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Use of Chlorhexidine in Implant Dentistry

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ABSTRACT

Chlorhexidine is a commonly used antiplaque and antigingivitis agent. Chlorhexidine was used as a broad spectrum antiseptic since the 1950's. Its antibacterial action is due to the disruption of the bacterial cell membrane by the chlorhexidine molecules, increasing the permeability and resulting in cell lysis. It can be either bacteriostatic or bactericidal depending on the dose. It is available in various formulations. This article discusses the clinical application of chlorhexidine in implant dentistry.

Key words: Chlorhexidine, spectrum antiseptic, antibacterial.

INTROCUTION

Chlorhexidine was developed in England during 1940's.It was marketed as a general antiseptic. In 1957 chlorhexidine was introduced for human use as an antiseptic for skin. Later it was widely used in medicine and surgery. Chlorhexidine is available in various forms such as digluconate, acetate and hydrochloride salts. Chlorhexidine is a symmetrical molecule. It has four chlorophenyl rings and two biguanide groups connected by a central hexamethylene bridge.

Chlorhexidine is an antimicrobial agent. It acts on the inner cytoplasmic membrane. It prevents plaque accumulation, hence it is a antiplaque and antigingivitis agent[1]. It can be bacteriostatic or bactericidal depending on the dose. It acts against a wide array of bacteria including Gram positive and Gram negative bacteria, dermatophytes and viruses. It also acts against fungi, yeasts and some viruses including Hepatitis B virus and Human Immunodeficiency Virus. Another most important unique property of chlorhexidine is its substantivity.

Chlorhexidine mouth rinses are available in the form of 0.2% and 0.12%.There is equal efficacy for 0.2%and 0.12% rinses when used at appropriate similar doses[2]. The time of rinsing is 30 or 60 seconds. The different available concentrations of chlorhexidine gel are 1%, 0.2%, 0.12%. Chlorhexidine gel, is applied once a day.

DISCUSSION

This antiseptic can be used at each stage of implant treatment[3]

1. Presurgical oral rinse- for reduction of bacterial load
2. Intra / extraoral scrub prior to implant surgery- as surface antiseptic
3. Hand scrub before gowns and gloves are worn prior to implant surgery- as surface antiseptic

4. Post surgical rinse- twice a day until closure of incision line
5. Periimplant tissue maintenance
6. Treatment of post operative infections

CHX, when rinsed preoperatively has been proven to be an effective aid in promoting healing and reducing surgical complications[4] . CHX also has been shown to have a high substantively, with the capability to be released over an extended period of time without losing its efficacy. Lambert, et al. (1997) also found that the infectious complications which lead to implant failure were more likely to occur during the closed healing period. Thus, CHX rinse has been shown to be an effective alternative in reducing infectious complications from implant surgery when routinely used in the peri-operative period, and should be used by practitioners who are concerned about infection, if not as the primary means of prevention than at least as an adjunct.

Other factors affecting success rates of implants that might be of greater importance include intra-operative management, skill of the surgeon in applying the basic principles of surgery and sanitary conditions, and the patient's medical status. Early loading of the implant, lack of sufficient alveolar bone, and patient factors such as hygiene levels and the use of alcohol and tobacco all increase the risk of post operative infection[5,6,7,8,9].

Chlorhexidine gluconate has demonstrated nearly 100% bacterial kill in a 0.12% concentration five hours after a 30 second oral rinse[10,11]. Oral hygiene aids such as brushes,flosses, yarns,tapes and cotton can be dipped in a solution of 0.12% chlorhexidine before use around dental implants to reduce plaque accumulation[12].

Irrigation of the implant sulcus with chlorhexidine gluconate is a useful long-term maintenance procedure. The irrigation cannule should have a non metallic, rounded tip with side escape portals. Flow of irrigant should never be directed into tissues. Incorrect use could cause tissue trauma and bacteremia[13]. Caution should be taken to adjust the rate of flow to the lowest setting. The patient is instructed to direct the antimicrobial solution into the sulcus allowing the solution to gently flood the sulcus.

Guided bone regeneration has been recommended for isolated localized bone defects associated with dental implant placement. Polytetra fluoroethylene membranes are used to provide a space beneath the membrane in the area of bone defect to allow formation of a blood clot, with the subsequent emergence of cells which can promote new bone formation. The routine use of chlorhexidine rinse is advocated until primary closure and healing of the soft tissue are completed following guided bone regeneration procedures[14,15] around implants.

As in the precautions required for natural dentition, the prevention of biofilm formation and its elimination from the implant surface is the first step to treating peri-implant disease. Peri-implant mucositis therapy is based on non-surgical therapy with supra- and submucosal scaling and use of antimicrobial agents, including chlorhexidine and essential oils[16].However, not all antimicrobials can offer additional clinical benefits. Studies evaluating antimicrobial activities on periimplant biofilms are important because the biofilm formed on dental surfaces has different characteristics from that formed on a titanium surface.[17] Gosau et al.[18] evaluated biofilm reduction on titanium specimens affixed to removable dental appliances and found that antimicrobial substances, such as sodium hypochlorite, 3% hydrogen peroxide, 0.2% chlorhexidine digluconate and essential oils, were able to reduce bacteria viability on the biofilm that developed on a titanium surface, as compared with saline solution. Likewise, 0.5% cetylpyridinium chloride and 40% citric acid were not effective in reducing biofilm. Antimicrobial action on peri-implant biofilm was also demonstrated by Baffone et al.[19] According to these authors, 0.2% chlorhexidine, essential oils, stannous fluoride and hexetidine associated with methylparaben and propylparaben were effective in reducing peri-implant biofilm in vitro. Among the antimicrobials evaluated, chlorhexidine and essential oils proved most effective in reducing biofilm under experimental conditions.

In a peri-implant induced disease model, Trejo et al evaluated the adjuvant action of antimicrobials associated to mechanical treatments, and the results demonstrated effects similar to those of an unassociated mechanical treatment for 3 to 4 mm deep peri-implant mucositis pockets. In humans, chlorhexidine used in the form of an irrigation solution, gel or chemical agent in a full-mouth disinfection approach also did not offer any additional clinical and/or microbiological benefits over the mechanical treatment alone. Felo et al.[20] reported that when diluted 0.06% chlorhexidine is used in a powered irrigator, as compared to rinsing with 0.12% chlorhexidine gluconate once daily, it may be a valuable adjunct for oral health in patients with implants, in reducing plaque and gingivitis 3 months after initial prophylaxis; however, there was no mechanical treatment group in this study. The superior results of chlorhexidine irrigation, compared with chlorhexidine mouthrinse, in reducing plaque and marginal bleeding were also identified in a systematic review published by Grusovin et al.[21]

The most common therapeutic agents found in commercial mouthrinse brands include a combination of four essential oils (thymol, eucalyptol, menthol and methyl salicylate), hexetidine, chlorhexidine gluconate, benzalkonium chloride, cetylpyridinium chloride, hydrogen peroxide, and sometimes domiphen bromide, fluoride and xylitol. These rinses have often been tested as adjuvants for daily oral hygiene procedures, and at least two agents, particularly 0.12% chlorhexidine digluconate and essential oils, have demonstrated clinical efficacy in both inhibiting and reducing dental biofilm formation, as a way of diminishing periodontal and peri-implant disease severity.[22] Chlorhexidine has been reported to reduce biofilm buildup in approximately 60% and gingivitis severity in 50% to 80% of cases, as shown by way of improvements in clinical parameters.[23] It has been demonstrated that the use of a mouthrinse containing 0.12% chlorhexidine digluconate results in a significant decrease in total anaerobes, total aerobes, Streptococci and Actinomyces, after both three- and six-month periods.[24]

According to good clinical practices and systematic reviews,[25,2626] Neely AL. Essential oil mouthwash (EOMW) may be equivalent to chlorhexidine (CHX) for long-term control of gingival inflammation but CHX appears to perform better than EOMW in plaque control. J Evid Based Dent Pract. 2012 Sep;12 Suppl 3:69-72.

Only two active ingredients, 0.12% chlorhexidine digluconate[27] and essential oils, should be considered the most effective, since they have been thoroughly tested and proven as effective for decades, and are also the only ones carrying the ADA seal of approval.[28] Moreover, 0.05% cetylpyridinium chloride and 0.03% triclosan active principles have been mentioned extensively in the literature, indicating their use in reducing plaque (24% to 28.2% and 24% to 29.1%) and gingivitis (24% to 29.1% and 16.9% to 23%, respectively);[29] however, they have less significant results in comparison with chlorhexidine and essential oils.

CONCLUSION

Chlorhexidine is of value in both the prevention and management of peri-implantitis. Thus, the use of a chemical plaque-inhibitory mouthwash may have a major effect on improving the oral health of the individual. Chlorhexidine is one chemical plaque control agent which has various clinical applications in dentistry especially in dental implantology .

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