



Improving Precision in Posterior Composite Restorations with the Innovative Stamp Technique: A Case Report

Swati Rani Gupta¹, Reema Joshi¹, Asha Thapa¹, Reetu Shrestha¹

¹Conservative Dentistry and Endodontics Unit, Department of Dental Surgery, National Academy of Medical Sciences, Bir Hospital, Mahabouddha, Kathmandu, Nepal.

ABSTRACT

Background

Posterior composite restorations, using the traditional methods, can often be technique-sensitive and may not always result in an exact replication of the tooth's natural anatomy and occlusion. The “Stamp technique” has emerged as a reliable method for producing biomimetic posterior restorations with accurate occlusal topography, requiring little or no occlusal adjustment. By creating preoperative impression of the tooth's occlusal surface before cavity preparation, this technique allows for precise reproduction of natural occlusal morphology, thereby reducing chair time and enhancing esthetic outcomes. This case report highlights the application of the occlusal stamp technique in a patient requiring multiple posterior composite restorations.

Keywords: occlusal anatomy; posterior composite restoration; stamp technique.

INTRODUCTION

Restoring posterior teeth with composite resin requires meticulous attention to both functional and esthetic outcomes. Achieving proper occlusal anatomy and contacts is crucial for harmonious occlusal relationship and patient comfort. Traditional freehand techniques, while effective, can be time-consuming and prone to variability in replicating natural occlusal morphology. The occlusal stamp technique provides an innovative yet straightforward approach that helps maintain the natural occlusal anatomy. It involves creating a preoperative imprint of the tooth's occlusal surface, which serves as a guide for reconstructing the anatomy after cavity preparation.¹ This technique is applicable in cases where the tooth's preoperative anatomy is intact and has not been lost due to the carious lesion.² This case report outlines each step, from impression making to finishing, highlighting the benefits and clinical relevance of this technique.

CASE REPORT

A 20-year-old male patient reported to the Conservative Dentistry and Endodontics Unit, Department of Dental Surgery, Bir hospital, with a complaint of black stains on his upper right and

lower left back teeth region since 2-3 months. It was not associated with sensitivity on cold and hot consumption. There was no history of night pain, pus discharge, or swelling. Past medical history, as well as past dental history were nonsignificant and he had no deleterious personal habits.

Intraoral examination revealed blackish discoloration in the occlusal pits and fissures, as well as in the palatal grooves of teeth #16 and #17 (FDI numbering system). Similar discoloration was noted in the occlusal pits and fissures of teeth #36 and #37. The occlusal morphology and the marginal ridges of the teeth were intact, with no significant cavitation (Figure 1-A,B). However, on exploration with an explorer tip, softness and a catch were detected in all four teeth. On palpation as well as on percussion, no tenderness was noted. Probing depths and mobility were within normal physiological limits. Pulp neural sensibility tests (Electric pulp test and cold test) elicited normal response in teeth #16, #17, #36 and #37 as adjacent and contralateral control teeth. Based on these findings, a diagnosis of pit and fissure caries with palatal extension in the maxillary molars and pit and fissure caries in the mandibular molars was established.

Correspondence: Dr. Swati Rani Gupta, Conservative Dentistry and Endodontics Unit, Department of Dental Surgery, National Academy of Medical Sciences, Bir Hospital, Mahabouddha, Kathmandu, Nepal. Email: swatigupta99100@gmail.com, Phone: +977-98498907228. **Article received:** 2024-12-09. **Article accepted:** 2025-01-15. **Article published:** 2025-03-31.

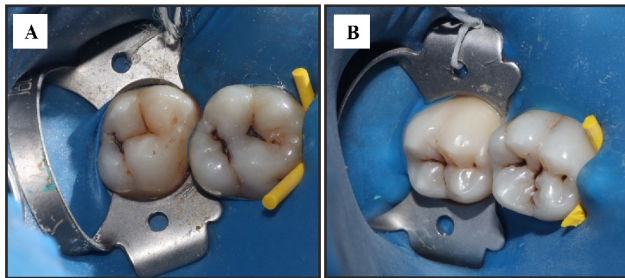


Figure 1. Preoperative clinical view (A) teeth #16, #17 (B) teeth #36, #37.

As the occlusal morphology of the teeth were intact, it was decided to utilize composite resin and the stamp technique for reconstructing the decayed area. The treatment method was discussed with the patient and consent was obtained. Under anesthesia and rubber dam isolation, the occlusal surfaces of the teeth were cleaned and dried with a brush and airflow to remove plaque, debris and saliva. The teeth were smeared with vaseline to act as a separating medium for the fabrication of stamp. Then, the occlusal stamps were fabricated using two materials: one was the most commonly employed flowable composite and the other was light-body polyvinyl siloxane material. These materials were used for two teeth each. A layer of flowable composite was syringed over the occlusal surface of teeth #16 and #17 and polymerized for 20 seconds. Another layer of composite was applied, after which the tip of a microbrush was trimmed and carefully dipped into the composite to act as a handle for the final phase of the restoration. This was followed by polymerization with visible light for 20 seconds to create stamps of the occlusal surfaces (Figure 2A). For teeth #36 and #37, stamps were fabricated using light-body material. The base and catalyst pastes were mixed and loaded into a syringe, then injected over the occlusal surfaces of the teeth. The microbrush, with its tip trimmed, was carefully dipped into it and the material was allowed to set (Figure 2B).

Once the materials had set, the corresponding edges on the buccal surfaces of the teeth were marked to ensure proper orientation during stamp repositioning. The stamps were then carefully removed from the tooth surfaces, avoiding any damage. The obtained stamps with the mentioned materials are depicted in figures 3-A, B.

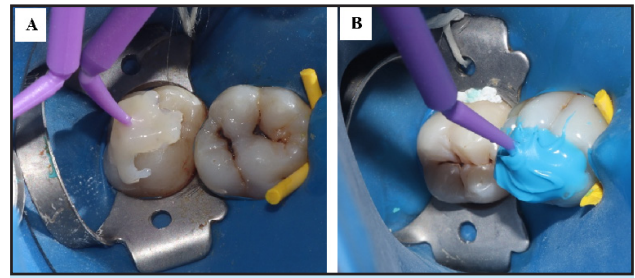


Figure 2. Occlusal stamp preparation (A) with flowable composite for tooth #17 (B) with light body elastomeric material for tooth #36.

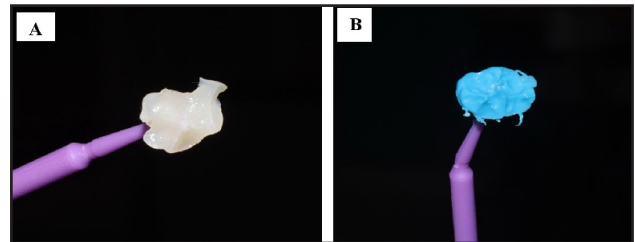


Figure 3. Obtained stamps (A) for tooth #17 (B) for tooth #36.

The teeth were cleaned to remove the separating medium. Caries were then excavated using a round diamond drill at high speed and class I cavities of approx. 2-3mm depth were prepared (Figure 4).



Figure 4. Caries excavation and cavity preparation.

Following this, cavities were etched using 37% orthophosphoric acid for 15-20 seconds, then rinsed with water for 1 minute and dried. Bonding agent was then applied and light cured for 20 seconds according to manufacturer instructions. Now, composite was placed using incremental technique upto 1mm short of the occlusal surface and each layer was light cured for 20 seconds. After the final layer of composite was applied, a teflon material was placed on it, over which the prepared stamp was placed ensuring correct orientation. The stamp was gently pressed against

the surface, allowing it to adapt to the not yet cured composite (Figure 5).



Figure 5. Stamp pressed over the final composite layer separated by teflon.

The stamp along with the Teflon material was removed. The excess material which flowed over the cusps was removed and the composite was light cured for 20 seconds. Rubber dam isolation was removed and the occlusion was checked for premature contacts using articulating paper. No high points were detected on any of the four restored teeth (Figure 7-A,B). Minimal finishing and polishing was done. The restoration was performed on two teeth at a time.

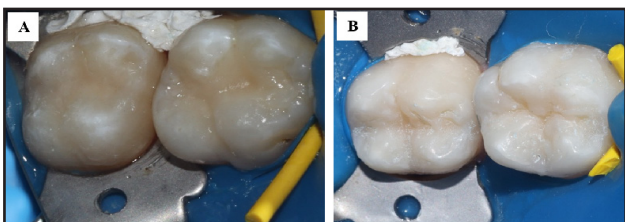


Figure 6. Postoperative photographs (A) teeth #16, #17 (B) teeth #36, #37.

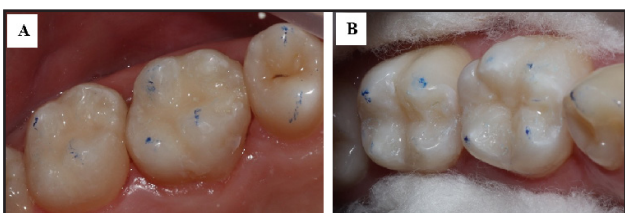


Figure 7. Occlusal verification with articulating paper (A) teeth #16, #17 (B) teeth #36, #37.

DISCUSSION

Re-establishment of occlusal anatomy in anterior teeth primarily focuses on aesthetics, while in posterior teeth, it is crucial for maintaining proper masticatory function and ensuring an accurate cusp-fossa relationship with the antagonist teeth.

Correct occlusion is essential for orofacial integrity, as inaccuracies in occlusal reproduction can result in occlusal discrepancies and temporomandibular disorders, potentially disrupting the entire stomatognathic system.³ While freehand techniques are commonly practiced, they are often labor-intensive and may lack precision in reproducing natural occlusal anatomy. The occlusal stamp technique, first introduced by Waseem Riaz, provides a valuable approach for achieving precise and accurate occlusal topography in posterior composite restorations. This method involves creating a preoperative imprint of the tooth's occlusal surface, to ensure an exact replication of the original anatomy.¹ The technique is best suited for cases where the tooth's occlusal anatomy remains intact before cavity preparation, as a preoperative impression is essential. So, it is particularly indicated for class I pit and fissure caries, occult caries, or in fluoride bombs, where undermined dentin decay exists without significant surface cavitation.⁴ In cases involving significant structural loss or existing restorations, alternative techniques may be required. Recent case reports have also explored its application in class II cavities, broadening its potential scope of use.² One of the most notable advantages of this technique is its ability to minimize adjustments to the occlusion during the finishing phase, as the original anatomy is precisely reproduced. Furthermore, it enhances procedural efficiency by simplifying the workflow and delivering consistent, reliable results. This approach also helps to minimize porosity in the final restoration by applying pressure through the stamped matrix, which reduces the formation of microbubbles and limits oxygen interference during the polymerization of the final composite layer. These attributes play a crucial role in enhancing the durability and long-term performance of composite restorations.⁵ While this technique offers several advantages, it also has certain limitations that must be considered. It requires significant expertise and clinical knowledge for successful implementation. Additionally, there is a risk of the stamp breaking or the stick detaching during the restoration

process. The approach may also be considered cost-ineffective due to the expenses associated with the use of flowable composite. Portions of the stamp extending into the buccal or palatal grooves, if not sufficiently thick as the occlusal portion, may break on application of pressure during restoration. This issue was encountered in the presented case, where manual sculpting was necessary to address the palatal extension area. However, if prepared correctly, the technique will add advantage in restoring palatal/ buccal extension areas without the need for Barton's matrix, thereby eliminating additional steps, reducing time, and minimizing technique sensitivity. Flowable composite is often preferred for the preparation of stamp because of its ability to reproduce fine details and its easy availability. However, its cost can be a limiting factor. The expense can be minimized in one way by using expired composites. Alternatively, various other materials can be used to create stamps, including polyvinyl siloxane impression materials, bite registration paste, clear polymethyl methacrylate, gingival barrier or liquid dam, pattern resin, transparent acrylic resin, pit and fissure sealants, impression compound, and thermoforming foil.³ In the case presented, both flowable composite and light-body polyvinyl siloxane material were utilized for stamp preparation. No noticeable differences were experienced in their handling or the final outcomes. This suggests that polyvinyl siloxane material can be a reliable substitute for flowable composite in stamp preparation. Regardless of the material chosen for stamp preparation, it is crucial to emphasize that the precise placement of the occlusal stamp is essential to achieving an accurate cusp-fossa relationship. The use of release agents has been advocated in the stamp technique, at two key stages. Firstly, during the preparation of the stamp, agents like petroleum jelly are applied over the tooth surface.⁵ These agents penetrate into the deep pits and fissure, which are functionally insignificant spaces, make the shape of the stamp more regular and facilitates its easy removal. Secondly, use of release agents have been recommended during

stamp placement to prevent adhesion between the composite resin and the stamp material. Teflon is the most widely used material for this purpose.² However, alternatives such as transparent/ cling film or petroleum jelly have also been suggested.^{3,5} Cling film, in particular, offers the added advantage of not requiring removal during curing, while also shielding the composite from numerous exposures to ambient light.⁶

When the occlusal stamp is pressed against the uncured composite, it allows excess material to flow out. In the case presented, this excess was removed after the occlusal stamp and teflon were taken off before light curing. Alternatively, literature suggests that the excess can be trimmed using rotary instruments after light curing, with the occlusal stamp and Teflon remaining in place during the curing process.^{2,7} To enhance the clinical acceptance of the stamp technique, Zotti F et al. (2023) compared its effectiveness to traditional restorative methods for Class I restorations. The study assessed parameters such as microleakage, voids, overhangs, and marginal adaptation. While no significant differences were observed in microleakage, marginal adaptation, or obturation defects, the stamp technique did result in the formation of larger overflow margins. However, the technique demonstrated an advantage of reduced operative time, as both the restoration and finishing processes were completed efficiently in a reasonably short time.⁸ Ramseyer et al. (2015) evaluated the outcome of stamp technique in seven cases of erosively worn dentitions (98 posterior teeth) after an average observation period of 40 months (40.8 ± 7.2 months) and found good overall results, with the restorations showing satisfactory clinical performance and durability over time.⁹ Vertuan M et al. (2022) also reported good clinical longevity of this technique a 4-year period in a tooth restored with bulk-fill composite. Small wear was observed which was within clinically acceptable levels.¹⁰ In this case, the occlusal stamp technique was effectively used to restore four posterior teeth, resulting in functional and aesthetically pleasing composite restorations. The patient expressed

satisfaction with the treatment, and the restoration demonstrated excellent replication of the original morphology. This case highlights the practical application of the technique, emphasizing its effectiveness in achieving superior outcomes, while eliminating the need for time-consuming sculpting. Further studies and clinical trials can help refine this technique, explore its applications in diverse clinical situations, and compare its long-term success rates with other restorative methods. By addressing these aspects, the broader applicability of this innovative approach can be better understood.

REFERENCES

1. Manik K, Ikhar A, Patel A, Chandak M, Mahapatra J, Bhopatkar J, Bhojwani PR. Effortless Precision: A Case Report on the Stamp Technique for Posterior Teeth. *Cureus*. 2024 Jun 28;16(6): e63198. [PubMed] [DOI]
2. Alshehadat SA, Halim MS, Carmen K, Fung CS. The stamp technique for direct Class II composite restorations: A case series. *Journal of Conservative Dentistry and Endodontics*. 2016 Sep 1;19(5):490-3. [PubMed] [DOI]
3. Mary G, Jayadevan A. Microbrush stamp technique to achieve occlusal topography for composite resin restorations-A Technical Report. *Journal of Scientific Dentistry*. 2016;6(2):76-82. [DOI] [Link]
4. Murashkin A. Direct posterior composite restorations using stamp technique-conventional and modified: A case series. *IJDR*. 2017;2(1):3-7. [DOI] [Link]
5. Pompeu JG, Morais RC, Ferreira TO, Prado VL, de Jesus Sousa Sampaio T, da Silva Pedrosa M. Occlusal stamp technique for direct resin composite restoration: A clinical case report. *Int J Recent Sci Res*. 2016;7(7):12427-30. [Link]
6. Agrawal P, Nikhade P. Stamp Approach for Posterior Composite Restorations: A Case Report. *Cureus*. 2022 Jul;14(7). [DOI] [PMC]
7. Martos J, Silveira LF, Ferrer-Luque CM, González-López S. Restoration of posterior teeth using occlusal matrix technique. *Indian Journal of Dental Research*. 2010 Oct 1;21(4):596-9. [PubMed] [DOI]
8. Zotti F, Vincenzi S, Zangani A, Bernardi P, Sbarbati A. Stamp technique: An explorative SEM analysis. *Dentistry Journal*. 2023 Mar 8;11(3):77. [PubMed] [DOI]
9. Ramseyer ST, Helbling C, Lussi A. Posterior vertical bite reconstructions of erosively worn dentitions and the “stamp technique”—A case series with a mean observation time of 40 months. *J Adhes Dent*. 2015 Jun 1;17(3):283-9. [PubMed] [DOI]
10. Vertuan M, Mosquim V, Guimarães GM, Obeid AT, Bombonatti JF, Ishikiriama SK, Furuse AY. The stamp technique for direct restoration in a ICDAS 4 carious lesion: A 4-year follow-up. *Journal of Esthetic and Restorative Dentistry*. 2023 Apr;35(3):442-8. [PubMed] [DOI]

CONCLUSIONS

The occlusal stamp technique, when applied correctly, provides esthetically pleasing, functional, and durable outcomes in posterior composite restorations with less post restoration adjustments, reduced chair time and high patient satisfaction. The potential limitation of this technique is that it can only be used for specific cases. Nevertheless, modification in technique and further research have the potential to broaden its scope and utility in clinical practice.

Conflict of interest: None

Funding: None

Citation: Gupta SR, Joshi R, Thapa A, Shrestha R. Improving Precision in Posterior Composite Restorations with the Innovative Stamp Technique: A Case Report. *JCMS Nepal*. 2025; 21(1): 92-96.