



PROTOCOL FOR USAGE OF MINERAL TRIOXIDE AGGREGATE (MTA) IN PERFORATIONS IN THE FURCATION REGION: TECHNICAL DESCRIPTION

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Summary

The occurrence of root perforations can arise from extensive carious lesions and pathological processes, as well as being the result of iatrogenic events during endodontic treatment, affecting the prognosis of the dental element. Currently, Mineral trioxide aggregate (MTA Angelus®) is accepted as the material indicated for sealing of perforations, as it has high success rates as a result of its physical and chemical features beneficial to the repair. Therefore, this article presents the technical protocol about the use of MTA Angelus® in sealing perforations in the furcation region.

Introduction

It is known that the occurrence of radicular perforations can arise from an extensive carious lesion and pathological processes, as well as being the result of iatrogenic events during endodontic treatment, which results in a communication of the pulp cavity with periodontal tissues¹. Considering that root perforations usually affect the prognosis of the dental element, the use of sealing materials has been a contributing factor in the repair procedures of these accidents². Currently, the existence of Mineral trioxide aggregate (MTA Angelus®) has increased the prognosis of this

type of treatment. This material has, among its clinical indications, the function of repairing root perforations by stimulating the formation of a biological sealing³. Therefore, considering that MTA Angelus® has a^{3,4} stimulating tissue response to the neoformation of mineralized tissue, this material is currently accepted as the material indicated for sealing of perforations. Prospective studies show that MTA Angelus® provides an effective sealing of radicular perforations, therefore improving the prognosis of perforated teeth by providing high success rates 2,4,5.

Purpose

The purpose of this article is to present a technical protocol about the use of MTA Angelus® in sealing perforations in the furcation region, making this procedure accessible to the dentist, with favorable prognosis.

Protocol of Use of MTA Angelus® for Perforations in the Furcation Region

It is essential, after the evaluation and clinical-radiographic observation of the perforation (FIGURES I, II and III), maintaining the aseptic chain during the execution of the entire treatment; this is obtained from the absolute isolation of the surgical field. After supplementary crown access and passive irrigation of the pulp chamber with a solution of NaOCl 5%, the cleaning of the perforation region should be performed with the use of ultrasound simultaneous to superficial irrigation with NaOCl 1% (FIGURE IV), aiming at removing debris as well as providing a better preview of the area to be sealed. After that, irrigate abundantly with a saline solution.

FIGURE I - Clinical aspect of the perforation of dental element 36 viewed with the help of M.O. (magnification in 10x).



FIGURE II – Radiographic image of perforation, with induction to bone loss.



FIGURE III – Simulation of perforation in the furcation region.

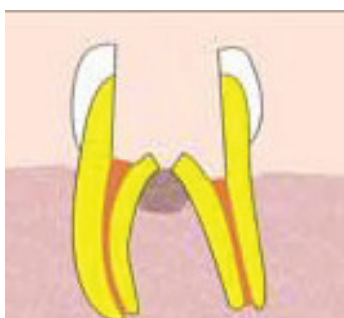
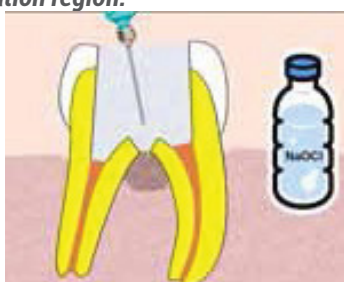


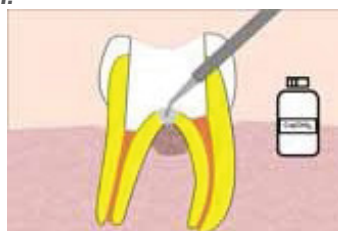
FIGURE IV – Superficial irrigation of the pulp chamber and perforation region.



In clinical conditions of aseptic perforations, as in accesses in a condition of pulp vitality, the sealing procedure can be executed at the same time. In the situations of perforation contamination, when present,

the invaginated perforation tissue must be removed with the help of a curette or through cauterization with the use of heated instrument. Subsequently, calcium hydroxide (C. H.) as a pro analysis (P.A.) is used as medication between each session, with the purpose of decontamination and alkalization, favoring the process of early formation of the organic seal (FIGURE V). After the period of one week, the passive removal of C.H. with the assistance of ultrasound and a saline solution was performed, evaluating the possibility of drying by the absence of exudate from the perforation. In its presence, new medication exchange was conducted.

FIGURE V – Placement of P.A. Calcium Hydroxide in perforation.



In the absence of previous endodontic treatment, the provisional sealing of root canal entry should be done to avoid accidental tamponade and subsequent inaccessibility. The preparation of MTA Angelus® (FIGURE VI) must be performed through its use with distilled water on a flat glass plate, with a rigid consistency, but keeping it moist. With the help of MTA Angelus® Applicator (FIGURE VII), the prepared cement is taken to the perforation to fill it, avoiding overflow (FIGURE VIII). With the help of condensers, the material should be better accommodated with light vertical pressure.

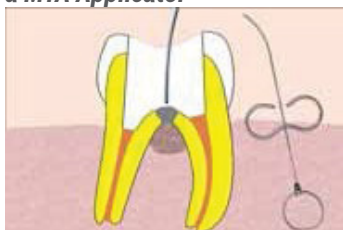
FIGURE VI – MTA Angelus® white Sealant (Angelus Ind. Prod. Odont. S/A, Londrina/Brasil)



FIGURE VII – MTA Applicator (Angelus Ind. Prod. Odont. S/A, Londrina/Brasil)



FIGURE VIII – MTA Angelus® sealant adaptation with the help of a MTA Applicator



It is essential that the MTA sealant remains hydrated, so its setting process is done properly, maintaining a sterile cotton lightly moistened with distilled water on the overflow for a period of 48 hours (FIGURE IX). Subsequently, the tooth is provisionally restored with glass ionomer sealant, and when it is accessed again, a careful verification of the appropriate setting and adaptation of the MTA should be done. After that, the endodontic treatment should be performed (FIGURE X), as well as the definitive restoration (FIGURE XI). After a period of 6 months, a neoformation of bone tissue must be observed clinically and radiographically, indicating the success of the procedure.

FIGURA IX - Temporary restoration with glass ionomer sealant preserving the necessary moisture to MTA setting.



FIGURE X – 6-month follow-up, with endodontic treatment already performed, observing neoformation of bone tissue next to MTA seal.



FIGURE XI – Dental element restored.



Discussion

Historically, several materials were indicated and studied to be used in the repair of perforations in the furcation region, including: zinc oxide and eugenol sealants (IRM and Super-EBA), glass ionomer sealants, resin, ionomer-resinous sealant, and more recently MTA sealant, the latter is shown to be the most indicated⁶. This is due to the fact that MTA demonstrates to have a good sealing feature, preventing bacterial infiltration, and promoting the formation of biological sealing on the defect to be repaired^{7,8}.

The literature demonstrates success rates favorable to the use of this material in this clinical condition, however, it is essential that the^{2, 4, 5} professional knows the proper technique for its use aiming an ideal result. Therefore, some factors are important to achieve a better prognosis when using this material to seal perforations. Focused on an appropriate adaptation and action of the MTA, it is necessary for the environment to present absence of infected tissue, because the pH is an important factor in the setting of this material⁹. Therefore, it is necessary in this clinical condition the use of C.H. as medication.

The professional must focus on disinfection and alkalization of the perforation region. However, it is observed that the use of the C.H. as a barrier to the M.T.A. should not be indicated, since the literature demonstrates better sealing results in the use of M.T.A. without the previous layer of C.H.^{5,10}.

Another important factor in this material refers to the ability to be used in the presence of moisture⁴, which favors its use in the perforation situations. It is also due to the fact that M.T.A. needs moisture so that its setting process is adapted, requiring, therefore, to maintain its hydration during its setting process¹⁰.

Conclusion

It can be concluded that the M.T.A. is an effective material to seal perforations in the furcation region, due to its physical and biological features, however, the professional should know its correct usage protocol focused on obtaining a suitable prognosis.

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