



Stamp Technique: A New Therapeutic Approach for Occlusal Restorations

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ABSTRACT :

Introduction:

Composite resin restorations are favored over amalgam due to patient demand for aesthetics and advances in Micro Dentistry. Minimally invasive techniques focus on preserving healthy tooth structure.

Direct restorations are challenging and time-consuming compared to precise indirect ones. The "Stamp Technique" helps achieve nearly perfect occlusal restoration by making an impression of the decayed surface.

The purpose of this article is to describe the method and present the material necessary for the implementation of a restoration using the stamp technique through 2 clinical cases.

Methods: This technique was used on two patients with occlusal caries of different severity, which allowed for an esthetic filling with a close approximation of the natural dental anatomy.

Results: An esthetic restoration without retouching and without overbite allowing a hormonal integration in the occlusion.

Discussion:

Carious lesions in posterior teeth develop on less cleanable occlusal surfaces. Restorations must accurately replicate tooth anatomy to prevent orofacial issues.

The "stamp technique" is effective for restoring tooth form and aesthetics, saving time and materials. The modified stamp technique (MST) uses transparent material for better accuracy. It offers a practical, biomimetic approach, significantly improving topography reproduction accuracy compared to conventional manual methods. This technique should be considered when conditions are optimal for its application.

The studies found no significant differences in microleakage or marginal adaptation between the stamp and traditional methods but noted the need for careful finishing. The stamp technique is efficient and durable.

Key words: Stamp technique; Esthetic Direct Composite; modified stamp technique; Case Report.

INTRODUCTION:

Composite resin restorations have gained significant popularity among dentists, leading to a decline in the use of amalgam in modern dental practice. This trend is largely driven by patients' growing interest and demand for aesthetic restorations, even for posterior teeth. Additionally, the advent of Micro Dentistry and recent advancements in bonding agents have also contributed to the widespread adoption of composite resin restorations. (1)

The need to move to less invasive dentistry and the possibility of obtaining a watertight surgical field are factors that are improving restoration techniques in favor of the use of composite resin. (2)

Minimally invasive restorative techniques prioritize the conservation of healthy dental tissue and the application of adhesive materials for posterior dental restorations (3).

Restorations can be classified as direct or indirect. While indirect restorations generally achieve superior contact, contour and occlusion, direct restorations are more sensitive to technique, require more time and may not consistently reproduce optimal shape and occlusion. (10)

The primary objective of a restoration is to reproduce the original dental anatomy as faithfully as possible, while ensuring optimal occlusal integration. With these objectives in view, why not consider adopting a new restorative method that achieves a rehabilitation identical to the original tooth structure?

This is the concept behind the "tampon technique", which allows the occlusal anatomy to be restored almost perfectly. This technique involves taking an imprint of the decayed occlusal surface, then applying this to the final composite restoration before light-curing it, to recreate the original tooth shape. Hand restoration with direct esthetic composite requires great skill, precision and attention to detail, all of which are crucial to the longevity of the restoration. The buffer technique reduces the overall procedure time and significantly reduces restoration porosity. (4)

Introduced by London practitioner Dr. Waseem Riaz, the "stamp technique" facilitates the precise reconstruction of occlusal topography in direct composite resin restorations (5). This technique involves creating a stamp that replicates the anatomy of the unprepared tooth (6). Once the stamp is fabricated on an unprepared occlusal surface, the cavity is prepared, and the stamp is then pressed against the final composite increment before curing (7).

This technique is particularly appropriate in cases where caries is detected during routine clinical or radiographic examinations on teeth with intact marginal crests and ideal occlusal anatomy. In posterior teeth, primary carious lesions may present intact occlusal morphology, although the decay penetrates beyond the dentine-enamel junction in terms of depth. In such cases, the literature suggests a restoration method using an occlusal stamp (8).

The diverse materials employed for occlusal replicas include light-cured composite, auto-polymerized acrylic resin, polyvinylsiloxane bite registration material, liquid dam material, transparent silicone molds and occlusal transfer devices (9).

The aim of this article is to illustrate the method and present the equipment required for the restoration using the stamp technique, based on 2 clinical cases.

CASE REPORTS:

Case 1:

A 32-year-old female patient presented with occlusal caries on tooth 34, classified as Site 1 Stage 2 according to the Si/Sta classification and Class I according to Black's classification (ICDAS score 4). Despite the carious lesion, the occlusal anatomy remains preserved. (Fig 1)



Figure 1 : Initial tooth condition

Radiographic examination showed a radiolucent area in the crown of tooth 47, indicating dentinal caries without pulpal involvement. (Fig2)



Figure 2 : Retroalveolar radiography

Before starting caries removal, and after the tooth has been isolated by the rubber dam, the occlusal surface is registered using a silicone A-key (remember to apply a separating agent such as glycerine to the occlusal surface). (Fig 3)

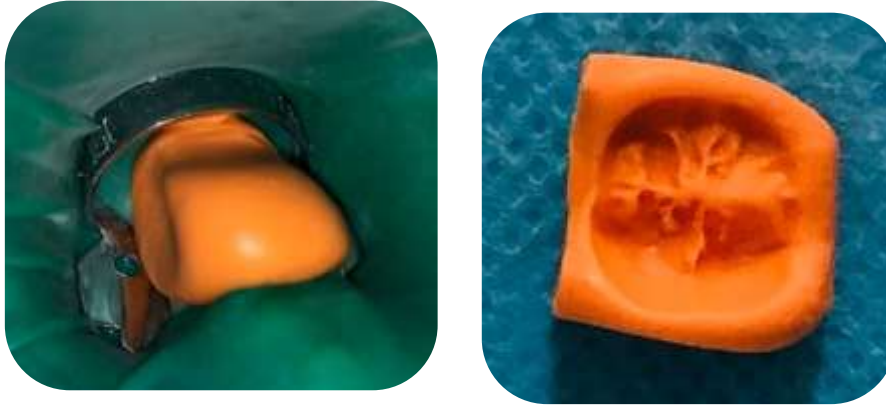


Figure 3: impression of the occlusal surface using a silicone A-key

The cavity was prepared using a high-speed round diamond bur. Infected dentine was removed using an excavating spoon and a round tungsten carbide bur at low speed (5,000 rpm)(Fig 4).



Figure 4: prepared cavity

Etching was effected with 37% phosphoric acid for 20 s. The cavity was washed and dried. The bonding agent was applied and cured.

Composite resin was applied in 2-mm increments and light-cured for 20 seconds (Figure 5).



Figure 5 : the first composite increments

Teflon tape was placed over the restoration, and the prepared stamp was pressed onto the final increment (Figures 6) before light-curing for an additional 20 seconds after removing the stamp.



Figure 6: placing the stamp on teflon using digital pressure

Finishing was achieved with diamond finishing tips, and polishing with polishing cups and cones. A post-operative assessment was carried out after 3 months (Figures 7).



Figure 7: final result, a 3-month follow-up the restoration is still intact and the patient is satisfied

Case 2:

A 27-year-old female patient came in with a complaint of discoloration of her lower right tooth. Clinical examination revealed a stage 2 (class I) carious lesion on tooth 46 (figure 8).



Figure 8 : initial tooth condition

Radiographic examination showed a radiolucent area in the crown of tooth 46 (figure 9), indicating dentinal caries without pulpal involvement. With the occlusal surface intact, we recommended a composite restoration using the occlusal stamp technique with a flowable composite material.



Figure 9 : Retroalveolar radiography

After isolating the tooth with a rubber dam, a flowable composite resin was placed on the intact occlusal surface. A micro-brush was employed as a handle, submerged in the composite (Fig. 10) and then light-cured to produce the occlusal stamp.



Figure 10 : A micro-brush with flowable composite resin was used as a stamp.

Cavity preparation and removal of the infected dentin were carried out, while the affected dentin remained intact. Composite restoration was performed as described in Case 1 (Figure 11).



Figure 11: prepared cavity and the first composite increments

Teflon tape was placed and the prepared stamp pressed on the final increment (Figure 12) before polymerization for 20 seconds after removing the stamp. Finishing and polishing were applied as in Case 1 (Figure 13).



Figure 12: placing the stamp on teflon using digital pressure



Figure 13: final state of resaturation after polymerization

DISCUSSION:

In posterior teeth, carious lesions generally develop on occlusal surfaces, which are less accessible for cleaning. The orientation of the dentinal tubules influences caries progression. As a result, caries on the occlusal surface generally progresses in a triangular pattern, with the apices pointing away from the dentine-enamel junction. This explains the presence of intact superficial enamel despite significant dentine destruction (10).

Successful restoration involves precise reconstruction of the correct occlusal and proximal anatomy, while maintaining a good balance with adjacent tissues. The importance of correct occlusion is crucial to orofacial integrity; poorly reproduced occlusion can lead to occlusal discrepancies and temporomandibular disorders, which can disrupt the entire stomatognathic system (11).

The "stamp technique" can be applied in many cases. It is particularly useful for sulcular or hidden caries, often referred to as "surprises", and even for proximal cavities where the occlusal anatomy is intact (9).

It restores the form, function and aesthetics of tooth structure, minimizing the need for post-restorative adjustments. As finishing and polishing time is minimal, this technique allows considerable time savings and reduced material consumption. The pressure applied by the stamp reduces microbubbles and oxygen inhibition (12).

Fluid composite is most often chosen for its accessibility and precise reproduction of detail. However, the cost of the material is high. However, stamps can be prepared from expired composites, thus reducing costs. Liquid barrier material can also be used, as it has a low viscosity and flows easily. Its high flexibility requires a large quantity of material for good strength (13).

To overcome the limits of these materials, Qian et al. (2021) described several advantages of the Modified Stamp Technique (MST). This technique employs a transparent occlusal impression material in place of a flowable composite resin to form the occlusal stamp, therefore eliminating the need for Teflon tape. As the stamp is optically transparent, there's no need to remove it before light-curing. This new technique guarantees precise restoration of occlusal anatomy and prevents the formation of an oxygen-inhibited resin surface layer, an improvement on the conventional method.(14)

In all, 30 posterior teeth with undermining caries were randomly divided into two groups and restored using the modified buffer technique (MST) and the conventional technique (CT) respectively. 3D images of the occlusal surfaces were acquired using an intraoral scanner before and after treatment, and the differences between these two 3D images were analyzed using reverse engineering software. Statistical analysis showed a significant difference between the groups, the MST was more effective for direct composite restoration. Morphological occlusal surface coherence using MST was superior to that using CT. (14)

To increase the acceptance of the stamp technique in clinical practice, Francesca Zotti and colleagues conducted a study in 2023 to investigate the effectiveness of this technique in terms of microleakage, voids, overhangs and marginal adaptation of Class I restorations, as well as to review operative times compared to traditional restorative procedures.(15)

Twenty extracted teeth were separated into two groups: ten teeth from the study group (SG) were prepared and restored using the stamp technique for Class I cavities, and ten teeth from the control group (CG) were restored using traditional methods. Scanning electron microscope analysis was carried out to estimate the specified parameters. (15)

There were no significant differences between the two groups with regard to microleakage, marginal adaptation or obturation defects. The stamp technique does, however, facilitate the formation of large overflow margins, necessitating a careful finishing phase. This means that the stamp technique presents no critical disadvantages in terms of restoration durability, and can be completed in a reasonably short time.(15)

CONCLUSION:

The tampon technique deserves to be included as one of the direct restoration techniques available to dentists in conservative dentistry, assuming that all the conditions for its use are present. It is a convenient procedure for direct composite resin restorations, offering both favorable and biomimetic results. The accuracy of topography reproduction with this technique is far superior to that of conventional manual methods.

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