

VITAL PULPOTOMY IN MOLARS

Vital pulpotomy should be performed as soon as possible after exposure by fracture or the removal of caries in order to minimize contamination of the pulp. The following clinical procedure will produce the highest rate of success. Slight modifications in this procedure are required for anterior teeth, bicusps and primary molars, and these can be found in the sections that follow.

PROCEDURE

1. **Obtain profound anesthesia** to assure patient comfort and cooperation. Occasionally, it may be necessary to use supplementary periodontal ligament, palatal or lingual injections. Injection directly into the pulp should be avoided because it can cause tissue laceration and force contaminants from the coronal pulp tissue into the radicular pulp.
2. **Isolate the tooth** with a rubber dam.
3. **Prepare the cavity.** Our primary concern is to avoid contaminating the amputated pulp with saliva and dentin debris. For this reason we remove all carious dentin from the sidewalls and cervical area of the tooth and clean and prepare the cavity to receive a restoration before dissecting off the roof of the pulp chamber. If necessary, modify the cavity preparation in order to improve vision to the surgical site (*PP1*).
4. **Dissect the roof of the pulp chamber.** This is accomplished by circumscribing the dentin overlying the pulp chamber, at the expense of the sidewalls of the tooth, with a #4 round bur, which offers good control with minimal penetration into the pulp chamber when making this delicate cut. Never use a fissure bur with a flat bottom. It cuts too aggressively for this procedure and can easily drop into the pulp, as indicated by the green lines in *Figure PP2*.



Figure PP1



Figure PP2



Figure PP3



Figure PP4



Figure PP5

5. **Create a ledge.** While performing the dissection, create a small ledge around the periphery of the pulp chamber by cutting into the sidewalls of the tooth. This creates a disk of dentin. The ledge later provides a physical stop for the cement base, which prevents restorative materials from being forced into the pulpal dressing and disturbing the healing process (PP3 and PP4).
6. **A disk of dentin will now be resting on the odontoblastic membrane.**
7. **Remove the disk of dentin from the roof of the pulp chamber** to create access to the coronal pulp tissue. Prior to removing the remaining island of dentin, the cavity is cleansed again with sterile saline solution or sodium hypochlorite to remove all dentin dust and debris. This is critical because the mere presence of dentin particles in the surgical site can cause failure. A spoon excavator is used to remove the disk of dentin, exposing the coronal pulp tissue. This is accomplished with little or no bleeding (PP5 and PP6).
8. **Inspect the odontoblastic membrane.** If the odontoblastic membrane directly beneath the freshly removed disk of dentin is healthy and intact, the prognosis for pulpotomy is favorable. A healthy, intact odontoblastic membrane appears as a shiny, glossy sheath with a purplish gray color (PP7). It is firm and resilient. When slight pressure is applied, it returns to its original shape. If the membrane is not firm and resilient, the degenerative process may have extended into the radicular pulp, and pulpotomy is not indicated.



Figure PP6



Figure PP7



Figure PP8



Figure PP9



Figure PP10

9. **Amputate the coronal pulp tissue** by sliding a sharp spoon excavator down the wall of the pulp chamber opposite the initial site of exposure to the level of the orifices of the root canals (PP8). Then cut horizontally across the orifices of the canals, thus separating the coronal pulp tissue from the radicular pulp (PP9). Lift the amputated coronal pulp tissue out of the chamber (PP10). Never amputate with a rotating bur.
10. **Control bleeding by packing the pulp chamber with sterile cotton pellets (PP11)**. To induce clotting in a healthy pulp, it can be helpful to apply a cotton pellet that has been slightly wetted with a local anesthetic containing epinephrine. Escharotic agents, such as phenol, should never be used to control bleeding.
11. **Clotting of the radicular pulp tissue should take place in a normal period of time (PP12)**. If not, this indicates that the radicular pulp tissue is not healthy and should be removed. If necessary, remove any blood from the sidewalls of the tooth with cotton dipped in sodium hypochlorite or any sterile solution.
12. **Place a layer of Pulpdent Paste approximately 3 mm thick over the amputated stumps**. Pulpdent Paste can be placed directly from the syringe through an 18-gauge needle (PP13).
13. **Dry the surface of the paste** with a slow stream of air to form a crust (PP14).
14. **Gently tamp the paste with a cotton pellet** to make sure it is in contact with the pulp (PP15). The dry crust prevents the cotton pellet from sticking to the dressing and pulling the dressing away from the pulp when the cotton is withdrawn.



Figure PP11



Figure PP12



Figure PP13



Figure PP14

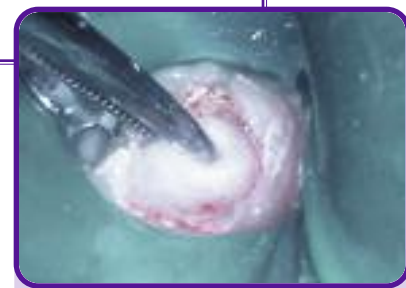


Figure PP15

15. *The pulpal dressing is now in place (PP16).*
16. *Choose a flowing cement* to use as a hard base over the pulpal dressing. Any flowing cement can be used, and flowable light cure materials in a syringe simplify the placement of the hard base (PP17).
17. *Flow the hard base over the Pulpdent Paste* to seal the pulpal dressing in place and provide compressive strength. To accomplish this, allow a creamy mix of cement to flow down the side of the cavity preparation, then over the pulpal dressing to the opposing walls, without entrapping air or exerting any pressure against the dressing. If syringeable materials are used, gently flow the material over the dressing and light cure, if appropriate. In either case, continue to fill the cavity to just above the ledge and allow the cement to set completely, or light cure, if appropriate.
18. *The hard base should cover the ledge* described above (PP18). After the cement sets, the ledge acts as a physical stop to prevent the base and pulpal dressing from being forced into the stroma of the pulp, which could lead to failure.
19. *Trim the hard base to receive a restoration (PP19).*
20. *Place a final or provisional restoration at the same visit, or place an indirect restoration as soon as possible, without disturbing the hard base.* It is important for the hard base and restoration to remain in place for at least three months to insure that the healing process will not be disturbed (PP20).

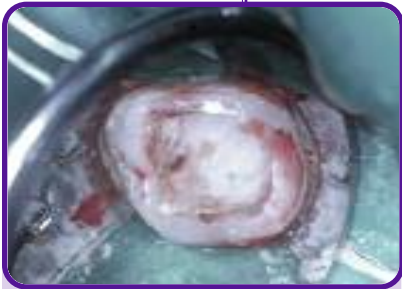


Figure PP16



Figure PP17

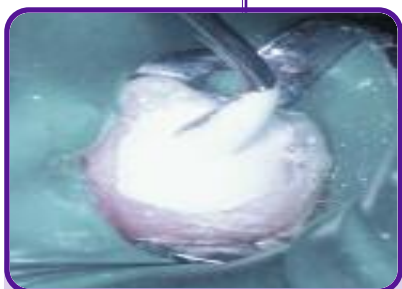


Figure PP18



Figure PP19



Figure PP20

Shows a healed pulpotomy of a mandibular right first molar (#30) six months following pulpotomy. Note the new dentin bridges. A stainless steel crown was used as a provisional restoration.