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EFFICACY OF THE STAMP TECHNIQUE FOR DIRECT COMPOSITE RESTORATION: A SYSTEMATIC REVIEW

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Introduction. Dental composite resin materials are more aesthetically pleasing than amalgam, and their mechanical properties have advanced sufficiently to make them suitable for posterior tooth restoration. However, there are some minor drawbacks to composite. It is a time-consuming procedure that requires exceptional operator skill to achieve a harmonious occlusal relationship with opposing teeth. To address these issues, the stamp technique was developed, which is a new method for posterior vertical bite reconstruction of worn dentition.

Aim – to conduct a systematic review to assess the efficacy of the stamp technique for direct composite restoration and to weigh the benefits and drawbacks of this technique.

Materials and methods. We searched for articles using various search terms related to the topic, chose 8 peer-reviewed articles, and summarized the findings.

Results. The pursuit of excellence in dentistry has become constant, and esthetic standards, even in the posterior segment, are becoming increasingly demanding [1]. When resin composites became a viable alternative to amalgam, the use of dental restorative materials underwent a dramatic shift [2].

Because of its effectiveness and low cost, amalgam has traditionally been used to fill cavities in posterior teeth, and it remains the restorative material of choice in some low- and middle-income countries. There are, however, concerns about the use of amalgam restorations (fillings) in terms of mercury release in the body and the environmental impact of mercury disposal [3].

Posterior composite resin restoration has become the standard among modern dentists, resulting in the use of very little amalgam in current practice. This is primarily due to patients requesting esthetic restoration for even their back teeth. Another factor contributing to the rapid rise in composite resin restoration is the introduction of minimally invasive restorative procedures that emphasize the preservation of sound tooth structure and the use of adhesive material in the posterior region [4].

Because of the advancement of modern resin materials with improved material properties, the indications for direct resin composite restorations are now being expanded. However, there are still some issues with handling resin composite material,

particularly in large restorations. With direct application techniques, it is difficult to reconstruct a functional and individual occlusion [5].

As a result, a new composite restoration placement technique was introduced. The new "stamp" technique involves creating an occlusal matrix to imprint the occlusal anatomy of posterior teeth prior to cavity preparation [4].

It was developed primarily for the treatment of Class I cavities by G.V. Black and erosively damaged teeth. When the preoperative anatomy of the tooth is intact and not lost due to the carious lesion, this procedure is appropriate. When the stamp technique is used, a precise tooth-like filling and an accurate functional occlusion are obtained. However, there is no evidence that this approach can be used to restore Class II by G.V. Black cavities [4].

The "stamp" technique allows the practitioner to duplicate the occlusal anatomy of teeth in a quick and easy manner that is suitable for adults and cooperative children's permanent teeth. It's also great for preventive resin restorations (PRR), where the use of a flowable material serves as both a restorative and a sealant.

Technique. Isolation with a rubber dam is used first, followed by the application of petroleum jelly as a barrier to the tooth surface. On the occlusal surface of the tooth, a stamp is made with flowable composite. The microbrush is used and immersed in the composite, and polymerization is accomplished through light curing for the stamp. The carious lesion is removed, and a Class 1 cavity is prepared. Etching is done for 30 seconds and then air-dried with a three-way syringe. After that, a bonding agent is applied and light cured for 20 seconds. The incremental technique for composite restoration is used up to 1 mm lower than the occlusal surface and light cured for 20 seconds. The final layer of composite is then applied, followed by the application of Teflon tape. The stamp is then removed by wrapping it in Teflon tape. The excess material is then removed and cured. The restoration is finished and polished to a high standard, and the occlusion is checked [7].

Over the last 50 years, two general stamp techniques for the use of restorative light-curing RBCs have been established, namely those that use a transparent material for the index/stamp. Due to the transparency of the material, the stamp remains in place on the tooth during the light curing of the RBC final surface layer. This stamp technique has been proposed using a variety of transparent materials, including polysiloxane bite registration materials, light-curable materials, and commercially available occlusal transfer devices. The other proposed stamp technique, on the other hand, removes the stamp before light curing the RBC. In this case, the material used to create the stamp does not have to be transparent [6]. The stamp, however, must be adequately isolated so that the unpolymerized RBC surface layer does not adhere to the stamp and thus becomes deformed when the index is removed. In addition to the tin foil already mentioned, cling film, dentin adhesive, and, more recently, PTFE tape have all been proposed as alternatives for isolation.

The stamp technique procedures for Class I cavities by G.V. Black are very simple and achievable. Without the use of an isolation agent, the flowable composite can be applied to the occlusal surface. However, if there are deep pits and fissures, the isolation agent should be used. In this case, the isolative material fills the pits and fissures and prevents the subsequent flowable composite from entering. This results in

a more consistent continuous surface of the final restoration. As a result, excessive air spray should be avoided when applying the isolation agent to the tooth surface [4].

Class II by G.V. Black restorations involve the removal of the tooth's marginal ridge to allow for adequate access to caries. The band must use a matrix to build up the correct contour of the proximal walls and create a healthy contact point. When using the stamp technique, the stamp will be used in the presence of the matrix band. As a result, the stamp technique should be altered. In this paper, two techniques for managing proximal caries using the stamp technique are described. The first step is to create a stamp using the same techniques as with Class I by G.V. Black. In such cases, the matrix band should be removed prior to curing the final composite incremental and the stamp applied. The matrix band is placed earlier in the second modified technique, forming a mold within which the stamp is prepared. Moving the matrix band during restoration is not necessary in these cases. To ensure that the matrix band is correctly positioned, it is recommended that you use the stamp during the placement process [4].

The most prominent advantage is, perhaps, the reduced overall time once the skill is mastered, as the post-restoration finishing time is reduced due to the almost instantly desired good cusp-fossa relationship. This is a boon for busy practitioners and helps to improve their reputation with patients. Furthermore, the degree of porosity in the final restoration is significantly reduced. This is because the stamp matrix exerts pressure on the composite, reducing the formation of microbubbles and the interference of oxygen with the polymerization of the final layer of composite. These factors have been shown to be major determinants of composite restoration long-term success [6, 7].

The fact that this technique requires skill and clinical acumen to be performed correctly is a relative disadvantage. Despite the fact that this technique has been used for Class-II cavities, it is reasonable to assume that the vast majority of cases where pre-operative anatomy is preserved are pit and fissure caries, i.e. Class-I cavities. Because flowable composite is typically preferred in this technique, a reduction in strength is to be expected. As a result, cases in which this technique is indicated should be chosen [6, 7].

One of the critical issues to address here is polymerization shrinkage. Composite restoration must be done in order to reduce polymerization shrinkage. When using this method, care must be taken to incrementally place the composite at the base of the cavity, and the stamp is used with the final increment to shape the occlusal anatomy [4].

Furthermore, the amount of time required to master and initially practice this technique is substantial. However, with practice, this is easily overcome. It is also important to note that the correct and precise placement of the occlusal stamp is a requirement for obtaining an accurate cusp-fossa relationship. Without it, distortions occur, negating the technique's primary goal [7].

Conclusion. The stamp technique for direct composite restorations is a practical and biomimetic procedure that is appropriate for a busy practice with a large number of patients. Topography replication has a higher accuracy than the manual method and can be applied to irregular cavities as well. Further in vitro studies will be carried out to precisely assess its efficacy.

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