

Dr. Kreena Patel

Kreena is a Specialist in Endodontics. She graduated from the University of Manchester and completed her specialist training at King's College London, where she qualified with distinction. Kreena has also worked in general practice and carried out further hospital training in Oral Surgery, Paedodontics and Restorative Dentistry.

Kreena is passionate about her work and enjoys the technical precision involved in Endodontics and Endodontic Surgery. She is also keen on improving the field of Endodontics and her research has been published in several international journals. She taught on the Specialist Endodontics Programme at Guy's Dental Hospital (King's College London) as a senior clinical teacher between 2016 and 2021.

Kreena currently works at Brigstock Dental Practice (South London) and Oaktree Dental Practice (Berkshire). She continues to lecture and teach, and leads her own online endodontic programme ('The Endo Course') and a hands-on endodontic course ('Endo Expertise'). You can also follow her endodontic educational content on Facebook and Instagram @kreenaspecialistendodontics.



Partial pulpotomy with Biodentine™ XP on a geminated tooth

How long have you been using Biodentine™?

I have been using Biodentine™ for over 10 years and have slowly pushed the boundaries of its use in this time. In my opinion, it is the best material on the market to date when working both in close proximity to the pulp and for perforation repair.

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

I initially used Biodentine™ as a thin layer but switched to using it in the Bio-Bulk Fill procedure in later years. Biodentine™ lends itself well to being used in this way; it has similar mechanical properties to dentine and bonds to it, providing an excellent seal that is resistant to leakage. I also find the handling and placement of the material quicker and easier when used this way. I nearly always use Biodentine™ in a one-stage procedure, and am more confident adjusting the coronal aspect when it has been placed as a thicker increment.



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

- **Direct/indirect pulp capping and pulpotomies.** I fill the dentine portion of the tooth using Biodentine™. Following the initial 12-minute set, I carefully clean the coronal cavity and add a >2 mm composite layer.
- **Perforation repair.** I carry out the endodontic (re)treatment first. Following good hemostasis, I repair the perforation and fill the pulp chamber using the Bio-Bulk Fill procedure. This ensures a thick layer of Biodentine™ is used to provide an excellent seal around the repair.
- **Internal repair of external cervical resorption (ECR) lesions.** I only carry out internal repairs on ECR lesions that are not amenable to surgical repair. In these cases, I mechanically and chemically clean the lesion as fully as possible internally, and fill the root canal and pulp chamber with Biodentine™. There is some evidence that this can help prevent resorption progression.
- **Apexification.** I use Biodentine™ for apexification of teeth with short roots to prevent coronal staining. I fill the entire root and pulp chamber with Biodentine™.

Summary

Introduction

The clinical case presented featured gemination, a rare developmental anomaly resulting in complex external and internal anatomy. Vital pulp therapy using Biodentine™ XP was used to avoid complex root canal treatment.

Methods

A partial pulpotomy was carried out using Biodentine™ XP in a single visit using the Bio-Bulk Fill procedure with a coronal composite.

Discussion

Root canal treatment would have required a larger and more destructive access cavity than normal to access the canals in this geminated tooth.

Conclusion

This case shows Biodentine™ XP can be successfully used for partial pulpotomies on teeth with reversible pulpitis where the pulp has been exposed and sealed a few weeks prior to treatment.

Introduction

The clinical case presented featured a rare developmental anomaly called gemination (*from latin Geminatio* ‘doubling’) or “double tooth”. The prevalence of tooth gemination is 0.1% in permanent teeth, and is more common in the anterior dentition.

Gemination occurs when a single tooth bud attempts to divide. Clinically, they appear as two fully or partially separated crowns, and radiographically they share a common root canal system. The tooth count is normal when the anomalous tooth is counted as one. Gemination should not be confused

with tooth fusion, which occurs when two adjacent tooth buds begin their development separately and fuse in the final developmental stage. The tooth count will be one short when the anomalous tooth is counted as one.

Vital pulp therapy has been explored as an alternative to endodontic treatment. It aims to preserve the pulp, which performs a plethora of important functions including dentinogenesis, immune cell defense and proprioception. Treatment options include indirect or direct pulp capping and partial or complete pulpotomy. They

focus on minimal intervention and can be a more cost-effective and less technique-sensitive option. Biodentine™ (Septodont) has been used for vital pulp therapy for over 12 years with impressive success rates. It is biocompatible, has antibacterial properties, and provides a marginal seal via mineral deposition within and around open dentinal tubules. It is also bioactive, favorably interacting with pulp cells to give an anti-inflammatory response and encourage dentine bridge formation.

Biodentine™ has several advantages over mineral trioxide aggregate (MTA), including a faster initial set and no discolouration. Biodentine™ also has physio-mechanical properties (compressive strength, flexural strength and hardness) which are comparable to dentine. It can therefore be used in

a Bio-Bulk Fill procedure as a pulp dressing and base material simultaneously.

Biodentine™ XP is mixed in a cartridge to give a predictable mix. It is administered via a gun with a flexible nozzle so the material is dispensed directly into the cavity, offering far superior handling.

Geminated teeth have a highly complex anatomy and pulpal network. Therefore, vital pulp therapy held significant advantages over endodontic treatment for the management of this case. This clinical case describes a partial pulpotomy procedure that was carried out on a tooth with complex pulpal anatomy (gemination) several weeks after the initial pulp exposure.

Case report

Clinical Signs & Symptoms

A 25-year-old male patient presented to his general dentist with subgingival asymptomatic caries in UR6. His general dentist started caries removal, which had resulted in a small pulpal exposure. A cotton pledget and temporary restoration were placed. The patient was referred to me for endodontic treatment because the tooth anatomy appeared complex.

The patient attended for an endodontic consultation 2-3 weeks following the initial treatment with symptoms of reversible pulpitis. Clinically, the UR6 was not tender to percussion or buccal palpation. It responded positively and normally to sensibility testing. The tooth had an enlarged occlusal platform (*Figure 1*).

Radiographic examination was carried out using periapical radiographs and CBCT (*Figures 2 & 3*). The UR6 had complex anatomy (eight canals). There was no evidence of a periapical radiolucency, and the PDL width was normal, with an intact lamina dura.

Diagnosis

Reversible pulpitis UR6; tooth gemination.

In light of the clinical and radiographic evidence, a partial pulpotomy procedure was planned. The patient understood that a full pulpotomy or root canal treatment may be required depending on the clinical findings during treatment.



Fig. 1: Preoperative photograph.



Fig. 2: Preoperative photograph.

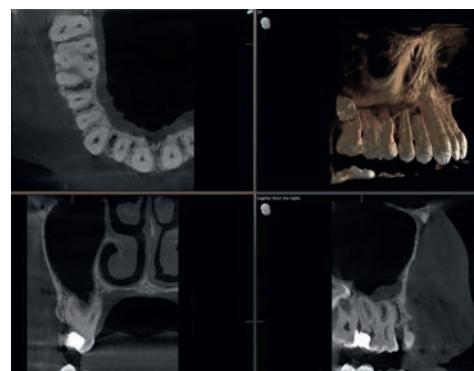


Fig. 3: Preoperative CBCT.

Procedure & Treatment

Local anaesthetic (2.2 ml 2% lidocaine 1/80k adrenaline, Lignospan Special, Septodont) was administered via a buccal infiltration and a rubber dam was placed. The temporary restoration was removed using a high-speed handpiece under copious irrigation. The pulp appeared mildly inflamed over the exposure site (*Figure 4*).

Complete marginal caries removal was carried out using a carbide tungsten carbide bur (*Figure 4*). A sectional matrix band (Palodent V3, Dentsply Sirona) was placed and a composite wall built (SDR, DentsplySirona) using a total-etch adhesive system, avoiding the pulp (*Figures 5 & 6*).

A sterile diamond bur and high-speed handpiece were used to remove 2-3 mm of pulp tissue below the exposed pulp. A 2.5% sodium hypochlorite damp cotton pledget was held over the exposed pulp for five minutes and good haemostasis was achieved.

Biodentine™ XP (Septodont) was placed directly over the pulp and used to replace the dentine portion of the tooth using a Bio-Bulk Fill procedure.

The Biodentine™ gun tip was placed close to the cavity base and Biodentine™ XP injected while slowly retracting. The material was gently adapted in place using minimal coronal pressure (*Figure 7*). The material was given 12 minutes for the initial setting reaction to take place.

A tungsten carbide gooseneck and ultrasonics were used to refresh the dentine margins. A definitive 2-3 mm composite restoration (Etch, Prime & Bond Active (DentsplySirona), G-aenial Universal Flo, (GC Dental) was placed over the Biodentine™ XP (*Figure 8*). The occlusion was checked.

Follow-Up

The patient had mild sensitivity to cold (lasting a few seconds) for one to two weeks following the procedure. At the one- and seven-month reviews, he was asymptomatic and UR6 responded normally to sensibility testing (cold and EPT). The review radiograph showed no periapical radiolucency and minimal-to-no pulpal retraction (*Figures 9 & 10*).



Fig. 4: Temporary restoration removed. The pulp was mildly inflamed at the exposure site.

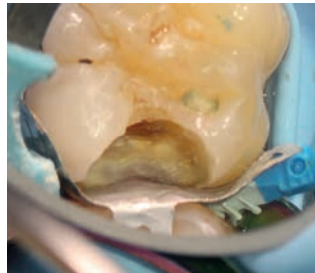


Fig. 5: Sectional matrix placed ready for the composite wall placement.

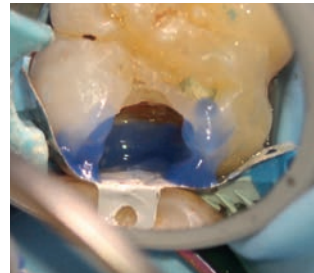


Fig. 6: Phosphoric acid used to etch the marginal enamel and dentine.

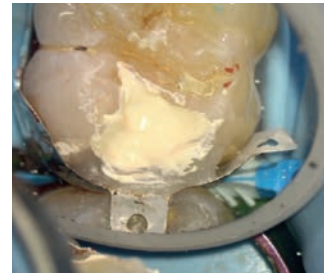


Fig. 7: Biodentine™ XP.



Fig. 8: Composite restoration.



Fig. 9: Review photograph.

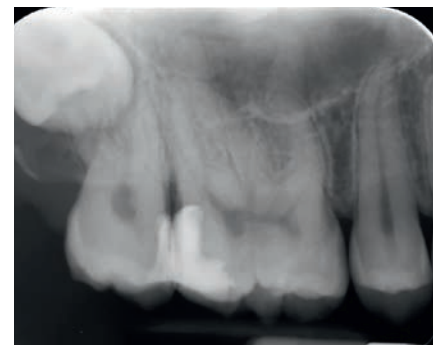


Fig. 10: Review radiograph.

Discussion

The presented tooth had gemination with complex external and internal anatomy. We were keen to avoid endodontic treatment if possible. This would have required a larger and more destructive access cavity than normal to access the canals. The root canal treatment and coronal restoration would have also been challenging.

A partial pulpotomy involves removing 2-3 mm of pulp around the exposure site. It was chosen over a direct pulp cap because the pulp had been exposed and sealed for several weeks prior to the procedure. It was expected that there would be some degree of irreversibly inflamed tissue around the exposure site which would require removal to improve the success rate. A partial pulpotomy may be beneficial compared to a full pulpotomy

because it preserves the cell-rich tissues in the coronal pulp. It also requires less dentine removal and presents a reduced risk of canal obliteration.

Case selection and clinical technique are important factors. The patient had symptoms of reversible pulpitis prior to treatment. Treatment was carried out under rubber dam and pulpal haemostasis was achievable within five minutes prior to placing Biodentine™ XP.

Biodentine™ XP was used in a Bio-Bulk Fill procedure to replace the dentine portion. Using Biodentine in this manner requires fewer materials, fewer clinical stages and less time. The tooth was restored to function using a composite in a single visit, which reduces patient morbidity and clinician time.

Conclusion

This case shows that Biodentine™ XP can be successfully used for partial pulpotomies on teeth with reversible pulpitis where the pulp has been exposed and sealed a few weeks prior to

treatment. The procedure was carried out in a single visit using Biodentine™ XP in a Bio-Bulk Fill procedure with a coronal composite.

References

- SWIFT JR, E.J., Trope, M. and Ritter, A.V., 2003. Vital pulp therapy for the mature tooth—can it work?. *Endodontic topics*, 5(1), pp.49-56.
- Alqaderi, H., Lee, C.T., Borzangy, S. and Pagonis, T.C., 2016. Coronal pulpotomy for cariously exposed permanent posterior teeth with closed apices: a systematic review and meta-analysis. *Journal of dentistry*, 44, pp.1-7.
- Albaiti, S.S., Albishri, R.F., Alhowig, M.T., Tayyar, W.I., Alqurashi, N.F., Alghamdi, F.T., Albaiti, S., Albishri, R., Tayyar, W. and Alghamdi, F., 2022. Partial pulpotomy as an applicable treatment option for cariously exposed posterior permanent teeth: a systematic review of randomized clinical trials. *Cureus*, 14(7).
- Chinadet, W., Sutharaphan, T. and Chompu-inwai, P., 2019. Biodentine™ partial pulpotomy of a young permanent molar with signs and symptoms indicative of irreversible pulpitis and periapical lesion: a case report of a five-year follow-up. *Case Reports in Dentistry*, 2019.
- Duncan, H.F., 2022. Present status and future directions—Vital pulp treatment and pulp preservation strategies. *International Endodontic Journal*, 55, pp.497-511.

Septodont

58 rue du Pont de Créteil - 94100 Saint-Maur-des-Fossés - France

www.septodont.com

Follow us on social media channels:

