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RESEARCH ARTICLE

REJUVENATING SMILES' USING CAD/CAM TECHNOLOGY

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ABSTRACT

A beautiful smile seems to reflect a certain style of living and the enhancement of facial beauty is more of the primary goals of patients seeking dental care. The lower one third of the face has a major impact on the perception of facial aesthetics and the role of beautiful smile is therefore undeniable.

Once the ideal relationship between the restoration and the facial soft tissue is achieved, improvements in natural beauty can be expected to follow. By improving deficient facial proportion and intergumental form, surgeons, orthodontists and restorative dentist have the unique opportunity to address these aesthetic needs while creating a pleasing smile.

Prosthodontist is probably the best person to identify the quality of smile. Further he is also able to change the quality of smile with the recently available innovative techniques and the state of art restorative materials and to plan restoration, to harmonize with the smile. With advancement in knowledge and techniques, dental professionals have the ability to approach smile design in a variety of ways, one of which is use of CAD/CAM. This paper depicts the concepts and practices of aesthetic dentistry by the use of advanced tools.

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INTRODUCTION

“All human desires are in some way related to beauty”

In this changing world, the appearance or packing of everything is important. A pleasing appearance is important not only socially and romantically but also economically, for it's has been found that attractive people tend to get the better jobs.¹

The dominance of dental composition may be amplified by rendering it more visible. Increasing the crown size or and using lighter teeth, placing them more anteriorly or increasing the exposed gingival length may produce this effect.¹ It is for that reason that the teeth and smile plays a major role in whether we perceive the face of an individual as attractive or not. It is now possible for the aesthetic dentist to beautify the patients smile while creating a more youthful appearance.¹ Patients seek treatment with various aesthetic, biologic and functional goals in mind. To determine the treatment plan and clinical results that will be most pleasing to the patients, every practitioner must discuss with the patient number factors these includes

1. The personal expectation of the patient.
2. The expected aesthetics and functional outcome of the planned treatment and the prognosis for longevity.

3. The number of teeth to be involved.
4. The type of restorative material to be used.
5. The tolerance of the patient for extensive dental treatment including interdisciplinary therapy.²

The objectives of cosmetic Dentistry must be to provide the maximum improvements in aesthetics with the minimum trauma to the dentition. There are a number of procedures that begin to approximate the ideal parameters of Cosmetic Dentistry, most notably that of porcelain veneers. In recent times, there is an increase in the number of patients seeking cosmetic dental procedures to enhance their smile and personality. Hence aesthetic dentists today should be well equipped to meet the demands of modern society.³ The present paper was an attempt to restore the esthetic smile for the patient using modern techniques.

Case Report

A 38 years old male patient reported to the Department of Prosthodontics, KLE VK Institute of dental sciences, Belagavi, with the chief complaint of an anaesthetic smile. He was concerned about the presence of a forwardly placed upper front teeth after restoration with bridge and irregular mandibular teeth. Patient gave the history of road traffic accident 20 years back and had lost few upper front teeth and undergone surgery for the same. History of two implant

placement in the upper front region of the jaw and restored with the Bridge. After few years patient had noticed some spacing between teeth and irregularity in the lower dentition. On intraoral examination and radiographic evaluation, Implants were seen in the region of 11 and 22, restored with Porcelain Fused to Metal bridge, endodontic treatment with respect to 23,24,25 and 26, restored with Porcelain Fused to Metal bridge. Irregularly placed mandibular anterior teeth and endodontic treatment with respect to 42 and 43, followed by Porcelain Fused to Metal crown and presence of anterior open bite (Figure.I).



Figure.I Pre-operative OPG.



Figure.II Pre-operative Intra-oral front and lateral views.



Figure.III Teeth preparation and attachment of impression copings.



Figure.IV Closed tray Maxillary and Mandibular elastomeric impressions.



Figure.V Temporization.



Figure.VI Computer assisted designing



Figure.VII Bisque trail done.



Figure.VIII Post-cementation front and lateral views.



Figure.IX Pre and Post Treatment profile views.

Patient was given a multidisciplinary treatment option for correction of the proclination and crowding of the mandibular anterior teeth. Patient was strictly against long-term orthodontic therapy. He desired an alternative approach which could address his complaints within a definitive time frame. Considering the patient's requirements and his time constraints an alternative treatment was planned.³

Treatment Procedure

- The patient's diagnostic impression was made using Irreversible hydrocolloid impression material (Ruthinium Alginate, Ruthinium Group, Italy) and models poured using type -III Dental stone (Kalastone, Kalabhai Karson Pvt Ltd, India)
- Series of patient's intra and extra oral photographs were recorded (Figure.II).
- Diagnostic mock-up was done using inlay modelling wax (Crowax, Renfert GmbH, Germany).
- Extraction of 32 due to internal resorption and lingual placement.
- Elective endodontic treatment was carried out with respect to 31, 33 and 41 for correction of malalignment.

- Open tray two stage elastomeric impression (Flexceed Putty type and Flexceed Light body, GC, India) was made for angulated abutments of 15° and 25° (Pitt-Easy, Sybron Implant Solution, USA) with 11 and 22 to facilitate the milling of angulated abutments.
- Custom milled angulated abutments of 15° and 25° were placed on implants in 11 and 22 regions respectively to facilitate change in labiolingual alignment.
- Teeth preparation was carried out with respect to 13, 12 and 23 and 33, 31, 41, 42, and 43 (Figure.III).
- Gingival retraction (Ultrapak #00, Ultradent Products Inc,USA) followed by closed tray two stage elastomeric impression (Flexceed Putty type and Flexceed Light body, GC, India) of maxillary and mandibular arches was made (Figure.IV).
- Temporization (Tempron, GC, Japan) was carried out as per the diagnostic mock-up (Figure.V).
- A bisque trial of CAD/CAM milled all-ceramic copings were carried out to check for marginal integrity and aesthetics (Figure.VI and VII).
- Final cementation of maxillary and mandibular completed prosthesis was carried out after occlusal correction and aesthetic evaluation using self-Etch / Self-Adhesive resin cement (Maxcem Elite, Kerr corporation, USA) (Figure.VIII).
- Post cementation instructions were given to the patient and follow-up appointment was scheduled (Figure.IX).

DISCUSSION

As the popularity of aesthetic dentistry is increasing, growing number of patients seeking treatment for the improvement of anaesthetic anterior dentition.¹The professional approach to dentistry has changed rapidly. The acceleration in dental ceramic and bonding material development has made conservative tooth preparation and restorative procedures possible that were never imaginable before. These new technique enable the clinician to achieve cosmetic improvements and aesthetically pleasing results. Dentists are excited about the positive impact a beautiful smile has on the social, Psychological and emotional lives of our patients.¹In comparison to all the other systems the CAD/CAM or copy milling technique creates a mean interfacial gap between the actual tooth structure and the restoration that is considerably wider than of the other systems. This technology for metal free restorations has been increasingly popular and reliable. Several systems have shown that CAD/CAM produced restorations are accurate enough to be used in modern clinic.¹

In cosmetic dentistry, success lies largely in understanding complaints and expectations of patients. Therefore, before choosing an aesthetic treatment, it is important that the patients are able to visualize the desired outcome. Considering the extra-ordinary circumstances where the patient had constraints for time frame and refused for a conventional approach an alternative approach was planned which enabled us to achieve a “balanced smile” that was overall pleasing. Finally, as aesthetic dentists we need to apply the right balance of prudence and wisdom with knowledge and progress to enhance our patient’s smile.³With the use of computer technology, the clinician can evaluate the patient’s dynamic tooth display and incorporate smile analysis into routine treatment planning.⁴

CONCLUSION

Smile designing is a multifactorial decision-making process; therefore, digital smile designing not only aids the clinician to communicate the desired outcome with the ceramist but also helps in treating the patients with an individualized, interdisciplinary approach.

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