Major antiseptic in dentistry

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Abstract
Over the years chlorhexidine has been used in dental practice as an excellent antiplaque agent. Chlorhexidine (CHX) not only shows the special properties of substantivity but, also has a broad spectrum antimicrobial activity that makes its use in various oral disorders. Almost all disciplines of dentistry make use of this material in different formulations such as mouth wash, gel, varnishes and restorative materials etc.

Keywords: Chlorhexidiene, Root canal irrigant, Phenols, Apthous stomatitis.

Introduction
It is an established fact that dental caries and periodontal disease are the two predominant diseases affecting the oral cavity and dental plaque plays a key role in the progression of these two diseases. Dental plaque forms naturally on the teeth and in the absence of adequate oral hygiene, it can accumulate beyond the levels that are compatible with dental health and at susceptible sites dental caries or periodontal disease or both can occur. Effective removal of dental plaque is one of the main strategies for the prevention of these two diseases. Plaque control by mechanical debridement is highly labour intensive whether professionally administered or practiced personally, satisfactory home care further demands a measure of manual dexterity and a high degree of motivation, which many individual do not possess. Not surprisingly, a large number of chemical agents have been tested for their ability to reduce plaque accumulation. Although many antimicrobial agents would appear to be suitable for plaque control, only few have been found to possess clinical efficacy. This is because many of the antimicrobial agents do lack property of substantivity and lacks efficacy against oral microorganisms. Currently formulated antimicrobial agents include essential oils, metals (zinc, stannous, copper), phenols (triclosan), plant extracts, (Terminalia chebula extract, garlic extract. occimum sanctum, triphala, aloe vera enzymes etc.[1-4]

Chlorhexidine is a bisbiguanide formulations with cationic nature. symmetric molecules with two chlorophenyle and two rings linked by a group bigunide central hexamethylene chain. This is a solid foundation and the most stable in salt form. The most common preparation is digluconate salt because of its water solubility. Chlorhexidine was developed in the 1940s as a result of search for antiviral agents. Chlorhexidine found that does not have antiviral activity but instead it has antibacterial activity. The use of chlorhexidine started as general disinfectant with a broad antimicrobial spectrum. Antimicrobial spectrum, including most of the microbes such as gram-positive and gram-negative organisms including bacteria spores, lipophilic viruses, yeasts and dermatophytes etc.[5,6] Chlorhexidine is widely used in various medical fields such as gynecology, urology, ophthalmology and treatment of burns etc. The first use of chlorhexidine in the dental practice is the site washing and disinfecting root canal surgery.[7-9]

Chlorhexidine on plaque
Several studies have proven efficacy in vivo and in vitro 0.2% chlorhexidine as antiplaque agents.[9-16] Effect from chlorhexidine on plaque inhibition is dose dependent, the dose typically range in concentration from 0.03 to 0.2% volume, frequency and concentration are important in determining clinical response. The optimum dose of chlorhexidine as gargle generally considered to be 20 mg twice daily, the same level of plaque inhibition could be achieved with greater volume lower concentrations. A lower concentration of chlorhexidine has been tested in several studies and proved effective. A persistent bacteriostatic action lasting for 12 hours was observed. There is no significant difference in plaque when 0.2% chlorhexidine mouthwash used for 15,30,60 seconds. There was no difference in plaque inhibiting action of 0.1%, 0.12% and 0.2% of chlorhexidine rinse.[17-22] Bonesvoll in his book studies reported that there is a rapid binding of chlorhexidine onmouth during the first 15 seconds of rinsing and almost 75% after 30 seconds of rinsing.[23] However invitro studies recently have

shown a 0.12% chlorhexidine has The antibacterial activity in both planktonic and biofilm organisms.[24] The substantivity of chlorhexidine is associated with controlled release system. The presence of β cyclo dextrin regulates and controls the amount of CHX released. Greater the amount of β cyclo dextrin, more progressive CHX release. The development of controlled release system of cellulose substrates can also be achieved by using microfibrillated cellulose (MFC). A new trial the approach proposed for the development of bio-based controlled release system. βCD and MFC mixed together to create synergies between their ability to control release the active molecule. MFC Association and βCD gives very promising results. The obtained release pattern has a combination of both actions MFC and βCD. MFC mainly act on the effects of the explosion, while βCD controlled and CHX regulated release from time to time. Therefore, complementary measures can be achieved by connecting the two release system. Depending on the needs of end users, CHX system / MFC / βCD will release a higher number of CHX progressive system / βCD.[25]

Effect of chlorhexidiene on oral tissues

Some studies support the view that the use of prolonged chlorhexidine is not associated with the development of resistant strains of microorganisms. With Long-term use of chlorhexidine, staining of teeth, the emergence of opportunistic pathogens or steady shift in oral flora has been reported.[1] Clinical studies indicate that the use of 0.2% chlorhexidine mouth wash causes a reduction in the number of oral bacteria without overgrowth by candida albicans or E. coli. A number of studies have examined the ability to produce oral bacteria resistant to chlorhexidine in the laboratory.

Chlorhexidine and Its Use in HIV Infection

Common oral disease such as gingivitis and periodontitis are usual in HIV patients. Palliative therapy for these conditions can prevent the more serious complications. Chlorhexidine plays an important adjunctive role in the treatment of HIV associated gingivitis and periodontitis. apthous stomatatis, candidiasis, herpes virus and HIV associated neoplastic lesions. Chlorhexidine found to be effective in reducing candida species in HIV affected individuals and children.[26,27]

In Patients with Drug Induced Gingival Enlargement

Chlorhexidine has an adjunctive role in the treatment of drug induced gingival enlargement.[28] The overall effect is not known as the research is inadequate and consist of mixed reports. More research is needed to evaluate the effect of chlorhexidine on the inflammation associated with gingival enlargement.

Use of Chlorhexidine in Recurrent Apthous Stomatitis

Chlorhexidine can be used in patients suffering from recurrent apthous ulceration on the basis that natural course of recurrent oral ulcers can be extended due to bacterial contamination. Several studies support the benefits of this therapy but chlorhexidine mouth rinse is of limited or no effect on established major apthous ulceration.[29] Studies have shown that chlorhexidine mouth rinse can reduce the incidence, severity and duration of apthous ulceration whereas chlorhexidine gel significantly reduced severity and duration but not incidence.[30]

Chlorhexidiene in dry socket

A significant reduction in the incidence of dry socket is observed in studies Larsen et al.[31] Hedstorm L 2007, found no effects on alveolar osteitis reduction.[32] More recently, a 0.2% bioadhesive gel form has become available and is more effective than the mouth wash. Its main advantage is that it extend the bioavailability of chlorhexidine in the application area. The topical application of chlorhexidine gel bioadhesive for surgical wound for a week after surgery possibly decreases the incidence of alveolar osteitis after extraction of mandibular third molar.[33] Babar A reported that one application of chlorhexidine gel effectively reduce the frequency of alveolar osteitis.[34] It is seen that increased concentartion from 0.2% to 1.2% gel is not possible as it doesn't show much affect.[35]

As a root canal irrigant

Intracanal tissue treated with chlorhexidine really inhibits the growth of E. feacalis. Martin and Nind investigating the efficacy of chlorhexidine as a disinfectant in presurgical apicectomy site observed the beneficial effects.[36] Numerous studies have prove that 2% chlorhexidine as effective as 5.25% sodium hypochlorite in reducing the growth of E.feacalis.[37-45] With a high concentration of substantivity of chlorhexidine was found for 12 weeks. The antimicrobial activity of CHX is reduced when combined with other substances, including CH, CH plus zinc oxide, among others.[46-50] However, CHX alone does not act as a physical barrier and does not present radiopacity. The use of CHX gel as intracanal medicament is recommended for a short period of time (3-5 days), particularly in those cases where the canals

were fully instrumented but could not be root-filled due to the lack of time. It is also recommended in cases of exudation, as it retains its antimicrobial activity in the presence of blood and other organic matters.[51,52] CHX gel is delivered into the canals with a syringe with 24-gauge needle, being easily introduced and removed from the root canals.).[53-57] Dornellis-morgental study observed that chlorhexidine irrigation solution can prevent the activity but did not eradicate E. faecalis in the root canal system.[58-60]

Conclusion

Chlorhexidine is not only an excellent antiplaque agent but also has excellent antimicrobial properties. Its extensive antimicrobial spectrum can be regarded as a benefit for maintaining overall oral health. A wealth of research supports its use in a variety of forms and in a variety of oral disorders. Although its use is limited because of side effect, new formulations with anti discolouration system has shown promising results. More importantly chlorhexidine has shown promising results in controlling dental caries.

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None.

Conflict of Interest

None.

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