

## Case Presentation

# Direct Restoration of Posterior Teeth Using Stamp Technique and Bulk-Fill Composite Resin

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Conservative restorative dentistry is provided with a wide range of techniques and systems for the rehabilitation of posterior teeth in a minimally invasive approach.

Stamp technique is a method used with a composite restoration in order to restore the original surface morphology of the tooth. This technique is indicated when the occlusal anatomy of the tooth is preserved and not disturbed by the carious lesions.

A proper understanding of the technique and its indications has contributed to the widespread use of this restorative approach. The aim of this case report was to describe the clinical steps of restoration of occlusal hidden carious lesions using the stamp technique and Bulk-fill composite resin.

**Keywords:** Composite resins, Dental occlusion, Dental-caries, Aesthetic

## Introduction

Posterior teeth can be restored using direct or indirect restorations procedures. The selection of the correct technique may be a challenging decision making process. The main issue of direct composite resin posterior tooth restoration is to preserve tooth structure and to get a correct occlusal contact form [1]. The stamp technique is a new method for application of large composite restorations with accurate occlusal topography. It consists of fabricating an occlusal matrix that mimics the natural occlusal anatomy of posterior teeth, before cavity preparation takes place. It's indicated when the preoperative anatomy of the tooth is intact and not lost because of carious lesions [2].

Therefore, occlusal hidden caries can be restored by the stamp technique as the enamel surface anatomical form is preserved hiding an involved dentin injury. The use of composite resin incremental technique is recommended for posterior teeth restoration to reduce the effect of shrinkage stress. However, the control of the application of small increments is depending on the clinician skills and it may compromise occlusion, function, and aesthetics if not well performed [3,4]. For that, the development of bulk-fill composite resins represented a new restorative concept. This restorative material can be inserted in increments of up to 4 mm in thickness without compromising conversion or mechanical properties at this depth [5,6].

The present paper aimed to illustrate through a clinical case the application of the stamp technique using bulk-fill composite resin in the restoration of site 1 carious lesions.

## Case Presentation

A 19-year-old female was referred to the department of Dental Medicine of Charles Nicolle hospital of Tunis for the treatment of her dental decays before kidney transplantation. The patient complaint was mild sensitivity to sweet and cold in the mandibular left region. Clinical examination revealed the presence of dark pigments on pits

on site 1 within the occlusal table of mandibular first left molar #36. However, the second mandibular left molar #37 presented a carious lesion in the occlusal pits and grooves showing minimal occlusal structure changes. Test sensibility showed a reversible mild sensibility of cold for both teeth. The panoramic radiograph revealed a carious lesion extending to the medium inner of the dentin in the #37. As the occlusal site was seemingly intact surface overlaying an extensive lesion, the carious lesion on tooth #37 was referred to a "hidden caries" (Figure 1 a&b).

The diagnosis of reversible pulp inflammation was retained for both teeth #36 and #37. Taking into account that the occlusal surface of the involved teeth had no change in their morphologies, we opted for the occlusal stamp technique for resin composite restoration of both teeth. First of all, teeth were cleaned with a silk brush and a prophylactic paste. Then, shade selection was performed using a VITA shade guide. After local anesthesia, the dam rubber dam was placed keeping the operating field dry and free of contaminants. A fine coat of Vaseline, a separating agent, was applied on the occlusal surface of the teeth to detach easily the impression material. The composite resin Ultradent™ LC Block-Out Resin material was applied to the occlusal surface, an applicator was immersed into it without touching the dental surface and the micro-brush was maintained over it with a gentle digital pressure than light-cured to fabricate the occlusal stamp. It was light cured and thus occlusal stamp was fabricated. After its complete curing, the stamp was removed and the corresponding edge on the buccal surface of the tooth was marked for orientation at the time of the stamp repositioning (Figure 1c,d&e).

Carious tissues were removed throughout the occlusal access of the #37 and a site 1 cavity adhesive preparation was prepared. After the complete removal of the carious lesion, the cavity was rinsed with chlorhexidine solution 0.2% and the dentin-pulp complex was lined with calcium hydroxide phosphate cement liner (Biner LC, Meta Biomed').



**Figure 1:** The stamp technique for site 1 on tooth #37. (a): Intraoral preoperative view; (b): Panoramic view showing the extension of the hidden caries on the second left mandibular molar tooth #37; (c): Rubber dam isolation; (d): Flowable composite resin with a microbrush; (e): The composite stamp; (f): Cavity preparation; (g): Etching; (h): The cavity was filled with bulk fill composite to level 1 mm below the occlusal surface followed by the placement of Teflon tape and the occlusal stamp; (i): Light curing after removing the stamp and Teflon tape.



**Figure 2:** The stamp technique for site 1 cavity of the tooth #36. (a): The stamp; (b): caries removal; (c): calcium hydroxide lining; (d): phosphoric acid etching; (e): the cavity was filled with bulk fill composite resin; (f): the placement of Teflon tape and the occlusal stamp; (g): view directly after removing the stamp; (h): postoperative intra oral view.

Selective Enamel etching was done using 37% phosphoric acid (Meta Etchant, Meta Biomed') for 30 seconds followed by dentin for 15s. The cavity was abundantly rinsed, then dried carefully with chip blower to obtain white frosted appearance in enamel. However, the surface of the dentin was kept slightly moistened the must be left moist "wet bonding", in order to avoid collagen collapse by absorbing excessive water using a cotton pellet. The cavity margins were then coated with a bonding agent (Ambar universal bonding FGM') and light-cured for 20 seconds with an LED source. The cavity was restored using a bulk nano-hybrid composite resin (Opus Bulk Fill APS, FGM') up to 1 mm lower of the occlusal surface then light cured for 20s. The final increment layer of composite resin was added and before light curing, a piece of Teflon film was applied on the occlusal surface. The

occlusal stamp, previously done, was firmly placed over the Teflon tape to achieve the morphological configuration corresponding to the initial situation of the occlusal surface. Next, the tape was removed and the occlusal excess of composite resin was eliminated then light cured for 40s using LED source (Figure 1 f,g,h&i).

Assuming the second left mandibular molar #37, the first left mandibular molar #36 was launched. The tooth was restored in the same manner (Figure 2 a,b,c,d,e,f&g).

The surfaces were polished using fine-grained abrasive flexible discs (SofLex Discs, 3M ESPE) and silicone polishing points. Finally, the rubber dam was removed and occlusion relations were checked and it was found that there was no need for adjustment. The

immediate result duplicates the original surface anatomy (Figure 2h).

## Discussion

The application of composite resin in dentistry has become increasingly widespread due to the rising aesthetic demands of patients [7]. Improvements in the composite resin properties, the ability of bonding of these materials to tooth structures, biomechanical strength and accurate reproduction of dental morphology, exhibiting aesthetic appearance make this material highly used in direct restoration in the posterior area [2,3].

The reconstruction of the posterior teeth with a harmonic occlusal surface morphology is a challenging issue for clinicians [8]. The methods of application of composite resins vary depending on the clinical situation. The stamp technique is being one of the most known and used operating method [2]. It is a simple and rapid technique of direct restoration by making an impression of the occlusal anatomy of the unprepared tooth. This method can be used in restoring teeth affected by the carious process, as long as the enamel surface is intact. The materials used for impression of involved area are the low viscosity composite and the rubber dam liquid [2,9-12].

The major advantage of this technique is that it allows an accurate reproduction of the occlusal surface. Occlusal adjustments are often not required if the anatomical morphology is completely reproduced by the stamp. However, a small amount of resin removal and slight finishing and polishing are necessary.

This clinical case was performed using Bulk-fill composite resin. These materials were developed with low polymerization shrinkage stress, low and high viscosity, and greater polymerization depth, with the potential to restore the cavity with an increment from 4 to 5 mm [5, 13-16]. Their polymerization mediators reduce shrinkage stress without reducing the degree of conversion of monomers into polymers with a good amount of inorganic load and good mechanical properties [1,4,7,8,16]. The stamp technique applied in this case showed satisfactory clinical results by reproducing original anatomy and aesthetics in a single appointment.

## Conclusion

Composite resin materials are becoming increasingly popular due to their esthetics and improved mechanical and physical properties. The stamp technique is an easy procedure that leads to a perfect morphological and functional restoration without requiring further occlusal adjustments. It is an effective approach for direct composite resin restoration in posterior tooth with hidden caries and extensive dentin involvement.

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