

CERAMAGE – A CERAMO POLYMER RESTORATION TO BE USED AS AN ALTERNATIVE TO CERAMICS; AS AN INDIRECT RESTORATIVE MATERIAL IN A MINIMALLY INVASIVE COSMETIC DENTISTRY PROTOCOL - A CASE REPORT

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Abstract

Tooth wear and discoloration is a normal process in the life time of an individual. Severe wear and discoloration can result in cosmetic concern and loss of vertical dimension. These problems can best be treated by giving fixed prosthesis. This case provides the management using the concept of Minimally Invasive Cosmetic Dentistry (MICD) with Ceramopolymer as the restorative material. Computer Guided Occlusal Analysis (CGOA) was used for establishing uniform occlusal force distribution.

Case report (J Int Dent Med Res 2013; 6: (1), pp. 31-35)

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Introduction

Discoloration and gradual wear of the occlusal surfaces of teeth is a normal process during the lifetime of an individual. However, excessive occlusal wear and discoloration can result in pulpal pathology, occlusal disharmony, impaired function, and aesthetic disfigurement.¹ Tooth wear can be classified as attrition, abrasion, and erosion depending on its cause. A differential diagnosis is not always possible because, in many situations, there exists a combination of these processes.² Therefore, it is important to identify the factors that contribute to discoloration, excessive wear and to evaluate alteration of the vertical dimension of occlusion caused by the worn dentition.³

The comprehensive concept of Minimally invasive cosmetic dentistry (MICD) and its treatment protocol were introduced in 2009 with the basic aim of a clinician effecting optimum clinical therapeutic improvements in smile enhancement, while performing corrective procedures that require as little clinical intervention as possible.⁴

The following case illustrates Minimally Invasive approach with Computer Guided Occlusal Analysis (CGOA).

Case Report:

A healthy 56 years old female patient reported to the Department of Prosthodontics, Dayananda Sagar College of Dental Sciences, Bangalore, with a chief complaint of replacement of missing posterior teeth. Intra oral examination revealed discoloured anterior teeth with generalized attrition and reduced vertical dimension of occlusion. Missing teeth in relation to permanent maxillary left second molar, permanent maxillary left third molar, permanent mandibular left first molar, permanent mandibular left second molar, permanent mandibular left third molar, permanent mandibular right first molar, permanent mandibular right second molar

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and porcelain fused to metal bridge in relation - permanent maxillary right canine to permanent maxillary right third molar. Porcelain fused to metal crown present in relation to permanent mandibular right second premolar along with root stump in relation to permanent maxillary left first premolar. Orthopantograph (Figure-1) and periapical radiographs showed adequate bone support.



Figure-1. Orthopantograph

Figure. 2 and 3. Before treatment Photos.



Figure-2. Pre-treatment Photo



Figure-3. Pre-treatment Photo

Procedure:

After thorough Oral prophylaxis, diagnostic casts were mounted on semi-

adjustable articulator using face bow transfer and centric relation record made by bimanual manipulation (Dawson's Technique).⁵ This was used for the development of diagnostic waxing with which Occlusion was developed to the increased vertical dimension and a customised anterior guidance was fabricated.

After the wax up on diagnostic casts, they were shown and discussed with the patient. Extraction of root stumps in relation to permanent maxillary left first premolar followed by immediate implant placement done. Tooth implant supported bridge has been planned by placing a implant in relation to permanent mandibular left second molar. Implants has been placed in relation to permanent mandibular right first molar and permanent mandibular right second molar. All the teeth were prepared for veneer's (anterior) by minimally invasive techniques. Indirect ceramopolymer (Ceramage, Shofu Inc, Japan) restorations were fabricated. These restorations were bonded by using Flowable composites⁶ and Bonding agents (Beautifil Flow Plus and Beautifil bond Shofu Inc, Japan).

Figure. 4, 5 and 6. After treatment Photos.



Figure-4. Post- treatment Photo



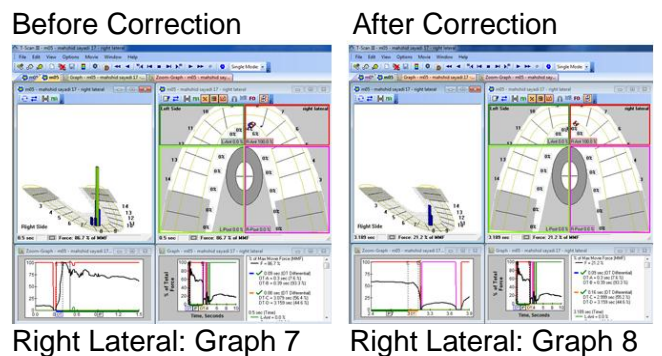
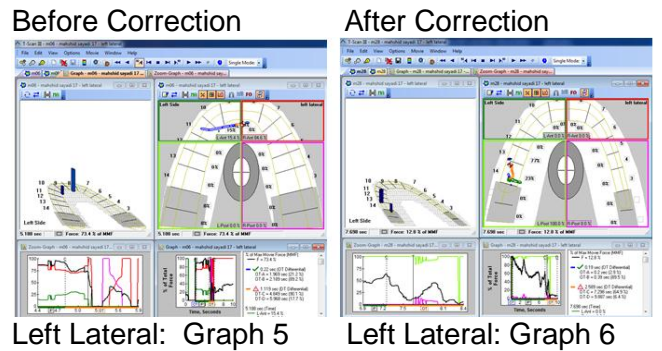
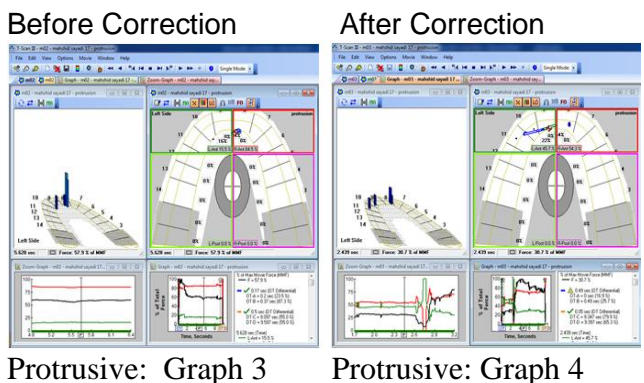
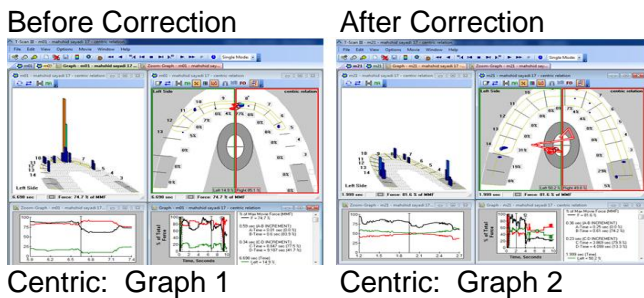
Figure-5. Post- treatment Photo



Figure-6. Post-treatment Photo

Then, the Digital analysis of occlusion was done by using T-Scan III (Tekscan, USA).

Photo Tekscan: Before Correction	After Correction
Centric: Graph 1	Graph 2
Protrusive: Graph 3	Graph 4
Left Lateral: Graph 5	Graph 6
Right Lateral: Graph 7	Graph 8



The forces were harmonized by Occlusal corrections as seen in the Post treatment T-Scan III recordings and the restorations were finished and polished intraorally to reduce the surface roughness⁶ by using Ceramage finishing and polishing kit and One gloss kit (Shofu Inc, Japan).

Discussion:

Full –mouth reconstruction, by very nature can be extremely complex. Dental technique and technologies have come a long way in the past 30 years and patients are often surprised by what can be done. Correct diagnosis and analysis is important to identify and address the causes of the problems in the treatment plan. Treatment is often a non-surgical and a minimally invasive approach to get the upper and lower jaws in proper alignment, restoring the teeth, ultimately creating a healthy and attractive smile that will last for many years.

In the present case minimally invasive approach with computer guided occlusal analysis for determining occlusal pattern was followed.

Minimally invasive technique involves performing corrective procedures with little clinical intervention like veneers, resin bonded bridges, partial veneer crowns, inlays and onlays

as opposed to placing complete coverage restorations like full crowns. The advantage of this technique would be conservative tooth preparation, minimizing untoward pulpal responses that frequently result when a vital tooth is prepared for full coverage.⁷

Computer guided occlusal analysis system being a latest advancement in dentistry⁸ aims at treating occlusal abnormalities by using T-Scan sensor as compared to articulating paper markings.⁹ Advantages of T-Scan being, it can be used for reducing chronic muscular hyperactivity^{10,11}, treatment of myofascial pain dysfunction syndrome¹²⁻¹⁵, illustrates true nature of occlusal force pattern, insight into degree of occlusal forces¹⁶ and contact timing sequence.¹⁷

The T-Scan Computerised occlusal Analysis System offers precision technology that analyses occlusal contact force and time sequences in 0.003-second increments and graphically displays them in movie form^{18,19}. This system simplifies occlusal adjustments at aesthetic prosthesis insertion, as it quickly isolates excessive force concentrations and time-premature contacts, so their eradication is predictable and effective.

The Occlusal force and time-sequence data are relayed to a personal computer through a high definition recording sensor that measures contact-varying relative force sequentially as differing tooth contacts interact at the Occlusal surfaces. During a turbo-mode recording, the sensor is scanned 3,000 times per second, resulting in a dynamic movie of changing Occlusal forces that can be incrementally viewed in a slow-motion playback.

This dynamic playback separates all the force variance into their contact order, while simultaneously grading their relative Occlusal force, so that a clinician can observe them for diagnosis and possible treatment. In two or three dimensions, the contact timing sequence can be played forwards or backwards continuously or in 0.003-second increments, to reveal an Occlusal "movie" that describes the occlusal condition. In the three dimension playback view, the force columns change both their height and colour designation. In the two dimension contour view, the colour-coded force concentration zones alter size, shape and colour as the Occlusal forces change. Warmer colours indicate forceful contacts, while darker colours indicate lower force contacts.

The choice of restorative material used for treating this case was Ceramage to conserve the remaining tooth structure.²⁰ Ceramage is a micro ceramic polymer system with 73% of zirconium silicate filler (PFS-progressive fine structured filler) supported by an inorganic polymer matrix which contains Urethane dimethacrylate and Urethane diacrylate.²¹ Ceramage combines extra ordinary hardness²¹ and fracture resistance.⁶ Ceramage ensures the reproduction of natural colour to fabricate restorations with life-like esthetics, excellent polishability and high resistance to plaque.²¹ Ceramage can be used in temporary bridges and fibre reinforcement to ceramage material has the potential to enhance the longevity of temporary bridges.²²

Conclusion:

Management of severely worn dentition and discoloration becomes a complex condition for treatment which involves restoration with full crowns. This innovative technique of MICD involves restoring the anteriors with Ceramage veneers and posteriors with Implants. Using CGOA for such cases helps in establishing uniform force distribution, bilateral simultaneity, measurable immediate disclusion minimizing the damaging effect of concentrated, excessive, isolated Occlusal forces.

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