

Direct pulp capping with Biodentine™ XP, a bioactive material

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I Introduction

Biodentine™ (Septodont; Saint-Maur-des-Fossés, France) is a bioactive cement which can be used in direct contact with vital pulp tissue to promote the formation of reparative dentin. In this case, we use the new Biodentine™ XP for direct pulp capping after iatrogenic pulp exposure in a 25-year-old male patient.

When Biodentine™ is used in direct contact with the vital pulp, the aim is to stimulate the formation of reactive reparative dentin (tertiary dentin). The following clinical case report illustrates the use of Biodentine™ for direct pulp capping.

Case Report

A male patient, 25 years old, came to our dental office for a routine check-up two years after the previous one. Bitewing films and intraoral examination showed an asymptomatic mesial deep carious lesion on tooth 37 (*Fig. 1*).

The patient reported no spontaneous symptoms. The tooth tested positive on CO₂ snow sensitivity and negative on percussion. After local anesthesia was administered, a rubber dam was put in place. During cavity preparation, the carious dentin was completely excavated and the pulp chamber was exposed iatrogenically. A communication of 1 mm was established (*Fig. 2*).

The pulp tissue showed slight bleeding and it was therefore decided to proceed with direct pulp capping. The bleeding was controlled by pressing a sterile cotton pellet soaked in a limewater solution (a saturated solution of calcium hydroxide) onto the exposed pulp (*Fig. 3*).

After hemostasis was achieved, a sterile cotton pellet soaked in 5% sodium hypochlorite (NaOCl) solution was applied to clean and disinfect the cavity. After placing a sectional matrix (*Fig. 4*), the cavity was bio bulk-filled with Biodentine™ XP (*Fig. 5*).

A micro-brush was used to flatten the material and ensure a good fit to the cavity walls (*Fig. 6*).

Approximately 12 minutes after mixing, when the Biodentine™ XP had set, the permanent enamel restoration was performed. After acid etching of the enamel margins, a universal

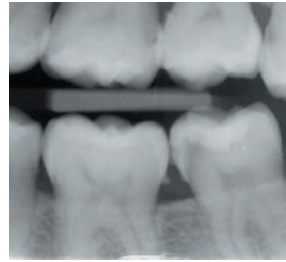


Fig. 1

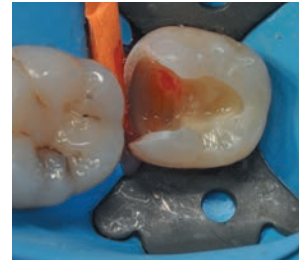


Fig. 2

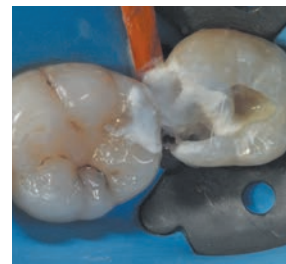


Fig. 3

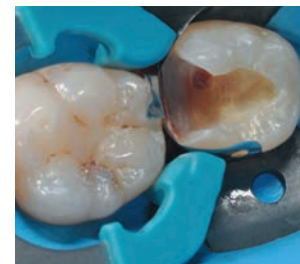


Fig. 4

dentin adhesive was applied. An “open sandwich” class II restoration was performed using a resin composite material (*Fig. 7*).

The final radiograph of the vital pulp therapy procedure showed the different layers of materials used, and correct marginal adaptation can be seen (*Fig. 8*).

At the follow-up visit, seven days after direct pulp capping, the patient reported some increased cold and warm sensitivity. After 40 days, the tooth tested positive on CO₂ snow sensitivity and negative on percussion. The patient reported no spontaneous symptoms. The response to electric pulp testing was within a normal value range.

After 3 months the X-ray shows no signs of periapical lesion (*Fig. 9*) and the patient reports no symptoms.



Fig. 5



Fig. 6



Fig. 7

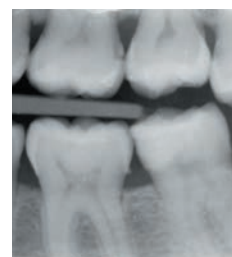


Fig. 8



Fig. 9

Discussion

Among the many materials that can be used for vital pulp therapy procedures, Biodentine™ is an excellent dentine substitute thanks to its mechanical properties. As extensively documented in the literature, Biodentine™ shows bioactivity and biocompatibility. The direct contact with the vital pulp tissue reduces inflammation and protects the pulp from bacterial infection.(1) The release of calcium and hydroxyl ions promotes dentinogenesis, and a dentine bridge is formed in the area of contact with the pulp.(2,3)

Biodentine™ has good marginal sealing properties and a good, spontaneous adhesion to the dentin, with a mineral-infiltrated zone developing. It has dentine-like radiopacity (*Fig. 8*)

and is insoluble when coming into contact with oral fluids. Thanks to this property, it is possible to carry out “open sandwich” class II restorations (like the one detailed in this case report) and bulk restorations, the latter of which must be covered by a composite no later than six months after placement.(4)

From preparation to dispensing, the entire procedure is very simple thanks to the new experience of Biodentine™ XP. The Biodentine™ mixer guarantees easy, perfect mixing, and the gun and the adjustable nozzle allow Biodentine™ XP to be applied directly into the cavity for a much more comfortable patient experience.

Conclusion

A new biological approach to pulp capping has become possible thanks to bio-ceramic materials like Biodentine™ XP due to their bioactive and biocompatible nature. Biodentine™ XP greatly

simplifies this procedure thanks to more thorough and predictable mixing. The injection system allows easier filling of the cavity without the danger of leaving voids in the restoration.



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