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Graduated in Dentistry at the Universidad Alfonso X el Sabio, Madrid, Spain. PhD in Biomedical Sciences at the Università Politecnica delle Marche, Ancona, Italy. Currently, research fellow at the same University under the supervision of Professors Angelo Putignano and Giovanna Orsini. My main activities concern endodontics, restorative dentistry, and aesthetics. After graduating, I had the opportunity to build on current scientific research with the goal of creating new procedures specifically designed to improve health outcomes. This translational research allowed me to apply simplified techniques and learn about the characteristics of the different materials. During lectures and workshops, I demonstrate the results of research work to provide predictable, repeatable, and quality results to improve all possible therapies for our patients.



Direct Pulp Capping with the Bio-Bulk Fill Technique

How long have you been using Biodentine™?

In my clinical practice, I have employed Biodentine™ for an extended period of six to seven years. With the introduction of Biodentine™ XP to the market, I switched to using this new product this year.

Why do you use the Bio-Bulk Fill procedure with Biodentine™? What are the main advantages for you?

This technique enables clinicians to simplify direct posterior restorations, including both direct and indirect pulp capping, through the utilisation of a bioactive material such

as Biodentine™ XP, as a dentine substitute. Indeed, the placement of a protective barrier over exposed or unexposed pulp induces the formation of a dentinal bridge and maintains its vitality and function. The combination of Biodentine™ XP and a resin-based composite for cavity filling ensures a safe outcome, preserving pulp vitality within a single visit.

When/in which cases do you use the Bio-Bulk Fill procedure?

I use it mainly in very deep cavities as a protective base, or for vital pulp therapy, both for indirect and direct pulp capping.

Summary

Introduction

This clinical case demonstrates the basic concepts of the Bio-Bulk Fill approach, using Biodentine™ XP material as a dentine replacement, to perform the restoration of a deep cavity lesion.

Grace, 32 years old, presented with a hole in her tooth, but did not report feeling any pain. The tooth was positive in the vitality test and negative in the percussion test. Clinical examination revealed a cavity without exposure of the pulp, and the radiological examination revealed no periodontal lesions.

Methods

After preparing the cavity with high- and low-speed burs and a vanadium excavator, direct pulp capping was performed using Biodentine™ XP. After allowing the material to harden for 15 minutes, the

lesion was transformed from a class II to a class I cavity. A bulk-fill composite was applied with the Essential Lines modelling technique to complete the direct restoration.

Discussion

The characteristics of Biodentine™ XP allow the practitioner to obtain a seal and form a barrier that induces a pulp response, therefore maintaining the vitality of the pulp. Furthermore, Biodentine™ XP presents good results in terms of bond strength, allowing the restoration to be completed in a single session.

Conclusion

After a six-month follow-up, no radiographic signs of periodontal issues were observed, confirming the maintained vitality of the treated tooth.

Introduction

In restorative dentistry, managing carious exposure in deep lesions is a common occurrence, especially in cases with no or mild symptoms. Various treatment options exist, including minimally invasive approaches to vital pulp treatment, such as direct pulp capping.

Direct pulp capping, when conducted after a careful diagnosis, is generally an effective clinical procedure for treating teeth with deep decay and exposed pulp. Calcium silicate-based materials, called bioceramics, are commonly applied in direct contact with the pulp. These materials play a crucial role in eliciting a pulp response and promoting the formation of a reparative bridge of hard tissues, thereby preserving pulp vitality. Additionally, new bioceramics can serve as a dentine substitute and have excellent bonding capacity with resin-based

composites, allowing for a one-step cavity filling with satisfactory adaptation to the cavity. This way, the procedure is simplified and the chair time required to complete the restoration is reduced.

This clinical case demonstrates the basic concepts of the “Bio-Bulk Fill” approach, using Biodentine™ XP as a dentine replacement, to perform the restoration of a deep cavity lesion. Grace, 32 years old, presented with a hole in her tooth, but did not report feeling any pain. The tooth was positive in the vitality test and negative in the percussion test. Clinical examination revealed a cavity without exposure of the pulp, and the radiological examination revealed no periodontal lesions.

Case report

Clinical signs and symptoms

The patient reported no pain. The clinical examination showed a deep carious lesion and the radiological examination showed a D3 lesion according to the American Dental Association Caries Classification System. Pulp vitality was positive and percussion test negative.

Diagnosis

Dental caries. Visible deep lesion with no symptoms.

Procedure and treatment

Direct restoration involving dental caries removal and the application of Biodentine™ XP for direct pulp capping.

The lesion was deep and the pulp was exposed. At this point, a cotton pellet was used to promote formation of the clot. Only after the bleeding had stopped was the direct pulp capping performed, applying Biodentine™ XP inside the cavity directly in contact with the pulp. After 15 minutes, when the material had hardened, the Biodentine™ XP layer was modified with burs and manual instruments in order to distribute the material homogeneously within the cavity.

A sectional matrix was positioned to transform the lesion from a class II to a class I cavity, and the

enamel was selectively etched for 20 seconds. After the application of the universal adhesive system, the mesial wall was built, re-establishing a proper contact point. Upon the removal of the sectional matrix, the class I restoration was completed using only one mass of bulk-fill composite, and the occlusal morphology was obtained following the Essential Lines modelling technique.

After completing the restoration and curing the material, glycerin was applied for 40 seconds for a final oxygen-free curing cycle. After the second premolar was performed, the old restoration of the first premolar was also replaced, again following the Bulk-and-Go and Essential Lines techniques proposed by StyleItaliano.

The check-up x-ray showed different radiopacities of the composite and Biodentine™ XP. After six months of follow-up, no radiographic signs of periodontal lesions were evident. The vitality test was positive and the percussion test negative, a sign of maintained vitality of the treated tooth.

Follow up

No symptoms or radiological lesions were observed at the six-month follow-up.



Fig. 01 - Deep proximal cavity.



Fig. 02 - Rubber dam isolation.



Fig. 03 - Dental caries removal using a vanadium excavator.

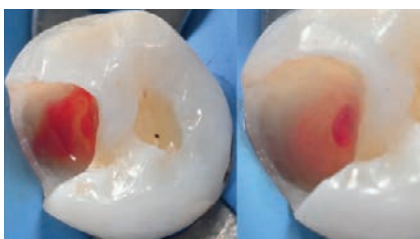


Fig. 04 - Clean cavity with pulp exposure.



Fig. 05 - Injection of Biodentine™.



Fig. 06 - Hardening of bioceramic material before restoration.

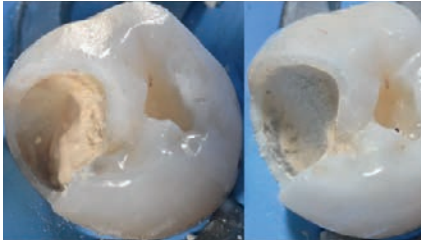


Fig. 07 - Shaping of bioceramic lining before restoration.

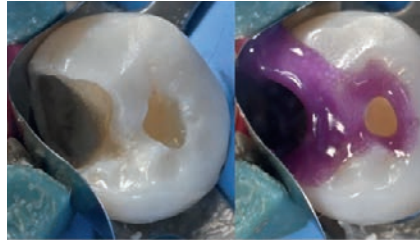


Fig. 08 - Selective enamel etching.

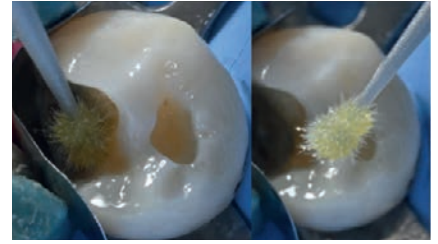


Fig. 09 - Bonding of class II cavity.



Fig. 10 - Mesial wall reconstruction, transforming class II into class I.

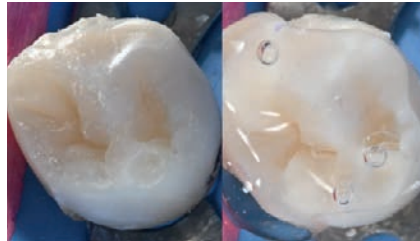


Fig. 11 - Occlusal modeling of lower premolar.

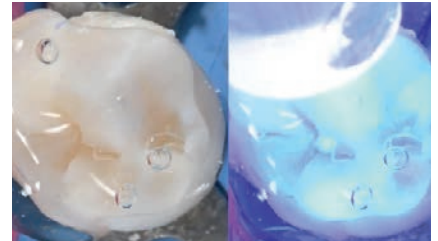


Fig. 12 - Light curing under glycerin gel.



Fig. 13 - Final restoration.



Fig. 14 - Final aspect of lower premolar restoration.



Fig. 16 - Restored lower premolars.



Fig. 15 - Before and after cavity restoration.

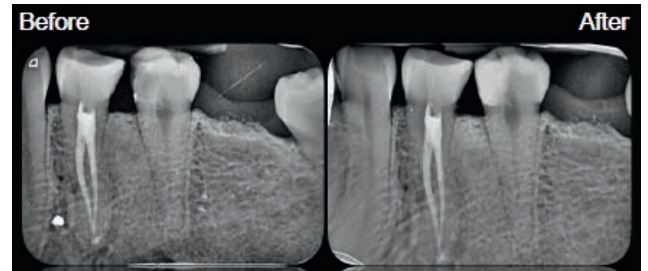


Fig. 17 - Xray before and after direct pulp capping.

Discussion

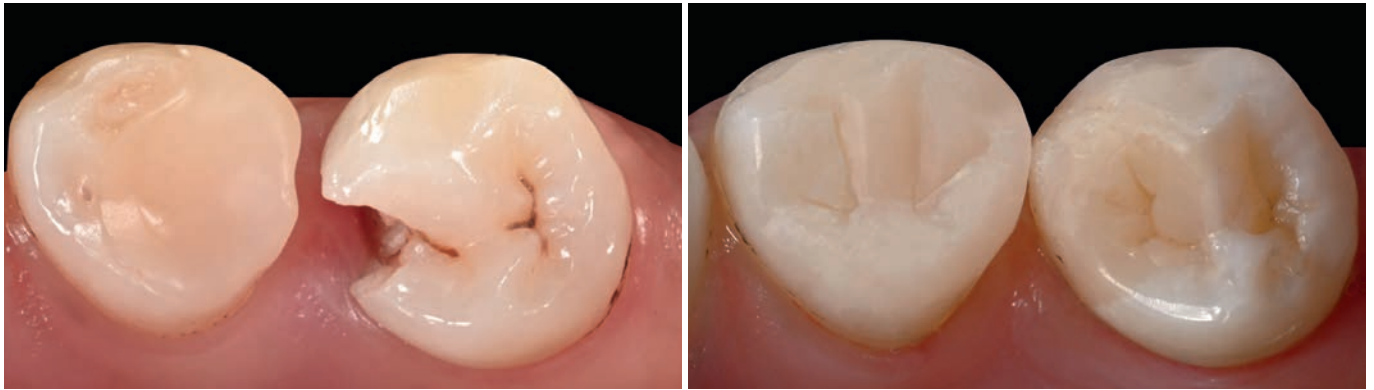
Biodentine™ XP plays a crucial role in eliciting a pulp response and promoting the formation of a reparative bridge of hard tissues, thereby preserving pulp vitality. Additionally, it can serve as a dentine substitute, allowing for a one-step cavity filling with satisfactory adaptation to the cavity.

Furthermore, the material is easy to handle and has excellent bonding properties with resin-based composites, allowing the practitioner to complete the restoration in a single session. This way, the procedure is simplified, and the chair time required to complete the restoration is reduced.

Conclusion

This technique allows the clinician to simplify direct posterior restorations, including direct or indirect pulp capping, using a bioactive material like Biodentine™ XP as a dentine substitute. The

combination of Biodentine™ XP and composite for filling the cavity and the Essential Lines modelling technique ensures a safe outcome in one single visit.



Before and after cavity restoration.

References

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