

# ESTHETIC EXPRESSIONS

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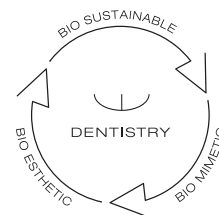
The Journal of  
**The Indian Academy of Aesthetic  
& Cosmetic Dentistry**



E s t d . 1 9 9 1



- VENEER
- OCCLUSIONVD
- COMPOSITE
- POST & CORE
- PEDIATRIC CROWN
- CAD/CAM BLOCK



SHAPING THE FUTURE OF DENTISTRY  
WITH FUNCTION & AESTHETICS

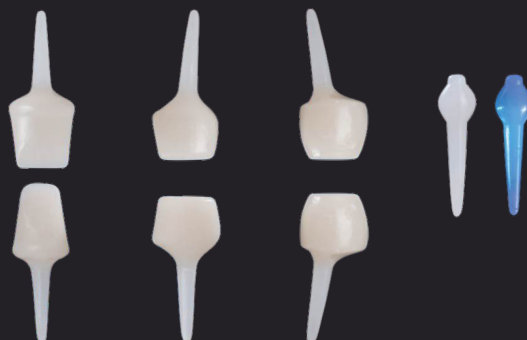


**VENEER & OCCLUSIONVD**

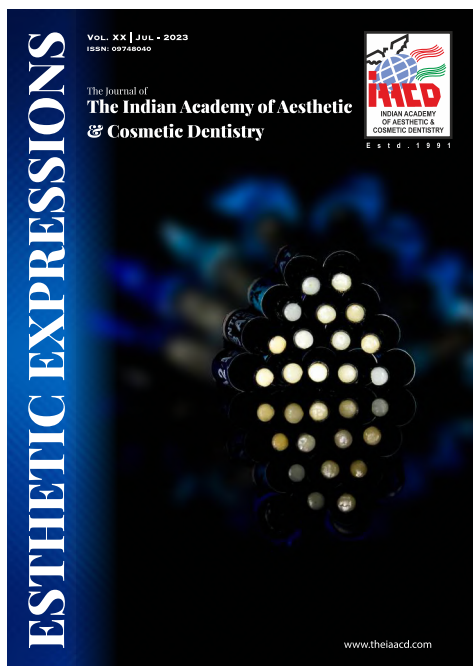


**NEW - CAD/CAM BLOCK**

**POST & CORE**



**PEDIATRIC CROWN**



Winner of  
IAACD COVERPAGE COMPETITION  
**Dr. Natasha Chandiramani**

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**Dr Trishala Kasliwal**

Editor in Chief  
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Dear Colleagues

Welcome to the latest edition of ESTHETIC EXPRESSIONS, the leading magazine dedicated to the fascinating world of aesthetic dentistry. In this issue, we delve into the revolutionary advancements in dental technology and explore the transformative power of the digital workflow.

First and foremost, I would like to express my heartfelt gratitude to the esteemed board members of the Indian Academy of Aesthetic and Cosmetic Dentistry (IAACD) for entrusting me with the role of Editor for this prestigious publication. It is a tremendous honour to be given this opportunity to curate and present the latest insights, trends, and innovations in the field of aesthetic dentistry.

I also extend my sincere appreciation to the incredible authors and contributors who have shared their expertise and knowledge with us in this edition. Their insightful articles on digital smile designing, minimally invasive aesthetic dentistry, facially driven aesthetics provide invaluable perspectives on the digital workflow and its impact on contemporary aesthetic dentistry. Their commitment to advancing the field and their passion for excellence shine through in each and every word.

Resonating the theme of the conference – Aesthetic Kaleidoscope through the pages of ESTHETIC EXPRESSIONS, we aim to inspire and educate our readers, be they seasoned professionals or eager students, on the remarkable possibilities that the digital workflow offers.

I encourage you to immerse yourself in the content of this issue, explore the articles, and absorb the wealth of knowledge shared by our esteemed contributors. May this magazine serve as a source of inspiration and a catalyst for your own professional growth.

Wishing you all an engaging and enlightening read!

Warm regards,

**Dr. Trishala Kasliwal**

**Editor-in-Chief**



**Dr. Deepak Mehta**

President  
IAACD

Greetings to everyone!

I am humbled and honored beyond words to be part of this prestigious organization. The Indian Academy of Aesthetic and Cosmetic Dentistry (IAACD) is truly a beacon of excellence and innovation in the field of dentistry. With its unwavering commitment to promoting artistic and ethical practices, the IAACD has undoubtedly revolutionized the world of aesthetic and cosmetic dentistry in India.

With over 1500 members, including more than a hundred accredited members, many of whom are outstanding clinicians, IAACD has consistently upheld the highest standards. This academy has served as a platform for sharing knowledge, fostering innovation, and promoting the highest standards of dental care.

I would like to thank our Editor Dr. Trishala Kasliwal for the outstanding work you and your team have put into curating the Esthetic Expressions Journal. As a dedicated reader and enthusiast of all things aesthetically pleasing, I am constantly in awe of the caliber of content and inspiration that this publication consistently delivers.

This year's conference will be held at a location with significant history. Mysuru, known for its rich cultural heritage and enchanting beauty, provides the perfect backdrop for our gathering. The city's grandeur and serenity will serve as an inspiration for us all as we come together to learn, collaborate, and forge lifelong connections with fellow professionals. I encourage each one of you to immerse yourselves in the unique blend of academia, networking, and rejuvenation that this conference offers.

The entire team at IAACD hopes that everyone will get the chance to learn new things in the realm of aesthetic dentistry and explore this cultural hub. The scientific sessions at our conference will present an array of thought-provoking lectures and clinical case studies which reflects the dedication and expertise of our speakers and members. The theme of this year's conference, "Aesthetic Kaleidoscope," reflects our commitment to embracing the diverse perspectives, techniques, and innovations that shape the world. This conference serves as a platform for sharing knowledge, exchanging ideas, and fostering collaborations that will propel our field forward. From advancements in smile design and digital dentistry to the latest techniques in minimally invasive dentistry, we have curated a program that promises to be enlightening, educational, and inspirational.

I would like to express my heartfelt gratitude to the Organizing Committee, Board of Trustees, Board of Directors, Volunteers and Sponsors for their relentless efforts in putting together this remarkable event. Their dedication and hard work have ensured that we have a conference of the highest caliber. I would also like to extend my appreciation to each one of you attending this conference. Your presence here is a testament to your commitment to professional excellence and lifelong learning.

**Dr. Deepak Mehta**  
**Indian Academy of Aesthetic and Cosmetic Dentistry**



**Dr. Hemant Sachdev**

Accreditation Chairman, IAACD  
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The Indian Academy of Aesthetic & Cosmetic Dentistry offers its Life Members an opportunity to become accredited members of the Academy. The accreditation process provides an excellent opportunity for members to enhance their clinical skills as well as their knowledge with respect to Restorative & Aesthetic Dentistry.

### **Accreditation Criteria & Process**

Life Membership to the IAACD is a primary requirement to become an Accredited Member. The validity period of the membership is a minimum of 13 months to allow the candidate to start the Accreditation process. Further, the candidate should have attended at least two national level meets in the past four years. Such a candidate, on completion of the above-mentioned criteria has to pay the Accreditation fee (Rs. 2400/- for Part 1 & Rs 3575/- for Part 2) and can appear for the Accreditation process. The accreditation process consists of two parts.

#### **Part 1 of the Accreditation Process:**

The candidate must submit before/after photographs of five aesthetic clinical cases - preferably in a Power Point(.pptx) format along with the application to appear for the Part 1 examination. The Part 1 exam is essentially a multiple choice written examination where the candidate has to answer 50 MCQs pertaining to various aspects of Aesthetic & Restorative Dentistry. The time allotted for this is 1 hour. A minimum of 70% marks (35/50) must be obtained to clear the Part 1 process.

#### **Part 2 of the Accreditation Process**

Upon clearing the first part, the candidate is eligible to appear for the Final (Part 2) exam during the subsequent IAACD conference (registration to the conference is compulsory). The Part 2 Exam consists of a Bench Test, Aesthetic Case Presentation & the Grand Viva.

**Bench Test:** Candidates have to do a direct composite veneer buildup on a prepared natural central Incisor as well as an aesthetic buildup for a large Class 1 cavity prepared on a natural molar. The total time allotted for this is 1.5 hours. Participants have to bring a working model with neatly mounted (anatomically with a clear gingival profile) 3 extracted anterior teeth (preferably from the same patient) - two upper centrals & one lateral incisor in contact with each other. The molar (upper or lower) should be mounted on the same model too. Please make a preparation for a composite veneer on the middle central incisor & a large Class 1 cavity (involving at least 3/4th of the occlusal surface) on the molar beforehand.

The veneer and the posterior restoration will be judged on various parameters such as the overall form & anatomy, marginal adaptation, contours, line angles, surface texture, internal characterizations, color match, finish & polish etc.

Participants will be provided an air-rotor connection and a micro-motro and light cure unit (if possible, please bring your own micro-motor & light cure units.) Participants are required to bring their own air-rotor as well as micro-motor contra-angle handpiece. Participants are also required to bring all the composite material that they will be using along with all necessary instruments, burs and finishing/-polishing kits.

**Grand Viva:** During the Grand Viva, the candidate will have to present and Anterior Aesthetic case - properly documented from the start to finish. The case presentation will have to be made on a PowerPoint or a Keynote presentation (either on a laptop or on a screen if logistics permit it). The presentation will be only for 5 minutes and the candidate will be asked questions on the case in addition to other aspects of Aesthetic & Restorative Dentistry.

**Repeat Exam:** In case a candidate is unable to clear the exam, there is a provision for a repeat exam. There is no fee for 1st attempt for Part 1 exam if the candidate appears for it at the next conference. Full fee for repeat of Part 2 Bench Test. There is no fee for repeat of the Grand Viva. The candidate, upon clearing the final accreditation exam, will receive the IAACD Accreditation Plaque & Certificate during a special ceremony at the subsequent Annual IAACD Conference and will join a niche group of Accredited Members of the Indian Academy of Aesthetic & Cosmetic Dentistry.

### Newly Accredited Members

On behalf of the Indian Academy of Aesthetic and Cosmetic Dentistry (IAACD), we would like to extend our warmest congratulations to the newly accredited members. We are thrilled to have you join our esteemed family of talented clinicians.



**Dr. Pranoti Veta**



**Dr. Usha Dadlani**



## 31<sup>st</sup> ANNUAL CONFERENCE 2022 KOVALAM KERALA

The Gala simply got phenomenal last year - it was a wonderful get-together after years! The 31<sup>st</sup> annual conference was truly remarkable after a period of online conferences and the lack of any in-person interactions owing to the global epidemic, with guests willing to step outside of their comfort zones to greet and meet.

Our 31<sup>st</sup> annual IAACD conference was held at The Hotel Leela - Raviz in Kovalam, which is located along the Arabian Sea's coastline. The resort is a spectacular beach getaway that is safeguarded on a cliff's edge and has a peaceful, calm atmosphere. It was held from 26<sup>th</sup> to 28<sup>th</sup> August 2022 with the theme "FUNCTIONAL AESTHETICS". More than 350 attendees attended the event, which featured a scientific extravaganza with hands-on workshops, podium sessions led by mentors known around the world, and presentations from national speakers who covered a wide range of clinical cases and subjects while having a lot of fun while updating and reviving our sharp minds.

For our delegates who attended the conference, a variety of subjects like functional occlusion, implant aesthetics, chairside veneers using injection moulding technology, indirect bonded restorations, anterior composite restorations, etc., and more were covered. We had a dedicated workshop on technical aspects specially conducted for dentists and technicians.

International and national speakers volunteered their expertise and their time with us to help us grasp functional aesthetics. They were Dr. Neeraj Khanna faculty at Dawson Academy, USA, who enlighten us about occlusion in full mouth rehabilitation and Dr. Nicolas Aronna from Spain enlightened us with soft tissue engineering around implants. Eleven Indian speakers shared their knowledge and experiences with the attendees on a variety of topics, including our founding president Dr. Sandesh Mayekar's talk on manual vs digital dental protocols.

The journal 'Esthetic Expressions' was released during the conference by our chief editor Dr. Vinothini Kannan giving a copy to the dignitaries on stage during inaugural ceremony. The IAACD also conducted the accreditation examination for dentists aspiring to excel in aesthetic dentistry. There was a wide varied representation of IAACD trade partners where the delegates could avail materials and information on the latest equipment and technologies needed for implementation in their clinical practice.

The response to this conference was overwhelming from the dental fraternity from all across the globe and the conference was a house full, a month before the event. There was dance and entertainment when everyone chose to move their feet to the tunes of Kerala drums, delicious food with Kerala delicacies, and a feel of a wonderful venue. The conference concluded with a lot of take-home messages from podium lectures as well as other scientific activities and with memories spend with dear and near ones in one of the most exotic seaside resorts in South India.



INDIAN ACADEMY OF  
AESTHETIC & COSMETIC DENTISTRY

# 31<sup>st</sup> ANNUAL CONFERENCE

## FUNCTIONAL AESTHETICS

A CONFLUENCE IN GOD'S OWN COUNTRY

📍 THE LEELA KOVALAM - A RAVIZ HOTEL, KOVALAM, THIRUVANANTHAPURAM, KERALA

📅 26, 27, 28 AUGUST 2022

  
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IAACD Zonal convention was held in Surat, Gujarat on the 9th of July 2023 in association with Varacha Dental Association. A well attended event with over a 100 delegates, Dr. Nikhil Bahuguna, BOD and President Elect, IAACD gave a lecture and demonstration on BioMimetic restorations in daily dental practice and introduced the audience to IAACD activities and updated them about the upcoming national conference to be held in Mysore in August 2023.

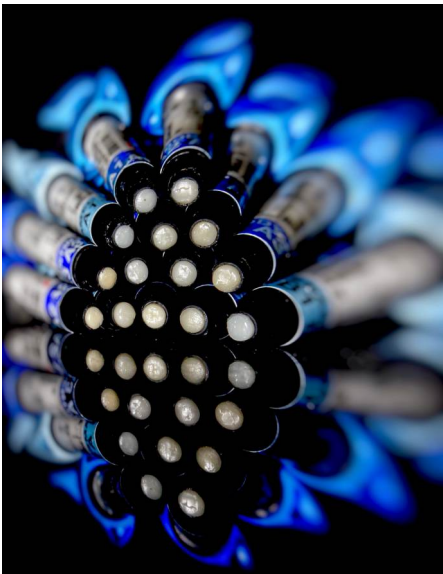


IAACD Zonal convention was held in Mira Road, Mumbai on the 12<sup>th</sup> of February 2023 in association with Mira Bhayander Dentists' Association. The event attracted over 70 delegates, with some prominently well-known faces as attendees. Dr. Jeet Naik (MDS Paediatric Dentistry) spoke about preformed stainless steel crowns while Dr. Kushal Jaju (MS Prosthodontics) spoke about Clinical Fixed Prosthodontics. The highlight were demonstrations by both the speakers on respective topics which engaged the audience till the end. This full-day event was well coordinated with the help of Dr. Harsh Haren Shah and the MBDA team.



TOP 6 FINALISTS OF THE IAACD COVERPAGE COMPETITION

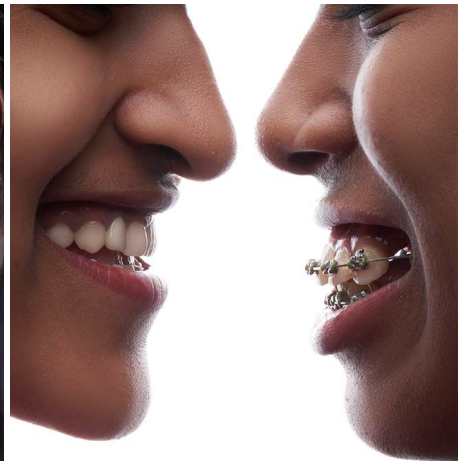
The IAACD Coverpage Competition was a platform that invited both dental and non-dental aesthetic images. Participants had the opportunity to showcase their artistic skills and creativity through captivating visuals. After careful evaluation, the competition's judges selected the top six images as the finalists. These chosen images represent a diverse range of aesthetic appeal and demonstrate the remarkable talent of the participants. Each of these images captivates viewers with its unique charm and visual impact.



Dr. Natasha Chandiramani



Dr. Akash Akinwar



Dr. Sarthak Kadel



Dr. Usha Dadlani



Dr. Farhat Sayyed



Dr. Neha Gupta

IAACD proudly presents the IAACD EDUSERIES, the ultimate platform for all things aesthetic dentistry. Join us as we continue our commitment to learning and knowledge sharing with a series of informative and insightful sessions. Our expert speakers cover a myriad of topics, providing you with valuable insights and the latest advancements in the field. Elevate your skills and stay at the forefront of aesthetic dentistry with IAACD EDUSERIES – where learning meets excellence.

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**All Principles of Smile Design in Visual Form**

Dr. Aslam Inamdar

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What is DSD?  
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The IAACD EduSeries on Bonded Restorative Dentistry by Dr. Sachin Deep Singh

**Veneerlay**

- Overlay-veneer (or "veneerlay") is used in the case of a restoration that involves the occlusal surface that extends to the entire buccal surface due to either esthetic or functional considerations.
- It is indicated in teeth positioned in esthetic areas (typically maxillary premolars) with significant loss of hard tissue, heavily discolored, and resistant to bleaching.
- The gold standard material is ceramic (lithium disilicate).

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**ART AND SCIENCE OF PORCELAIN VENEERS**

Dr. Manav Kalra MDS

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**LIGHT CURING: KEY TO LONGEVITY**  
How long should our composite restorations last?

- The light curing process is essential for the polymerization of composite restorations.
- Proper light curing technique is crucial for the longevity and aesthetic appearance of composite restorations.
- Understanding the factors affecting light curing, such as light intensity and curing time, is key to achieving optimal results.

REGISTER NOW!

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22 Jun 9:00 AM LIVE ON ZOOM

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## State of the art CAD/CAM Block:

### A case report using the innovative Edelweiss CAD/CAM Block.



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Dept of Paediatric Dentistry,  
Saveetha Dental College,  
Chennai, India.



**Dr. Desigar Moodley**

Smile and Educaiton Centre,  
Wolfurt, Austria.

### Introduction

In recent years, computer-aided design and computer-aided manufacturing (CAD/CAM) technology has revolutionized the field of dentistry, offering precise, efficient, and aesthetically pleasing solutions for dental restorations. CAD/CAM systems have become an integral part of the digital workflow in fixed prosthodontics, allowing dental professionals to create highly accurate and customized prosthetic restorations.

CAD/CAM blocks play a pivotal role in this process. One of the key advantages of CAD/CAM blocks is their ability to provide a precise fit. CAD/CAM blocks provide excellent marginal accuracy, ensuring a precise fit and reducing the need for adjustments during the seating process. This precise fit enhances restoration longevity, reduces the risk of microleakage, and promotes optimal oral health. This leads to improved patient satisfaction and reduces chairside time.

The selection of a particular CAD/CAM block is important in relation to specific patient needs, restoration location, and aesthetic requirements. By understanding the limitations associated with CAD/CAM blocks, clinicians can make informed decisions, manage patient expectations, and select the most suitable materials and techniques for successful dental restorations. Continuous learning and staying updated with advancements in CAD/CAM technology are crucial for successful implementation

### Types of CAD/CAM Blocks

Nowadays, a large number of CAD/CAM blocks are available and newer materials are introduced into the market at a rapid rate. Dental professionals are faced with a complex decision process when choosing a restorative material for a particular indication.

The evolution of CAD/CAM materials mainly involves ceramics, resins and hybrid materials (resin-ceramic materials or resin glass materials).

#### Ceramic Blocks

Ceramic CAD/CAM blocks are widely used in dentistry due to their aesthetics and biocompatibility. They are composed of densely sintered ceramic materials, such as lithium disilicate or zirconia. However, mechanical properties decrease with the fragile glass phase hence, filler particles are added to the base glass to improve mechanical properties, such as the strength, thermal expansion and contraction behaviour<sup>4</sup>. These materials are brittle in thin sections and prone to fracture especially in thin sections.

#### Zirconia Blocks

Zirconia CAD/CAM blocks are made from a crystalline form of zirconium dioxide. They are renowned for their exceptional mechanical properties, including high strength, fracture resistance, and biocompatibility. However, their high opacity may limit their aesthetic applications to non-visible areas.

### **Resin Blocks**

Resin CAD/CAM blocks, also known as composite blocks, are composed of a resin matrix filled with a mixture of ceramic or glass particles. They offer a balance of strength, aesthetics, and ease of use. They are suitable for fabricating inlays, onlays, veneers, and temporary restorations. However, resin blocks are more prone to wear and staining, making them less suitable for posterior load-bearing restorations or high aesthetic zones. They lack long term colour stability and prone to fracture.

### **Hybrid Blocks**

Hybrid CAD/CAM blocks consist of a composite resin matrix infused with ceramic or glass fillers. Hybrid blocks offer improved mechanical properties such as enhanced strength and fracture resistance when compared to pure resin blocks. The hybrid composition allows for efficient milling with better wear resistance. They provide better aesthetics and but still lacks strength. These blocks are mainly chemically cured and lack colour stability and are subject to fracturing easily.

### **Edelweiss Hybrid Glass CAD/CAM Blocks**

A variation of the hybrid type of block is from the manufacturer Edelweiss Dentistry, (Wolfurt, Austria) that was recently introduced as a CAD/CAM block with a homogeneous base material consisting of a single glass phase. This is produced through a controlled laser sintering technology causing the glass crystals to form a single homogenous layer. The finished glass product is characterized by a single-phase glass crystal that is embedded in a resin matrix. The Edelweiss CAD/CAM block is mainly composed of silica and barium glass with a very small portion of resin. It also contains zinc oxide and fluoride for added antibacterial properties, a unique feature of the Edelweiss CAD/CAM material. The optical properties are similar to that of

predominately glass ceramics without the brittleness of the ceramics but maintaining flexibility. This block belongs to a special class of materials namely hybrid glass material.

The composition of Edelweiss CAD/CAM blocks is mainly silicate glass, zinc oxide nanoparticles, aluminium oxide and fluoride. According to the manufacturer, there is no need for any further silane/primer addition as the bond occurs with the silica present in the Edelweiss CAD/CAM material together with the Edelweiss composite which acts as the luting cement. The addition of zinc oxide nanoparticles provides antibacterial properties preventing any plaque accumulation on the surface of the material. Fluoride enables possible hydroxyapatite regeneration if required. The addition of zinc oxide and fluoride is unique to the edelweiss CAD CAM blocks. Aluminium oxide provides additional strength and improves the optical properties of the CAD/CAM block.

With ceramics colour matching of a restoration to the adjacent teeth can at times be difficult due to the translucency of the ceramic and the visual exposure of the polymerized resin luting cement through the ceramic material. Since the Edelweiss T Blocks (Translucent) mimics the enamel translucency, different brightness effects of the tooth can be reproduced with the availability of opacity shades of the resin cement itself. Thus the T Block when milled represents the natural enamel while the underlying composite cement represents the dentine shade providing a perfect mimicking of the natural tooth. Furthermore, clinicians are now in control of the final aesthetic outcome by being able to adjust both internal and external characterizations chairside according to the patient's needs, thereby eliminating any errors of miscommunication between the clinician and dental technician.

According to the Edelweiss Dentistry, the luting resin cement for edelweiss CAD CAM Blocks is of a similar composition to that of



the CAD/CAM block itself, thus alleviating any visual exposure of the cement/restoration through the restoration or at the interface finish line. With this system, Edelweiss makes use of resin composites of varying opacities that can be used to colour match the restoration with adjacent teeth.

Partially sintered CAD/CAM blocks have the disadvantage of ill-fitting final restoration because of the extensive sintering shrinkage that may occur during the post-sintering process. Being of a homogenous crystalline glass phase, Edelweiss CAD/CAM Blocks does not require any further post-sintering process, hence the advantage of a superior fit where no shrinkage is involved in the processing.

Ceramics are brittle in thin sections and therefore needs to be milled with at least 0.4 mm margins. Ceramics also require extensive tooth preparations and needs to incorporate resistance and retention forms into the preparation design. Edelweiss CAD/CAM Blocks can be milled to 0.2mm margins, hence promotes gingival health and aesthetically superior because margins are almost invisible. Zirconia blocks may be considered to strong and when used over implants may cause fracture of implant screws. Resin and composite blocks also possess satisfactory mechanical properties, but they may have comparatively lower wear resistance than ceramic-based blocks. Edelweiss CAD/CAM blocks has the strength similar to ceramics without the brittleness making it ideal when used in minimal invasive preparations.

The magnitude and direction of occlusal forces exerted on the restoration should also be considered when selecting CAD/CAM blocks. Restorations in areas with heavy occlusal forces require materials with high strength and durability, such as Edelweiss hybrid glass blocks. These blocks can withstand the masticatory forces and minimize the risk of fracture or wear.

Each patient has unique needs and expectations that should be taken into account when selecting CAD/CAM blocks. Factors such as the patient's oral health, occlusal habits, aesthetic preferences, and financial considerations should be considered. Customization options offered by Edelweiss CAD/CAM blocks, such as shade matching and material selection, allow clinicians to tailor restorations to the individual patient's requirements. Achieving aesthetic harmony between CAD/CAM restorations and natural dentition requires careful shade matching and surface characterization. Additionally, surface characterization techniques, such as staining can further enhance the aesthetic outcome by replicating the surface characteristics of natural teeth. The Edelweiss hybrid glass block offers superior aesthetics because of its glass like nature and can easily be characterized/stained chairside.

Clinical durability of ceramics is highly related to their brittleness; most ceramic restorations fail because of crack propagation due to the material brittleness. Furthermore, microcracks can be introduced by the actual milling process as well leading to long term failure. Both natural flaws and machining flaws can act as failure origins. Chipping of the veneering ceramic on zirconia restorations continues to be a problem. Furthermore, their direct impact from masticatory forces may cause wear of the antagonist teeth. With Edelweiss CAD/CAM Block there is a balance between strength and wear resistance allowing the restoration to behave similar to natural tooth.

#### **CASE REPORT**

This case report aims to present a clinical case involving the use of the Edelweiss CAD/CAM Blocks and provides a comprehensive review of the existing literature on its indications, clinical outcomes, and patient satisfaction.

A 40-year-old male patient (ASA 1) presented with discoloured teeth and old defective restorations, and he felt that the old crowns

looked too yellowish. The patient desired to restore his aesthetics. Clinically, he presented with defective restorations, insignificant loss of Vertical Dimension of Occlusion (VDO) and compromised aesthetics (Figure 1).



**Figure 1.** Pre operative frontal view revealing old crowns and unsightly buccal lesions.

The pre-operative radiograph was within acceptable limits. In spite of the overall condition, the natural teeth were free of active dental caries and oral hygiene was good with good periodontal health. Occlusal examination revealed a stable inter-cuspal relation between maxillary and mandibular teeth position and no para-functional habit was reported by the patient.

An interocclusal record at the patient's maximum intercuspation position was made using a polyvinylsiloxane bite registration material (Jet Blue Bite fast, Coltene Whaledent, USA).

All old and defective crowns were removed, and the maxillary teeth were prepared according to the principles for full coverage crown restorations (Figure 2).



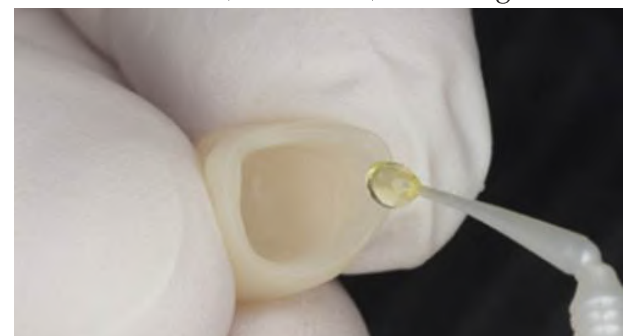
**Figure 2.** Teeth prepared with finish lines at gingival level. The finish line location was largely dictated by the finish lines of the existing crowns and where possible were prepared at the gingival

level. The mandibular anterior teeth were prepared for more conservative veneer preparations. A light body polyvinylsiloxane material (President, Coltene Whaledent, USA.) was carefully injected onto the tooth preparations, ensuring the material reached all teeth surfaces including the margins to be recorded. A stock tray loaded with putty material (President, Coltene Whaledent, USA.) was seated over the dental arch to make the definitive impression. The material was dispensed directly onto the occlusal surface of the lower teeth and mandible was moved into patient's maximum intercuspation position. The shade was determined using a shade guide (Vitapan 3D Master, Vita, Lichenstein). The crowns and veneers were then manufactured by the dental laboratory team using edelweiss CAD/CAM T (Translucent) Blocks (edelweiss Dentistry, Austria). Once received, they were tried in for accuracy of fit (Figure 3).



**Figure 3.** Try-in of crown to assess the accuracy of fit.

The fitting surfaces of the restorations were prepared prior to cementation by applying a thin layer of Edelweiss Bond (edelweiss Dentistry, Austria) (Figure 4) and light cured for 10 secs (Valo, Ultradent, USA) (Figure 5).



**Figure 4.** Application of edelweiss Bond to the inner surface of the crown



Figure 5. Light curing of edelweiss Bond for 10 seconds.

The prepared surfaces of the teeth were etched using 37% phosphoric acid (Ultra-etch, Ultradent, USA) for 15 seconds (Figure 6), thoroughly rinsed off to remove all etchant.

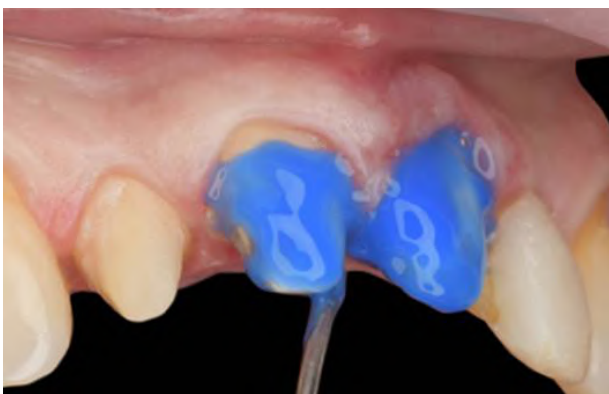


Figure 6. Teeth etched with 37% phosphoric acid for 15 seconds.

All-Bond Universal bonding agent (Bisco, USA) was applied liberally to the moist tooth surfaces (Figure 7) and light cured for 20 seconds.



Figure 7. Application of dentine bonding agent on to etched surfaces of teeth.

The appropriate shade of composite was selected and dispensed and evenly spread on the inside of the crown (Figure 8 & 9) and then seated onto the prepared tooth. Excess composite was removed (Figure 10), light cured for 20 seconds on all surfaces (Figure 11) and the restoration margins were finished and polished using fine diamond burs, rubber finishers and polishers (Figure 12).



Figure 8. Appropriate colour of composite selected.



Figure 9. Composite spread evenly into the fitting surface crown.



Figure 10. Crown inserted and excess composite removed along the margins.

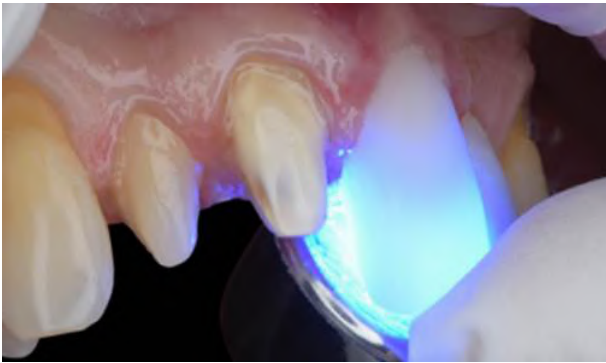


Figure 11. Light cured for 20 seconds in all directions.

Both the static and dynamic occlusion was checked, and after some minor adjustments and interferences eliminated the patient was dismissed with stable posterior contacts. At the first recall, the restorations were inspected, and some minor modifications implemented. At this recall appointment, patient expressed complete satisfaction with both the aesthetics and function.



Figure 12. Post operative view showing excellent natural aesthetics of the Edelweiss CAD/CAM Blocks.

## DISCUSSION

There is a wide variety of CAD/CAM blocks available on the dental market consisting of different types of materials that may vary in size, colour, strength, aesthetics with varying translucence and chromacity and may or may not require a post milling treatment. Nowadays, manufacturers suggest that clinicians have more than 20 blocks available for chairside use as both strength and aesthetics necessitates the need to have a variety of blocks in one's inventory. Because of this variation in the properties of the current blocks it may seem logical, therefore, to have blocks that can combine both the strength and aesthetics into a single block.

Edelweiss Dentistry, through its latest laser sintered hybrid glass technology, makes use of this concept of having a single translucent

block that mimics the translucency of enamel while the underlying dentin shade can then be duplicated through the use of various resin composite/cement shades. Through this process of laser sintering, together with high temperature and pressure, the mechanical properties of the material have improved, giving the material a combination of resilience (principal property of the dentine) and resistance to wear (property attributed to the enamel). The Edelweiss CAD/CAM Blocks combines the best properties of glass ceramic, particle filled ceramic and resin technology into a single CAD/CAM block.

## CONCLUSION

Material choice in CAD/CAM restorations is largely dictated by aesthetics and/or function. And clinicians need to plan this at the start of the treatment. Outstanding results can be achieved by carefully selecting suitable materials that can blend in with the environment masking any underlying discolorations by using the right CAD/CAM Block and implementing an optimum preparation design with minimum loss of good tooth structure.

With recent advancements in CAD/CAM blocks the combination of aesthetics and strength may no longer need to be compromised. By selecting the right CAD/CAM block, clinicians can achieve restorations that offer a harmonious blend of aesthetics, functionality, and longevity, ultimately contributing to improved patient satisfaction and oral health outcomes.

The new Edelweiss CAD/CAM block combines the properties of both particle-reinforced and predominately glass ceramics are featured in a single hybrid glass block, having the flexibility of dentin and the wear resistance of enamel. It thus gives aesthetics that matches the translucency natural enamel and the chromacity of dentine without comprising its strength.

In the clinical case reported, the Edelweiss CAD/CAM block restored both the aesthetic properties of the tooth structure that blended in with the shade and vitality of the natural surroundings whilst using the least invasive method of restoring the teeth.

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## One Day Dentistry - A Practice to Master

### Dr Segin Chandran

- Oral and Maxillofacial Surgeon
- Oral Implantologist
- Digital Dental and Surgery Specialist
- CEO and Managing Director:  
Kamala Dental Specialty Hospital, Kerala, India

“One-day dentistry” also known as same-day dentistry, is a concept in which a patient can receive complete dental care in a single visit to the dentist's office. This approach is becoming increasingly popular among patients who have busy schedules and cannot avail time for multiple visits to the dental office.

The latest technological advancements in computer aided design and manufacturing systems (CAD/ CAM) allows the possibility of speedy dental restorations. These systems help dentists to create dental restorations such as crowns, bridges and veneers at the ease of their chair side time during the patient's waiting time. This process, thus eliminates, the need for multiple appointments and temporary restorations which could be an inconvenience for patients due to lack of available time, or unacceptable aesthetics of temporization. In addition, same-day dentistry can also include other dental procedures such as fillings, root canals, and even extractions in some cases.

The goal of same-day dentistry is to provide patients with high-quality dental care in a convenient and efficient manner. Hence this protocol can be considered as a boon for non-residential patients having limited holidays with an urgency to complete their dental procedures within a minimal period. However, it is important to note that not all dental treatments can be completed in a single visit, especially if the treatment involves soft tissue healing time and gingival volume stabilization.

In rare occurrences, despite one's best efforts to communicate with lab works using shade

tab images, drawings and digital photographs, the results may get compromised in its aesthetics or function. Even in top rated dental laboratories, there may be contingencies that their technicians may change thus causing variations in experience and technical expertise. Therefore, there could be times when we may not be able to establish control over situational variables thus affecting the total planned outcome of dental laboratory services.

Over the past decade, there has been a significant rise in the adoption of digital workflows across dental practices worldwide. Advancement of digital technology has revolutionized various aspects of dentistry including diagnosis, treatment planning, and fabrication of dental restorations. Many dental practices have incorporated various levels of digitalization at different levels, customizing their own needs starting from data storage, clinic management software, and digital diagnostic methods like RVG, OPG, CBCT.

Over the last few years we have seen an influx of digital scanners being incorporated into dental practices replacing conventional impression materials. Reproducibility, easy communication, corrections during acquisitions, high accuracy levels are some of the qualities which make intra oral digital scanning most accepted and preferred amongst the dental fraternity.

Digitalization has helped the dental fraternity to have in-house restorative options such as milled (subtractive) or 3D printed (additive) manufacturing techniques. The milling protocol is more common and time-tested

offering better accuracy levels in comparison to 3D printing for temporization as well as permanent crowns.

With such digital revolutions taking place, alongside the unprecedented evolution in the use of artificial intelligence and machine learning, the field of Dentistry is developing at a rapid pace. It only remains to be determined as to what percentage of conversion has taken place in terms of digitalization in our dental practices. The process of digitization however may be gradual as all digital protocols cannot be learned and used overnight to replace of the analog protocols that we presently practice.

The higher learning curve which is expected to be achieved while adapting to the developing digital protocols is quite concerning. It involves a higher equipment procurement and maintenance expense, which triggers an underlying stigma associated with higher investment and lesser return. However, this stigma is untrue. If well formulated, the in-house fabrication of prosthesis will gain better benefits in much lesser time. Besides, there would be more acceptance due to lesser wait time, whilst permitting us to offer procedural charges similar to that of lab delivered work with better precision and aesthetics in a shorter duration.

We all look forward to improving our efficiency in our day to day work and practices. Efficiency is nothing but improved productivity in lesser time. Digitalization of our facility has seamlessly helped @ Kamala Dental Specialty Hospital improve our efficiency multifold. Just like any other isolated dental practice centers during the pandemic period, we were very much in need for an in-house productivity channel to cater to the needs of our associated patients at that time.

Most of us adapted to digital diagnosis and digital impression into our practices at that time. However, very few of us have made it to the next level of in-house manufacturing of dental prostheses and in-house fabrication of surgical guides for guided surgeries. There

was a thought to have chair side design option to check the merits of tooth preparation before it reached the manufacturer. Early detection of errors in tooth preparation would allow modifications thus avoiding repeating prosthesis after manufacturing.

One-day dentistry and One-day implant protocols are possible only by incorporating chair side milling units. CEREC was born as an alternative to conventional amalgam fillings, then available composite restorations that had high polymerisation shrinkage and to incorporate minimally invasive procedures like inlays and onlays than opting for full coverage crowns. Thus the idea of computer-assisted production of ceramic restoration was born.

The CEREC chair side designing and manufacturing system as such is not a new concept .It was way back in 1973 Dr Francois Duret conceptualized the first chair side CAD/CAM system. It was Dr. Werner Mormann a Swiss prosthodontist and his Italian engineer Marco Brandestini who developed the first functioning chair side prototype of CEREC. It was in 1980, now over 40 years the softwares and the hardwares developed a full-fledged reliable system provide solution for most of our restorative needs.



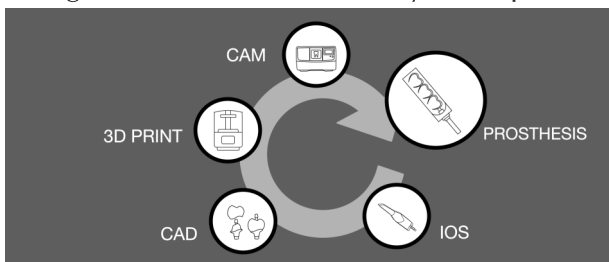
**Fig 1. CEREC System with Speed Fire**



**Fig 2. Planmill from Planmecca**

The latest chair side manufacturing units provide both wet and dry milling. Most

popular and available options are CEREC Dentsply Sirona and :Planmill from Planmecca .The most popular and most accepted workflow is CEREC . Finding the right tool ,materials and protocol for most of the indications in prosthetic and restorative procedures end here as its an open system to receive blocks from different manufacturers. CAD/CAM workflow is very simple. Scan — Design — Fabricate — Delivery to the patient.



**Fig 3. Chair side CAD CAM Workflow**

The latest generations intra oral scanners are faster, more accurate and provide the maximum depth scanning. This makes the scanning much superior recording sub gingival margins, prepared post space and implant impressions.

The acquired 3 Dimensional images are magnified minimum 40 times in designing software's that helps in maintaining marginal integrity and a perfect restorative seal.

When we visualize our own preparations in CAD/CAM software, this is the best tool for self evaluation and corrections. The clinical skills of restorative dentist improves many fold once he evaluates his own preparations in such a high magnification. The latest CEREC

software evaluates the preparation for margins, clearance and adequate thickness for the material choice for the restoration. The CEREC Designing software provide a restorative design proposal digitally using preferred algorithms and artificial intelligence (AI).

These designs can be tweaked according to the clinician's choice by means of designing tools. These tools are much easier than photoshop or any other computer programmes. Anyone with minimum computer knowledge and designing skills can

master this digital workflow in few days' time. One can easily make inlays, Onlays, Crowns and Bridges upto 3-4 units.

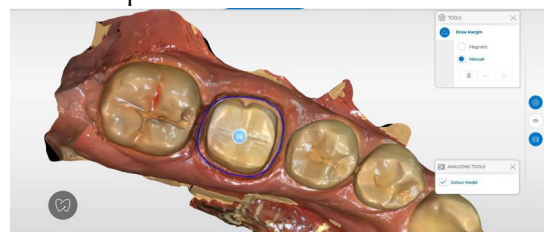
With the advent of implant based prosthetic options, the long span bridges are nowadays eliminated from most of the dental practices.

The material choices are also in plenty as we have Dentsply Sirona and many other restorative material manufacturers like Ivoclar, GC, VITA, Coltene are also making CAD/CAM blocks suitable for CEREC. Both temporary and permanent restorative options are available in CEREC blocks. The materials with compressive strength ranging from 125 MPa to 1200 MPa are used for different occlusal load demands.



**Fig 4. CEREC Blocks**

These designs can be tweaked according to the clinician's choice by means of designing tools. These tools are much easier than photoshop or any other computer programmes .Anyone with minimum computer knowledge and designing skills can master this digital workflow in few days time. You can make inlays, Onlays, Crowns and Bridges upto 3-4 units .With the advent of implant based prosthetic options, the long span bridges are nowadays eliminated from most of our practices.



**Fig 5. Intra Oral Scan with margins marked**



**Fig 6. Preparation Analysis in CEREC software**



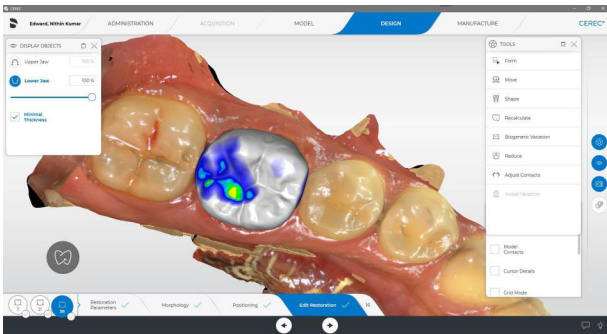


Fig 7. Crown Proposal from CEREC

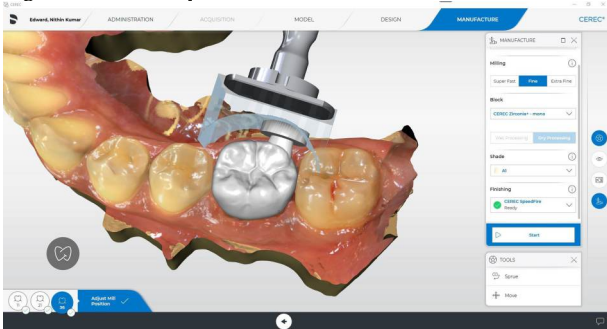


Fig 8. Crown ready to mill

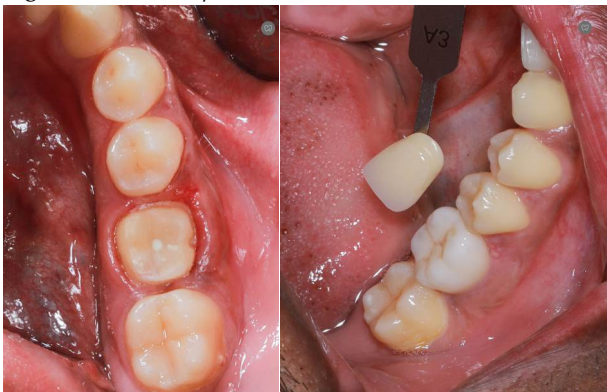


Fig 9. Tooth preparation Fig 10. Trial and shade matching



Fig 11. MIYO staining Fig 12. Final Restoration in 1 hr

The material choices are also plenty and we have Dentsply Sirona and many other restorative material manufacturers like Ivoclar, GC, VITA, Coltene are also making CAD/CAM blocks suitable for CEREC. Both temporary and permanent restorative options are available in CEREC blocks. The materials with

compressive strength ranging from 125 MPa to 1200 MPa are used for different occlusal load demands.

In one day dentistry, the need for temporisation is eliminated most of the times and we are able to deliver the permanent prosthesis in few hours time. Still we temporise in those cases where the soft tissue profile is altered for the aesthetic enhancement or to enhance the periodontal conditions, till we gain a stable soft tissue architecture around the planned prosthesis.

The cross-linked acrylic / PMMA blocks are available in different shades and sizes to provide aesthetic temporization. They are soft, so fast milled and delivered chair side. These are faster than 3D printed temporary crowns, and are available in multilayered polychromatic blocks. But the strength is only 100- 150 Mpa.

For interim restorations that need to be maintained for months and at times to years, the hybrid blocks are used. These hybrid materials, a combination of composite resin and ceramic fillers offers a better colour stability, wear resistance and polish ability giving both advantages of composites and ceramics.

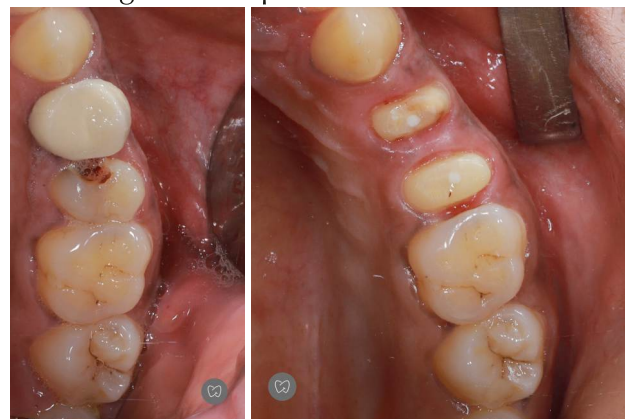


Fig 13. Faulty crown Fig 14. Teeth Preparation and decay 24,25



Fig 15. Hybrid ceramic teeth with in 1 hr

The Leucite reinforced composite blocks are also commercially available. The permanent restorative options for chair side CAD/CAM - Lithium disilicate and Zirconia remained the best options. Zirconia being opaque and much harder in nature, though remain a choice in stress bearing areas.

Multiple unit bridges, and patients with para functional habits like bruxism or clenching. Monolithic Zirconia or Zirconia framework layered with glass ceramic are the materials of choice. Multilayered Zirconia blocks are now available for use with CEREC milling in different translucencies owing to a compressive strength ranges between 850-1200 Mpa.

Though it offers high strength and durability the wear and tear to the opposing natural teeth and damage to periodontal tissue in case of occlusal disharmony are considered as drawbacks of this particular material.

Lithium disilicate offers high translucency due to its silica content and is the material of choice for the anteriors and posteriors when restorative thickness is adequate and the functional occlusal load is minimal. Lithium disilicate offers a compressive strength range between 350-700 MPa.

Tessera from Dentsply claim to have maximum compressive strength in Lithium disilicates i.e., 700MPa, making it suitable for both anteriors and



Fig 16. Crown Prep in 15

Fig 17. Tessa Crown in 15



Fig 18. Crown Prep in 25

Fig 19. Tessa Crown in 25

When this protocol is in house, the clinician takes control over all the variables that can affect the clinical outcome. Both functional and aesthetic parameters are evaluated and taken care during the acquisition (intraoral scanning), designing and faster chair side milling and characterisations done by staining and glazing or using the latest liquid ceramics. (MIYO/CERA Motion)

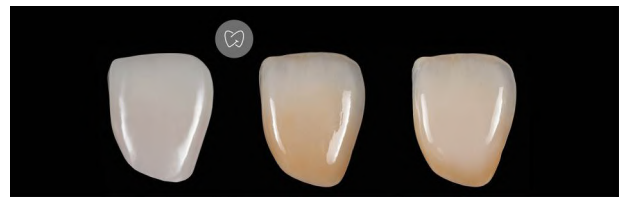


Fig 20. MIYO Characterization



Fig 21. High Aesthetics created in shorter time

Chairside milling units are faster, when milling soft Zirconia blocks (usually 7 - 10 minutes) compared to pre sintered lithium disilicate blocks which takes around 15-20 minutes. Anterior teeth that demands high end aesthetics can be given with a cut back in the entire labial or the incisal area for the secondary characterisations like translucency and mamelons in traditional conventional lab protocols.

Thus chair side CAD/CAM solutions are not more reliable in providing faster solutions. This makes the one day dental practices a step above others in higher conversion rates with utmost patient satisfaction.

**Case Report:  
One Day Implant and One Day Crowns**

Female patient aged 46yrs with history of trauma and fractured central incisors, root canal treatments and crowns in porcelain fused to metal done 15 years back in our

centre, currently staying in Houston (USA) fractured one of her right central incisor at root level and consulted her dentist and confirmed the damage. She preferred to get the corrections done @ Kamala Dental as her previous treatment lasted 15 years and she was happy with it.

When she contacted our office she was happy to know that we have several faster and reliable options now. She flew down to Kerala only for her dental visit and she had shaky incisor when she rushed to our practice directly from Airport.

She was happy as she went to her parents in Thiruvananthapuram without any visible change in her smile in 3 hrs time. The procedural sequence is high here.

Her shaky central incisor crown was removed, the root membrane therapy was performed to maintain gingival and bony architecture preserving smile line and labial bone around the socket. The pre-existing crown was reshaped and connected to a temporary abutment. The temporary prosthesis was then fixed to "Anyridge Implant" in fresh extraction socket giving good socket seal.

She was back again after 9 months time to get her crowns changed to highly aesthetic crowns made of Tessera Lithium disilicate. In CEREC protocol in one day time again!

**First visit: One Day. 3/09/22**

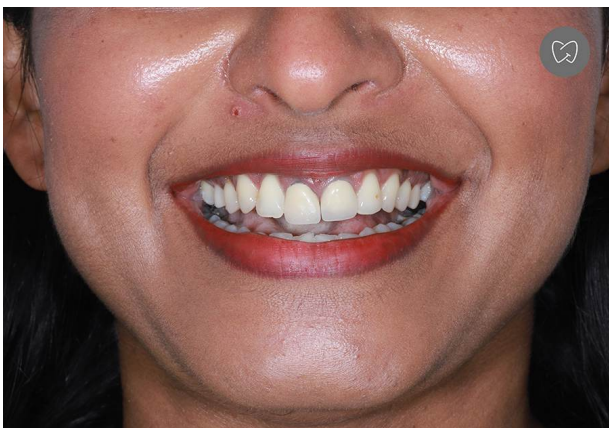


Fig 22. Fractured Crown



Fig 23. Central incisor 11 with 15 yr old PFM crown



Fig 24. Root fracture below CEJ

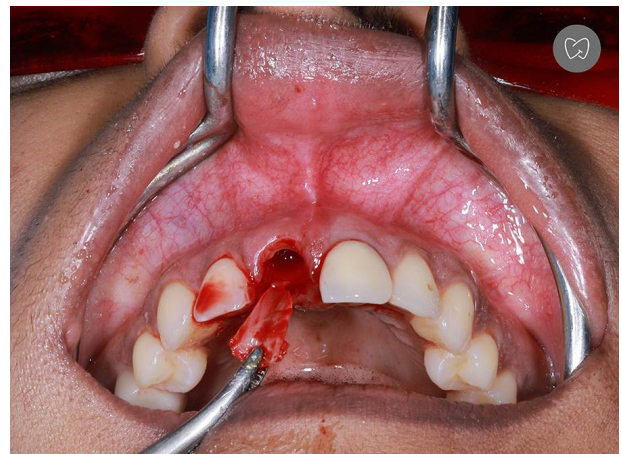


Fig 25 Partial Extraction



Fig 26. Root Fragment extracted



Fig 27. Megagen Anyridge implant placed

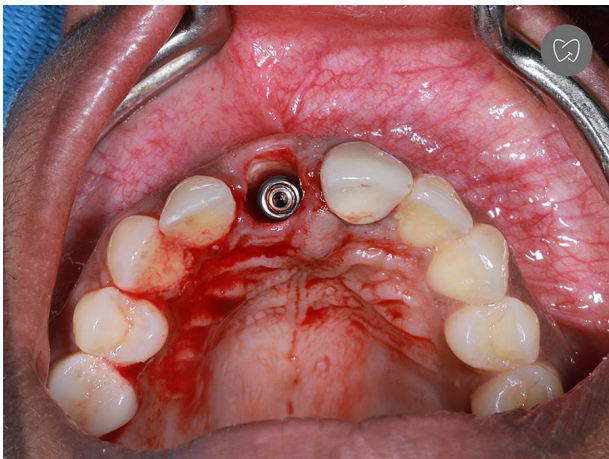


Fig 28. Incisal view



Fig 29. Temporised with existing crown



Fig 30. Smile restored in 3 hrs

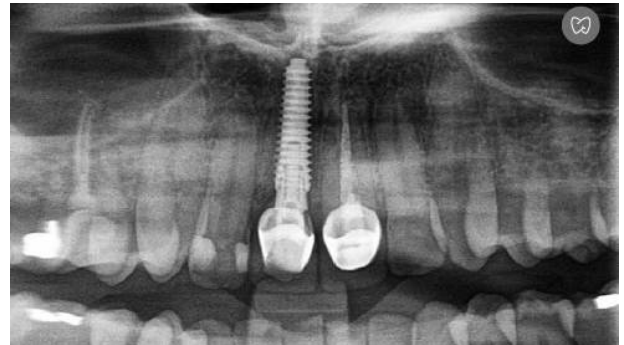


Fig 31. Post OP Radiograph

**Second Visit: One Day. 10/06/23**

Patient returned to our dental hospital with love and gratitude to complete her planned procedure of crowns replacement to new aesthetic and durable ones. We could do this within a day time as we were equipped to CEREC one day protocol for implant crowns as well. Two CEREC milled multi-layer E max Zr CAD crowns with MIYO liquid ceramic characterization were delivered in a day time.

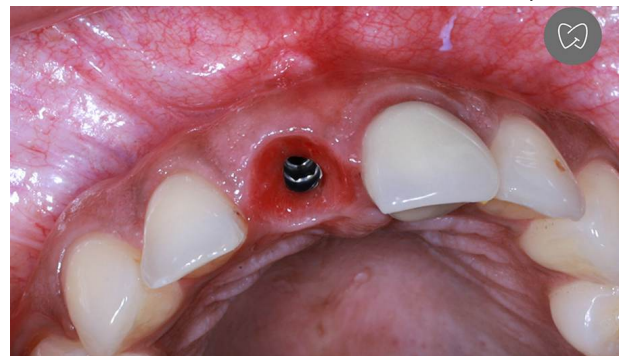


Fig 32. Good Emergence profile after 9 months



Fig 33. CEREC Crowns proposal

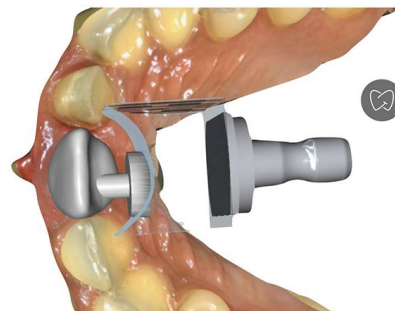


Fig 34. CEREC milling in selected blocks



Fig 35. After glazing and characterization



Fig 36. Palatal view



Fig 37. Smile Restored

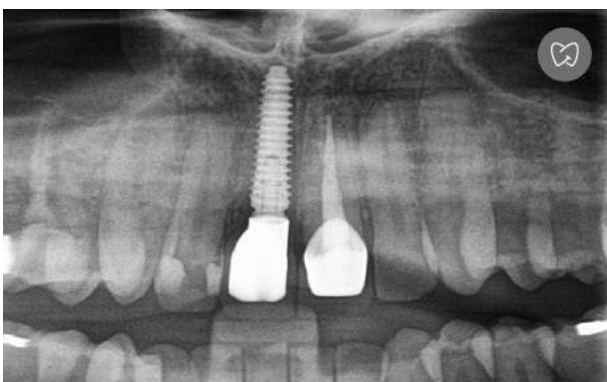


Fig 38. Post OP Radiograph

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## DIGITAL ANALYSIS FOR MIDLINE DIASTEMA CLOSURE USING DIRECT COMPOSITES

### Dr. Denzil Albuquerque

- MDS
- He is a senior clinician with over 12 years of specialist experience.
- His private practice is exclusive in microscopic dentistry specializing in restorative and cosmetic dentistry, micro-endodontics at Dental Expert, Mumbai, India.

### Introduction

Maxillary anterior spacing or midline diastema is a common complaint of patients as it draws immediate non-aesthetic attention. Multiple options exist for closure of a diastema that aim to either camouflage or biologically close the space. A treatment plan should be formulated after a thorough analysis and must be inclusive of the patient concerns.

### Case Report

A 32-year-old female reported to the practice with a complaint of spacing and discoloration in the upper front teeth region. Intra-oral examination revealed presence of midline spacing between maxillary central incisors with a previously de-bonded restoration. Considering scheduling, economical and aesthetic options, a direct composite restorations for diastema closure was planned.



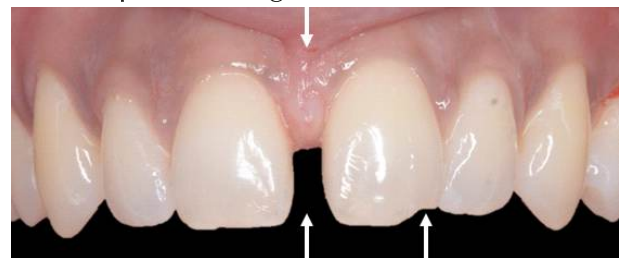
**Fig. 1.** Initial Presentation. Previously conjoint filling between central incisors, de-bonded and separated from tooth #11 with a stained open margin



**Fig. 2.** Smile Analysis. Pleasing smile line & profile. Incisal edge position maintainable. Low lip line ensures no visibility of cervical margins or gum positions.



**Fig. 3.** Diastema visualization after removal of old composite filling.



**Fig. 4.** Local factor assessment. High papillary frenal attachment, wide midline diastema. #21, rotated mesio-labially with disto-incisal edge fracture.



**Fig. 5.** Tooth Proportions Analysis. Height to width ratio discrepancy noted. Visually pleasing ratio ranges from 75-85%. #21: longer and wider than #11, with gingival zenith more apical.



**Fig. 6.** Planned Tooth Proportions and Outline. Equal and visually pleasing ratio. Although slight discrepancy exists in individual tooth measurements (#21 > #11), maintaining midline and equal proportions will allow for visual camouflage. Gingival position and zenith mismatch to be unaltered as it not visible in smile due to low lip line.



**Fig. 7.** Shade Match. Multiple composite buttons of different shades are placed from cervical to incisal third in thickness corresponding to final restoration. The images are digitally modified to match value in a black and white image and chroma in a high saturation image.



**Fig. 8.** Rubber Dam Isolation. Anterior sextant isolation is preferred to allow for visualization and perspective of adjacent teeth. Rubber dam isolation enhances soft tissue isolation and provides a contamination and distraction free environment.



**Fig. 9.** Palatal Wall Build Up. No additional tooth preparation was done. Enamel etching was followed by adhesive application and palatal wall build-up individually on each tooth. A clear plastic matrix was used which was finger supported palatally.



**Fig 10.** Proximal Walls Built Up. Proximal walls built successively with curved sectional posterior matrices (TorVM). Note the gingivally re-positioned, broad contact areas to allow for papillary closure of the cervical embrasure without black triangle formation.



**Fig. 11.** Labial Layering. Labial composite layering; distal edge buildup of #21.



**Fig. 12.** Initial Contouring, Finish and Pre-polish.



**Fig. 13.** Before and after comparison of diastema closure.



**Fig. 14.** Immediate Post Operative Assessment. Individual tooth proportions equal, within desired limits of 75-85%.



**Fig. 15.** Shape Assessment. Similar tooth shapes and outlines.



**Fig. 16.** Immediate Post Operative Assessment. Minimal embrasures (arrows). #21 slightly wider, more prominent than counterpart. Rounding off vertical labial line angles will minimize visual discrepancy.



**Fig. 17.** Final Restorations after refinement of labial line angles and opening up embrasures.



**Fig. 18.** Smile restored in harmony with lips, smile line and facial midline.



**Fig. 19.** Before and after comparison of diastema closure with direct composites.



**DISCUSSION**

- Incisal Edge position is the starting point for all smile corrections.
- The incisal width to length ratio of the central incisors is a major determinant of the treatment plan.
- Digital analysis using photography allow for predictable analysis, planning and execution of anterior aesthetic restorations.
- Composite restorations need clinical skill, adequate armamentarium and understanding of the material.

**CONCLUSION**

Attention to details, digital analysis using photography and thorough planning and execution allow for predictable, immediate, aesthetic diastema closures with direct composites.

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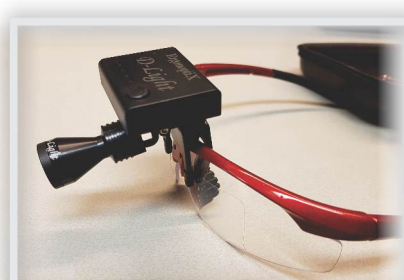
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**RESTORING LOST TOOTH STRUCTURE USING SHORT FIBER REINFORCED COMPOSITE AS REINFORCEMENT.**

**Dr. Varsha Rao**

- Dr. Varsha Rao has been in clinical practice for more than 23 years
- She has received extensive training in implant and aesthetic dentistry
- She is passionate about restorative dentistry and speaks on the topic of simplifying composites in day to day practice
- She is the HCP for the direct restorative line for 3M India and Key opinion leader of Ultradent India, Garrison dental, Ind.
- She is an accredited member of IAACD and an accredited speaker of Maharashtra state dental council

**Introduction**

Loss of tooth structure as a result of trauma is a clinical situation that most clinicians have to face in their practice. The lingual putty index technique is a predictable way of delivering lifelike buildups. In addition to this, if we use fibre reinforced materials, the longevity of the restoration may also increase. This case presentation documents both these steps.

**Case Presentation**

A 21 year old student presented with a Ellis class 2 type fracture involving the enamel and dentin due to trauma. We decided to go ahead with a buildup with composite material using a combination of universal composites and short fibre reinforced composite. The description of the procedure is detailed in the pictures as follows:



1- Preop view



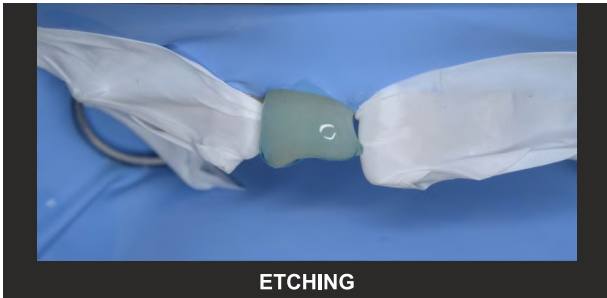
2-Mockup(buildup with composite) was made in an attempt to recreate lingual anatomy of the tooth.



3. A palatal index was made using silicone impression material.

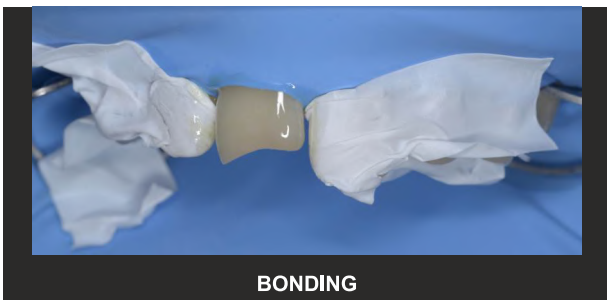


4 & 5. The putty is scored at the level of the fracture. (This marking will help load the enamel /body shade directly on the index)



ETCHING

6. The tooth was prepared using a FO21F bur (Mani) to place a bevel about 3-4 mm in depth and 0.5 to 0.7 mm in depth and the bevel was smoothed using Soflex (3M) coarse disc. Total etching (etching both enamel and dentin) was done using Unietch with BAC (Bisco)



BONDING

7. Bonding agent (SBU from 3M) was applied and cured.



BODY SHADE UPTO THE MARKING

8. Body shade (3M z350xt) was used as the first layer.



PALATAL SHELF-BODY SHADE

9. Palatal shelf using the Lingual patty index.



REINFORCING THE SHELF USING FIBER REINFORCED COMPOSITE FLOW

10. The Palatal shelf was reinforced using EverXflow (GC).

The short-fiber content of everX Flow works in a manner similar to the concept of iron rebar in construction. It supposedly helps reinforce restorations and increases fracture toughness. Fibers also help to redirect cracks and avoid catastrophic failures.



MAMELONS WITH DENTIN SHADE

11. The bulk of the restoration is then built with dentin shade, mamelons (taking reference from adjacent tooth) is built into this layer.



WHITE TINT FOR SOME CHARACTERISATION

12. White tint is added for characterization.



FINAL LAYER - BODY SHADE

13. The final layer was made using body shade again.



FINAL CURE THROUGH KY JELLY

14. The final layer was cured through an invisible barrier (KY jelly was used in this case) to rid it of oxygen inhibiting layer.



MARKING FOR ADJUSTMENTS

15. The line angles and excesses were marked using a micro mechanical lead pencil Excess composite was removed and finishing, polishing was done using Soflex discs and spirals (3M).



IMMEDIATE POST OP



IMMEDIATE POST OP

16 & 17. Immediate post op.



18. Preop and Post op collage of the Case.

**CONCLUSION**

To remain minimally invasive while treating a young tooth and to ensure longevity and strength to the restoration was the goal of the clinician while performing the above procedure .To use the lingual putty index technique is a predictable way of ensuring the restoration looks lifelike and natural .

**DISCUSSION**

To have a set of protocols in place while doing aesthetic procedures is a time and material efficient way to execute them .It is easy for a clinician to follow set protocols rather than do things in an arbitrary manner .

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## RESTORING - THE INDIRECT WAY

### Dr. Pranoti Veta

- Dr Pranoti Veta, graduated from Bharati Vidyapeeth Dental college and hospital, Navi Mumbai, 2014.  
- Has been awarded as Runner up at Indian Dental Divas as Aesthetic Dentist of the year 2019 and 2020

### Introduction

One of the patients desire when seeking dental treatment is the aesthetic transformation of their smiles in short span of time. Thus, conservative treatments that are solutions to aesthetic problems including modifications in colour, shape and size which provides the results that patient expects should be the first option. Ceramic veneers / laminates are capable to mimic natural teeth with great colour stability, periodontal biocompatibility and long term predictability.

### Case Presentation

23 year old patient came with a chief complain of unpleasant smile and gap between teeth. On examination, radiographically both central incisor were root canal treated 8-9 years back which were asymptomatic. Clinically, left central was slightly discoloured.



Fig. 1



Fig. 2



Fig. 3



Fig. 4

### Treatment Plan

Lithium disilicate Veneers from canine to canine except 21-full coverage Emax layered zirconia crown. Mock-up made with composite on plaster model poured in clinic itself. Using this mockup, putty index /template was made with heavy body from 3M for transferring the same intraorally for test drive with bisacrylic (3M Protemp).

Immediately after satisfactory test drive and patient approval, the same bisacrylics were used as preparation guide (APT) so as to guide the preparation over this material for minimal enamel loss possible with 0.5mm depth cutting bur. In diastema, margins to be placed 2mm palatal to the midline papilla.

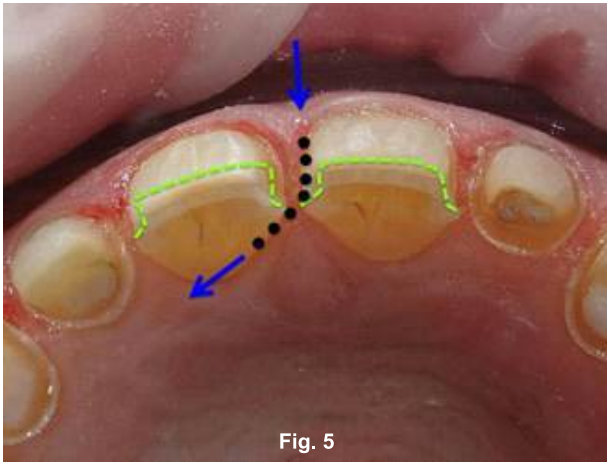


Fig. 5



Fig. 6

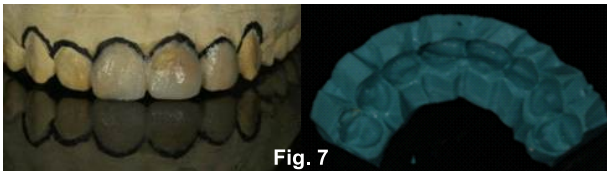


Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11

Later impressions were made using heavy and light body A-silicone (3M) with 000 retraction cord (ultradent) placed in the sulcus.



Fig. 12

Provisionals made up of bisacrylic given to the patient till the final prosthesis were delivered.

To minimize chances of errors such as marginal fit and flush bisque trials were done with shade selection.



Fig. 13



Fig. 14

After receiving prosthesis from laboratory (katarra dental) fit was checked on model followed with some aesthetic shots.



Fig. 15

After been checked intraorally and approved both by me and patient, went ahead with cementation which is the last but critical step and it has to be done carefully which will give good predictability. The teeth were isolated and other required material were kept ready.



Fig. 16



Fig. 17

Laminates being thin and fragile are prone to fracture during handling or misplacing, so embedded them in putty such as the intaglio surface is upside which also ensures proper step by step conditioning. Initially, the surface is treated with 9.7% Hydrofluoric acid for 90 seconds washed thoroughly with saline then again etched with 37% phosphoric acid to remove debris, rinsed and air dried it. Later silane coupling agent was applied and left it to dry for about 120 seconds.



Fig. 18



Fig. 19

Once the prosthesis are ready, condition prepared teeth initially with 37% phosphoric acid for 20 seconds and then generous rinsing and drying to be done such that prepared teeth should be clean.



Fig. 20

The bonding agent (3M universal scotch bond) is then rubbed for 20 seconds and thinned out bonding layer with air, ensuring that there's no excess agent that will interfere with the passive fit of the veneer followed by curing for 20-30 seconds.



Fig. 21

The cement is applied onto the internal surface of the veneer and placed on the tooth incio-cervically ensure all margins are correctly seating, tack cure for one second and remove excess cement.



Fig. 22



Fig. 23



Fig. 24

Later light cure properly for 30 second followed by curing under liquid based gel (K Y JELLY) to remove Oxygen Inhibited Layer. Making sure to clean excess from all surfaces followed by polishing with extra fine abrasive strips to finish the margins.



Fig. 25



Fig. 26



Fig. 27



Fig. 28





Fig. 29



Fig. 30



Fig. 31



Fig. 32



Fig. 33  
From forced to confident smile

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## Digital Smile Designing – Smile transformation in a Digital Way!!

**Dr. Bhushan Lachke** B.D.S.

- Accredited Member (IAACD)
- Board of Directors (IAACD)
- Nobel Fellowship (ISOI) in 2014
- Trained under Dr. Walter Devoto, Founder of Style Italiano for Direct Composite programme.
- Publishes case reports in various journals.
- Conducts training programmes on Direct Anterior Composite Restorations and Photographic Documentation Protocol.
- Director at Smile.Com Dental Clinic (Navi Mumbai)

### Abstract

This article describes an esthetic rehabilitation of a case of mild fluorosis in a Young Girl; Bonded glass ceramics i.e lithium Disilicate restorations were given to improve the color, shape and alignment of the teeth. One month follow up have displayed acceptable outcomes and esthetic appearance.

### Introduction

Dental fluorosis is caused by an excessive fluoride intake during tooth formation. Fluoride-containing dental products and drinking water are two main potential sources for this developmental tooth disorder. Fluoride-related alterations in enamel lead to surface hypermineralization and sub surface hypomineralization which are characterized by white opaque appearance with secondary brown stains.

The successful treatment of fluorosed teeth is a subject of interest in the literature. An appropriate treatment plan may be selected depending on the severity of the fluorosis.

In the mild cases of dental fluorosis, clinical appearance is characterized by opaque white areas presenting as horizontal lines and cloudy patches on the enamel surface. Bleaching and microabrasion have been recommended for these forms of fluorosis.

In the moderate level of fluorosis, all tooth surfaces are affected by white opacities. Brown stains also present in involved teeth. Some pits and wear area may be observed on the surfaces as a result of damage to the poorly mineralized enamel. Treatments

include microabrasion, direct composite restorations or combination of both methods. In some instances like severe cases, esthetic veneers or crowns may be necessary for the some patients. Frequently, the management of fluorosis involves resin composite restorations. In this situation, some concerns raise about the effect of etching and bonding agents on the fluorotic enamel and dentin.

This article presents the stages of esthetic rehabilitation of a patient with moderate fluorosis including indirect veneering and old pfms replaced with Zirconia crowns .

### Case Presentation

A 25yr young girl was referred to the clinic for the esthetic rehabilitation. She had to appear for Cabin Crew interview for a reputed Air-lines. On examination, rotated left lateral incisor, missing canine and generalised Flurosis present. (ref. Image 1 & 2).



Image 1: Preop DATA Intraoral



Image 2: Extraoral DATA

**Treatment & Plan**

Through prophylaxis done. Digital Mock up Design made from Exocad software and 3D printed model fabricated with same Design. Putty Index made with Addition Silicone material to transfer APT (Aesthetic Pre-evaluative Temporaries) (ref. Image 3 and 4) which is used further for temporization also.

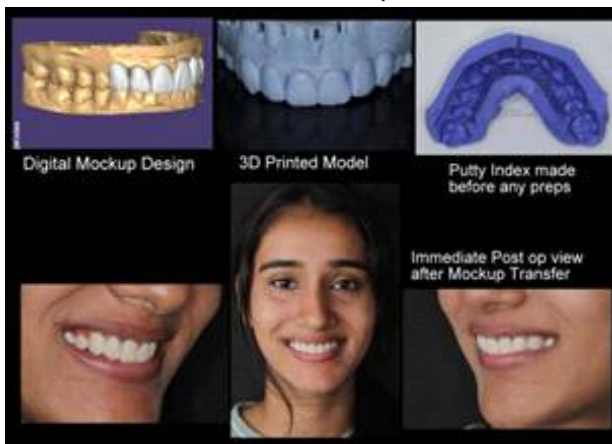


Image 3: Mockup Transfer



Image 4: APT

With the patients need to improve in her smile in terms of shape and color, we decided to go for highly esthetic restorations i.e lithium disilicate Laminates in upper anteriors and zirconia crowns to replace old pfm crowns. Laminate preps done with depth Cutting burs followed by non end cutting taper burs Polishing of preps done with swissflex, Coltene discs (ref Image 5 & 6).



Image 5: Preps Through Temps



Image 6: Polished Preps

Prep of left premolar done in such a way to make it look like canine, same instructions given to Lab technician to fabricate Design of that premolar. Analog Impression made with Addition Silicone and temporization done with protemp 4 (ref image 7).



Image 7: Post Prep Temporisation with Bis GMA

Digital Designing of Final veneers done on EXOCAD software by lab on scanned models. (Ref. Images 8 and 9).

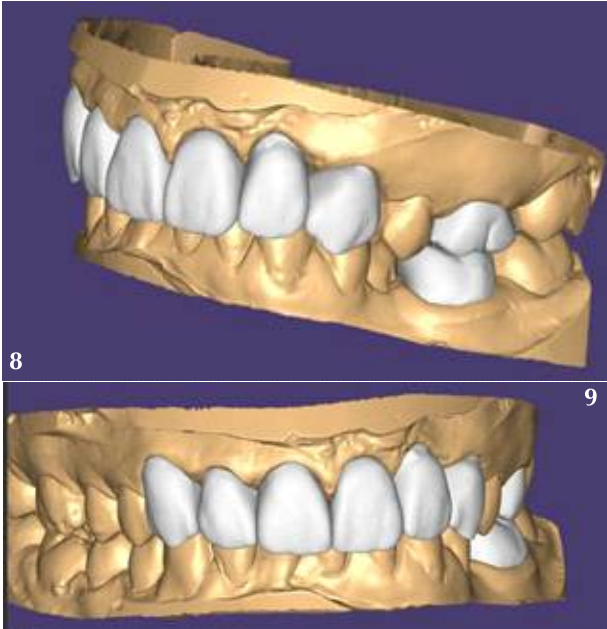


Image 8, 9: Digital Planning done for LiDi Designs in Exocad Software and prosthesis made in a CAD CAM technique.

Bisque trial prosthesis fabricated from lab. (Ref. image 10).



Image 10: LiDi Emax laminate prosthesis from lab

Tryin of laminates done with tryin paste and sent them back to Lab for final glazing. (Ref. image 11,12)



Image 11: Laminates try in done in mouth before bonding



Image 12: Value Assessment Image to check shade match Bonding of all six veneers in a conventional protocol (Ref. Image 13 to 16)



Image 13: Post Bonding Intraoral View



Image 14: Post Bonding Intraoral Left Lateral View



Image 15: Post Bonding Intraoral Right Lateral View



Image 16: Post Bonding Intraoral Frontal View

Follow up images taken after 2 weeks. (Ref. Image 17 to 23).



Image 17: Post Bonding Right Lateral View



Image 18: Post Bonding Full Smile View



Image 19: Post Bonding Left Lateral View



Image 20, 21: Post Bonding Full Face View



Image 22: 2 weeks Post bonding follow up



Image 23: Post Bonding Full Face view

### Bonding Protocol

9% HF on Veneers 10 Sec applied then thorough wash and rinse done.

Silane Monobond N, Ivoclar Viva-dent) application done for 60 Sec.

Simultaneously 37% phosphoric Acid on Tooth 15 Sec applied and thorough wash and rinse done. Universal Bonding Agent applied on tooth surface and cured it for 40 Sec Veneer Cement(3M) on Inteliago surface applied and Laminate seated onto tooth surface. Tack cure for 5 Sec done and excess luting cement removed by Floss inter dentally, #12 Blade on cervically done. Final curing done for 40 Sec each on all surfaces with glycerine gel on top for oxygen inhibition.

Zirconia crowns luted with SpeedCEM plus resin Cement from Ivoclar.

### Discussion

The aim of the treatment in this case was to improve the patient's smile and aesthetic rehabilitation of teeth. This goal was achieved using glass ceramics, which are the treatment of choice to mask tooth discoloration in cases of moderate to severe fluorosis.

LiDi Ceramic veneers/crowns can completely mask the discolored tooth with minimal reduction of sound tooth substance because they require a minimally invasive design preparation. In addition, advances in ceramic materials have facilitated this process. Ceramic veneers provide both predictable and long-lasting aesthetic rehabilitation. The durability and clinical success of porcelain veneers/crowns have been widely investigated in the literature. It has been reported that ceramic veneers provide durable and successful restoration with an estimated survival probability of 93.5% over 10 years. Satisfactory results were obtained in a case of fluorosed teeth restored with porcelain laminate veneers over a 6-year follow-up. Furthermore, numerous studies have demonstrated acceptable aesthetic outcomes in cases of moderate to severe fluorosis.

### Conclusion

Ceramic veneers are considered one of the most popular restorative materials in aesthetic dentistry. They provide excellent aesthetic results when an appropriate treatment plan and protocol are used during the clinical and laboratory fabrication stages. This case report describes the use of ceramic veneers to enhance the appearance of fluorosed teeth, thus improving the patient's smile and, consequently, self-esteem. To achieve great aesthetic results a clinician must analyse case before starting any procedure. With Glass ceramics we can give a 'wonderful transforming effects and results to the flurosos teeth.

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## Minimally Invasive Aesthetic Solution for Peg Laterals: A Combination Approach

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- International Certification in Advanced Aesthetic and Restorative Dentistry from Egas Moniz University, Portugal
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- Conducts training programmes on Direct Anterior Composites, Dental Photography, Smile Designing and Minimally Invasive Restorative Procedures.

### Introduction

Smile Enhancements are now routinely performed procedures in daily practice. In an attempt to beautify a smile, it is very often seen that over treatment has become a norm. While porcelain is indeed the more superior material with regards to aesthetics and longevity, direct composites when done with the correct protocols can also be excellent alternatives while being entirely non-invasive. Sometimes, less is more. It is then up to the clinician to choose the right materials which will give the best service to the patient in a given scenario and refrain from unnecessary procedures which require loss of precious enamel. This case report is one such scenario where we chose a combination of ceramic and composite to achieve a beautiful result while being minimally invasive.

### Case Presentation

A dentist wished to improve her smile after Orthodontic treatment as she had peg shaped lateral incisors and hence a diastema distal to both lateral incisors. Due to tooth size Arch Length discrepancy, the Orthodontist could not close the diastemas with the peg laterals and hence we decided to treat it restoratively. She was undergoing treatment at another dentist for the implant in 25.

O/E: Peg shaped lateral incisors with 0.5mm diastema mesially and 3to 4 mm diastema space distally.

#### Medical History:

No significant medical history.

Dental History: Recent Orthodontic treatment. Implant with 25

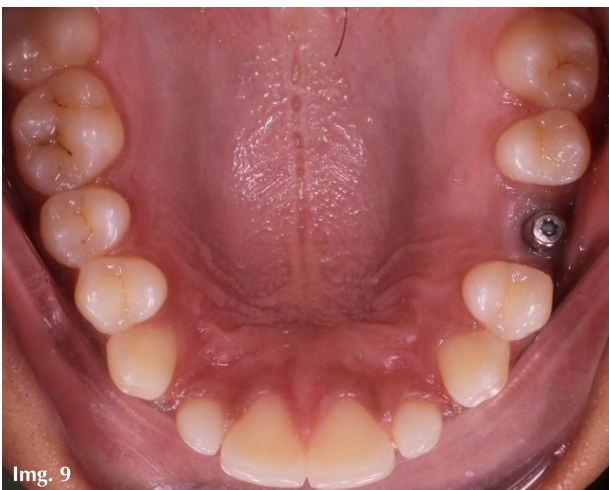
### Treatment plan:

- Lithium disilicate veneers on 12 and 22 with minimal preps.
- Composite restorations on mesial surface of 13 and 23 to close the remaining space (no Prep).

Initially a wax up was made from the laboratory closing the entire space with only a veneer on each lateral. But this was making the laterals look too wide. Hence we decided to make Indirect veneers on 12 and 22 and direct composite restorations on mesial of both canines and evenly distribute the space. Composite restorations on the canines were made using only 2 opacities of a Nano Composite material.

Pre operative intra oral and extra oral Photographs were recorded in the first appointment (Fig.1 – Fig.13) and Maxillary and Mandibular Alginate Impressions were recorded and sent to the Lab for a Wax up.



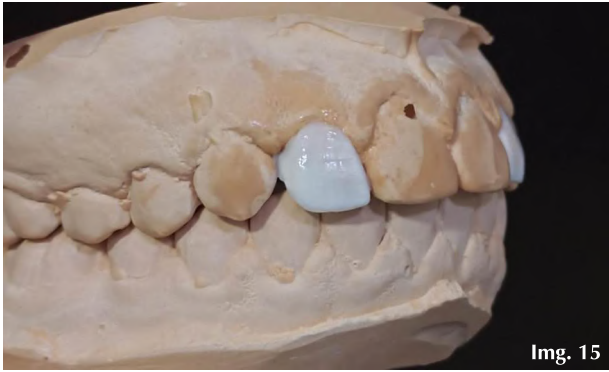


The shade was recorded as 2M2 on the Vita 3D Master Shade Guide (Fig.14)

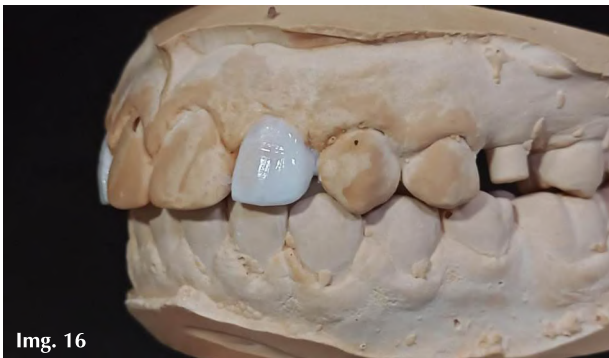




The Laboratory initially sent us the wax up for just 2 ceramic veneers on the peg laterals (Fig.15 - Fig.17).



Img. 15



Img. 16



Img. 17

A putty index was fabricated on this waxed up cast using Honigum Putty and Light body Silicone (DMG) (Fig.18).

Img. 18



A bisacryl material, Protemp 4 (3M ESPE) was injected into the putty index space for the lateral incisors and transferred to the mouth of

the patient. Note the excess material flowing out of the V shaped notches of the index facilitating easy removal. The index is removed once the material hardens completely (about 3 to 4 minutes) (Fig.19-20).



Img. 19



Img. 20

The mock up was shown to the patient and with her consent it was decided to reduce the width of the laterals. Since we wanted to be as minimally invasive as possible, it was decided to close the remaining space mesial to the canines on both sides with direct composite restorations. The wax on the models was trimmed of leaving 1mm space distal to the laterals and the putty index and mock-up was repeated (Fig.21-23).



Img. 21



Img. 22



Img. 23

Once approved by the patient, the same intraoral mock-up was used a preparation guide. A depth cutting bur was used to make initial depth cuts which were 0.3mm deep cervically and 0.5mm deep in the middle third of the tooth. Depth cuts of about 2mm were given incisally. (Fig.24, 25).



Img. 24



Img. 25

A pencil was used to mark the deepest portion of the preparation and then the bisacryl material was removed and preparation completed with a diamond point TR -13 (MANI). This APT or Aesthetic Pre evaluative temporary Technique allows us to be minimally invasive and preserve healthy tooth structure. Gingival retraction was done with knitted retraction cord no 000 by Ultrapac (Ultradent).The preparations and finish lines were kept smooth with no sharp angles. Proximally, the finish lines were placed palatally to hide the veneer tooth interface. The cervical finish lines were kept equigingival (Fig.27,28,29).



Img. 27

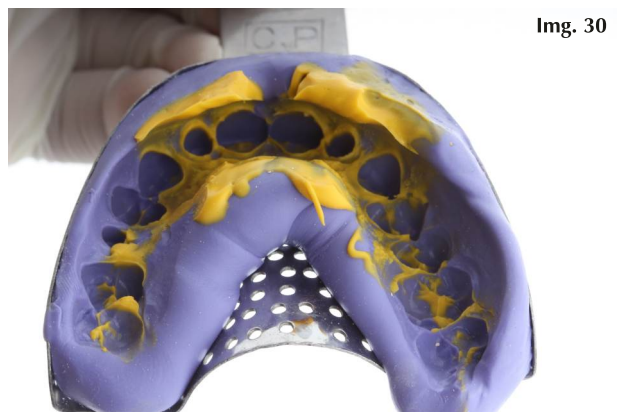


Img. 28



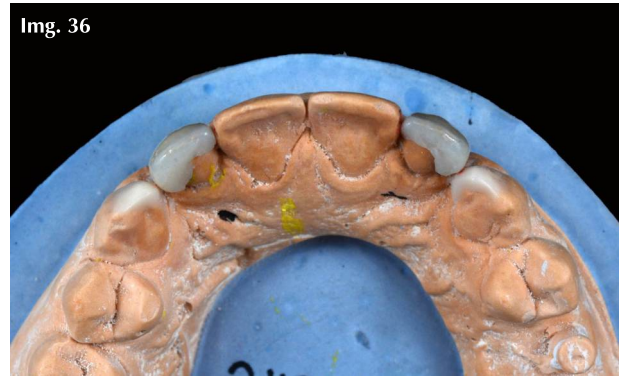
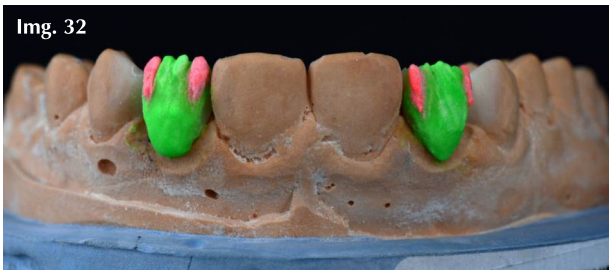
Img. 29

A One step impression method was used to record the final impression in Addition Silicone Impression material using Putty and Light body material (Honigum, DMG). Equal quantities of putty material base and catalyst were mixed and loaded onto a perforated stock metal tray while at the same time the light body was injected onto the prepared teeth. The tray with the loaded putty was now carried to the mouth and kept in place till complete set (Fig.30).



Img. 30

Layered Lithium Disilicate veneers were fabricated in the lab (Fig31-37) An intraoral trial was done and approved by the patient.



On the day of cementation, rubber dam isolation was carried out. This provides a clean working field for adhesion. Additionally floss tie ligatures were used for added retention and retraction (Fig.43,44,45).



The adjacent teeth were protected with a metal matrix and the teeth were cleaned with an air polisher (Esthetrix Blaster) to remove the biofilm and to clean the tooth prior to bonding the veneers. This was repeated on both the lateral incisors (Fig.42).



The preparation of the intaligo surface of the veneers was done with 9 % Hydrofluoric Acid (Ultradent) for 20 seconds after which it was rinsed of thoroughly with water(Fig. 38,39)



The veneer surface was cleaned with 37% Orthophosphoric Acid (Dtech Etchant) for 30 seconds and rinsed off with water. The etchant was actively rubbed with a micro brush (Fig.40).



Next, a silane coupling agent ( Ultradent) was applied on the intaligo surface of the veneer and allowed to dry (Fig.41).



The veneer with the silane applied was further kept in a oven for one minute to improve the efficiency of the silane coupling agent. An etchant gel, 37% Phosphoric Acid( Dtech) was used to etch the enamel for 15 seconds. The Etchant was then washed off with water for one minute thoroughly (Fig.46).



A Universal adhesive , Scotch bond Universal(3M ESPE), was rubbed on the etched tooth in multiple coats according to manufacturers instructions and gently air dried with the 3 way syringe. The adhesive was then not photocured (Fig.47).



A veneer luting cement, Rely X Veneer Cement (3M ESPE) was applied on the inner surface of the veneer and seated with gentle but firm pressure on the tooth. The tooth was tack cured for 5 seconds after which the gross excess cement was removed carefully using a

12 no sharp blade. The entire tooth was the photocured for 20 seconds on all surfaces – buccal, palatal, incisal, cervical, mesial and distal. The same process was repeated on the other side as well (Fig.48,49).



Img. 48



Img. 49

Next, we proceeded with the direct diastema closure of the 13 and 33. The buccal surface and mesial surface of the canine was cleaned with a coarse disc (Shofu, Snap On Disc) to remove the aprismatic layer prior to bonding (Fig. 50)



Img. 50

An etchant gel, 37% Phosphoric Acid (Dtech) was used to etch the enamel for 15 seconds. The Etchant was then washed off with water for one minute thoroughly. A Universal adhesive, Scotch bond Universal(3M ESPE), was rubbed on the etched tooth in multiple coats according to manufacturer's instructions and gently air dried with the 3 way syringe. The adhesive was then photocured for 20 seconds (Fig. 51).



Img. 51

Layer by layer, body and enamel shade of composite material Filtek Z350 Xt (3M ESPE) was added and contoured to close the diastema. A transparent mylar strip was used with the final layer interproximally to develop a contact point. A large broad tipped instrument was used to model the buccal composite of the canines (Solo Anterior, LM Dental) (Fig.52-55).



Img. 52



Img. 53

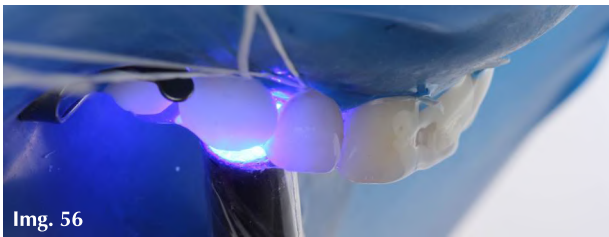


Img. 54



Img. 55

The final restorations as well as the cervical and palatal margins of the cemented veneers were cured under a layer of glycerin to completely cure the oxygen inhibited layer (Fig.56).



Post operative photographs were recorded immediately and 48 hours post hydration (Fig.57-64) showing beautiful integration of the ceramic and composite. The patient was thrilled with the final result.



6 month follow up (Fig. 65-67) and One Year



Follow up (Fig. 68, 69) showing excellent gingival health as well as imperceptible direct and indirect restorations which have blended with her smile.



Img. 68



Img. 69

**CONCLUSION:**

The ultimate goal of any treatment plan for smile designing should be to maintain as much healthy tooth structure as possible without compromising on aesthetics. For this it is often necessary to think laterally and explore treatment combinations which when performed with the correct protocols can give long term clinical success.

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Stabilization Splint for Traumatology  
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## Facially Driven Digital Esthetic Rehabilitation: A Multidisciplinary Approach

### Dr. Aslam Inamdar

- The orofacial architect is an experienced clinician and technology enthusiast who completed his B.D.S. from Nair Hospital Dental College, Mumbai, 2001.
- He is extensively trained in DSD from Christian Coachman, Brazil.
- Dr. Aslam is the first Indian to complete a diploma in SKIN CAD-CAM & 3D staining technique from Romania.
- He is also the first Asian dentist to complete a diploma as a digital expert in Facial Esthetic Treatment Planning, JSI Spain.
- He is a reputed clinician and national Speaker for digital dentistry and its clinical applications.
- Awarded Best Aesthetic Practitioner at Fandent multiple times and finally bestowed Superstar Dentist of the year 2019.

### Introduction

Esthetic Rehabilitations bring with them a plethora of challenges involving the facial as well as Dento-gingival Complex. Out of the two Repair and Preserve, Preservation will always hold the higher value. To preserve what is left and restore what is missing, we need a concrete plan and team to execute the same. 3D treatment planning in this Digital era has given us the predictable equation to look at the bigger picture and simplify the Diagnosis, Communication and execution. Multidisciplinary treatments are the need of the hour for complex cases to trace the Plan in reverse. A dedicated multidisciplinary team powered by a Digital 3D Plan and templates can do lifechanging transformations day in and day out.

The purpose of this article is to highlight a multifactorial Complex Case Simplified by the patient centric facially driven 3D treatment Planning executed by a guided multidisciplinary approach.

### Case Presentation

This young woman presented with a primary complaint that she doesn't like her smile. On probing further, she opens about the dislike for shape and color of her teeth and gum display. She had already undergone orthodontic alignment a few years ago and was unwilling for any more alignment.

During initial Consultation, we gathered all the information needed for digital planning: Facial and Intraoral photos, intraoral scans, Videos showing her facial movements and lip

dynamics and CBCT Imaging (fig.1 - fig. 12). On gummy Smile evaluation the lower facial height was same as the mid facial height ruling out Vertical maxillary excess (fig.7). The upper lip was thin(fig.8). Upper lip length was 22 mm at rest and lip mobility was more than 8mm ruling out hypermobility of lip(fig.6). She was thoroughly explained about the facial component for reducing the hypermobility of lips, the role of Botox and fillers.

After evaluating the gathered data and assembling the digital clone, we presented her with a self-explanatory simple roadmap for the treatment and made her envision the end result before starting the treatment. The entire case is presented stepwise using 3D treatment planning with complete digital workflow.

Proposed treatment Plan can be segregated in four phases:

Phase 1: Upper arch Motivational Mockup test Drive based on the facially Driven 2D and 3D treatment plan. (Fig.13-Fig 19)

Phase 2: Flapless Guided Crown-lengthening with osseous recontouring of upper arch. (Fig.20-Fig.32)

Phase 3: Upper 3D Functional Mockup based on the facially Driven 3D treatment plan and this time we give two Test Drives. New set of Natural shapes for 10 teeth or we copy the shapes of 11 and 12 to modify 21 and 22 and achieve symmetry and balance. (Fig. 33-42)

Phase 4: She chose to go ahead with 10 teeth new shapes. Copy Paste Natural Restorations in monolithic leucite glass ceramic for upper anteriors and premolars were delivered. (Fig.43-Fig.57)



Step 1: Data collection (Fig1-Fig.12)  
Pre-op Photos and videos



Fig. 2

Fig. 3



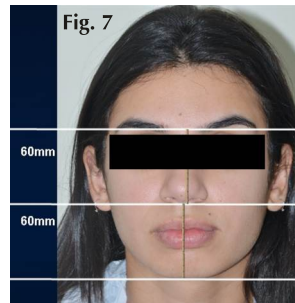
Fig. 4



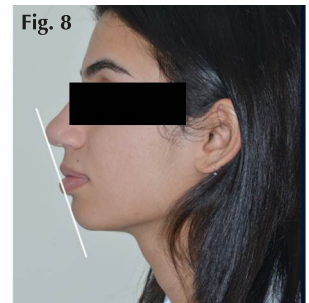
Pre-op Video



Gummy Smile analysis (lip mobility)



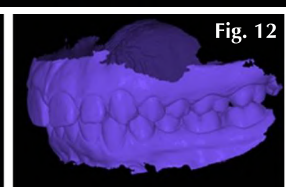
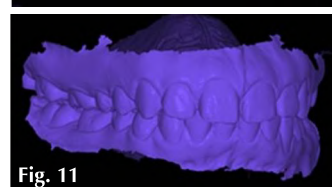
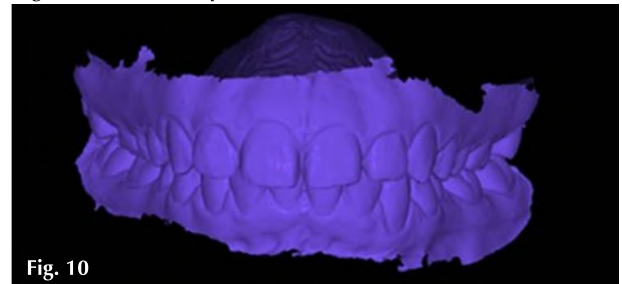
No vertical maxillary excess



Thin upper lip



Fig 10, 11, 12. Pre-op Intraoral Scans



Step 2: 2D Smile Frame and Simulation(Fig.13-Fig.14)



Fig. 13 2D DSD Smile Frame



2D Simulation

Step 3: Facially Driven 3D Motivational plan and test Drive (Fig.15-Fig.19)

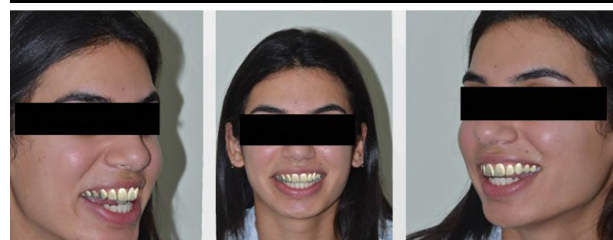
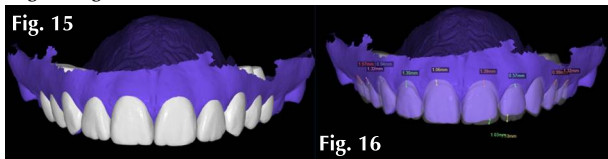


Fig 17. 3D Simulation

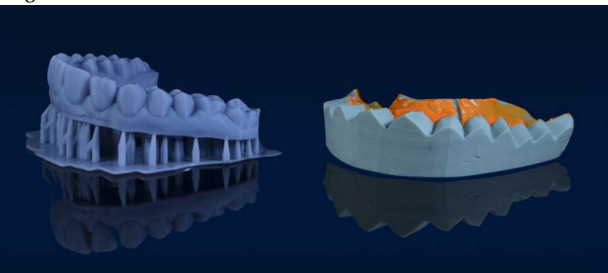


Fig 18. 3D Printed Model And Silicon Index



Fig 19. Motivational Test Drive

Step 4: Perio-Analysis and Double Crown lengthening Guide (Fig.20-Fig.27)

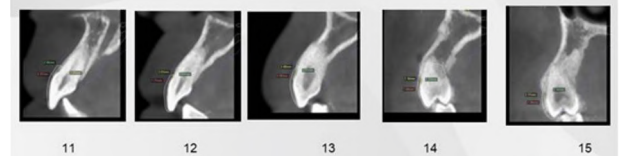


Fig 20.

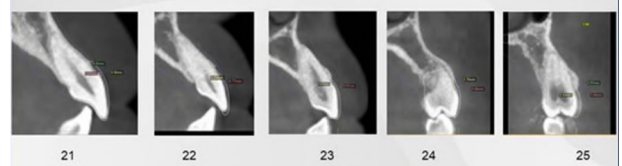


Fig 21

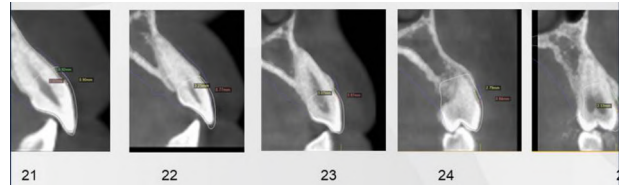


Fig 22.

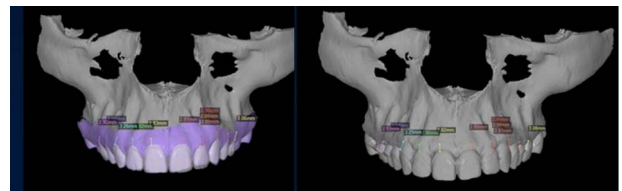


Fig 23.

Perio-Analysis on CBCT

Fig 24.

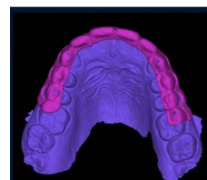


Fig 25.

Double Crown-lengthening Guide



Fig 26.



Fig 27. 3D Printed Guide

Step 5:  
Guided Flapless Crown lengthening with Osseous recontouring  
(Fig.28 - Fig.32)



Fig 28



Fig 29



Fig 30. Immediate Post Crown lengthening



Fig 31.



Fig 32. Post Crown-lengthening

Step 6:  
Facially Driven 3DFunctional plan & test drive (Fig.33-Fig.42)

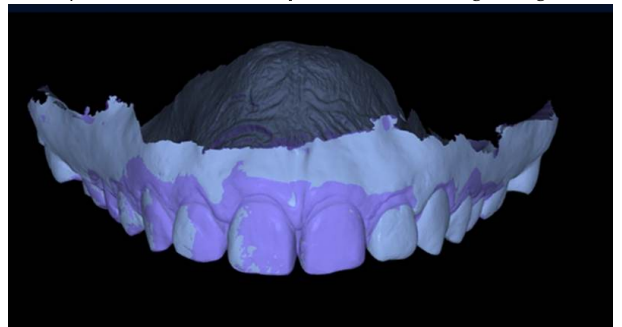


Fig 33. Overlap of preop and post crown-lengthening scan

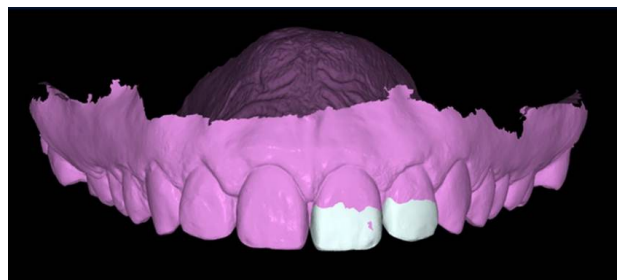


Fig 34. Mockup of 21 and 22 copy of 11 and 12

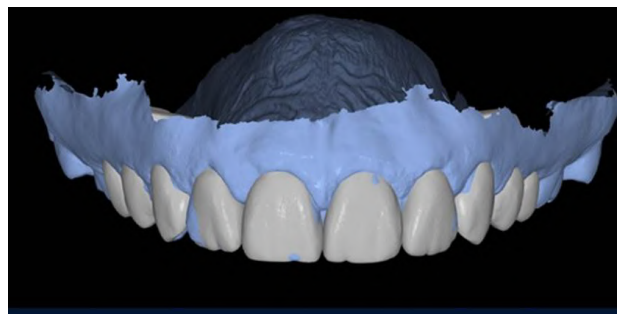


Fig 35. Mockup of 10 teeth with natural shapes



Fig 36. Mockup of 21 and 22 on Digital Clone



Fig 37. Mockup of 10 teeth on Digital Clone



Fig 38. Test Drive 21 and 22



Fig 39. Test Drive 10 teeth



Fig 40. 2 teeth vs 10 teeth



Fig 41. 21, 22 Functional Test Dive



Fig 42. 10 teeth Functional test Drive

Step 7: Guided tooth preparation(Fig.43 - Fig.48)



Fig 43. Minimally invasive tooth preparation using APT

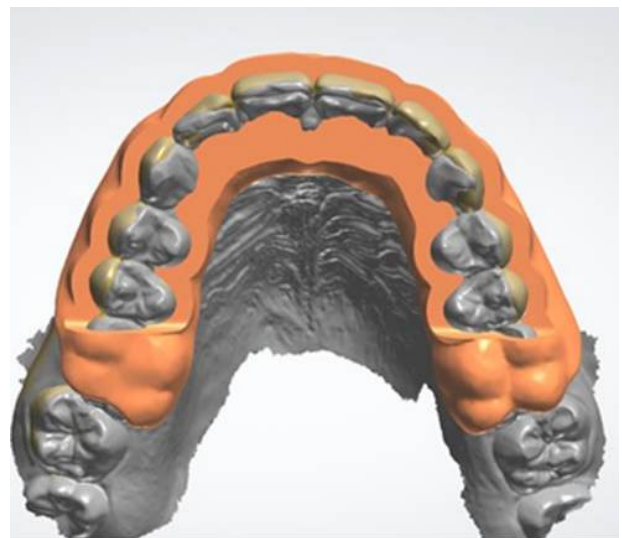


Fig 44. Buccal thickness guide design



Fig 45. All in one guide design



Fig 46. 3D Printed tooth preparation guide



Fig 47. Guided controlled tooth preparation



Fig 48. Preparation evaluation with Graduated probe

Step 8: 10 Natural Monolithic milled Leucite glass Ceramic restorations in shade A1, Design and bonded (Fig.49-Fig.57)

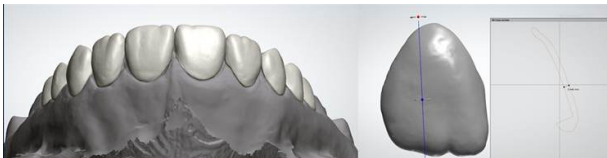


Fig 49. This is final restoration design and thickness is 0.4-0.5 mm for each restoration



Fig 50. Natural shapes milled in Empress CAD Multi A1



Fig 51. Minimally invasive Natural restorations 3D painted and polished.



Fig 52. Post Bonding



Fig 52b. Post Bonding



Fig 53.



Fig 54.



Fig 54b. Post-op

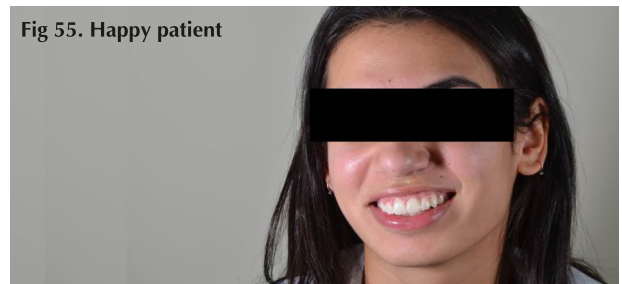


Fig 55. Happy patient



Fig 56. Copy pasting Natural Shapes in Final Restorations



Fig 57. Summarizing the case

### Conclusion:

Digital 3D treatment planning coupled with natural algorithms gives the correct and predictable roadmap to the multidisciplinary team and the templates generated provides seamless execution. It gives a clear understanding for the team as well as the patient to visualize the outcome which can be completely achieved as promised.

### Discussion/takeaway:

Complex cases demand a thorough pre-treatment work up. Creating a digital clone helps us to plan and visualize better as compared to the conventional methods. As aesthetics begins with face we can actually take facial references into consideration and simulate the design on the face virtually before it goes in for the test drive. Smile test drives at every step give the patient a clarity and transparency of the treatment that is proposed and executed.

Let the patients choose what is best for them, we can only give them the right options. The multidisciplinary team is well oriented to a real-time plan and templates ensure the predictable outcome.

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## COMPOSITES TO LIGHT UP A SMILE!

### Dr Sanah Sayed

- She is an Aesthetic and restorative dentist with over a decade of clinical experience.
- An alumni member of D.Y. Patil school of dentistry, Navi Mumbai she finished at the top of her class and went on to study and pursue Aesthetics at Manipal college of dental sciences, Karnataka.
- She has worked with her mentor, Dr Suhas Lele on various pageants, celebrities and top models in her formative years.
- Awarded "Outstanding dentist of the year" by Famdent Excellence in Dentistry, 2022 and "Aesthetic dentist of the year 2022" by Indian dental divas awards she currently maintains her private practice at Pune where she tries to marry aesthetics and functionality to deliver healthy smiles to her patients.
- She is a member of IAACD and KOL for Kulzer India.
- She is the mentor of Sanah Sayed Dentistry and regularly conducts workshops on smile designing and composites.

I have always believed that there is a strong connection **between Mental and Dental.**

**"You are just one decision away from a completely different life"**

Stable Mental health and Sound Body Awareness are the main reasons why patients exhibit a discipline in maintenance of oral hygiene. Stress and diet are the major contributing factors why most young patients report with high caries index and cracked/ fractured teeth these days.

Here my patient is a 24 year old young male who has been bravely battling Cancer for most of his life and this year he is **finally Cancer – Free**. As he begins his new journey, a brand new smile and confidence awaits and he has started taking baby steps to live a normal life.

### MATERIAL SCIENCE:

**Refractive index variation & Glass effect** are the major reasons why composites should be layered and in most anterior cases (except Class III with an intact palatal wall) it is indicated to layer different opacities & chromaticity to prevent a non-vital looking restoration because currently no composite is able to **maintain translucency without losing value (glass effect)**.

Teeth are unique and possess varying degrees of translucency and poly chromia thus making understanding of opacities and value crucial for mimicking natural teeth for a dental professional. Our eyes are extremely sensitive to Value since rods outnumber cones however cannot record color but can appre-

ciate the brightness or dullness or a restoration.

Enamel shades provide translucency essential to mimic enamel but lose value when layered in the thickness equivalent to enamel. Hence layering creates an underlying opaque or chromatic base over which the enamel can create varying degrees of translucency. Translucency is most appreciated in the Incisal third and Chroma is appreciated in the middle one third area bringing us to the next step of Shade selection.

### Shade Selection:

It is important to select the shade in the beginning of the appointment since teeth start dehydrating in just 3 minutes and are most dehydrated at 45 minutes. This can give a false impression of a tooth that is "brighter" than actual. When the tooth rehydrates back in 24-48 hours the restoration is not a perfect shade match making the margin obvious and unsightly.

The technique to choose shade described here is the **Composite button** technique. Though Composites are calibrated to a Vita shade guide, it would be wrong to think that A2 from two different companies would be identical. The discrepancy of chroma (saturation) is pretty evident when working with different commercially available products.

This technique involves placing small increments (buttons) on the surface of the tooth without etching & bonding. The increment is then cured and photographed to arrive at the closest match possible. The dentin is selected at the cervical area. Body at the middle one



and Enamel at the incisal one third area since enamel is the thickest here and devoid of any dentin (in young patients).

The photograph thus clicked gives us Hue. A monochromatic image of the same picture helps assess value and an oversaturated pictures gives us Chroma.

Once the Shade selection is done we can simply flick off the buttons.

In this case, we have selected three opacities Opaque light(OL), A2universal and Clear translucent (CL) available from Topaz, Kulzer.

### **Procedure (Step by step):**

**Local Anaesthetic:** The patient is always injected a local anaesthetic to make him comfortable prior to the procedure, this ensures no sudden movements and most times the patient is comfortable enough to sleep in chair. This reduces the anxiety in the room enabling the team to deliver better results.

**Rubber dam:** A medium sheet was chosen for this case due to the tight contacts between teeth. Anterior isolation is achieved by punching holes on teeth to be worked on and the assembly is held in place by clamping the premolars. Floss ties are further used to retract the gingiva and expose the cavities sub gingivally.

**Air abrasion:** Aluminium trihydrate (50 micron) was used to abrade the surface of the enamel and dentin creating roughness that helps in retention of resin tags - **Micromechanical bond.**

**Etching protocols:** Total etch technique is used in this case applying 37% phosphoric acid for 15-20 sec on enamel and 5-10 seconds on dentin. The gel is then washed and air-dried taking care to wash completely and not over desiccating the tissues.

**Bonding protocols:** 8th Generation bonding agent is used in this case (**Gluma, Kulzer**). The content of the bonding agent is acidic monomers, acetone and water. Acetone is a vehicle which drives out the water in the dentinal for

another 10 seconds. (**Gluma, Kulzer**) tubules and evaporates allowing better wettability of bonding agent (hydrophobic). The acidic monomers lose their potency when they come into contact with the dentinal tissue hence scrubbing the bond into the cavity will let new monomer come into contact with the tissue making sure the dentin is etched and primed well before bonding protocols. I scrub the bonding agent into the tissue for 20 seconds, air dry with oil free air and cure.

**Layering protocols:** We used 3 different opacities to restore the teeth. In teeth where the palatal wall was intact, dentin was used only 0.5 mm thickness to mask the discoloration and universal was layered to balance opacity followed by enamel shade again not more than 0.5 mm in thickness.

In teeth lacking the palatal wall, the palatal build up was first done with dentin to block the darkness of the oral cavity followed by universal and enamel.

Though Composite button technique gives us the desired ingredients for a restoration, the **thickness of individual layers** would greatly vary depending on the age, chromaticity, translucency and bucco lingual width of a particular tooth and must be decided by the dentist mindfully. Every layer is placed not more than 2 mm and cured for 20 seconds. Opaque or darker shades should be cured longer.

**Surface texture, blending and moulding the composite:** A great tool to help mould the composite is a flat or pointed brush (**GC**) dipped in unfilled resin. The composite is always blended composite to tooth to achieve a seamless integration of the restoration.

**Elimination of oxygen inhibition Zone:** K Y jelly (Johnson & Johnson) is coated on top of the final enamel layer and cured for 40 seconds to removed oxygen inhibition zone. The top layer of composite exposed to ambient air has some free monomer radicals that do not form polymer chains completely. This may entrap powder generated from mechani

cal finishing & polishing and the composite could change colour over time with interaction of pigments present in food affecting the long term stability of the restoration.

**Finishing & Polishing protocols:** A red ring round ended bur is used to shape transitional line angles and create surface texture. We start polishing with Soflex discs(3M) at 15-20,000 RPM and intermittent water. This can be followed by spirals that are diamond impregnated available from 3M or Eve polishers (Ivoclar). A buff with Diamond polishing paste is then used (Prisma Gloss/ Ultradent) to achieve final lustre.

All polishers should be used as per manufacturer's instructions.

**Cervical Overhangs:** A great tool to ensure no overhangs are left behind causing gingival inflammation is #12 surgical blade. Interproximal polishing should be carried out with strips sequentially in a S shaped pattern starting from coarse to fine.

**Follow ups:** Follow ups are carried out 5-7 days later for final polishing and patient is recalled after a month again.

**Conclusion:** This case will always remain as one of my career highlights, not because it was challenging but because it helped me appreciate the undying human spirit. This young patient has taught me how the human spirit even if bent cannot be broken.

**Discussion: Both optical efficiency and refractive index** are proving to be the path to follow for developing better restorative materials that can effectively mimic natural teeth.

With modern composites already mimicking fluorescence and opalescence, appreciated in natural dentition it is only a matter of time that more advancements in the field make Composites a viable solution for smile designing & caries control in the most predictable manner.

Dentist must explore available materials to deliver the best possible results in a limited time to the patient that can satisfy both their aesthetic and functional demands.



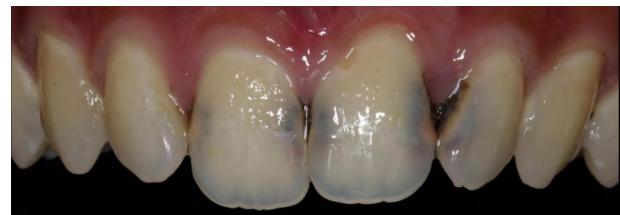
1 – Smile makeover with composites



2 – Young male patient with multiple decayed teeth looking for a quick fix before he flies out



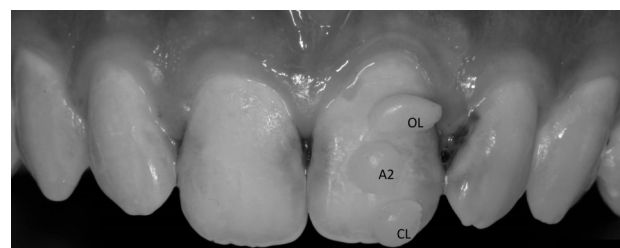
3 – Occlusion needs to be addressed but he plans to work on it once he's back



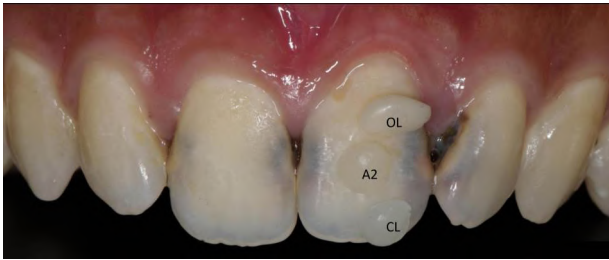
4 – Multiple areas of decay and demineralization



5 – Pre ops



6 – Composite button technique  
Value – gives enamel shade (Monochromatic image)



7 - Hue



8 - Chroma - Degree of Saturation, Gives dentin shade (Oversaturated image)



9 - Isolation, Abrasion & Etching



10 - That's my big reveal! No pulp exposures



11 - 12 done, focussing on one tooth at a time makes it less overwhelming



12 - Teflon tape and Mylar strips took us till the very end!



13 - 21 built



14 - Build ups complete  
Texture achieved with brush slightly dipped in unfilled resin (Signum, Kulzer)



15 - Elimination of oxygen inhibition zone (K Y Jelly)



16 - Immediate post operative



17 - Those gingival margins will heal.  
#12 blade used to remove cervical overhangs



18 – Follow up 5 days



18 – Follow up 5 days



18 – Follow up 5 days

## PRACTICE BUILDER ENRICH AND ENHANCE ENAMEL 360° HOLISTIC PROACTIVE ORAL CARE

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<p><b>PHILIPS ZOOM</b> IN-OFFICE TEETH WHITENING</p>	<p><b>SONICARE BRUSHES</b> ORAL HYGIENE</p>	<p><b>ZOOM DAYWHITE/NITEWHITE</b> AT HOME BLEACHING</p>	
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## Layered Injection Molding - A Pre-Clinical Evaluation of a Clinical Possibility



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### Introduction

Modern age dentistry has begun to adapt to a more holistic approach where function and aesthetics have become confluent with each other. The advances in adhesive dentistry and tooth coloured restorative materials have raised the standard for direct restorations.

The concept of injection molding originates from a long-standing manufacturing process of injecting molten material into a mold to produce parts.

### Advantages

- Minimally invasive.
- Additive in nature (in most cases) and/or subtractive-additive.
- A direct technique.
- Has aesthetic outcomes comparable to their indirect counterparts.

### Drawbacks of Injection Molding

- Restorations are monochromatic and lack life-like anatomy due to absence of histological layers.
- The minimum number of sittings would be two; an increased amount of chair side time.
- Communication with the lab becomes detrimental.

### Why do we need layers?

The stratification or layering technique allows the clinician to create polychromatic restorations which are highly aesthetic as they replicate the histological layers and anatomic features. Layering in increments improves the marginal adaptation while also reducing the effects of polymerisation shrinkage.

### Challenges and Pitfalls of Layering

- Depends on the clinician's skill level and understanding of the materials as well as the technique itself.
- Higher chance of poor manipulation leading to creation of gaps, voids and visible seams causing early aesthetic and structural failures.
- Achieving the right contours and aesthetics can be difficult for an inexperienced clinician.

### Aims and Objectives

To evaluate a technique that combines layering with injection molding in multiple space closure in maxillary anterior teeth (additive technique). To compare traditional injection molding vs layered injection molding for predictable and consistent aesthetic treatment outcomes.

### Do the materials support it?

Clear silicone vinyl polysiloxane materials such as Exaclear (GC) and Memosil-II (Kuraray) are the materials of choice to fabricate a mold/stent.

The newer age low viscosity flowable and injectable composite systems lend themselves to the injection molding technique excellently.

In Layered/Modified Injection molding, a combination of packable composite and a clear silicone stent is used to confine the flowable/injectable composite to predetermined contours established by a laboratory wax up.

### Materials used:

- Exaclear - GC
- Packable composite - Dentin shades A1, A2, A3 and White
- Injectable composite - GC G-aenial Universal Flo Shade A1
- Finishing Instruments - Red band and yellow band burs; Soflex Discs
- Polishing Instruments - Lucida Polishing Kit

### Methodology

This study compared the traditional injection molding technique to the layered technique by restoring three maxillary anterior teeth in each upper quadrant.

Tooth numbers 11, 12 and 13 - Layered Injection Molding Technique.

Tooth numbers 21, 22 and 23 - Traditional Injection Molding Technique.



Fig 1. The study was conducted on the Nissin 300 Series Standard Jaw Model (GNR300-U) with push-type typodont teeth.



Fig 2. Maxillary anterior typodonts were prepared to recreate a clinical scenario with multiple spaces where one might use injection molding as a treatment technique.

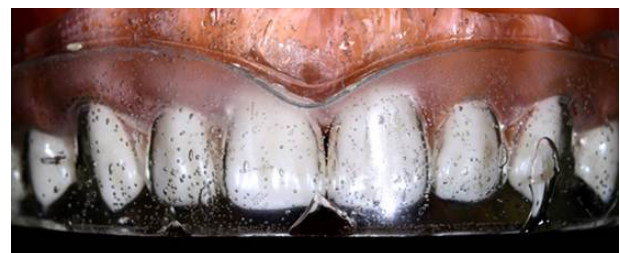


Fig 3. An Exaclear impression of the unprepared typodonts was fabricated to serve as a stent for injectable composite restorations.



Fig 4. Each tooth was isolated and acid etched.



Fig 5. Dentin adhesive was applied and light cured.



Fig 6. Packable composite of a dentin shades A3, A2, A1 and White were used to recreate the anatomy of dentin i.e, the lobes, mamelons while leaving space at the edge for a dentin free zone.



Fig 7. Composite syringe was inserted with the Exclear stent in place.



Fig 8. Flowable composite was injected into the stent.

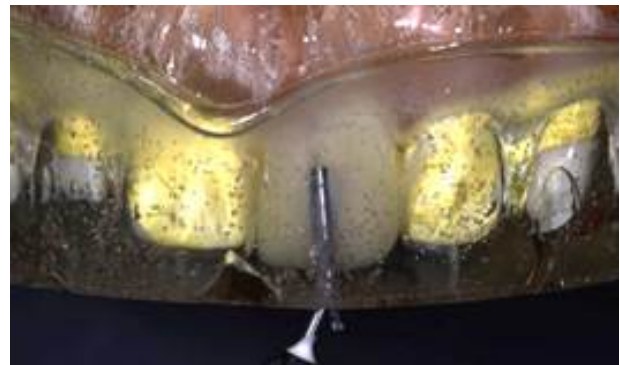


Fig 9. Flowable composite was injected into the stent.



Fig 10. Results after finishing and polishing



Fig 11. Results after finishing and polishing.



Fig 12. Photo showing comparison between Layered Injection Molding on the left and Conventional Injection Molding on the right.

## Discussion

Ideal Aesthetic characteristics and Anatomic composition

- Incisal edge halo
- Translucent zone
- Mamelons
- Basic shade high-value area
- Interproximal and Cervical neck hues.

### Shape of Color: Aesthetics from a Physiologic Perspective; John C. Schwartz, DDS. (2012- Dentistry Today)

#### Aesthetic evaluation

A subjective evaluation was carried out by 2 independent evaluators on 5 sets of restored typodonts. The evaluation was based on the FDI World Dental Federation: clinical criteria for the evaluation of direct and indirect restorations (2010).

The Aesthetic Properties considered for the evaluation were:

1. Surface Lustre
3. Translucency
4. Aesthetic Anatomical Form

#### Parameters for Aesthetic evaluation

FDI World Dental Federation: clinical criteria for the evaluation of direct and indirect restorations

A. Aesthetic Properties	1. Surface Lustre	3. Translucency	4. Aesthetic Anatomical Form
<b>1. Clinically excellent/very good</b>	1.1 Lustre comparable to enamel.	3.1 No difference in shade and/or translucency.	4.1 Form is ideal.
<b>2. Clinically good</b>	1.2.1 Slightly dull, not noticeable from speaking distance. 1.2.2 Some isolated pores.	3.2 Minor deviations in shade and/or translucency.	4.2 Form is only slightly deviated from the normal
<b>3. Clinically sufficient / satisfactory</b>	1.3.1 Dull surface but acceptable if covered with film of saliva. 1.3.2 Multiple pores on more than one third of the surface.	3.3 Distinct deviation but acceptable. Does not affect aesthetics: 3.3.1 more opaque . 3.3.2 more translucent. 3.3.3 darker. 3.3.4 brighter.	4.3 Form deviates from the normal but is aesthetically acceptable.
<b>4. Clinically unsatisfactory (but repairable)</b>	1.4.1 Rough surface, cannot be masked by saliva film, simple polishing is not sufficient. Further intervention necessary. 1.4.2 Voids.	3.4 Localized clinical deviation that can be corrected by repair: 3.4.1 too opaque. 3.4.2 too translucent. 3.4.3 too dark. 3.4.4 too bright.	4.4. Form is affected and unacceptable esthetically. Intervention/correction is necessary.
<b>5. Clinically poor (replacement necessary)</b>	1.5 Very rough, unacceptable plaque retentive surface.	3.5 Unacceptable. Replacement necessary.	4.5 Form is unsatisfactory and/or lost. Repair not feasible / reasonable, Replacement needed.
<b>Overall Esthetic Score</b>	<b>Acceptable esthetically (n and %):</b>		<b>Not Acceptable (n, % and reasons):</b>



**Results:****1. Surface Luster**

Both of the evaluators found both techniques to result in similar surface lustre as this property is more dependent on finishing and polishing protocol and the material's properties.

**4. Aesthetic Anatomical Form:**

The overall contour and anatomy of the restorations did not vary as the same stent was used for the outermost layer.

An important point to be noted is that the set of teeth restored with layered injection molding showed significantly visible internal anatomic characteristics such as mamelons and lobes.

**3. Translucency:**

Typodonts restored with layered injection molding received significantly better scores compared to their counterparts.

**Advantages and Disadvantages of Layered Injection Molding****ADVANTAGES**

- Polychromatic life-like restorations.
- The clinician has more control over anatomic features as well as the thickness of different layers i.e, characterisation of teeth is more specific.
- Predictable and easy to explain to the patient.

**DISADVANTAGES**

- The clinician still requires a certain amount of knowledge, skill and specific materials.
- Minimum number of sittings is two.

**Conclusion**

Layered injection molding technique was found to be more aesthetic as it was stratified and replicated natural internal anatomy and translucency much better than Conventional Injection Molding.

**Clinical Significance Of Layered Injection Molding Technique**

This technique can help produce more consistent, easily achievable and highly aesthetic life-like anterior restorations.

A lack of skill or time for stratification technique should not be a limiting factor for aesthetics.

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Universal Adhesive

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## From TMD Woes to Radiant Smiles: Digital Smile Designing with Precision for Total Relief"

### Dr. Sanyogita Kshar

- She is a highly accomplished dentist, completed her B.D.S from SPDC, Wardha in 2001.
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- Life and accredited member of IAACD
- Recipient of aesthetic practice of year Famdent Award 2022 and Dental Diva award 2023.



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- Recipient of Famdent award 2018, 2019, 2021
- Guide in the Department of Oral Medicine, Diagnosis, and Radiology at VPDC&H, Sangli.
- Runs an exclusive centre in south Mumbai for TMJ and implants
- He is highly regarded for his expertise in TMJ disorders, Occlusal Splint Therapy, and Full Mouth Rehabilitation.
- In 2023, he achieved his Mastership in Oral Implantology

A smile has a profound impact on those around us. While some individuals naturally possess an appealing smile, it is our responsibility as dentists to provide everyone with a beautiful, natural-looking smile. However, despite using the best restorative materials, skills, and dedicating ample time, we have observed that these aesthetic outcomes often do not endure. This raises the need to understand why our restorations lack durability, as it can lead to economic burdens for patients due to the expenses involved.

It is a well-established fact that durable structures necessitate a strong and sturdy foundation to support supra-structures. The same principle applies to the foundation of the masticatory apparatus the temporomandibular joint (TMJ), including its ligaments and muscles. The TMJ should be sound and healthy before we can provide an aesthetically pleasing smile.

"Ignoring the temporomandibular joint (TMJ) in dental diagnosis is like trying to solve a puzzle with missing pieces. To be truly competent in diagnosing and treating occlusion, a dentist must understand the intricate relationship between occlusion and the position and condition of the TMJ." - *Dr. Peter Dawson*

Likewise, a dentist who disregards occlusion cannot effectively address problems related to the TMJ. Failure to recognize the relationship between occlusion and the position and condition of the TMJ only allows for guesswork in diagnosing numerous occlusion problems commonly seen in general practice. According to Dr. Peter Dawson, a dentist who neglects the TMJ cannot be competent in smile design or in diagnosing or treating occlusions.

Temporomandibular disorders (TMD) are prevalent conditions affecting 5% to 12% of the population. TMD encompasses a range of clinical conditions characterized by localized pain, restricted or asymmetrical mandibular movements, and TMJ noises like crepitation or clicking. These disorders involve the temporomandibular joints and the associated musculoskeletal structures. Additionally, changes in head and shoulder positions can be attributed to TMD, and excessive loading of the joint can occur due to bruxism. Pain in the upper quarter and masticatory motor system can also be caused by cervical spine disorders, such as muscular dysfunction, cervical lordosis, and cervical spondylosis.

When diagnosing malocclusion or malposition, it is crucial to gather a thorough patient history to identify potential causes, such as habits affecting tooth angulations and buccal-lingual positioning. Assessing overbite, overjet, space analysis, and occlusion classifications is essential. Functional assessment involves observing the patient's swallowing and breathing patterns during the initial visit.

A comprehensive intraoral examination can reveal signs of bruxism and wear, indicating potential incisal and occlusal disharmony.<sup>2</sup> TMD can impede one's ability to smile, but proper treatment can restore normal jaw function, alleviating pain and enabling patients to smile once again. The aetiology of TMD is multifactorial, involving factors like stress, occlusion, parafunction, and psychological aspects. Occlusal instability can lead to overload on the masticatory system, potentially resulting in TMD. This excessive force from grinding or clenching teeth can lead to enamel breakdown.

In modern dentistry, repairing individual teeth alone is no longer satisfactory. More and more patients expect not only functional and mechanically sound results but also aesthetically pleasing outcomes. Therefore, when formulating a treatment plan, considering the TMJ, occlusion, and the entire masticatory system is crucial.

In modern dentistry, repairing individual teeth alone is no longer satisfactory. More and more patients expect not only functional and mechanically sound results but also aesthetically pleasing outcomes. Therefore, when formulating a treatment plan, considering the TMJ, occlusion, and the entire masticatory system is crucial.

The ultimate objective of aesthetic treatments is to satisfy patients and meet their expectations of enhancing facial aesthetics and smile. To address patients' doubts about irreversible procedures, techniques like Digital Smile Designing (DSD) can be

employed. DSD involves digitally designing and modifying patients' smiles and then transferring the design to their mouths using a test drive technique. This allows patients to visualize the end results in their own mouths even before any intervention is performed. DSD facilitates visual communication and patient involvement in the smile design process, ensuring predictable treatment outcomes and increasing case acceptance. This article provides a comprehensive case of digital smile designing.

#### **CASE REPORT:**

Upon the patient's visit, she expressed concerns regarding the frequent dislodgement of her anterior teeth fillings (fig 1,2) and her desire for anterior veneers [we had done for her family member a few years ago] so specifically wanted them. In our examination, we discovered that the patient diligently maintained oral hygiene, exhibited good gum health, and had minimal calculus buildup.

However, to identify the root cause of all her problems, a closer examination was necessary. Based on our findings, the patient has been diagnosed with temporomandibular disorder (TMD), along with occlusal interferences and a loss of anterior [fig 8] and canine guidance [fig 9 and 10]. The patient also reported a history of frontal headaches, which were evaluated by a physician. However, the physician was unable to provide a proper diagnosis for the cause of the headaches. It is worth noting that the patient has been using fancy balms imported from various parts of the world as an alternative to taking painkillers on a regular basis. Based on our analysis, we have concluded that the occlusal interferences [fig 8,9,10] were the underlying cause of the multiple dislodged fillings and interdental caries [fig 1 and 2] that the patient has been experiencing. These interferences have been putting excessive pressure on the teeth,<sup>1</sup> leading to the instability of the fillings and the development of caries even in the areas

where proper cleaning and oral hygiene were maintained. Addressing the occlusal interferences and restoring proper alignment and balance in the patient's bite is crucial for resolving these issues and preventing further dental problems.

The patient was initially provided with permissive occlusal splint (fig 11) and an anterior deprogrammer to manage her temporomandibular disorder (TMD) for a few months. Regular visits were scheduled for reprogramming during this period. Once her TMD symptoms were consistently resolved and her VAS (Visual Analog Scale) score indicated improvement, we proceeded with her smile rehabilitation.

To ensure patient satisfaction and approval, multiple test drives [it's a concept by which a patient can have replica of final restoration in mouth over existing teeth in composite temporization material (bis-acrylic) even before starting the case] were taken. (fig 15, 16,17,18) First, the casts were sent to the laboratory for a manual wax-up(fig12,12.1). Then, a test drive was conducted using the wax-up.[fig 15 and 17]

Intraoral scans were also taken to digitally design a motivational wax-up using a technique called copy-paste dentistry [fig13, 13.1]. This involved adopting a smile or specific teeth from a smile donor and digitally pasting them onto the patient's existing teeth. After obtaining design approval from us and the patient, the lab printed the models, (fig 13, 13.1) and a putty replica [fig 13.2] was made for a test drive to finalize the smile design. some changes were suggested by patient which was communicated with lab via a dsd design[fig 19.1] and guidance's were checked for approval of final length of teeth and optimal aesthetics [fig 19].

Once the patient approved the digital mock-up test drive, upper tooth preparation was performed for the anterior region using the test drive as a guide. (fig 20, 21,22) Another scan was taken to capture the prepared teeth. (fig 23)

Subsequently, Empress veneers were milled using CAD/CAM technology. (fig 24) These veneers, composed of leucite glass-ceramic, offered increased strength due to the controlled formation of leucite crystals within the glassy matrix.

The upper veneers were then luted onto the prepared teeth (fig25), and occlusion was carefully checked using Bausch paper to ensure proper alignment and contact. occlusal splint was still in lower arch (fig 26) for few more weeks after bite settled then the lower teeth were prepared scan done (fig 27, 28,29,30) and prostheses were delivered accordingly [fig 30]. To achieve uniform contact and optimal occlusion, bite adjustment was checked using T-scan technology, and sequential adjustments were made as necessary. (fig 39). Fig 41 and 42 we can see a peaceful neuromusculature and healthy lip support. Patient was very happy with results and it can be appreciated by Duchenne lines on her face [A Duchenne smile is the one that reaches your eyes, making the corners wrinkle up with crow's feet] (fig 42,43).

It's the smile most of us recognize as the most authentic expression of happiness.] Can be seen in most of post operative pictures. (fig 41, 42).

By following this comprehensive treatment approach, including TMD management, digital smile design, and the utilization of advanced materials and technology, we were able to successfully rehabilitate the patient's smile while ensuring functional and aesthetic harmony. (fig 31,32,33,34,35,36,37,38)

We extend our gratitude to Dr. Aslam Inamdar for his invaluable digital support, from scanning to printing, which has greatly aided our diagnostic and treatment processes. Dr. Inamdar's expertise and utilization of advanced technology have been instrumental in providing us with the necessary tools for treatment planning. Furthermore, we express our appreciation for his assistance in delivering veneers, a vital component of our

patient's dental care. Dr. Inamdar's commitment to employing cutting-edge techniques has significantly enhanced our ability to provide optimal dental care and achieve successful outcomes for our patients.

So in conclusion;

The journey towards smile designing for patients with temporomandibular disorder (TMD) involves a comprehensive approach to ensure optimal oral health, functional restoration, and aesthetic enhancement. By implementing a combination of occlusal splint therapy and rehabilitation techniques, we were able to address the underlying issues causing TMD and restore the patient's proper jaw function.

The initial phase of treatment involved the use of an occlusal splint, which provided stability and alleviated the symptoms associated with TMD. This custom-made appliance helped reposition the jaw, reducing muscle tension, joint discomfort, and teeth grinding. The splint also played a crucial role in preventing further damage to the teeth and surrounding structures.

Following successful management of TMD symptoms, the patient underwent a comprehensive smile makeover to enhance both the appearance and functionality of their smile. The rehabilitation process focused on restoring proper occlusion, tooth alignment, and overall dental aesthetics. veneers, and crowns were utilized to achieve a natural and harmonious smile.

Through the collaboration of a skilled dental team, the patient experienced not only an improved quality of life but also regained their confidence in their smile. The smile makeover not only addressed the functional concerns associated with TMD but also provided a remarkable transformation in the patient's appearance, enhancing their self-esteem and overall well-being.

It is important to highlight that smile designing for TMD patients requires a personalized

and multidisciplinary approach. Each case should be carefully evaluated, considering the individual's unique occlusal patterns, aesthetic goals, and overall oral health. By combining the use of occlusal splints to manage TMD symptoms and a comprehensive smile makeover to restore function and aesthetics, we can provide patients with a truly transformative dental experience.

In conclusion, the successful treatment of TMD through occlusal splint therapy and subsequent smile makeover not only restores the patient's oral health and function but also rejuvenates their smile, ultimately enhancing their quality of life.

#### Details of the procedure is as follows:



Fig 1: Pre op OPG

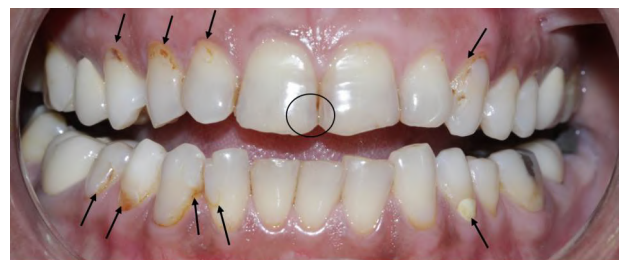


Fig 2: Multiple Cervical and Interdental Caries



Fig 3: In Occlusion



Fig 3.1 Shade selection



Fig 4. Left side occlusion View



Fig 5. Right side occlusion View



Fig 6. Pre op smile observe the lip position & facial musculature



Fig 7. Right lateral profile



Fig 8. Anterior guidance observe loss of anterior guidance



Fig 9. Right canine guidance observe buccal cusp of 16 and 17



Fig 10. Left canine guidance observe 25, 27



Fig 11. Permissive occlusal splint with anterior and canine guidance



Fig 12.



Fig 12.1. Manual waxup



Fig 13. Digital wax up printed models copy paste dentistry



Fig 13.1. Digital wax up printed models copy paste dentistry



Fig 13.2. Putty index



Fig 14. Pre op smile



Fig 15. Test drive of manual wax up



Fig 16. Test drive digital mock up observe the vast difference in both test drives





Fig 17. Manual Mock up Test Drive



Fig 18. Digital Mock up Test Drive



Fig 19. Checking of guidances in test drive

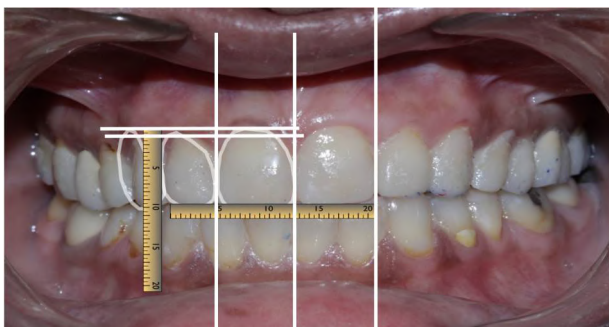


Fig 19.1. DSD planning and communication of changes to lab



Fig 20. Upper Anterior Crown Preparation



Fig 21. Upper right crown preparation



Fig 22. Upper left crown preparation



Fig 23. In 2018 we had access to black and white scanner



Fig 24. The impress veneer and crowns were milled and we checked it's fitting on a 3d printed model



Fig 25. Upper prosthesis luted



Fig 26. Upper prosthesis luted and lower still on temporaries, splint kept for few more weeks for stabilization of bite



Fig 27. Lower Anterior Crown Preparation done



Fig 28. Retraction and then scan



Fig 29. Lower teeth scan

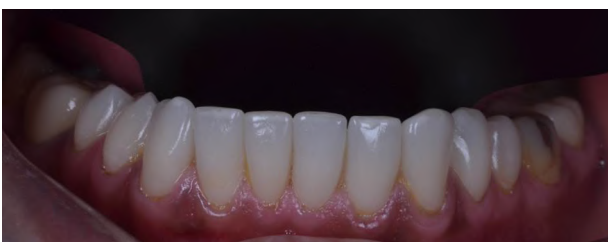


Fig 30. Empress Veneers given for lower arch



Fig 31. In occlusion



Fig 32. Left View



Fig 33. Right View

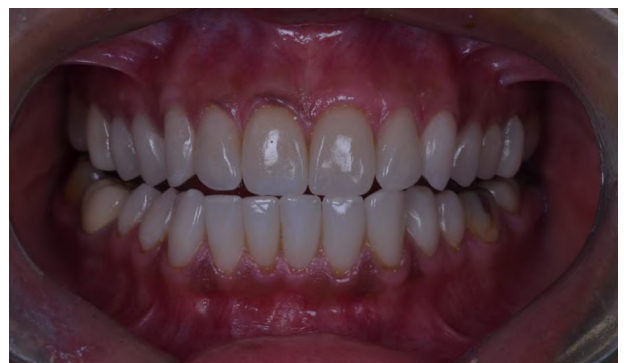


Fig 34. Anterior Canine Guidance restored



Fig 35. Canine Guidance – Right View



Fig 36. Canine Guidance – Left View



Fig 37. Intra oral view – Maxilla



Fig 38. Intra oral view – Mandible

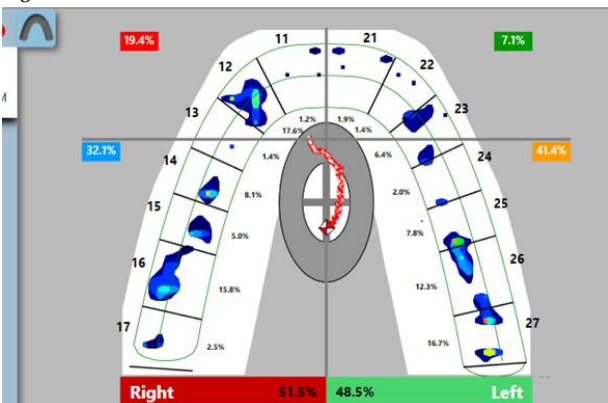


Fig 39. Occlusion checked with t scan see the balance bite on both sides



Fig 40. Stabilization Occlusal Splint Given



Fig 41. Extra oral photos

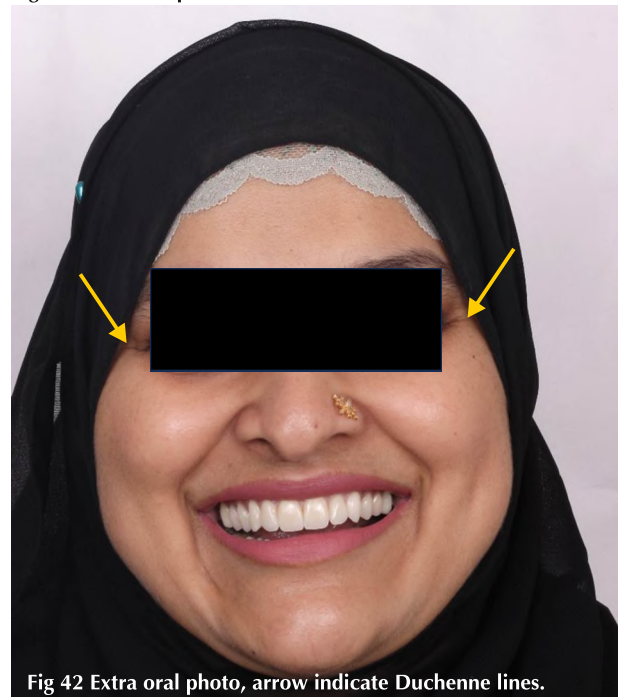


Fig 42 Extra oral photo, arrow indicate Duchenne lines.



Fig 43. Extra oral photo, side view, arrow indicates Duchenne lines



Fig 44.1. Extra oral right side view



Fig 44. Extra oral left side

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## Edelweiss Pediatric Crowns: A review and case report of a new and conservative approach to restoring pediatric teeth.



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### Introduction

Dental caries is a highly prevalent disease that remains a worldwide public health problem affecting millions of children worldwide. The restoration of severely decayed or damaged teeth in pediatric patients poses a significant challenge for dentists. In restorative pediatric dentistry, there are several options of materials to restore decayed primary teeth, including composites, glass ionomer cements, resin modified glass ionomer cement and compomers. Even though these materials have shown satisfactory properties, a large number of failures are still reported, mainly related to secondary caries or fracture of the restoration. Longevity of these restorations relies on a number of factors related to clinical variables like size of the cavity preparation, dental material's properties, operator's ability, and patients' behaviour. Composite resin restorations offer good aesthetics and require minimal tooth reduction. They are commonly used for anterior teeth due to

their natural appearance. However, composite resin restorations may have higher failure rates in posterior teeth due to their lower strength and susceptibility to wear and fracture. Composite resin restorations are more technique sensitive and time-consuming procedures. The performance of composite resins is affected by presence of water or saliva. Therefore, in non-cooperative children, or in cases where moisture is difficult to control, the restoration can be jeopardized, and a low performance can be expected. Glass ionomer cements that are less technique-sensitive and can be placed in a single increment which favours clinical management, A better performance was observed for Resin Modified Glass Ionomer Cements (RMGIC), compomers, and GIC (in contrast to composite resin) due to the easier and faster application technique of these materials. However, these materials lack the mechanical properties of composites

A Cochrane Review 1 showed that crowns placed on primary teeth with large decay, or that have had pulp treatment, have a less risk of failure or pain in the long term compared to fillings. Various pediatric crown options are available, including stainless steel crowns, strip crowns, and zirconia crowns. However, each option has its limitations in terms of aesthetics, durability, and ease of placement. SSCs have been widely used in pediatric dentistry due to their durability and cost-effectiveness. However, aesthetics can be a concern, as SSCs may not be as esthetically pleasing as resin-based crowns. Moreover, their placement requires significant tooth reduction, which can be challenging in pediatric patients with limited tooth structure. Strip crowns are tooth-colored, preformed crowns made of composite resin. They provide good aesthetics and require minimal tooth reduction compared to SSCs. However, strip crowns may be prone to fractures and have lower longevity compared to SSCs. They may not be suitable for molars due to their limited strength, and their adaptation to the tooth can sometimes be challenging. Zirconia Crowns require extensive tooth reduction to allow for proper placement of the crown. The preparation guidelines require it to be subgingival and invariably results in extensive bleeding. They are more expensive compared to the other crowns.

Recently, Edelweiss Dentistry (Austria) have launched a Pediatric crown that overcomes the disadvantages of the current crowns on the market. In recent years, the Edelweiss Pediatric Crown has emerged as an ideal alternative in the field of pediatric dentistry. It is biocompatible with zero Bisphenol A making it completely safe for the child patient. It contains zinc oxide nanoparticles and fluoride resulting in it being antibacterial with no biofilm formation on the surface. The hybrid glass structure mimics that of natural enamel giving the crown a natural appearance. Because of its resin content it can easily

be repaired in the mouth.

This case report aims to present a clinical case involving the use of the edelweiss Pediatric Crown and provides a comprehensive review of the existing literature on its indications, clinical outcomes, and patient satisfaction.

### CASE REPORT

A 4-year-old female patient was referred to our clinic with the complaint of painful teeth during meals and the presence of unsightly front teeth. Clinical examination showed large carious lesions in the upper front teeth (Figures 1 and 2).



Figure 1. Caries associated with the anterior teeth.



Figure 2. Palatal aspects of the anterior teeth showing extent of the caries.

The objectives of the treatment plan were firstly to alleviate pain and remove any pathology and then restore function and aesthetics. Since aesthetics was a priority, Edelweiss Pediatric Crowns were used to restore the front teeth.

All caries was removed using a round diamond bur and mesial, and distal reduction was achieved with fine tapered diamond bur to open the interproximal contacts and to begin circumferential reduction. Buccal and palatal reduction was achieved with a tapered round end diamond. All margins and extent of reduction was dictated by the caries

and kept to a minimum to preserve as much tooth structure as possible with margins kept supra-gingival. The pulp and dentine were protected with Glass Ionomer Cement prior to the cementation of the pediatric crown (Figure 3).



Figure 3. Pulp and dentine protected with glass ionomer cement.

Using a sizing gauge (supplied by the manufacturer) to determine appropriate size, the appropriate size crowns were selected (Figure 4).

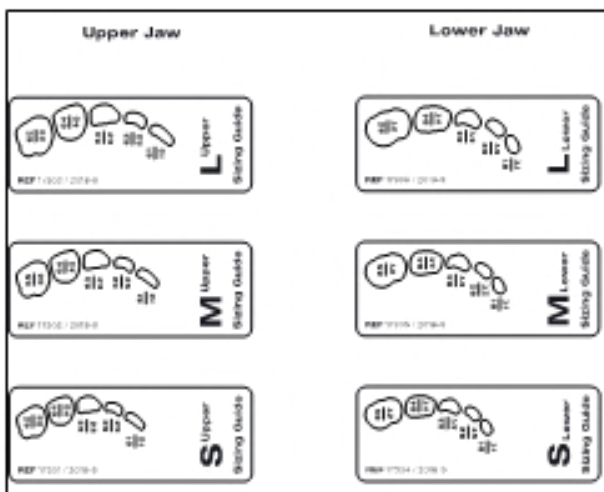


Figure 4. Sizing guide as supplied by the manufacturer.

The crowns were then checked for fit and prepared for bonding procedure. The inside of the crowns was lightly roughened using a diamond football bur (RA 379), rinsed off and air dried. Edelweiss Veneer Bond was applied to the inside of the crown and light cured for 20 seconds (Figure 5).



Figure 5. Edelweiss Bond applied to the inside of the crown.

The prepared tooth surface was etched with 37% phosphoric acid for 10 seconds, bonding agent applied and light cured for 20 seconds (Figures 6 & 7).



Figure 6. Bonding agent applied to tooth.

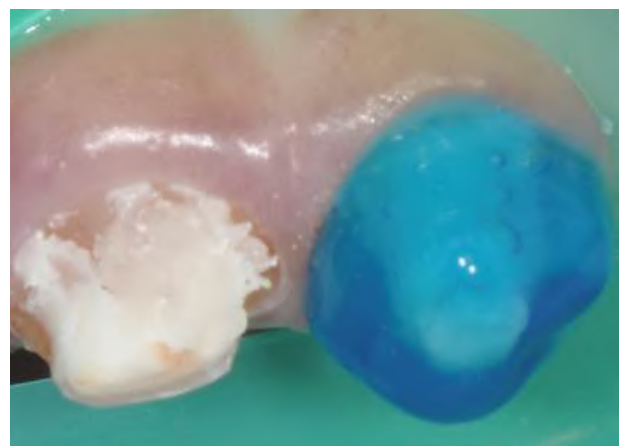


Figure 7. Tooth surfaces prepared with 37% phosphoric acid for 10 seconds.

Edelweiss composite colour A0 was added to the inside of the crown and placed over the prepared tooth (Figure 8), seated firmly and excess composite removed from the margins (Figure 9).



Figure 8. Edelweiss Crowns placed on prepared tooth.



Figure 9. Excess cement removed from the margins.

Occlusion was assessed and final cure was achieved with 20 seconds light curing (Figure 10).



Figure 10. Front teeth restored with edelweiss Pediatric Crowns.

Recall visit after 4 months showed no staining of the crowns and good gingival health (Figure 11). There was no chipping and the edelweiss Pediatric Crowns blended in the oral environment. Patient was pleased with the aesthetic results and could function well with no discomfort during eating.



Figure 11. Four month follow up showed good gingival health and no discoloration of the crowns.

#### DISCUSSION

The management of dental caries in children is based on the fact that caries is a progressive disease which can eventually damage the tooth and can be detrimental to the permanent tooth or the child's general well-being. The main objective of restorative treatment in the pediatric patient is to repair or limit the damage from caries, protect and preserve the tooth structure and maintain pulp vitality whenever possible.

Dental aesthetics and the importance of retaining the anterior teeth for proper childhood psychological development, may be influenced at increasingly early ages and by interaction with other children<sup>2</sup>. The demand for aesthetics, rather than function, of deciduous teeth restorations seems to be increasing<sup>3</sup>. To satisfy these demands the market has recently seen a shift away from stainless steel crowns. Prefabricated zirconia crowns like NuSmile, Cheng Crowns and Kinder Krowns are made of yttrium-stabilized zirconium. Zirconia crowns offers superior aesthetics when compared to stainless steel crowns. However, in-vitro fracture load studies by Townsend et al<sup>4</sup> showed variation in crown thickness and fracturability between the Zirconia crowns. Statistically significant differences were found among the forces



required to fracture zirconia crowns by the three different manufacturers. The increase in force correlated with crown thickness. The forces required to fracture the pre-veneered stainless steel crowns were greater than the forces required to fracture all manufacturers' zirconia crowns 4. Edelweiss pediatric crowns behaviours similar to natural tooth structure with a flexural modulus of 20GPa 5 giving it an advantage it that it's wear resistance is similar to the natural tooth.

The edelweiss Pediatric Crowns seem to perfectly imitate the natural deciduous teeth in form mimicking the anatomy of the primary tooth. The mesial and distal margins of the edelweiss Pediatric Crown follows the natural gingival-line of the milk teeth minimizing excessive tooth reduction and there is no need to take margins sub-gingival unless caries dictates extension. Furthermore, because of the minimal preparation needed there is no risk of iatrogenic damage to pulp tissue of the deciduous tooth. These pre-fabricated crowns permit a quick and safe treatment with maximum aesthetic results. Should retreatment be required, Edelweiss Pediatric Crowns offer the advantage that it can be easily removed as it cuts similar to that of dentin.

The morphology of the Edelweiss Pediatric Crown has similar cuspal features to that of the deciduous tooth hence very little occlusal adjustment is needed. If it is needed, it can be done on the pediatric crown itself and not on the opposing tooth thus preserving natural tooth structure. Unlike Zirconia crowns any occlusal adjustment has to be done on the opposing tooth causing unnecessary damage to the opposing tooth. Furthermore, the natural abrasion of Edelweiss crowns and flexural modulus similar to tooth structure 5 may make these crowns more tolerable in the child's mouth and 'kinder' to the temporomandibular joints.

### Conclusion

The Edelweiss Pediatric Crown provides a simple and effective aesthetic yet functional treatment option for the rehabilitation of decayed primary teeth and a superior alternative to both stainless steel or zirconia crowns.

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