Case Report

Precision Replication of Occlusal Anatomy Using the Stamp Technique: A Case Report

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Abstract:

The stamp technique is a minimally invasive and highly precise method used in restorative dentistry to replicate the natural occlusal anatomy of posterior teeth. This case report describes the use of the stamp technique in a 23-year-old female patient, who presented with pit and fissure caries in tooth 46. Clinical and radiographic evaluation revealed an intact occlusal surface with early carious involvement, making the case ideal for the stamp approach. A flowable composite was used to create a stamp of the occlusal surface prior to cavity preparation. After standard etching and bonding protocols, the cavity was restored with composite resin using the preformed stamp to replicate the original anatomy. The technique significantly reduced the need for occlusal adjustments and polishing, yielding a highly aesthetic and functional result. This case highlights the efficiency, accuracy, and patient centred advantages of the stamp technique in conservative restorative dentistry.

Keywords: Stamp technique, Minimally invasive restoration, Direct composite restoration

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INTRODUCTION:

In recent years, the demand for aesthetic and minimally invasive dental treatments has led to the widespread use of composite resin restorations in posterior teeth. While composite materials offer advantages such as superior aesthetics and conservation of tooth structure, challenges remain in replicating precise occlusal anatomy, especially in Class I cavities. Traditional free-hand sculpting techniques are time-consuming and technique-sensitive, often requiring extensive finishing and polishing to achieve functional harmony.

The stamp technique, introduced to address these limitations, it is a restorative method that effectively combines aesthetics and function by precisely replicating the tooth's original occlusal anatomy prior to cavity preparation. Dr. Waseem Riaz, a

dental practitioner based in London, introduced and advocated this technique for achieving precise occlusal topography in direct composite resin restorations1–3.

The technique is ideal for cases involving shallow to moderate occlusal caries, where the occlusal anatomy remains largely intact However, in cases with extensive tooth structure loss such as large MOD (mesial-occlusal-distal) cavities or when the occlusal surface is severely decayed, where the cavity margins are subgingival the technique becomes less viable4.
This case report illustrates the application of the stamp technique in a 23-year-old female patient with pit and fissure caries in the mandibular left second molar(37), demonstrating its effectiveness in preserving natural tooth anatomy while delivering aesthetically pleasing and functionally sound results.

Case Presentation

A 23-year-old female patient, reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of black discoloration and occasional food lodgement in her lower left back tooth region.
Her past medical and dental history were non-contributory. On intraoral clinical examination, tooth number mandibular left second molar (37) exhibited pit and fissure caries, with the marginal ridges intact and no visible cavitation. The occlusal surface showed anatomical integrity, making it an ideal case for the stamp technique.

Fig 1: Preoperative Photograph

To assess pulpal status and the extent of carious involvement, an intraoral periapical radiograph was taken, which revealed superficial occlusal radiolucency with no periapical changes.

Fig 2: Preoperative radiograph

Rubber dam isolation was achieved to provide a clean and moisture-free operating field. A thin layer of separating medium was applied to the occlusal surface of tooth 37 using a microbrush. This was done to ensure that the stamp could be removed easily after fabrication.

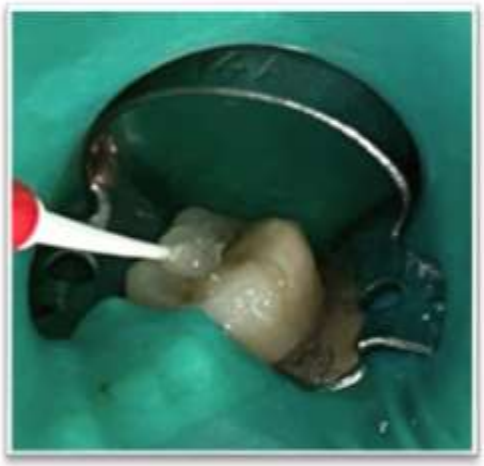


Fig 3: Application of a single coat of petroleum jelly with applicator tip

To create the occlusal stamp, a layer of flowable composite (Tetric N-Flow, Ivoclar Vivadent, Schaan, Liechtenstein) was applied over the intact occlusal anatomy of tooth 37. A trimmed microbrush tip was

inserted into the unset composite to act as a handle. This setup was then light-cured to form a rigid stamp that preserved the preoperative occlusal morphology.

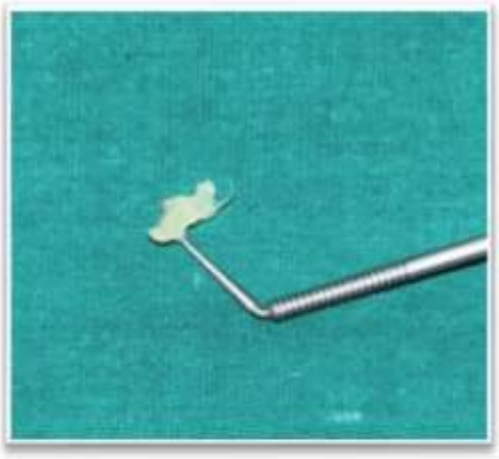
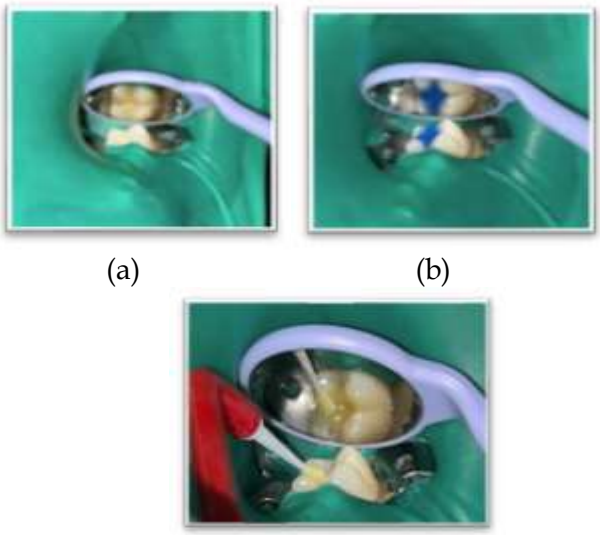


Fig 4: Occlusal stamp made using microbrush stamp technique

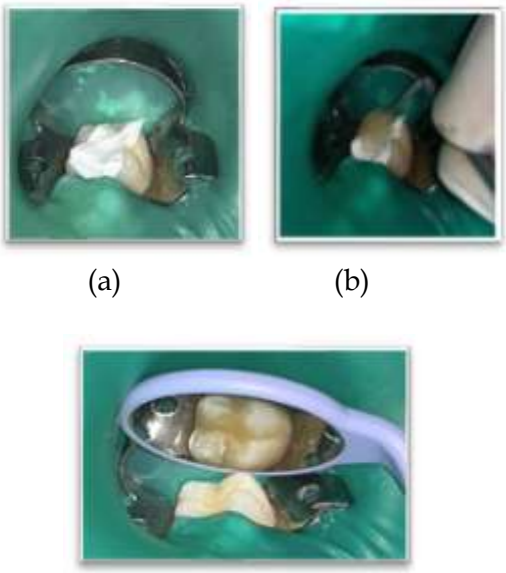
Following stamp fabrication, standard cavity preparation was performed. Carious tissue was removed, and a conservative Class I cavity design was established to provide proper retention and resistance form. Care was taken to preserve as much natural tooth structure as possible.



(a) (b) (c)

Fig 5: (a) caries excavation/ cavity preparation (b)enamel etching with 37% ortho phosphoric acid(c)Application of bonding agent

The prepared cavity surfaces were then etched with 37% orthophosphoric acid (Prime Dental, Ahmedabad, India) for 30 seconds to create microretentive areas for bonding. The etchant was thoroughly rinsed off, and the surface was gently air-dried using a three-way syringe. A universal bonding agent (Single Bond Universal, 3M ESPE, St. Paul, MN) was then applied to the etched surfaces according to the manufacturer's instructions and light-cured for 20 seconds.



(a) (b) (c)

Fig 6: (a)Teflon applied covering the occlusal surface(b)Microbrush stamp pressed over the cling film(c)Final restoration

Composite restoration was carried out incrementally using Spectrum composite (Dentsply Sirona). The cavity was filled to a level approximately 1 mm below the original occlusal surface and light-cured. For the final increment, a thin layer of composite was placed, and a strip of Teflon tape was laid over it to prevent the composite from sticking to the stamp. The preformed occlusal stamp was carefully positioned over the Teflon tape and gently pressed to transfer the original occlusal anatomy. Once the stamp was removed, the final layer of composite was light-cured to complete the restoration.

Minimal finishing and polishing were required due to the accuracy of the occlusal reproduction. Final polishing was performed using a polishing paper disc (Shofu Super-Snap Mini Kit, Kyoto, Japan) to achieve a smooth and lustrous surface. Postoperative instructions were given to the patient, emphasizing the importance of maintaining oral hygiene and avoiding hard or sticky foods for 24 hours. A follow-up visit was scheduled after 3 months to assess the restoration's function and integrity.

DISCUSSION

The primary objective of a dental restoration is to restore the shape, function, phonetics, and aesthetics of a damaged tooth. Restorations are broadly classified into two types: Direct and Indirect. Direct restorations are placed directly within the patient's oral cavity and are generally suitable for small to moderate cavities. They offer advantages such as minimal tooth preparation and lower cost. However, they require a high degree of clinical skill. In contrast, indirect restorations are fabricated outside the oral cavity either in a dental laboratory or with CAD/CAM technology and are later cemented into the mouth5. The choice between direct and indirect restorations depends on factors such as the extent of the tooth damage, aesthetic demands, and clinical feasibility.

The stamp technique is an innovative and conservative approach that addresses one of the major challenges in direct posterior composite restorations: replicating the tooth's natural occlusal anatomy. In conventional freehand techniques, achieving ideal cusp-fossa relationships and occlusal balance often requires significant time for sculpting and post-curing adjustments6. In contrast, the stamp technique provides a preoperative impression of the original anatomy, significantly reducing finishing time and improving accuracy.

Merits of the Stamp Technique

- **Faster procedure:** Saves time by eliminating the need to manually recreate the occlusal anatomy.
- **Reduced material consumption:** Requires less restorative material due to precise anatomical replication.
- **Decreased chairside time:** Minimizes occlusal adjustments, conserving time and articulating paper.
- **High accuracy:** Accurately replicates the original occlusal anatomy, ensuring better anatomical fidelity.

In this case, tooth 37 presented with pit and fissure caries without significant structural breakdown, making it an ideal candidate for the stamp technique. The intact occlusal surface allowed for the fabrication of a detailed and accurate stamp using flowable composite. During the final restoration, this stamp ensured precise anatomical reproduction, enhancing functional efficiency and aesthetic integration.

Other cost-effective materials could be considered as follows:

- Pit and fissure sealants
- Poly methyl methaacrylate [clear]
- Pattern resin
- Gingival dam material
- Vacuum formed template.
- Bite registration material

Moreover, the technique minimized material wastage and operator fatigue, as the need for multiple occlusal adjustments and extensive polishing was eliminated. Literature supports that this method not only reduces chair time but also enhances marginal adaptation and minimizes polymerization shrinkage, as pressure applied by the stamp helps in compacting the composite and reducing air entrapment7–9.

However, as with any clinical technique, it has limitations. The stamp technique is only applicable in cases where the occlusal surface is intact or minimally affected. If the occlusal anatomy is significantly destroyed or altered, the use of this technique becomes unfeasible. Additionally, fabrication of the stamp must be carried out with

precision to avoid distortion during handling or polymerization.

Overall, this case demonstrates that with proper case selection, the stamp technique offers a highly efficient, minimally invasive, and aesthetically superior alternative to conventional composite restoration methods.

CONCLUSION

The stamp technique is a reliable and effective method for restoring posterior teeth when the original occlusal surface is intact. It allows for the reproduction of natural occlusal anatomy with high precision while reducing operative time, minimizing finishing and polishing efforts, and enhancing patient satisfaction. In the present case involving tooth 37 of a 23-year-old female patient, the technique proved to be highly successful in achieving both functional and esthetic outcomes. With appropriate case selection and careful handling, the stamp technique can significantly enhance the quality and efficiency of restorative procedures in daily clinical practice.

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