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**"ENHANCING ENDODONTIC SUCCESS: THE BENEFITS OF CONTINUOUS CHELATION PROTOCOLS"**

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The success of endodontic treatments depends largely on proper instrumentation, effective disinfection, and precise three-dimensional obturation of the root canal system to eliminate microbial biofilms and organic debris.

Sodium hypochlorite (NaOCl) is widely regarded as the gold standard for irrigation due to its potent antimicrobial activity and tissue-dissolving properties. However, its interaction with dentin and its inability to remove the inorganic smear layer created during instrumentation necessitate the incorporation of chelating agents.

Traditional chelation protocols, such as the sequential use of NaOCl and ethylenediaminetetraacetic acid (EDTA), often lead to inefficiencies, including loss of irrigant potency over time and potential weakening of dentinal structures. Furthermore, EDTA, when mixed with NaOCl, decreases the quantity of free available chlorine, thus reducing NaOCl's tissue-dissolving ability.

New irrigation protocol based on continuous chelation was established. Continuous chelation can be defined as the concept of using a single mix of a weak chelator, such as Etidronic acid, with NaOCL throughout the entire root canal preparation pro- cedure without causing a reduction in the antimicrobial and proteolytic activity of NaOCL. Etidronic acid, also known as "1-Hydroxyethylidene-1, 1-Bisphosphonate" or HEDP, is chemically compatible with NaOCl, allowing for a sustained synergistic effect during irrigation. By preserving NaOCl's antimicrobial efficacy while simultaneously chelating calcium ions, continuous chelation protocols offer advantages such as enhanced smear layer removal, reduced mineralization of biofilm matrices, and prevention of dentin erosion associated with stronger chelators like EDTA. Furthermore, the continuous chelation approach ensures effective contact of the irrigant with complex anatomical structures, including lateral canals and isthmuses, thereby improving disinfection outcomes.

Conclusions. Integration of continuous chelation protocols utilizing sodium hypochlorite (NaOCl) and etidronic acid presents a promising advancement in endodontic therapy.

NaOCl's potent antimicrobial properties are complemented by etidronic acid's ability to effectively chelate calcium ions and disrupt mineralized debris. This combined approach not only enhances the cleaning efficiency of the root canal system but also promotes a more thorough disinfection process, potentially leading to improved treatment outcomes. By addressing the limitations of conventional irrigation techniques (sequential irrigation), continuous chelation protocols may significantly reduce the risk of treatment failure and post-operative complications.