

The Use of Histoacryl in Endodontics

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The oral environment is one of the most complex systems of the human body. It is populated by a variety of microorganisms, with some of the species still not classified. Tissue adhesives, such as cyanoacrylates, have been used in dentistry and in medicine because of their adhesiveness potential to the human tissue, even in the presence of moisture, their biological compatibility, surface isolation, hemostatic properties and bacteriostatic features. Based on these observations, the authors investigated the use of a tissue adhesive (Histoacryl; Laboratório Braun, RJ, Brazil) with the purpose of sealing the remaining dentin, especially in endodontically treated molars and premolars. The results strongly suggest that Histoacryl controls micro-leakage of oral fluids at the filling/tooth interface.

Key Words: tissue adhesive, cyanoacrylates, Histoacryl.

Introduction

Aseptic procedures during endodontic treatment must be thoroughly conducted to prevent contamination of the root canal which may result in harmful sequel to the tooth or to adjacent tissues (Fors and Berg, 1986; Hermesen and Ludlow, 1987; Klager and DuPont, 1987). Undoubtedly, all types of efforts must be made to eliminate microorganisms located in the root canal system to prevent apical-cervical or cervico-apical recurrent contamination.

Engström et al. (1964) and Egström and Lundberg (1965) have found that there is a reduced chance of success when there is invasion of microorganisms during endodontic therapy, thus a higher chance of success is closely related to effective microbial control. Todd and Harrison (1979) emphasized that the dentinal wall/temporary filling interface is a pathway for fluids to leak towards the pulp chamber. Several authors suggest a new endodontic treatment in teeth where the pulp chamber has been kept in contact with oral fluids for an average period of 30 days, even in the absence of any signs and symptoms (Madison et al., 1987; Swanson and Madison, 1987; Torabinejad et al., 1990; Magura et al., 1991). Torabinejad et al. (1990), in an *in vitro* study, found that there was leakage of microorganisms up to the apical region, when microorganisms were inoculated in the cervical region through the dentinal wall/root canal filling interface.

These findings justify the priority which has been given to the tight sealing that should be present at the entrance of the root canal filling. This area represents an open access for invasion of microorganisms in a very short period of time.

Histoacryl, a cyanoacrylate-based tissue adhesive, was tested in this investigation with the purpose of evaluating its capacity to make the floor of the pulp chamber impermeable in endodontically treated teeth.

Materials and Methods

Recently extracted human molars were selected for the experiment and treated endodontically according to the technique of Paiva and Antoniazzi (1991). After searing off the root canal fillings at the entrance of the root canal, Histoacryl (Laboratório Braun, Niterói, RJ, Brazil) was applied.

All samples were stained with 1% Rhodamine B⁵, which was applied to the pulp chamber and remnants of the root canal filling. Once the chamber was totally filled with the dye, the teeth were mounted on a wax stand in order to maintain them in a resting position for a period of two hours. Afterwards, all samples were washed for ten minutes in running tap water and abraded in a labial-lingual direction with an Endo-Z bur, using a slow-speed hand piece and intense irrigation.

Results

The sections were examined photographically showing the following results:

- The samples submitted to Histoacryl treatment over the floor of the pulp chamber and around the marginal-cervical sealing of the canal filling did not show any leakage of the RhB dye.
- The samples that did not receive treatment with the Histoacryl film showed significant penetration of the dye.

Discussion and Conclusions

Madison et al. (1987), Swanson and Madison (1987), Madison and Wilcox (1988), Tarabinejad (1990), Magura et al. (1991), and Switzer et al. (1992) showed that microleakage in the region of the entrance of the root canals in endodontically treated teeth jeopardizes the success rate of Endodontic therapy.

The use of a material capable of sealing the pulp chamber, eliminating microleakage of oral fluids through the filling/tooth interface would be the ideal solution to avoid the incidence of failure. There is no material in Dentistry able to eliminate microleakage of oral fluids through the tooth/filling interface. The materials used as temporary filling always present long-term problems in relation to marginal leakage, depending on the size of the filling and the time of permanence (Keller et al., 1981). Many materials are being tested trying to solve this problem. In 1986, Friedman et al. showed that

ZOE (zinc oxide-eugenol) based materials show better results as temporary fillings, but their use must not exceed three weeks.

Prior studies have shown that Histoacryl's impermeability capacity, even in the presence of humidity, provides excellent antimicrobial properties to the material, and thus favors its use in Dentistry.

The results of this investigation allow us to conclude that despite the fact that Histoacryl is recognized as a tissue adhesive, used for minor surgeries due to traumatic injuries, this material can also be used as an agent which increases the quality of marginal cervical sealing and which should be incorporated to the arsenal of dental practice.

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