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“Occlusal Stamp Technique: A Replication of God’s Gift Anatomy”: A Case Series

Dr Mohit Chaudhari¹, Prof. (Dr) Harpreet Singh², Dr Bharat Bhushan³, Dr Shubham Sharma⁴,
Dr Harpreet Kaur⁵, Dr Arsh Kumari⁶, Dr Subreena Zahoor⁷

Postgraduate Student, Desh Bhagat Dental College and University, Mandi Gobindgarh, Punjab, India¹

Dean Research, Professor and Head of the Department, Desh Bhagat Dental College and University, Mandi
Gobindgarh, Punjab, India²

Postgraduate Student, Desh Bhagat Dental College and University, Mandi Gobindgarh, Punjab, India³

Postgraduate Student, Desh Bhagat Dental College and University, Mandi Gobindgarh, Punjab, India⁴

Postgraduate Student, Desh Bhagat Dental College and University, Mandi Gobindgarh, Punjab, India⁵

Postgraduate Student, Desh Bhagat Dental College and University, Mandi Gobindgarh, Punjab, India⁶

Postgraduate Student, Desh Bhagat Dental College and University, Mandi Gobindgarh, Punjab, India⁷

Corresponding author: Prof (Dr) Harpreet Singh,

ABSTRACT: To replicate the dental anatomy is challenging in the dental restorations to restore the shape, function, phonetics, and aesthetics of damaged teeth. While direct composite restorations are commonly used, they require significant operator skill to recreate accurate dental anatomy and restore proper occlusion. The "Stamp" technique is a newer method designed to improve the accuracy of large composite restorations by creating precise occlusal topography. Initially introduced for restoring Class I cavities and erosively damaged teeth, this technique is most effective when the preoperative tooth anatomy remains intact and is not significantly altered by caries. The Stamp technique involves creating an occlusal index that captures the natural occlusal anatomy of the posterior teeth before cavity preparation. This index is then pressed against the final composite increment before curing, resulting in a positive replica of the original tooth anatomy. This approach allows for a restoration that closely mimics the natural tooth structure, ensuring both functional and aesthetic outcomes. The Stamp technique is particularly beneficial when restoring teeth with minimal carious damage, including occult caries, where cavitation is clinically unnoticeable. Although the Stamp technique has shown promise for Class I restorations, its use for Class II cavities, which affect the interproximal areas of the tooth, has not yet been well-established. Creating a functional and esthetic direct composite restoration still requires considerable skill, but the Stamp technique offers a more efficient solution by merging both function and esthetics. However, further studies are needed to explore its application in more complex restorations.

KEYWORDS: Anatomy, Composite, Cavity, Esthetics, Occlusal Index, Stamp Technique.

I. INTRODUCTION

Some of the main objectives of a restoration is to restore the form, function and occlusion of the individual tooth that is mutilated by the disease. Compared to indirect restorations, where contact, contour and the occlusion is well controlled and achieved in the laboratory, the direct restorations pose challenges in achieving the same intra-orally. It can be technique sensitive, time consuming and may not result in precise reproduction of the form and occlusion. The various matrices available, for both metallic and non-metallic restorations, mainly enable achieving the contour and contact of the proximal surfaces¹, but do not help achieve the precise occlusion. The occlusal carving is left for free hand dexterity and skill which has the risk of being over/ under finished resulting in over/ under restored surfaces. This leads to occlusal discrepancies that can range from minor to major. In addition, the surface finish obtained after finishing with the abrasives would not be as smooth as the one finished under a matrix.³



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In the second decade of the 21st century, dentistry has undergone significant advancements, characterized by a paradigm shift towards biomimetic dentistry, a field focused on emulating natural biological processes. This evolution has led to notable improvements in both the aesthetics and functionality of dental treatments, as traditional methods are not only refined but also augmented by innovative techniques.⁴ A technique was proposed by Dr. Waseem Riaz a London based practitioner which is known as 'Stamp technique' in which direct composite resin restorations was used to obtain the precise occlusal topography easily. It has also been reported for vertical bite reconstruction of worn out dentitions.⁵ Manually making an optimal direct composite restoration demands a high level of experience. The "stamp technique" stands out as a method that seamlessly combines aesthetics and function in composite restorations by accurately replicating the tooth's original anatomy based on its unprepared structure.⁶ This novel stamping procedure begins with creating an index, which can be considered a negative reproduction or small imprint of the occlusal topography. It can be utilized when there is no visible cavitation or tooth structural loss but radiographic evidence of caries. This index is placed against the final composite increment before curing, yielding a positive imitation. The pre-existing state is reproduced, with the added benefit of less time spent removing excess and polishing repairs⁷

II. CASE REPORT

Case 1-

A 23-year-old male patient presented to the Department of Conservative Dentistry and Endodontics with the chief complaint of black stains on the lower left posterior tooth region. The patient's medical history was non-contributory, and intraoral examination revealed satisfactory oral hygiene. Clinical assessment identified pit and fissure caries localized to tooth #36 (Fig.1).



Fig. 1. Preoperative photograph

To assess the extent and depth of the lesion, an intraoral periapical radiograph was obtained. Radiographic interpretation confirmed the absence of marginal ridge involvement, indicating a conservative restorative approach. Based on the clinical and radiographic findings, a composite resin restoration utilizing the stamp technique was planned to accurately reproduce the tooth's original occlusal morphology.

The procedure began with isolation of the tooth using a rubber dam to ensure a moisture-free operating field. A separating agent was applied to the occlusal surface of tooth #36 using a microbrush. Subsequently, a liquid dam material (Nexus Medodent) was applied over the intact occlusal anatomy and indexed at the cusp tips (Fig. 2A). A microbrush, with its tip cut to serve as a handle, was embedded in the dam material. The assembly was then cured using an LED light source, creating an occlusal stamp that provided a precise negative replica of the tooth's original anatomy (Fig. 2B).



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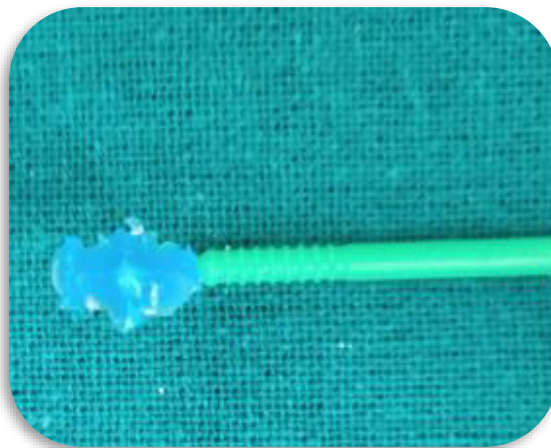
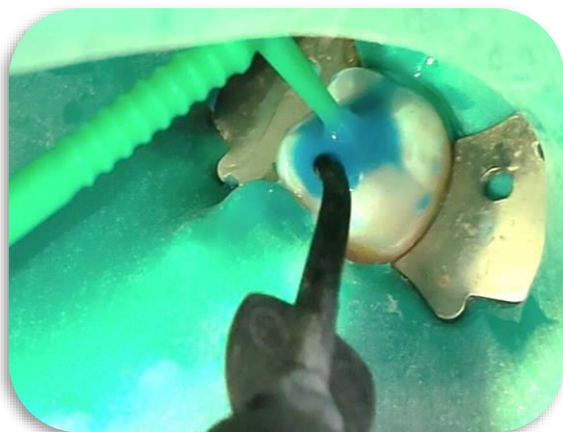


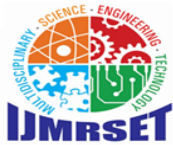
Fig. 2A. Application of liquid dam, Fig. 2B. Occlusal stamp obtained

Caries excavation was performed, and a Class I cavity preparation was completed (Fig. 3). The prepared cavity was etched using 37% phosphoric acid for 15 seconds, rinsed thoroughly, and gently air-dried. Resin composite (Te-Econom Plus, Ivoclar Vivadent) was placed incrementally, with the material layered up to 1 mm below the original occlusal level. Each increment was light-cured for 30 seconds.



Fig. 3 Class I cavity prepared

After the placement of the final increment, Teflon tape was applied to prevent the occlusal stamp from adhering to the composite material. The previously fabricated stamp was carefully positioned and pressed onto the uncured composite to replicate the natural occlusal anatomy (Fig. 4). The final layer was then light-cured for 30 seconds to secure the restoration.



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Fig. 4 Seating the occlusal stamp over teflon tape.

Following composite placement, minimal finishing and polishing were performed to refine the margins and restore the occlusal contours (Fig. 5). The rubber dam was removed, and the patient was provided with appropriate postoperative instructions regarding oral hygiene and dietary care.



Fig. 5. Postoperative clinical view of tooth number 36.

Case 2

A 20-year-old male patient reported with the chief complaint of black discoloration in the lower right posterior tooth region (Fig. 6).



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Fig.6 Preoperative photograph

An intraoral periapical radiograph was obtained to evaluate the extent of carious involvement and based on diagnosis, restoration with occlusal stamp technique was planned.

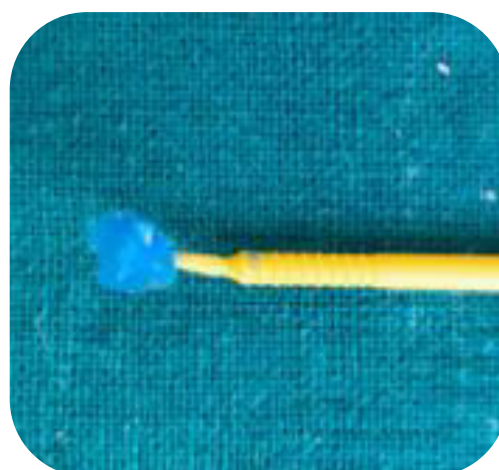
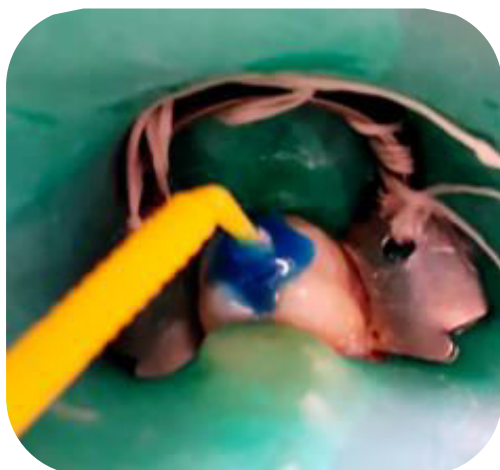


Fig. 7A. Liquid dam application, Fig. 7B. Occlusal stamp obtained.

Occlusal stamp was obtained using the liquid dam as discussed in case 1 (Fig. 7A & B)



Fig. 8A. Caries excavation and cavity preparation, Fig. 8B. Etching was done



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Caries excavation and cavity preparation were performed (Fig. 8A), followed by etching with 37% phosphoric acid (Fig. 8B). Incremental placement of composite resin was then carried out until the final increment, over which teflon tape was placed (Fig. 9).



Fig. 9 Teflon tape placement over the last increment of composite.

Minimal finishing and polishing was completed using a polishing disc (Shofu Super-Snap Mini Kit, Kyoto, Japan) (Fig. 10).



Fig.10 Postoperative photograph



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Case 3

A 21-year-old female presented with brownish discoloration on the teeth, on evaluation caries involving pit and fissure surfaces of teeth #46 and #47 (Fig. 11)



Fig.11 Preoperative Photograph

An intraoral periapical radiograph was obtained to evaluate the extent of carious involvement and based on diagnosis, restoration with occlusal stamp technique was planned.

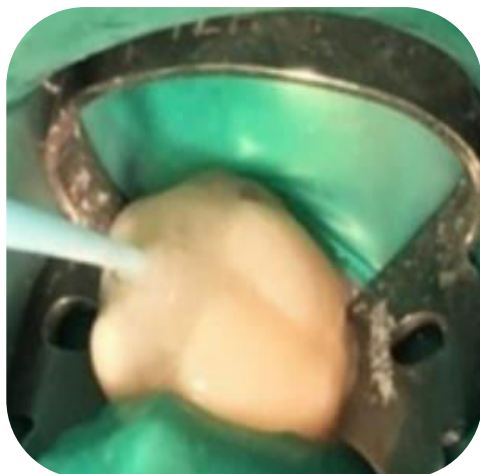


Fig 12A. Pattern resin application over the occlusal surface, Fig. 12B. preparation of stamp

The occlusal stamp was obtained using pattern resin (Fig. 12A and B), as described in Cases 1 and 2. Caries excavation and cavity preparation were then performed (Fig. 13).



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Fig 13. Cavity Preparation

After placement of the final composite increment, the preformed occlusal stamp was carefully aligned and gently pressed over the Teflon tape to reproduce the original occlusal anatomy.

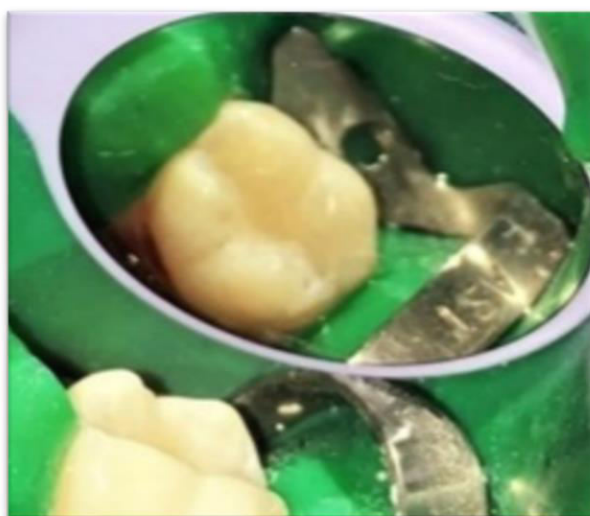


Fig. 14. Final Composite Restoration

Minimal finishing and polishing were performed using a polishing system (Shofu Super-Snap Mini Kit, Kyoto, Japan) (Fig. 14), restoring both function and esthetics with high precision.

III. DISCUSSION

Any restoration's ultimate objective is to restore normal form and function while also making dental treatment more comfortable for the patient. This case aids in achieving the aim above by maintaining a harmonious cusp fossa relationship with the antagonist and neighboring teeth. When the tooth structure is intact but has caries beneath it, this treatment is utilized (class I and class II). Cling film can be used instead of Teflon tape since it does not need to be removed during curing. It also shields composite materials from numerous exposures to ambient light.⁸



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Resolving occlusal issues resulting from modifications in occlusal morphology is crucial⁹. Primary occlusal trauma can be brought on by interference or early contact resulting from inadequate occlusal adjustments. Because the natural anatomy of the tooth is preserved, this approach has a considerable benefit.¹⁰

Direct restorative material that is often used for tooth biomimetic restoration nowadays is composite resin. Based on a survey conducted by researchers at the University of Otago, New Zealand, the use of composite resins for the posterior tooth restoration in the occlusoproximal portion of premolars were 93.7% and permanent molar teeth at 85.2%. Factors affecting the increased use of composite resins as the restoration material are due to the color of the teeth so that the aesthetics are good, minimal tooth preparation, low edge leakage if the application of the bonding is correct, does not conduct heat, is easily formed in a long working time, can be polished at one visit resistance to fracture and moderate wear, durable with a restoration replacement period of around 8 years.¹¹

The flowable composite is commonly used because it allows for precise detail reproduction and is readily available. However, it can be costly. One way to reduce expenses is by using expired composites to prepare stamps¹². Liquid dam material has low viscosity for easy flow but requires a large amount for proper strength due to its high flexibility. Additionally, it is expensive. Transparent acrylic resin is a good material due to its easy handling, low cost, and precision¹³. However, it can create a rough surface under the stamp because it is transparent and can be retained while curing¹⁴. It prevents dental drilling-induced microfractures from occurring, ensures the continuity of the filling's surface and borders, and cuts down on the time required for occlusal correction. Although it works well for Class II cavities as well, the stamp approach is mostly employed for Class I cavities. But before using this method, it's imperative to carry out a comprehensive assessment.⁹

IV. CONCLUSION

The occlusal stamp technique represents a highly effective and conservative approach for restoring posterior teeth affected by occlusal caries, particularly when the original anatomy is intact. By accurately replicating the preoperative occlusal morphology, this technique ensures optimal functional and esthetic outcomes with minimal occlusal adjustment. It is especially advantageous in young patients and cases requiring precise anatomical replication. Additionally, the stamp technique reduces chairside time, enhances patient comfort, and maintains the integrity of the tooth structure. With proper case selection and adherence to protocol, the occlusal stamp technique serves as a reliable and efficient method in modern restorative dentistry.

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