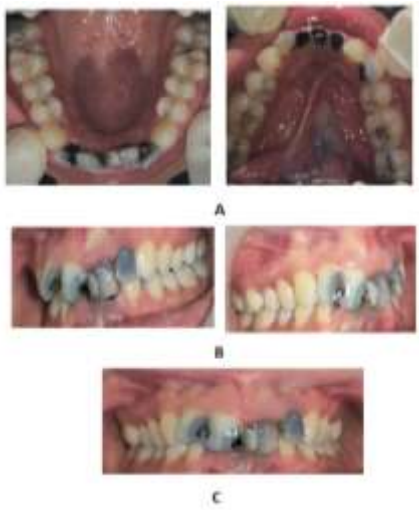

Fig.2 Preoperative intraoral view showing the carious lesions, deep bite, malalignment and position of gingival zenith.

On occlusion, class 1 molar relationship with deep bite and overjet of only 0.5mm was present.On radiographic examination, 21 and 22 were root canal treated and periapical radiolucency seen irt 22.

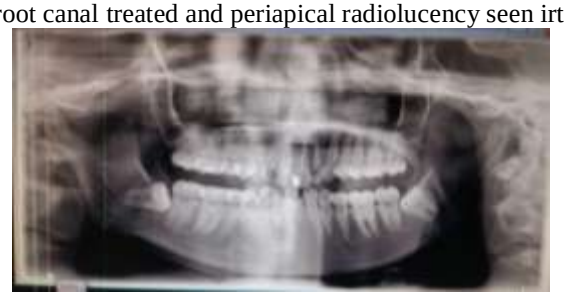

Fig. 3 Preoperative OPG radiograph

International Journal Dental and Medical Sciences Research
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After complete examination, treatment planning was done keeping in mind the esthetic requirement of the patient and also the socioeconomic status of the patient.

Restorative procedure strategy:- In an esthetic restorative treatment plan, the restorative procedure alternatives always should be explained to the patient, including the differences in costs, the levels of tooth structure removal, the expected clinical longevity, the time period necessary to conclude the treatment, and the possible esthetic result. Based on these factors, the patient and the dentist then will decide what the best treatment to be selected is. Root canal treatment was performed for 11 ,12 and 22 and the mandibular root stumps were extracted and allowed for healing of extracted site. Crown lengthening and gingival zenith correction surgical procedure planned followed by porcelain fused metal crowns for maxillary arch. For mandibular arch PFM bridge planned using both canines as abutment. Shade selection was done before performing any prosthetic procedure both in day light and LED light source verified by patient as well as the attender.

Fig.4 OPG radiograph after preprosthetic procedures completed.

A B

Fig.5 Position of gingival zenith before and after periodontal surgical procedure using mock wax up as guide.

Fig.6 Mockwax up

Restorative technique:-After completion of preprosthetic procedures,[Fig.4,5] face bow recording was done to establish the plane of orientation. Post n core for grossly carious 22 was done and initial tooth preparation performed along with temporization.Interocclusal record made using aluwax and functional bimanual manipulation method to direct mandible into centric relation position. 22 was also extracted later on because of fracture and not being able to restore further .After healing of extraction socket, final tooth preparation was done for maxillary anteriors and mandibular canines.[Fig.7]

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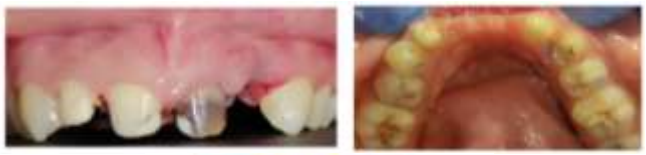

Fig. 7 Final tooth preparation done for maxillary and mandibular anteriors.

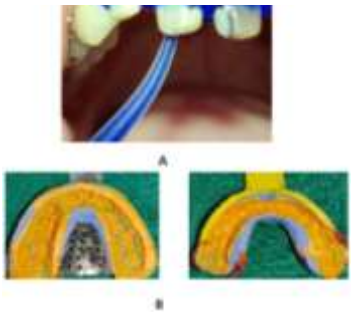

Fig.8 A- Gingival displacement using magic foam; B- Final impression of upper and lower arches

Gingival displacement was done using magic foam [Fig.8A]and the final impression[Fig.8B]was made with addition silicone impression material using 2 stage impression technique with stock tray of appropriate size. Wax pattern made with blue inlay wax after die cutting in master cast. Casting of wax pattern completed and coping trial done on patient after finishing and ultrasound cleaning. Final prosthesis seated in patient oral cavity[Fig.9,10], final corrections done and prosthesis cemented using glass inomer cement. Post op instructions and follow up visits was clearly explained to patient for proper maintenance.

Fig. 9 Final maxillary and Mandibular prosthesis cemented.

Fig. 10 Pre-op and post- op frontal view of patient smile.

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III. DISCUSSION:-

Smile plays a major role in how we perceive ourselves, as well as the impressions we make on the people around us. Smile is dependent on the musculature and the presence of the teeth. The anatomical elements of the face and the biological elements that include the functional and phonetic elements, provide the reference frames, guidelines and points. These elements help the dentist to achieve a general sense of orientation and diagnosis.References can be classified as[8,9]

1. Horizontal references,
2. Vertical references,
3. Sagittal references and
4. Phonetic references

Horizontal references: The horizontal perspective of the face is provided by the interpupillary line and the commissural line. The inter-pupillary line helps to evaluate the orientation of the incisal plane, the gingival margins and the maxilla. An imaginary horizontal line through the incisal plane and the gingival margins should be visibly parallel to the inter-pupillary line. This helps to diagnose any asymmetry in the tooth position or gingival location.

Fig. 10 Interpupillary, commisural and midline of face.

Vertical references: The facial midline serves to evaluate the location and axis of the dental midline and the medio-lateral discrepancies in tooth position. The inter-pupillary line and the facial midline emphasize the 'T' effect in a pleasing face. Axial inclination is the direction of the anterior teeth in relation to the central midline and becomes progressively more pronounced from the central incisor to the canine.There is a definite mesial inclination to all the anterior teeth related to the midline.

Sagittal references: Soft tissue analysis at a standardized position helps in studying the profile of an individual. The lip protrusion, the amount of prominence of chin, recession or prominence of the nose and its degree, all help in profile analysis for diagnosis and treatment planning. The E-line or esthetic line is an imaginary line connecting the tip of the nose to the most prominent portion of the chin on the profile. Ideally the upper lip is 1-2 mm behind and the lower lip 2-3mm behind the E-line. Any change in the position of the E-line indicates the abnormality in the upper or lower lip position.

Phonetic references: Phonetics play a part in determining maxillary central incisor design and position. 'F' and 'V' sounds are used to determine the tilt of the incisal third of the maxillary central incisors and their length. The 'M' sound is used to achieve relaxed rest position and repeated at slow intervals can help evaluate the incisal display at rest position. 'S' or 'Z' sounds determine the vertical dimension of speech.

LIPS- There are three aspects of the lip morphology that should be considered: **width, fullness, and symmetry**. Wide lips make for a wide smile. The fullness and symmetry of the upper and lower lips should also be documented. The fullness of the lip, or lip volume, can be categorized as **full, average, or thin**. Lip symmetry involves the mirror image appearance of each lip when smiling.

When smiling, the inferior border of the upper lip as it relates to the teeth and gingival tissues is called the **lip line**. An average lip line exposes the maxillary teeth and only the interdental papillae. A high lip line exposes the teeth in full display as well as gingival tissues above the gingival margins. A low lip line displays no gingival tissues when smiling. In most cases, the lip line is acceptable if it is within a range of 2 mm apical to the height of the gingiva on the maxillary centrals . In cases where there is a high lip line and an excessive gingival display exists, an unwanted ''gummy smile'' becomes evident. Cosmetic crown lengthening to expose the covered enamel can improve normal tooth height and tooth proportions. This can produce a more pleasing emergence profile of the tooth. These procedures can also be helpful in creating symmetry, positive radicular architecture, and proper zenith points of the gingival margins. The inferior border of the upper lip and the superior

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border of the lower lip form an outline of the space that is revealed when smiling. There are six basic smile-zone shapes: straight, curved, elliptical, bow-shaped, rectangular, and inverted . The first three shapes are the most common.

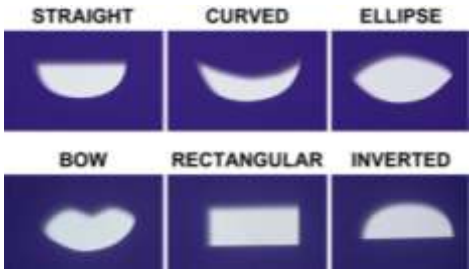

Fig.11 Smile shapes

Gingival zenith- Gingival esthetics has always been an important component of a beautiful smile.The gingival zenith level (GZL) for both right and left lateral incisors relative to the adjacent gingival zenith position of the central incisor and canine teeth were coronal by approximately 1 mm.[3]

The gingival contours should be symmetric and the marginal gingival tissues of the maxillary anterior teeth should be located along a horizontal line extending from cuspid to cuspid. Ideally, the laterals reach slightly short of that line. It is also acceptable, although not ideal, to have the gingival height of all six anteriors equal in gingival height on the same plane . In such cases, however, the smile may appear too uniform to be esthetically pleasing. A gingival height of the laterals that is more apical to the centrals and cuspids is considered unattractive .[2,3,4]

Fig.12 Ideal and accepted gingival zenith relation.

GOLDEN PROPORTION- The position of the tooth in the arch, the relationship between the width, the length and the face of the tooth can also be numerically established in relation with certain anatomic landmarks. Gold Proportion is expressed in numerical form and applied by classical mathematicians such as Euclid and Pythagoras in pursuit of universal divine harmony and balance. It has been applied to a lot of ancient Greek and Egyptian architecture and may be expressed as the ratio 1.618:1. If the ratio is applied to the smile made up of the central, lateral incisor and the mesial half of the canine, it shows that the central incisor is 62% wider than the lateral incisor which in turn is 62% wider than the visible portion of the canine which is the mesial half, when viewed from the front. The natural pleasing smile may not necessarily comply with all rules of symmetry or golden proportion or may not exhibit perfect balance without irregularity of shape.[3, 2]

Fig.13 Golden Proportion

1- Marina Rodrigues Santi, Beatriz Ometto Sahadi, Rodrigo Barros Esteves Lins, Marcelo GIANNINI, Luis Roberto Marcondes Martins. Digital Smile Design Applied to Dental Esthetic: A Case Report. Dental Research and Oral Health 3 (2020): 141-152.
2- Soares CJ, Fonseca RB, Martins LR, Giannini M. Esthetic rehabilitation of anterior teeth affected by enamel hypoplasia: a case report. J Esthet Restor Dent. 2002;14(6):340-8.
3- Davis NC. Smile design. Dent Clin North Am. 2007 Apr;51(2):299-318, vii.
4- Chu SJ, Tan JH, Stappert CF, Tarnow DP. Gingival zenith positions and levels of the maxillary anterior dentition. J Esthet Restor Dent. 2009;21(2):113-20.
5- Beall AE. Can a new smile make you look more intelligent and successful? Dent Clin North Am. 2007 Apr;51(2):289-97, vii.
6- Beall AE. Can a new smile make you look more intelligent and successful? Dent Clin North Am. 2007 Apr;51(2):289-97, vii. doi: 10.1016/j.cden.2007.02.002. PMID: 17532913.
7- Pimentel W, Teixeira ML, Costa PP, Jorge MZ, Tiossi R. Predictable Outcomes with Porcelain Laminate Veneers: A Clinical Report. J Prosthodont. 2016 Jun;25(4):335-40. doi: 10.1111/jopr.12413. Epub 2015 Dec 3. PMID: 26633080.
8- Solomon EGR: Esthetic consideration of smile; J of IPS 1999: 10(3); 41-47
9- Goldstein, RE: Change your Smile, ed 3 Chicago, Quintessence, 1997.