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The stamp technique for direct Class II composite restorations: A case series

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Abstract

Background: “Stamp” technique is a new method for placing large composite restorations with accurate occlusal topography. It was introduced mainly to restore Class I cavities and erosively damaged teeth. This technique is indicated when the preoperative anatomy of the tooth is intact and not lost due to the carious lesion. A precise tooth-like filling an accurate functional occlusion is obtained when the stamp technique is applied. However, using this technique to restore Class II cavities is not established yet.

Aim: To introduce modifications of the stamp technique that make it applicable to restore Class II composite restorations.

Materials and Methods: The traditional materials and tools used for direct composite restorations are needed with no additional instruments. Clinical illustrations and step-by-step description are provided in this paper.

Results and Conclusion: Using the stamp technique to restore Class II cavities is achievable, simple and practical, and result in a very accurate anatomical restoration.

Keywords: Class II restorations; composite resin; conservative dentistry; occlusion; occlusal topography

INTRODUCTION

Posterior composite resin restoration has become a norm among modern dentist, resulting in very few amalgam used in current practice. This is mainly due to patients seeking esthetic restoration even for their posterior teeth. In the Scandinavian country and Japan, the use of dental amalgam has become obsolete due to concern with the mercury-related health toxicity.^[1] Another factor contributing to the rapid increase in composite resin restoration is the introduction of minimal invasive restorative procedures which stress on the conservation of sound tooth structure and usage of adhesive material in the posterior region.^[2]

However, composite still has minor drawbacks. Its multiple procedures are time-consuming and need

excellent operators' dexterity and skill to achieve harmonious occlusal and cusp-fossa relationship with opposing teeth.^[3,4] Time needed for finishing off the restoration is double compared with the amalgam restoration.^[3] By putting the shade selection aside, the contour of the final composite restoration together with the contour of the contact point is the main point to be addressed when dealing with posterior composite restorations. For this reason, an alternative placement technique of composite restoration was introduced. The new “stamp” technique consists of fabricating an occlusal matrix to impress the occlusal anatomy of posterior teeth before cavity preparation takes place.^[5,6] This matrix is then pressed against the final composite increment before curing takes place. This technique is suitable in cases where the caries is evident during the clinical examination or routine radiographic examination of teeth with intact marginal ridges and ideal occlusal anatomy. The advantages of using an occlusal matrix are the reproduction of the original

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occlusal anatomy and occlusion, minimal requirement of finishing and polishing, minimal voids at the occlusal anatomy, and reproduction of optimally polymerized occlusal surface due to the exclusion of air during curing.^[7]

CASE REPORTS

Case I

Mesial caries was clinically detected in tooth 15 of a 56-year-old male patient presented to the dental clinic seeking the replacement of missing tooth No. 46. Extension of caries was detected by a bitewing X-ray [Figure 1a]. The caries was large but did not involve the occlusal surface. The tooth was isolated by rubber dam [Figure 1b] and a separation agent (Zartex, Zarir & Zaida Industries, Malaysia) was brushed on the tooth surface [Figure 1c]. Flowable composite resin (Filtek Flow, 3M-ESPE, St Paul, MN, USA) was applied on the intact occlusal surface and indexed over the

cuspal tips [Figure 1d]. A tip of a microbrush was cut and the microbrush was used as a handle. The handle was immersed into the composite [Figure 1e]. Before being polymerized by light to fabricate the occlusal stamp [Figures 1f and g]. All carious tissues were removed throughout an occlusal access, and Class II cavity was prepared [Figure 1h]. The cavity lining was achieved using glass ionomer (GC Fuji Lining LC, GC America Inc.). A short metal strip was inserted and adapted to the cavity walls using a wooden wedge and a clamp from the Palodent Sectional Matrix System (Dentsply Caulk, Milford, DE) [Figure 1i]. The cavity was restored incrementally using a posterior composite resin (3M ESPE) up to 1 mm lower the occlusal surface [Figure 1j and k]. The last layer of composite was added and before being cured, the metal strip was removed, a piece of Teflon tape was laid on the occlusal surface, and the occlusal stamp was sealed in place over the tape [Figure 1l]. Next, the tape was removed [Figure 1m] and the metal strip was replaced carefully [Figure 1n]. The proximal excess material was



Figure 1: The stamp technique for Class II cavity of tooth 15: (a) A bite-wing X-ray view shows the extension of mesial caries on tooth 15, (b) isolation by rubber dam, (c) applying separation agent on the occlusal surface, (d) flowable composite with a microbrush, (e-g) the composite stamps, (h) cavity preparation, (i-k) the cavity was filled incrementally to level 1 mm below the occlusal surface, (l) the placement of Teflon tape and the occlusal stamp, (m) directly after removing the stamp and Teflon tape, (n) reinsert the matrix strip, (o) after polymerization of the composite, (p) final finishing

removed and the composite was then polymerized and polished [Figure 1o and p].

Case II

Distal caries was observed on a bitewing X-ray of tooth 45 of a female dental student who had just completed her orthodontic treatment [Figure 2a]. The stamp technique restoration was indicated as caries did not involve the occlusal surface. The rubber dam was placed [Figure 2b] and the metal strip was inserted distally and adapted around the mesial and distal surfaces of the tooth using a clamp of the Palodent Sectional Matrix System [Figure 2c]. Flowable composite resin and microbrush were used to fabricate an occlusal stamp as described in Case I [Figure 2d and e]. After caries removal and cavity preparation [Figure 2f], the same metal strip was reinserted, adapted in place using the stamp, and fixed using a clamp and wooden wedges [Figure 2g and h]. After lining with glass ionomer cement, the cavity was restored incrementally using a

posterior composite resin up to 1 mm lower the occlusal surface [Figure 2i]. Another layer of composite was added and Teflon tape was laid on it [Figure 2j]. The occlusal stamp was sealed in place for a short time [Figure 2k], before being removed [Figure 2l]. Next, the tape was removed and the composite was then polymerized [Figure 2m]. After removing the metal strip and rubber dam, a sharp edge was observed at the margin [Figure 2n] but no high bite points [Figure 2o]. The sharp margin was rounded and polished [Figure 2p].

DISCUSSION

The restoration of actual topography of tooth surfaces will definitely promote patient's compliance and acceptance toward dental treatment. This case series describes a simple technique to obtain a good surface finish and actual anatomy of the direct posterior composite with minimal time required using the stamp technique with flowable composite.

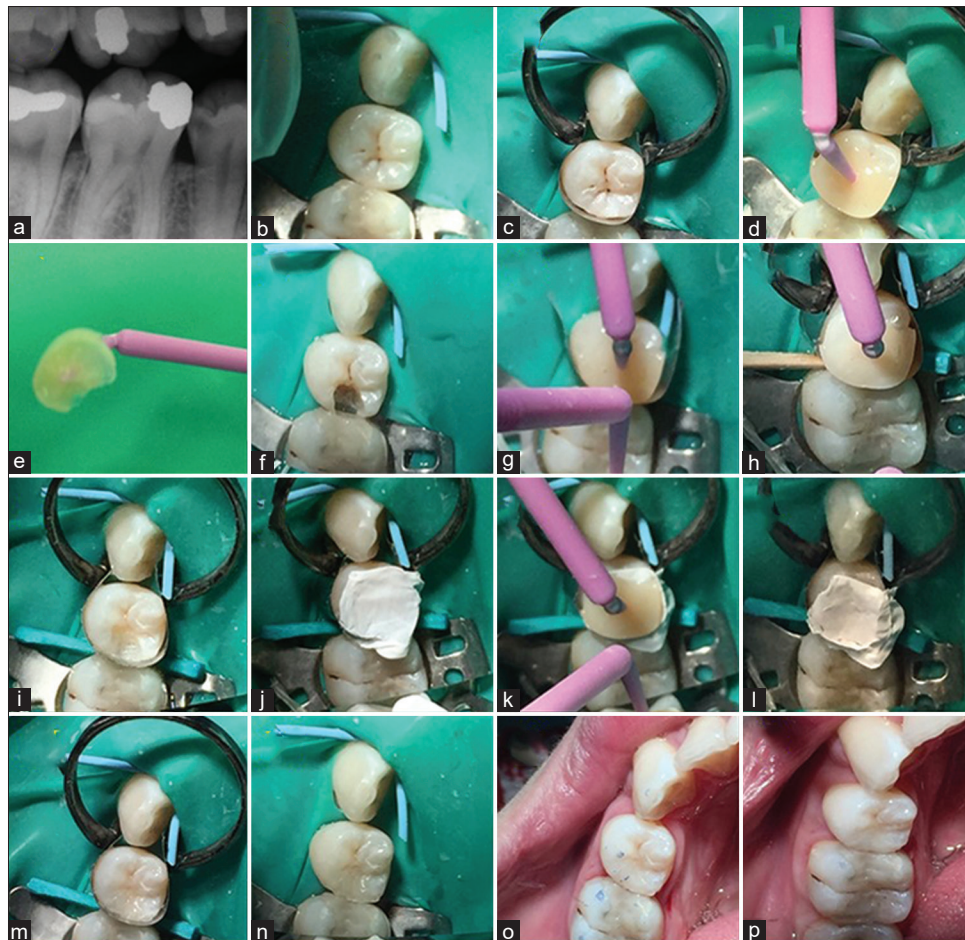


Figure 2: The stamp technique for Class II cavity of tooth 45: (a) A bite-wing X-ray view shows distal caries on tooth 45, (b) isolation by rubber dam, (c) placement of matrix band distally, (d and e) the composite stamp, (f) cavity preparation, (g) readapt the matrix band in place using the stamp, (h) fix the band in place using a clamp and wooden wedges, (i) the composite was added and light cured 1 mm less than the occlusal surface, (j and k) the placement of Teflon tape and the occlusal stamp, (l) directly after removing the stamp, (m) after composite polymerization, (n) after the removal of the matrix band, note the sharp margin, (o) check occlusion after the removal of the rubber dam, (p) final finishing

For Class I cavities, the stamp technique procedures are very simple and achievable. The flowable composite can be applied on the occlusal surface without the need of isolation agent. However, in the presence of deep pits and fissures, using the isolation agent is recommended. In such condition, the isolative material fills the pits and fissures and does not allow the subsequent flowable composite to flux inside. This leads to the more proper continuous surface of the final restoration. Thus, extremely air spray should be avoided while spreading the isolation agent on the tooth surface.

Class II restorations involve the removal of the marginal ridge of the tooth to provide a suitable access to caries. Using matrix, the band is required to build up the correct contour of proximal walls and create a healthy contact point. If the stamp technique is applied, the stamp will be used in the presence of the matrix band. Thus, the stamp technique should be modified. In this paper, two techniques are described to manage proximal caries following the stamp technique. The first involves the fabrication of a stamp following the same procedures used with Class I. In such cases, the matrix band should be removed before curing the last composite incremental and the stamp should be applied. In the second modified technique (Case 2), the matrix band is placed earlier and provides a mold where the stamp is prepared within. In such cases, moving the matrix band during restoration is not required. It is recommended to use the stamp during the placement of the matrix band to ensure its correct position [Figure 2g and h].

The correct occlusal anatomy of a filling leads to a functional restoration and avoids the primary occlusal trauma.^[8] Both adjustments suggested here are able to retrieve the exact anatomy of the occlusal surface. However, from our experience, the first adjustment (Case I) may lead to extra composite in the interdental proximal space which needs to be removed carefully before polymerizing. Whereas, the second adjustment (Case II) may lead to a slight sharp marginal edge which needs to be rounded.

With the minimal time required for finishing to obtain a good fossa-cusp relationship with the opposing dentition,^[7] stamp methods are suitable in a busy practice dealing with many patients. Dentists are able to concentrate their office time with more complex cases and can increase her/his reputation.

One of the important issues to be addressed here is the polymerization shrinkage. Composite restoration must be to reduce the polymerization shrinkage. By using this method, care needs to be exercised to place the composite incrementally at the base of the cavity, and the stamp is used with the final increment to shape the occlusal anatomy.

CONCLUSION

The stamp technique provides an easy approach to restore Class II fillings with accurate topography and fewer layers of composite, less postfill adjustments, and less time.

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Conflicts of interest

There are no conflicts of interest.

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