

Restoration with 'Stamp Technique' in Dental Caries with Intact Occlusal Morphology: Case Series

Oklüzal Morfolojinin Bozulmadığı Diş Çürüklerinde 'Stamp Tekniği' ile Restorasyon: Vaka Serisi

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ABSTRACT

The primary objective of a restoration is to rehabilitate the tooth's morphology, function, and occlusal role as closely as possible to its natural state. The stamp technique is one biomimetic technique that meets these expectations by mimicking nature closely. This technique's advantage is that it allows for the rapid and easy restoration of teeth whose occlusal surfaces have not been compromised by decay. This case presentation aims to share the advantages of the stamp technique in pediatric patients. Occlusal caries were detected in patients who visited our clinic. The affected teeth did not exhibit endodontic symptoms. Using the stamp technique, it was decided to perform direct composite resin restorations on these teeth. Under rubber dam isolation, the occlusal surface was taking an impression. The decay was removed, and the cavity was selectively etched with 37% phosphoric acid gel, followed by the application of an adhesive agent. Composite was placed in the cavity according to the layering technique and polymerized with light. The final composite layer was shaped using the taken impression and light-cured, followed by polishing and finishing procedures. The stamp technique facilitates the reformation of occlusal morphology in posterior composite restorations. Reducing procedure time is valuable for increasing patient motivation in pediatric patients. Additionally, the continuity of chewing and joint functions is maintained by easily replicating occlusal contacts.

Keywords: Composite resin, Conservative dentistry, Stamp technique

ÖZ

Bir restorasyonun temel amacı dişin morfolojisini, işlevini ve oklüzyondaki görevini doğala en yakın şekilde rehabilite edebilmesidir. Bu beklentileri, doğala en yakın şekilde taklit ederek karşılayabilen biomimetik tekniklerden biri de stamp tekniğidir. Bu tekniğin avantajı oklüzal yüzeyin çürük sebebiyle bozulmadığı dişlerin hızlı ve kolayca restore edilebilmesidir. Bu olgu sunumunun amacı çocuk hastalarda stamp tekniğinin avantajlarını paylaşmaktır. Kliniğimize başvuran hastalarda oklüzal çürükler tespit edilmiştir. İlgili dişlerde endodontik semptomlar bulunmamaktadır. Dişlere stamp tekniği kullanılarak direkt kompozit rezin restorasyon yapılmasına karar verilmiştir. Rubber dam izolasyonu altında oklüzal yüzeyin ölçüsü alınmıştır. Çürük temizlenip kavite %37'lik fosforik asit jeli ile selektif olarak asitlenip adeziv ajan uygulanmıştır. Kaviteye tabakalama tekniğine uygun şekilde kompozit yerleştirilmiş ve ışıkla polimerize edilmiştir. Son tabaka kompozit de alınan ölçüyle şekillendirilip ışıkla polimerize edilmiş, cila ve bitim işlemleri uygulanmıştır. Stamp tekniği posterior kompozit restorasyonlarda oklüzal morfolojinin yeniden oluşturulmasında kolaylık sağlamaktadır. Özellikle çocuk hastalarda işlem süresinin kısalması hasta motivasyonunun artması açısından değerlidir. Ayrıca oklüzal temasların kolayca taklit edilmesiyle çiğneme ve eklem fonksiyonlarının devamlılığı sağlanır.

Anahtar Kelimeler: Kompozit rezin, Oklüzal morfoloji, Stamp tekniği

Introduction

The primary objective of restoring a tooth is to regain its original function and aesthetics. Nowadays, biomimetic approaches have started to gain importance. Biomimetic dentistry aims to approximate nature as closely as possible. Its main objective is to replace lost tooth tissues with materials that will restore their original function, meet aesthetic expectations, and withstand all functional stresses.¹

For patient comfort, it is crucial for restorations to mimic occlusal anatomy and ensure occlusal stability to restore ideal chewing function. Reproducing occlusal anatomy as it was can be challenging with traditional methods. During attempts to create an ideal occlusal surface, excessively contoured or shallow, irregular surfaces may also be formed.² Disruption of occlusal anatomy can lead to complications such as neuromuscular imbalance and impaired chewing function. To avoid these complications, a restorative technique known as the stamp technique has been developed. This technique aims to make the design of occlusal anatomy quicker and more reproducible, thereby minimizing anatomical errors.³ The complexity of the traditional approach has led to the exploration of innovative solutions, resulting in the emergence of the "Stamp technique." This new restorative approach aims to facilitate the design of occlusal anatomy while reducing the risk of anatomical errors.⁴ Dr. Waseem Riaz is the clinician who first described the Stamp technique for replicating ideal occlusal anatomy in composite resin restorations. This technique, aimed at maintaining function and aesthetics, involves taking an impression of the occlusal surface before caries removal. The obtained impression can be considered a negative copy of the occlusal anatomy and is used to shape the final composite layer. To create the impression, the occlusal surface of the tooth to be restored must be intact.⁵ For this reason, it can be said that the stamp

technique has a limited indication.⁶ Stamp technique can be applied to teeth with intact marginal walls, intact occlusal anatomy and dentin caries in clinical and radiographic examinations.⁷ However, cases have been reported in the literature where the stamp technique can also be used for interproximal carious lesions where the occlusal and interproximal walls and marginal ridge remain intact.⁸ Additionally, this technique is also used to rehabilitate the loss of vertical dimension caused by teeth worn down by occlusal forces.⁹

There are two stages that distinguish the Stamp technique from traditional techniques in practice. The first one is to take an impression of the occlusal surface before starting cavity preparation.¹⁰ The second is to create the surface anatomy using this impression before placing the final composite layer on the tooth.⁸ In this case report, cases restored with the stamp technique in paediatric patients are presented.

Case Reports

Four patients aged 10-14 years, who were systemically healthy and presented with complaints of dental caries, were included in this case report at the Department of Pediatric Dentistry, Faculty of Dentistry, Selçuk University. The case reports comprise five cases, as one patient's report includes two teeth. Clinical examination of the patients revealed that the occlusal surface anatomy of the carious teeth was intact. The patients exhibited no symptoms such as pain or percussion sensitivity. Examination with a probe in the fissures of the teeth revealed soft surfaces, and brown discolorations were observed in the fissures of the affected teeth. Radiological images of the cases where deep occlusal caries were suspected confirmed the presence of dentin caries. Due to the intact occlusal surface anatomy and the preserved marginal ridges, treatment was planned using the Stamp technique. The patients'

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parents were informed about the treatment and informed consent was obtained. Treatment commenced with the administration of local anesthesia. The teeth were isolated with a rubber dam, and the occlusal surfaces were polished to remove debris. A thin layer of Vaseline was applied to the occlusal surfaces, followed by applying flowable composite (Nova Compo-HF, Imicryl). A bond brush was gently placed in the center of the occlusal surface and light-cured to take the impression of the occlusal surface. Carious tissue was removed using diamond and steel round burs. The tooth surfaces were etched with 37% orthophosphoric acid (Panora 200 Asit Etch Etching Gel, Imicryl) for 30 seconds on enamel and 15 seconds on dentin. The acid was rinsed off with water for approximately 30 seconds. The cavity was gently dried with air. Adhesive (Nova Compo-B, Imicryl) was applied according to the manufacturer's instructions, rubbed for 20 seconds to act as a primer, and light-cured for 20 seconds. Universal composite (Nova Compo-HS, Imicryl) was placed in 2 mm layers in the cavity, and each layer was light-cured for 20 seconds. Before the final composite layer was polymerized, the occlusal surface was covered with Teflon tape. The initial occlusal impression key was gently pressed onto the restored tooth to shape the occlusal surface anatomically. After final polymerization, occlusion was checked. Occlusal adjustments were completed, and after polishing, the treatments were finished (Figures 1-5).

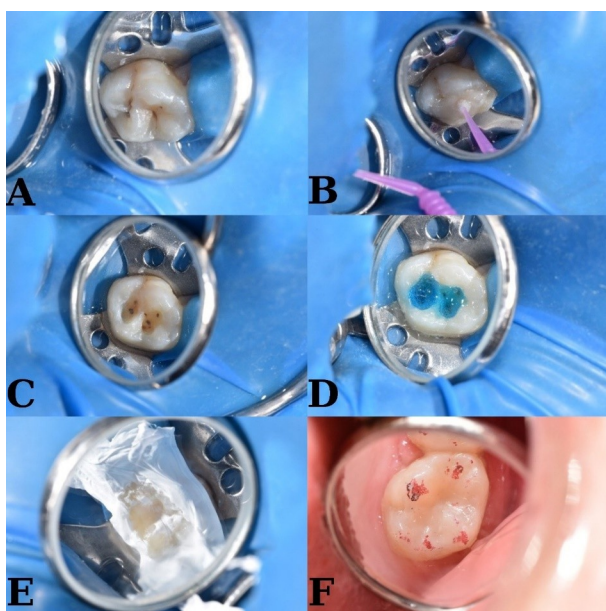


Figure 1. Application of the stamp technique on tooth number 16 of a 10-year-old female patient; A) Occlusal Caries; B) Taking an impression of the occlusal surface; C) Cavity preparation; D) Acid etching; E) Placement of Teflon tape; F) Final

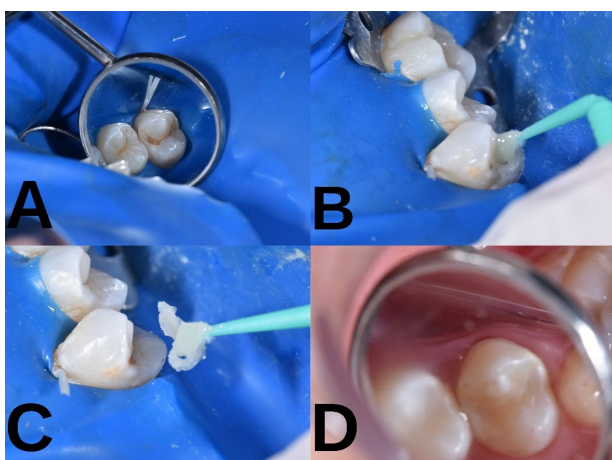


Figure 2. Application of the stamp technique on tooth number 24 of a 13-year-old male patient; A) Occlusal Caries; B) Taking an impression of the occlusal surface; C) Occlusal impression; D) Final

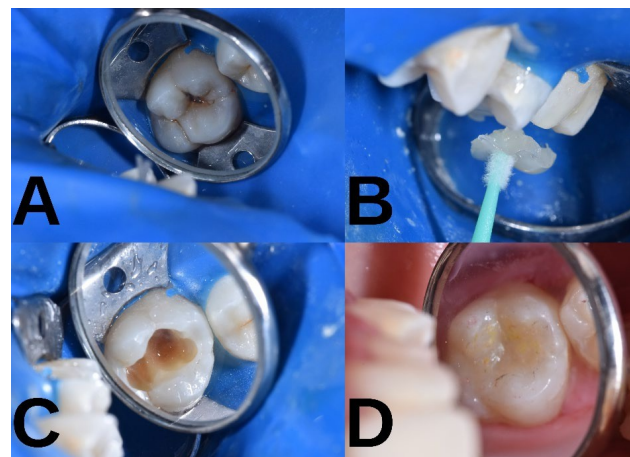


Figure 3. Application of the stamp technique on tooth number 26 of a 13-year-old male patient; A) Occlusal Caries; B) Taking an impression of the occlusal surface; C) Occlusal cavity; D) Final

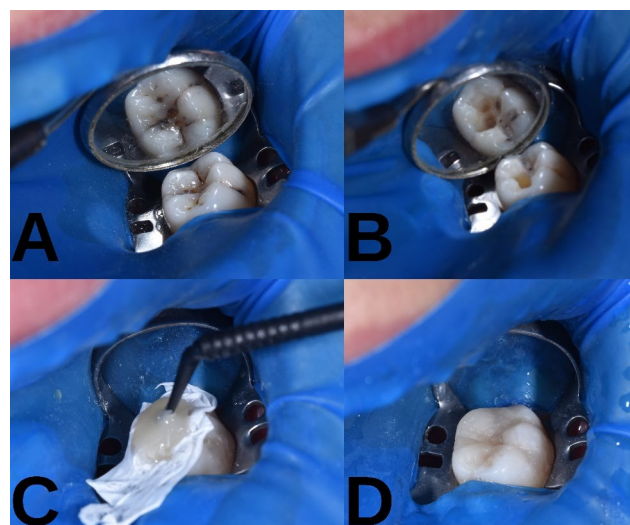


Figure 4. Application of the stamp technique on tooth number 36 of a 12-year-old male patient; A) Occlusal Caries; B) Occlusal cavity; C) Placement of Teflon tape; D) Final

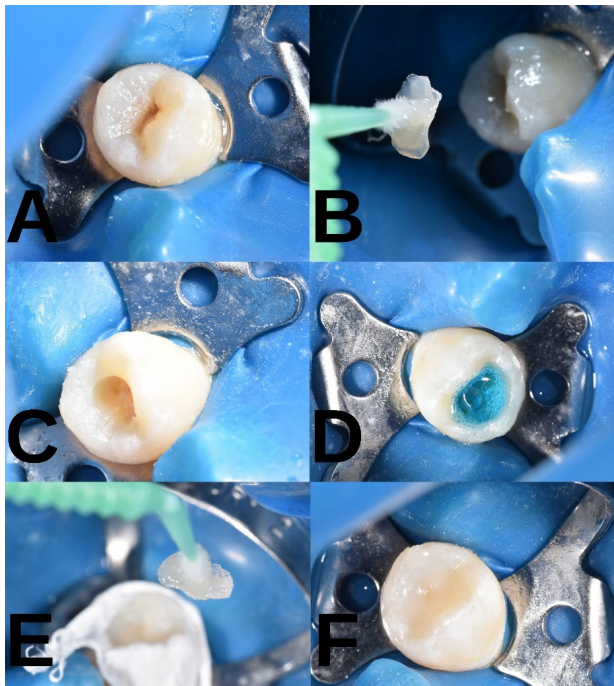


Figure 5. Application of the stamp technique on tooth number 35 of a 14-year-old female patient; A) Occlusal Caries; B) Taking an impression of the occlusal surface; C) Cavity preparation; D) Acid etching; E) Placement of Teflon tape; F) Final

Discussion

Biomimetic approaches are techniques used to achieve results that closely mimic the natural tooth structure and the tubercle-fossa relationship. Composite resins are frequently used materials in biomimetic restorations. In addition to their biomimetic properties, composites also offer the advantage of enabling minimally invasive procedures.¹⁰

In addition to their excellent aesthetic properties, composite resins can be used in direct and indirect restorations, allowing minimal preparation thanks to their ability to be used with adhesive systems.¹⁰ Direct techniques allow for the completion of restorations in a shorter time, which is a significant advantage, especially for pediatric patients. However, their mechanical strength is often lower compared to indirect restorations. Additionally, they have various disadvantages, including wear on proximal edges and occlusal surfaces, surface roughness, marginal discoloration, secondary caries, postoperative sensitivity, technique sensitivity, and insufficient bonding to dentin.¹¹

The Stamp technique, one of the direct techniques, involves creating an occlusal surface impression critical to replicate the occlusal surface anatomy. This technique provides advantages in cases of occlusal caries where the occlusal anatomy and marginal ridges remain intact.¹² In this study, Class I carious teeth with intact occlusal surface anatomy were treated using the Stamp technique. The aim was to preserve the tubercle-fossa relationship and to recreate the occlusal surface anatomy as close to natural as possible. The flowable composite was used as the impression material, and Vaseline was applied to facilitate easy removal of the impression from the surface. It is noted that different materials, like conventional impression materials, can also be used in the application of this technique.

The ability to quickly and practically replicate the original morphology in suitable cases makes the Stamp technique a comfortable treatment option for both the patient and the dentist. However, the need for additional materials and clinical expertise can be considered disadvantages of this technique. Using a cement spatula instead of a bond brush and expired impression materials as the impression material could be beneficial in reducing costs.¹³

Following the introduction of the Stamp technique by Dr Waseem Riaz, many case reports have been published.⁵ Although the technique has many limitations, case reports have presented

successful results in teeth treated with this technique.^{3,4,8,10,14} Similar to the literature, in this case, series, the Stamp technique was applied only to occlusal carious teeth with preserved occlusal surface integrity.

Zotti and colleagues conducted an in vitro study examining 20 composite fillings restored using the Stamp technique and the conventional layering technique under a scanning electron microscope. They statistically analyzed the data obtained, testing the cases for microleakage, marginal adaptation, the presence of overhangs, and voids. The results were successful for both techniques, with no significant difference found between them. However, the researchers reported a significant difference in the restoration times between the two techniques, noting that the finishing and polishing time required for the Stamp technique was considerably shorter.³

Conclusion

Despite some limitations in the applications of the Stamp technique, it offers advantages such as the ability to rehabilitate surface anatomy and occlusion in a manner closest to the original, and a reduced need for finishing and polishing procedures. The ability to replicate ideal occlusal relationships and the shorter treatment duration are also significant for patient comfort.

Değerlendirme / Peer-Review

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It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

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Yazar Katkıları / Author Contributions

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