

Chlorhexidine: #1 Ally in the dental office

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Introduction

Ever since it was discovered in the 1950s, and particularly since it first appeared on the market in the 1980s, chlorhexidine has been the main antiseptic used for chemically controlling oral biofilm. Therefore, it is considered as the gold standard agent for its anti-plaque and anti-gingivitis effects, which are superior to other existing antiseptics.

Because it is highly reactive and cationic in nature, it has a bactericidal effect at high concentrations and a bacteriostatic effect at low concentrations, as well as elevated substantivity, which allows it to continue working in the environment in which it is applied for several hours after administration.

Typically, chlorhexidine is found in its digluconate salt-based soluble form in mouthrinses, gels, sprays and varnishes.

It is important to keep in mind that there are clinical studies proving that aside from the main active ingredient, the entire composition of a formula significantly influences its efficacy ¹. It is essential to study the different components in a formula to prevent possible interactions ².

The primary uses for chlorhexidine in the dental office are: as an aid in the treatment of periodontal and peri-implant diseases; for irrigation and disinfection of root canals in endodontic procedures and for post-operative chemical control of biofilm when mechanical oral hygiene cannot be performed properly, and wounds would otherwise take longer to heal or even become infected.

Furthermore, chlorhexidine may help in many other, less obvious, day-to-day situations which we will cover below.

Alternative uses of chlorhexidine-based formulations

First of all, the use of a chlorhexidine mouthwash before any dental procedure has been shown to greatly reduce the probability of in-office cross-infection caused by the presence of bacteria in the environment and by their dissemination through aerosols ³. This is particularly important when using ultrasonic scaling devices and any type of rotating instruments that

produce these aerosols. These should ideally be coupled with high power suction systems to increase effectiveness.

Another important issue are the bacteraemias that can occur after certain dental procedures. These have been shown to be remarkably reduced with prior chlorhexidine rinsing ⁴, a practice that has even been suggested for the prevention of endocarditis. For this, interconsultation is necessary to verify the patient's primary physician's opinion on the need to provide the patient with antibiotics before the procedure. However, due to the high incidence of hypersensitivity and adverse effects from many antibiotics, chlorhexidine formulations may be a treatment option in some cases.

Similarly, in a comprehensive systematic review, the use of chlorhexidine preoperatively and postoperatively in surgical extractions, especially third molars, was shown to significantly decrease postoperative complications, including alveolar osteitis or dry socket ⁵. This is vastly important, as this is a fairly common complication involving a great deal of pain, and it continues to be one of the most frequent causes of post-extraction emergency. It could even help to improve the patient's perception of the practitioner, by making post-surgery much less problematic.

Also, the pre-operative use of chlorhexidine in implant surgery is known to significantly decrease the occurrence of infectious complications and implant failure ⁶. Contamination of the bone collected during surgery can even be reduced for subsequent autografting. Implant treatment is increasingly common in the dental practice, and good pre- and post-operative biofilm management is essential for ensuring the long-term success of such treatments. Similarly, it is very useful to use chlorhexidine for the disinfection and transport of different prosthetic attachments that are to be placed in the mouth.

Furthermore, chlorhexidine has been shown to have a powerful antifungal capacity in immunocompromised or medically compromised patients, where the growth of opportunistic species like fungi is more likely to occur ⁷. Similarly, chlorhexidine has proven effective in reducing periodontopathogenic species and also *Candida* ⁸ in patients exposed to radiation and who may suffer from mucositis. Moreover, chlorhexidine may be helpful for controlling periodontal disease and caries in institutionalised patients whose mechanical oral hygiene may be poor or difficult to properly carry out.

Orthodontic patients may also greatly benefit, as their appliances make mechanical oral hygiene more difficult. Several studies have shown that the use of chlorhexidine-based mouthrinses can improve user's periodontal and caries parameters ⁹. This is particularly important in patients who have difficulty controlling biofilm via routine mechanical methods and in those who are at high risk for caries.

Chlorhexidine has also been shown to have a potential beneficial effect on recurring mouth ulcers. In this sense, the focus would be on reducing severity, relieving pain and helping to speed healing of the ulcers that appear in the mouth.

Finally, within the field of adhesive dentistry, a recent meta-analysis published the use of chlorhexidine after etching with orthophosphoric acid and before application of a multiple-component adhesive system, to reduce the degradation of the hybrid layer that is formed between the tooth surface and the dentin adhesive ¹⁰. The explanation is that chlorhexidine may inactivate some of the matrix metalloproteinases responsible for this degradation which would otherwise reduce the restoration's bond strength. However, more research is needed to more accurately determine the type and mode of chlorhexidine application in order to increase the long-term success of adhesive restorations.

Conclusion

Chlorhexidine-based formulations are a greatly useful tool for oral healthcare professionals in the chemical control of biofilms and, therefore, in the prevention and treatment of oral infections and for maintaining oral health. They can also be used in many circumstances where extra reinforcement of chemical biofilm control is needed for preventing or minimising possible complications from dental treatments. The use of chlorhexidine mouthrinses by orthodontic patients can facilitate their hygiene, thereby improving periodontal and caries parameters in these patients.

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