Dental plaque is defined clinically as a structured, resilient, yellow-grayish substance that adheres tenaciously to the intraoral hard surfaces, including removable and fixed prosthesis. The plaque as a potential factor in development of periodontal diseases has been well studied and documented in medical literature. The emerging concepts of biofilm as a self-sustained ecosystem have been poorly understood. The basic outline of life of microbiota in an aerobic, anaerobic and facultative state have been extensively studied, but the factors responsible for the thriving of particular species and the inhibitory factors for the retardation of certain species has not been well recorded.

This review paper discusses the emerging concepts in chemical plaque control methods in attaining an optimal level of oral hygiene standards and maintenance of oral health. Plaque control: Plaque control is defined as the removal of microbial plaque and food debris from the oral cavity. The concept of plaque control is broadly based on factors of mechanical plaque control and chemical plaque control. The mechanical plaque control is mainly achieved through tooth brushing either using a manual brush or using a motorized tooth brush or with the help of pressurized water pump system involving the use of water under pressure pumped through fine blunt needle or nozzle. The chemical control of plaque includes organic or inorganic chemicals, which inhibit the accumulation, growth and survival of microbiota and debris.

Mechanical plaque control: The mechanical plaque control is achieved by instituting the different brushing methods, which helps in the disruption of plaque from sub gingival, marginal and supragingival region, hence preventing the maturation of plaque which leads to the expression of virulent pathogenic bacteria. Usually the dexterity and motivational level of individual to maintain the mechanical plaque control decreases with the time factor. The level of mechanical plaque control achieved at individual level decreases on a time gradient. Hence a chemical plaque has to be addressed on individual level on daily basis for proper maintenance of oral health.

Chemical Plaque Control Agents are classified into three generations (Table 1).

**First Generation**
- Phenols (Triclosan): It's a phenol derivative which is synthesized used as a topical antimicrobial agent with a broad spectrum of action including against both gram -ve and gram +ve bacteria. It also has specific action against mycobacterium and candida species.
  - Mechanism of Action: Triclosan acts on cytoplasmic membrane and induce leakage of cellular contents which leads to bacteriolysis and Cell death.
  - Triclosan is induced in toothpaste to prevent plaque formation. It is used along with zinc citrate or its polymer gantrez to enhance its retention in the oral cavity. It also inhibits prostaglandins and leukotriens thereby it reduces the degree of inflammation.
  - Metallic ions: These are Zn -ions and Cu -ions. It acts by reducing the glycolytic activity in bacteria and hence delays bacterial growth.
  - Quaternary Ammonium Compounds:  These are Benzathion Chloride, Benzenallium Chloride and Cetylpyredinum. These are cationic antiseptics and surface active agents which are effective against gram +ve organisms.
  - Mechanism of action: Positively charged molecule reacts with negatively charged cell membrane phosphates and thereby disrupting the bacterial cell wall structure.
  - The side effects includes staining and enhanced calculus formation, it also causes burning sensation and desquamation.

**Second Generation**
- Bis biguanides

**Third Generation**
- Delmopinol

**Table 1: Classification of Chemical Plaque Control**
mouth rinses and toothpaste. It is an extract from blood root plant Sanguinare candensis. It is a benzophenanthredinedeal-leloid. Mechanism of action is not known. It is most effective against gram positive organisms.

**Second generation**

Bisbiguanides[^6]: isbiguanides posses anti plaque activity including Chlorhexidine, Alexidine and Octenidine.

Chlorhexidine gluconate, a cationic bisbiguanide is the best known and widely used member of this class.[^6] The antiplaque properties of chlorhexidine are unsurpassed by other agents. It has much greater and more prolonged effects than other antiseptics.[^10] The digluconate of chlorhexidine (1:6 – Di 4 – chlorphenyl – diguanidohexane) is a synthetic antimicrobial drug which is effective in vitro against both gram positive and gram negative bacteria including aerobes, anaerobes, yeast and fungi.[^7]

Mechanism of action: Prevents pellicle formation by blocking acidic groups of salivary glycoprotein's thereby reducing glycoprotein adsorption on to tooth surface. Prevents adsorption of bacterial cell wall on tooth surface. Prevents binding of matura-plaque.

Antibacterial action of Chlorhexidineconsists of two actions, i.e., bacteriostatic at low concentration and bactericidal at high concentration.

Bacteriostatic action at low concentration is mainly due to the negative energy of the bacterial cell wall reacts with positive energy chlorhexidine molecule. This alter the integrity of cell membrane and Chlorhexidine binds to inner membrane phospholipids and increases permeability. This leads to the vital elements leaks out resulting in bacterial cell death.

Bactericidal Action is due to the higher concentration of chlorhexidine. This cause progressive greater damage of membrane and the larger molecular weight compounds loss and coagulation and precipitation of cytoplasm. The Free CHX molecules enter the cell and coagulate proteins and vital cell activity ceases and cause resultant cell death.

It has shown that 0.2% CHX mouth rinses will prevent development of experimental gingivitis, it has been shown that Chlorhexidine is more effective in preventing plaque accumulation on a clean tooth surface than in reducing pre existing plaque deposits.[^9] The adverse effects of chlorhexidine includes brown staining of tooth and mucus membrane. It ceases binding of plaque to tooth, thus aiding the easy removal of plaque by mechanical procedures. It is indicated as a pre brushing mouth rinse.

Adverse effects of Delmopinol are staining of tooth and tongue, taste disturbances and mucosal soreness and erosion.

Miscellaneous agents includes Salt of Zn and Cu, bispyridine cetidine, amylases, proteases and cloxtranase.

In conclusion all these agents were effective in plaque disruption and preventing its maturation. Clinicians should advice their patients after considering the positive effect of each of these agents against a favorable result could derived by their patients.

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