



Post-Treatment Evaluation of Pulp Therapy in Children

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DESCRIPTION

Vital Pulp Therapy (VPT) is a conservative approach aimed at maintaining the health and function of the dental pulp in young permanent teeth affected by caries or trauma. The success of VPT is influenced by various factors, including patient cooperation, the extent of pulpal inflammation and the materials used. In cases where children exhibit severe anxiety, uncooperative behavior, or extensive dental needs, General Anesthesia (GA) is often required to facilitate treatment.

Vital pulp therapy procedures under general anesthesia

Indirect pulp capping: Indirect pulp capping is performed when deep carious lesions are present without direct pulp exposure. The affected dentin is selectively removed and a biocompatible material, such as calcium hydroxide or Mineral Trioxide Aggregate (MTA), is applied to promote pulp healing and tertiary dentin formation. A definitive restoration is then placed to seal the tooth from bacterial ingress.

Direct pulp capping: This technique is used when the pulp is exposed due to caries or mechanical factors but exhibits no signs of irreversible inflammation. A pulp capping agent, such as MTA or biodentine, is placed directly over the exposed pulp tissue to encourage repair and maintain pulp vitality. Long-term success depends on proper case selection and immediate sealing with a durable restoration.

Pulpotomy: Pulpotomy is indicated for cases with deeper pulpal involvement but without irreversible damage. The coronal pulp tissue is removed and a medicament, such as MTA, formocresol, or ferric sulfate, is applied to the remaining radicular pulp to encourage healing and maintain function. The treated tooth is then restored with a stainless steel crown or composite resin to ensure long-term protection.

Clinical outcomes and success rates

Pulp vitality maintenance: Studies have shown that VPT performed under GA can achieve high success rates in maintaining pulp vitality when proper protocols are followed. The use of bioactive materials such as MTA and biodentine has significantly improved outcomes due to their superior sealing properties and ability to stimulate dentin formation. Pulpotomy procedures, in particular, have demonstrated favorable success rates, often exceeding 85% over a two-year follow-up period.

Radiographic and clinical findings: Postoperative radiographic evaluation is essential in assessing treatment success. Successful VPT is characterized by the absence of periapical radiolucencies, continued root development and no evidence of internal resorption. Clinically, teeth treated with VPT under GA generally exhibit minimal pain, no signs of swelling and normal function when evaluated during follow-up appointments.

Postoperative pain and complications: While some degree of postoperative sensitivity is expected, significant pain or swelling is uncommon when VPT is performed correctly. Complications such as persistent pain, pulp necrosis, or the development of periapical lesions may require reevaluation and, in some cases, endodontic retreatment or extraction. The choice of pulp capping material and the ability to achieve a bacteria-tight seal play key roles in minimizing complications.

Tooth survival and longevity: Tooth survival rates following VPT under GA are influenced by factors such as the extent of initial pulpal involvement, material selection, and restoration quality. Studies indicate that first permanent molars treated with indirect pulp capping, direct pulp capping, or pulpotomy can remain functional for several years, provided that proper oral hygiene and regular dental check-ups are maintained. The placement of stainless steel crowns after pulpotomy has been particularly effective in prolonging tooth survival by reducing the risk of reinfection and structural failure.

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Materials used in VPT

The choice of pulp capping materials plays a significant role in treatment outcomes. Traditional materials such as calcium hydroxide have been widely used but have limitations in long-term stability. Modern bioactive materials, including MTA and

biodentine, offer superior sealing capabilities, biocompatibility and the ability to induce dentin bridge formation. The selection of restorative materials also affects success rates, with stainless steel crowns demonstrating better longevity compared to composite restorations in young patients.