

Microbrush stamp technique to achieve occlusal topography for composite resin restorations - A Technical Report

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ABSTRACT : Occlusal discrepancy after direct restorations, even if it is minor, leads to discomfort to the patients, since proprioceptors of stomatognathic system react sensibly under pressure. Eventually patients compensate by adapting to new habitual occlusal position, which causes serious long term craniomandibular disturbances. A stamp technique is proposed which is an easy-to-follow procedure to recreate accurate occlusal topography for a direct composite resin restoration effectively and efficiently.

Introduction

Some of the main objectives of a restoration is to restore the form, function and occlusion of the individual tooth that is mutilated by the disease. Compared to indirect restorations, where contact, contour and the occlusion is well controlled and achieved in the laboratory, the direct restorations pose challenges in achieving the same intra-orally. It can be technique sensitive, time consuming and may not result in precise reproduction of the form and occlusion. The various matrices available, for both metallic and non-metallic restorations, mainly enable achieving the contour and contact of the proximal surfaces,^[1] but do not help achieve the precise occlusion. The occlusal carving is left for free hand dexterity and skill which has the risk of being over/ under finished resulting in over/ under restored surfaces. This leads to occlusal discrepancies that can range from minor to major. In addition, the surface finish obtained after finishing with the abrasives would not be as smooth as the one finished under a matrix.

Occlusion from trauma is an iatrogenic wound if not taken into consideration during the operative procedure would alter the stability of entire stomatognathic system.^[2] A functional occlusion promotes favorable adaptation of neuro musculature, temporomandibular joint, teeth and its supporting structures while maintaining a positive and stable inter-cuspal relation of centric occlusion with no symptoms of mandibular dysfunction and no signs of tooth wear.^[3,5] Importance of occlusion is paramount that, orofacial integrity is the key element for psychosocial well being.^[4]

One technique that is proposed by Dr. Waseem Riaz a London based practitioner is a 'Stamp technique' practiced for direct composite resin restorations to obtain the precise occlusal topography easily. It has also been reported for vertical bite reconstruction of worn out dentitions.^[9]

Stamp is like an index, which is the mini impression made by putty before tooth preparation for a full crown preparation. This stamp replicates the original anatomy of the tooth structure by virtue of copying the original unprepared tooth structure.^[6,7,8] This technique is used where the occlusal surface is almost intact before the restorative procedure.^[7] For mild or moderate cavitated carious lesions, the cavitation are blocked with wax and occlusal pattern is sculpted on the wax.

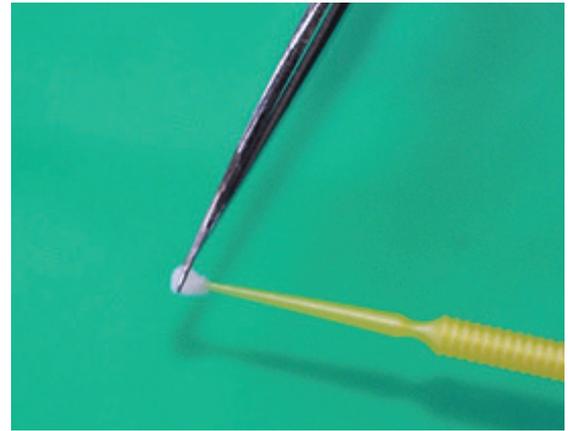
Technique

The step-by-step procedure is illustrated in the figures 2 to 21.

The cavitated tooth to be restored was isolated under rubber dam. Cavitated caries mesial to oblique ridge was blocked out by base plate wax. A single coat of petroleum jelly/ vaseline which acts as separating agent was applied onto the occlusal surface with an applicator tip. The tip of a microbrush was trimmed with the scissors for ease of handling. Flowable composite material was applied to the occlusal surface, and the microbrush was placed over it with a gentle digital pressure. It was light cured and thus occlusal stamp was fabricated.



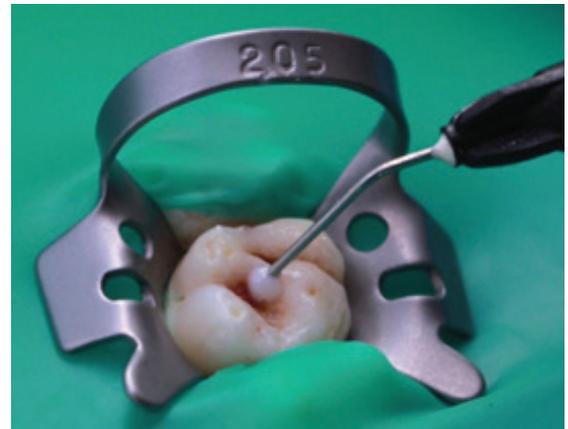
Step . 1 Pre – operative photograph, Class I superficial cavitated caries in left maxillary molar with palatal extension



Step 4. The tip of the microbrush is cut for better handling characteristics



Step 2. Mesial cavitated occlusal caries being blocked with base plate wax



Step 5 . Flowable composite applied over the wax on the mesial cavity as well as on the distal aspect



Step 3. Application of a single coat of petroleum jelly with applicator tip



Step 6 . Microbrush is pressed on the flowable composite with gentle digital pressure



Step 7. Microbrush stamp is being cured with LED Curing unit



Step 10 . after pumice prophylaxis



Step 8. Occlusal stamp made using microbrush stamp technique



Step 11 . Caries excavation with tungsten carbide bur using Airtor handpiece



Step 9. pumice prophylaxis done with pumice slurry using rubber cup in a contraangle handpiece in slow speed



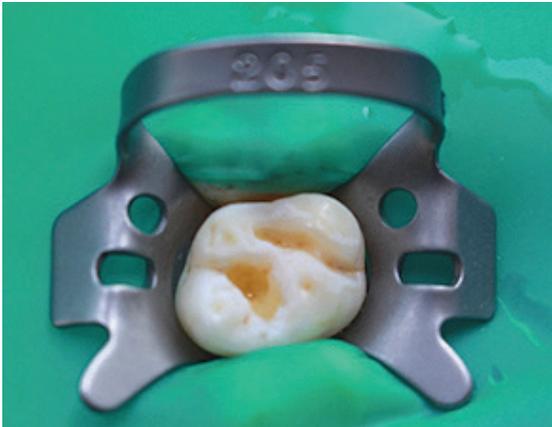
Step 12 . caries excavation/ cavity preparation



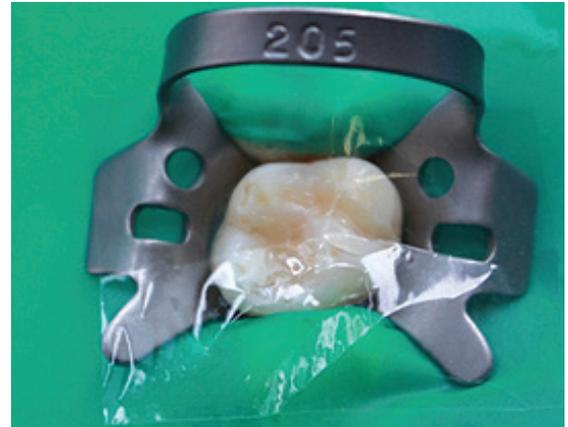
Step 13. Selective enamel etching with 37% ortho phosphoric acid



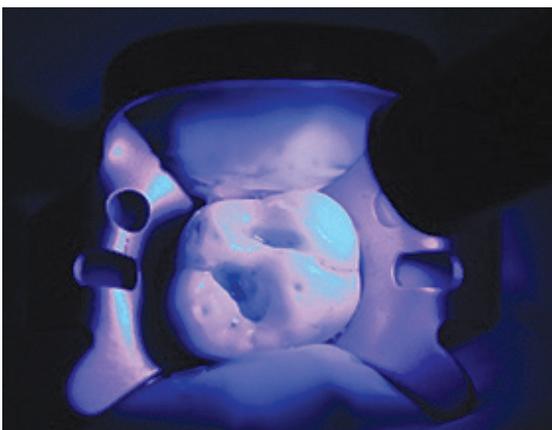
Step 16 . final layer of resin composite applied



Step 14 . Etched enamel and moist dentin



Step 17 . Cling film applied covering the occlusal surface



Step 15 . Bonding agent applied and cured



Step 18 . Microbrush stamp pressed over the cling film



Step 19 .Curing done with LED curing lightn(480nm)



Step 20. Polishing with POGO -1



Step 21. Polishing with POGO -2



Final restoration

Pumice prophylaxis was done with pumice slurry using rubber cup in a contra angle micromotor handpiece under low speed to remove the separating agent and the debris. Caries was excavated and cavity preparation done using Airtor handpiece using tungsten carbide bur. Selective enamel etching was done with 37% ortho phosphoric acid [Tetric N Etch Ivoclar vivadent] and rinsed with water using disposable needle and syringe. The cavity was dried with chip blower to obtain frosty white appearance in enamel , while the dentin was blot dried. Bonding agent [Tetric N Bond, Ivoclar vivadent] was applied with an applicator tip and cured for 20 seconds followed by the incremental addition of packable resin composite resin [B2 shade Tetric N ceram, Ivoclar vivadent]. The restoration was light cured using LED [Unicorn Denmart] for 20 seconds.

After final increment was added, a cling film was applied onto the surface. The fabricated microbrush stamp was pressed over the cling film. Upon removal of the cling film, the gross excess was removed with sharp hand instrument. The resin composite was then cured. Polishing was carried out using single step POGO composite polishing kit.

Discussion and Conclusion

Merits

- Faster procedure since less time required to recreate occlusal anatomy by hand
- Material consumption is less
- Decreased chair side time in adjusting is less [save articulating paper and time]

- Decreased chair side time in finishing and polishing procedure
- Replicates original occlusal anatomy since it is the copy
- No need of special instruments.[XTS anti stick instruments]

Demerits

- Index is of less clinical efficacy for repeated restoration failure cases
- Index doesn't recreate imperfections such as deep pits and fissures since mimicking it in the occlusal stamp is not possible.
- Possibility of stick falling off stamp and can pose a threat for aspiration or chocking.
- Cost effective since the materials used for this technique such as microbrush, and
- Flowable composites are expensive.

Other cost-effective materials could be considered as follows:

- Pit and fissure sealants
- Poly methyl metha acrylate [clear]
- Pattern resin
- Gingival dam material
- Vacuum formed template.
- Bite registration material

The microbrush stamp technique is an easy-to-follow procedure to effectively and efficiently recreate accurate occlusal topography in teeth with almost intact occlusal anatomy.

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