Cetylpyridinium Chloride, An innovative molecule

The use of physical and chemical components for oral hygiene dates back to approximately 5000 years before Christ. Throughout history, man has developed tools to take care of teeth and prevent bad odour. Later, with the emergence of microbiology, it was found that those responsible for bad breath and the most common oral diseases were bacteria, and removing them with antiseptics was proposed.

Until now, a series of compounds with the ability to eliminate microorganisms have been tested; however, it has been discovered that not all of them can be used in the oral cavity, because they can potentially damage soft tissues, mucosa or teeth, or because they have an unpleasant taste or smell. These difficulties still exist today and should be resolved in order to come up with effective oral hygiene tools.

A series of compounds that are capable of combating dental plaque exist and have been classified as follows:

- **Antiseptic agents** that prevent proliferation and/or eliminate microorganisms that form plaque.
- **Antibiotics** capable of inhibiting or killing specific bacterial groups.
- **Enzymes or enzyme combinations** that can break up or disperse the extracellular matrix of the biofilm or act upon the community physiology.
- **Non-enzymatic**, dispersing, denaturalising or modifying agents that can alter plaque structure or the metabolic activity of plaque.
- **Agents that can interfere with the adhesion of the acquired pellicle**.

Currently, a great number of toothpastes and mouthwashes are available on the market that are presented as products that are efficient in maintaining optimal oral health. Different antigingivitis and antiplaque products are formulated with active ingredients such as triclosan (toothpastes), stannous fluoride (toothpastes), cetylpyridinium chloride (mouthwashes and toothpastes) and cetylpyridinium chloride (CPC) (mouthwashes and toothpastes).

**Pros and Cons of CHX, alcohol and CPC**

Currently, the majority of mouthwashes use CHX, alcohol and CPC as their active ingredients or a mixture of these. However, different studies have found that alcohol can present some adverse effects, such as oral or oesophageal cancer and the deterioration of synthetic dental reconstruction materials and is contraindicated in patients with mucositis, immune compromised patients, patients undergoing head and neck irradiation, sensitised patients and in children 2,3.

DIFFERENT STUDIES HAVE SHOWN THAT MOUTHWASHES CONTAINING CHX, CPC AND A COMBINATION OF BOTH ACT EFFICIENTLY AS ANTIPLAQUE AGENTS ON HALITOSIS AND ON GINGIVITIS.

Different studies have shown that mouthwashes containing CHX, CPC and a combination of both act efficiently as antiplaque agents on halitosis and on gingivitis4,5,6. CHX is probably the most frequently used molecule in different health disciplines due to its excellent antibacterial effect7. Particularly in the oral cavity, it shows the best results for treating periodontal disease. However, it is true that it does possess some adverse effects, such as promoting the formation of calculus, tooth staining and a bitter taste. Also, some clinical studies have described that it may cause mucosal irritation and desquamation.1. Because of CHX’s side effects, certain molecules such as CPC have become very important. Currently, new formulations are being developed to improve the effectiveness of CPC either alone as the main active ingredient or in mouthwashes combined with CHX.

DIFFERENT STUDIES HAVE SHOWN THAT CPC IN DIFFERENT CONCENTRATIONS IS EFFECTIVE IN REDUCING SUPRA AND SUBGINGIVAL DENTAL BACTERIAL PLAQUE.

Nowadays, CPC is being used in various applications in the food industry, since it is capable of eliminating pathogens such as Salmonella spp. and Campylobacter spp., as well as killing Staphylococcus spp. bacteria in proportions of 1:50000 in merely 10 minutes. It is also used in the pharmaceutical and cosmetic industries and as a cleaning and disinfecting agent9,10,11.

Cetylpyridinium Chloride (CPC)

C. hexadecylpyridinium chloride or CPC is classified as a cationic quaternary ammonium surfactant, is soluble in alcohol and in aqueous solutions; it can act as a detergent and as an anti-Septic, it is non-oxidizing and non-corrosive and has a neutral pH8. Its molecular structure is made up of a polar and a non-polar region, as shown in figure 1.

This molecule has bactericidal and bacteriostatic activity against Gram positive and Gram negative bacteria, although evidence suggests that it is more effective against the first ones. It is thought that its mechanism of
The vital amputation (VA) of deciduous teeth with the goal of maintaining their function - and mineral trioxide aggregate (MTA) containing agents are a controversial subject.

The European Society of Endodontology (ESE) defines pulp amputation as a procedure during which part of the exposed vital pulp tissue is removed with the aim of maintaining vitality and function of the remaining parts of the pulp. 

Indications 2 and 3 include:

1. treatment of deciduous teeth;
2. treatment of permanent teeth with incomplete root growth;
3. emergency measure.

Seider recommends VA for the accidentally opened pulp of young molars and extremely curved, narrow root canals.

According to Swift et al., a success rate of 92% following VA was achieved in teeth with incomplete root growth and the other with incomplete root growth. The authors suggest several reasons for this failure:

- pulp already heavily inflamed initially;
- too much pressure applied during application; and
- disposal of the blood coagulum via haemostatic agents.

Seider states the following regarding the success of VA:

- A higher rate of success is observed in cases of iatrogenic pulp exposure.
- Treatment success is reduced in cases of complete root growth.
- Molars are more successfully treated than incisors.
- For a pulpotomy with Ca(OH)2, Jensen presupposes that there is no pain existent anamnestically.

Teixeira et al. corroborate the significance of pain prior to VA. In their study of 41 Ca(OH)2 vitally amputated permanent teeth, anamnestic pain existed in 12 cases. The pulpotomy of these aching teeth led to failure after six to eight months in 50% of the cases (n = 6), while all other vitally amputated teeth were considered successfully treated.

McDougal et al. report on 75 eugenol pulpotomies on aching permanent molars and premolars. A clinical success rate of 90% after six months and 78% after 12 months was observed. The teeth, which were successfully treated, were radiologically controlled and it was shown that 40% of the teeth were free of pathologic findings after six months and 42% after 12 months.

According to Jensen, pulpotomy is an attempt to stimulate hard tissue healing at the area of amputation. Fountain and Camp point out that a pulpotomy may result in canal calcification, internal resorption or necrosis of the pulp. Koletz and Massler refer to literature that reports the formation of a dentine bridge in rat teeth under non-calcium-containing materials, such as wax, amalgam, acrylic resin and zinc oxide eugenol. In human teeth, the bridging under Ca(OH)2 was successful in 45% of the cases and in 23% of the cases. During their own tests on rat teeth, the authors assessed good reparative reactions with complete bridging following pulpotomy with Ca(OH)2, zinc oxide-eugenol, cordite and silver amalgam.

According to Alacam, various materials are recommended for pulpotomy: Ca(OH)2, formocresol, glutaraldehyde, ferrous sulphate, zinc oxide-eugenol and polyacrylic acid. Zakharova et al. compared MTA, formocresol, ferrous sulphate and bi-active glass with regard to their pulpotomy compability and found MTA to be the ideal pulpotomy agent.

Agents that contain CH2O are historically used for deciduous teeth.

Overdiek tested N2 as CH2O- form of apical foram en closures and for accidentally opened pulp.

Frankl considers the advantage of pulpotomy compared with RCT as there being no instrument fractures or perforations during pulpotomy. A possi- ble failure could always be countered with a RCT. He asserts that Ca(OH)2 in the form of pulpotomies can be successful only if teeth are asymptomatic prior to treatment and if accidentally opened pulp and, therefore, bleeding from the pulp.
According to the literature, N2 X-rays on deciduous teeth yield significantly better results than Ca(OH)2 pulpotomy. Therefore, Frankl performed N2 pulpotomies on permanent teeth as well.19,20 He selected only asymptomatic teeth whose pulp had been immediately extirpated for treatment. The treatment was performed under a rubber dam and thus pulp bleeding did not have any effect. Two hundred and fifty cases were re-examined for 2 years in 1990, 529 N2 VA patients who were followed from 1990 to 1994. Material and method

The study was conducted in my dental practice, which is located in a rural area. Between 1990 and 1994, 376 VA failures and 2,152 VA patients were treated. Failure of retrograde extirpation was the main reason for the extirpation of the second molars. In the case of X-rays of the first molars, the teeth were still partially covered by bone, making extraction unlikely. N2 VA failures were therefore defined as cases in which the treatment had been performed with a single extirpation of the pulp, and the failure was defined as a germ case in which the tooth could no longer be treated. The X-ray failure rate was determined by the following method:

1. The tooth was examined radiographically for the first time after the treatment.
2. The tooth was re-examined for the second time after 12 months.
3. The tooth was re-examined for the third time after 24 months.
4. The tooth was re-examined for the fourth time after 36 months.
5. The tooth was re-examined for the fifth time after 48 months.
6. The tooth was re-examined for the sixth time after 60 months.
7. The tooth was re-examined for the seventh time after 72 months.
8. The tooth was re-examined for the eighth time after 84 months.
9. The tooth was re-examined for the ninth time after 96 months.
10. The tooth was re-examined for the tenth time after 108 months.
11. The tooth was re-examined for the eleventh time after 120 months.
12. The tooth was re-examined for the twelfth time after 132 months.
13. The tooth was re-examined for the thirteenth time after 144 months.
14. The tooth was re-examined for the fourteenth time after 156 months.
15. The tooth was re-examined for the fifteenth time after 168 months.
16. The tooth was re-examined for the sixteenth time after 180 months.

The failure rate was calculated as the number of teeth that failed divided by the total number of teeth examined. The failure rate was calculated for each group of teeth (4 teeth in each group) and for each period of observation (2 years for each group).

In summary, the comparison of 710 N2 VA failures and 852 N2 root-filled molars after VA therapy was done. The average follow-up period for VA failures was 49.4 months. For VA failures, this rate was 46.5% (n = 57). For VA failures, the extraction rate was 45.4% (n = 57). The difference was significant (p < 0.001). The VA failure rate of the RCF level was 45.4% (n = 57). The difference was significant (p < 0.001).

The results show that the endodontic failure rate of VA is significantly lower than the endodontic failure rate of root-filled teeth. VA failures were significantly lower than root-filled failures.14

The correlation between VA failures and root-filled teeth was investigated. Adequately filled teeth (< -1 mm) showed a failure rate of 10.1%. When more than -1 mm and less than -2 mm of root filling were present, the failure rate was 22.1%. Hence, the conclusion may be drawn that the root filling material does not correspond to the one of properly performed root filling followings VA and is far superior to a noticeable underfilled root filling. Molven attributes a more favourable peri-apical situation to pulpotomized than to root-filled crowns.

In our study, Asgary and Eshjin do not explain the technical performance of the BCP15. However, they established that pulpotomies are statistically significantly superior to RCTs of VA in the absence of infected canals. But the failure rate is neither defined nor numerically expressed. Additionally, the follow-up time of six months is considered very brief.

Discussion

A direct comparison between VA failures and pulpotomies, especially as regards incomplete root filling, was omitted. The failure rate for VA failures was 11.9% for VA failures at 5 years (statistically insignificant; p = 0.06). The failure rate of the RCF level was 45.4% (n = 57). The difference was significant (p < 0.001). The VA failure rate of the RCF level was 45.4% (n = 57). The difference was significant (p < 0.001).

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Dental practice in Japan goes Kitty-crazy

TOKYO, Japan: With Hello Kitty, the Japanese wholesale company Sanrio created a trademark that is recognised by consumers worldwide. Last week, the first dental practice fully branded with the white cat’s head and characteristic red bow was opened in the capital Tokyo.

Bought by dentist Koshika Masanori in November, the facility has been completely renovated over the past two months, featuring pink examination rooms, heart-shaped waiting chairs and chandeliers. According to its website, the practice is currently offering a wide range of dental procedures, including implants, cosmetic dentistry, prophylaxis, and periodontal and paediatric treatment. Media reports said that the unique project has received full support by Sanrio, whose Japanese headquarters is only 20 minutes away from the practice.

The company introduced its iconic logo modelled on a Japanese bobtail cat in 1974. Nowadays, it can be found on almost any retail product, including toys, clothing, cellphones and even tooth caps used in orthodontics.

Last year, the brand was reported to have generated over ¥80 billion (US$1.04 billion) revenues in Japan only.

Osteoporosis drug ingredient found useful against periodontitis

BANGALORE, India/CHICAGO, IL, USA: Certain kinds of bisphosphonates may have potential in treating severe forms of gum disease, a clinical study conducted by Indian researchers has revealed. Clinical specialists from the Government Dental College and Research Institute in Bangalore are reporting that a solution containing Alendronate acid was found to stimulate an increase of probing depth reduction as well as bone fill in patients suffering from aggressive periodontitis.

During a six-month clinical trial, the researchers treated over 50 intrabony defects with a solution made of 1% Alendronate and a polyacrylic acid-distilled water mixture. Other patients with the same conditions were treated with a placebo gel. The results showed an improvement of clinical parameters such as probing depth reduction, clinical attachment level and bone fill in patients treated with the Alendronate solution.

Preparations based on Alendronate are available on the market since 1995. They are used to treat common bone diseases like osteoporosis. Data derived from clinical studies with these drugs has demonstrated a reduction of fracture risks and normalisation of bone turnover rate in post-menopausal women, amongst other benefits.
Belmont Launches new CP-ONE PLUS

TAKARA BELMONT is known as a world-leading manufacturer of dental equipment of high durability and reliability as it has been thoroughly committed to pursuing advanced technologies to manufacture safe, high quality products since 1921.

The CP-ONE PLUS is the latest addition to the dental unit range from TAKARA BELMONT. The CP-ONE PLUS succeeds in taking the concept of the CP-ONE and improving it with advanced technology and comfort. Think of communication, patient comfort and operator comfort.

The CP-ONE PLUS was designed by incorporating dentists’ requirements and desires one by one, from the treatment space all the way down to minute details that will be recognized through dentists’ fingertips. An ideal treatment environment, the CP-ONE PLUS is a “thinking of all” dental chair and unit, the answer to dentists’ aspirations, made possible only through the fusion of the expertise and technological leadership of TAKARA BELMONT.

Thinking of Communication

The CP-ONE PLUS is a comfort ergonomically designed folding leg-rest chair and base-mounted unit enabling patients to access to the chair either from front or from side with ease. It can be put in a 6-o’clock face-to-face treatment. Standing directly in front of the patient gives the doctor an accurate picture of the patient’s jaw and bite. CP-ONE PLUS provides a 90 degree eye-contact position that is conducive to a natural, stress-free atmosphere for discussion, and provides for relaxed, thorough communication. The patient perfectly communicates what they are feeling, and the doctor communicates what they intend to do.

Thinking of Patient Comfort

To provide true comfort for all patients including children, the elderly and those with limited mobility, the CP-ONE PLUS is designed with abundance of new innovative features. The folding leg-rest chair with low initial height of 40mm secures easy access. The new shock-less hydraulic system eliminates any jarring movements of the chair, keeping patients calm and comfortable ensuring a stress-free treatment. Besides the standard manually rotatable cuspidor bowl, the optional electrically-motorized rotatable cuspidor bowl is available to facilitate patient access. The movement of the hydraulic powered head-rest causes the mouth to naturally open wide, decreasing the burden of the patient. Additionally, the newly-designed arm-rest and optional leg-rest heater offer luxury and relaxation for patients.

The CP-ONE PLUS not only addresses operator’s daily requirements, but also meets your unfilled demands. The arc delivery system that is inherited from the CP-ONE allows effort-less transfer of instruments and smooth positioning adjustment of the doctor’s table providing the optimum position anywhere from 8 to 2-o’clock, that give you an unprecedented operating style. The redesigned instruments holder is adjustable horizontally and vertically, which ensures that the dentist always has his tools within easy reach. Two types of instruments storage are available, holder, and place type. Both types are detachable and autoclavable to enhance hygiene.

The newly developed foot controller (electric control) is controlled by either pressing and/or turning the disk, which provides precise instruments control. The assistant instrument holders are detachable and autoclavable. In addition, various types of cups (paper, plastic, stainless) can be used due to the new cup-filler sensor.

Upholstery is available from an extensive selection of 18 colours. Furthermore the newly-developed LED dental light equipped with 10 white LED modules is coming soon as an extra option.

Belmont leads the way with a totally new generation of dental treatment centre.

Belmont has combined cutting edge technology with traditional values for a dental treatment centre that offers sophistication, performance, flexibility and above all durability.

The Clesta II epitomizes Belmont’s reputation for innovation, style, practicality and reliability. Technologically advanced and superbly engineered it represents a new generation of dental systems.
Planmed Verity, a new, mobile extremity scanner for orthopedic imaging of the extremities receives the CE mark and thus, is now available for sale in the EU and many other countries where the CE certificate permits sales. Planmed Verity Extremity Scanner utilizes cone-beam CT (CBCT) technology that provides fast and accurate low-dose 3D imaging of peripheral skeletal fractures and disorders at the point-of-care. The compact, mobile device can be easily sited in any existing X-ray room, side-by-side with other imaging systems.

“As an all new approach to imaging of extremities, the Planmed Verity system has already raised a lot of interest within the field of orthopedic imaging. Now the pending system deliveries can begin”, says Mr. Vesa Mattila, Vice President of Planmed Oy.

Planmed’s innovation provides volumetric 3D imaging for accurate and fast diagnosis with a substantially lower radiation dose compared to conventional CT imaging. During the scan, which takes less than 20 seconds, images are acquired using a short X-ray pulse instead of continuous radiation. This enables a low radiation dose.

For optimum patient comfort the Planmed Verity features an adaptable, soft-surfaced gantry with a TearDrop-shape optimized for orthopedic imaging. The gantry and positioning trays are easily adjustable for imaging for example a foot, ankle, knee, hand, wrist, or elbow. Furthermore, special gantry movements allow weight-bearing 3D scans of a standing patient, a new way of extremity imaging which has not been possible with conventional CT scanners.

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Dried licorice root fights the bacteria that cause tooth decay and gum Disease

Scientists are reporting identification of two substances in licorice - used extensively in Chinese traditional medicine - that kill the major bacteria responsible for tooth decay and gum disease, the leading causes of tooth loss in children and adults. In a study in ACS’ Journal of Natural Products, they say that these substances could have a role in treating and preventing tooth decay and gum disease.

Stefan Gafner and colleagues explain that the dried root of the licorice plant is a common treatment in Chinese traditional medicine, especially as a way to enhance the activity of other herbal ingredients or as a flavoring. Despite the popularity of licorice candy in the U.S., licorice root has been replaced in domestic candy with anise oil, which has a similar flavor. Traditional medical practitioners use dried licorice root to treat various ailments, such as respiratory and digestive problems, but few modern scientific studies address whether licorice really works. (Consumers should check with their health care provider before taking licorice root because it can have undesirable effects and interactions with prescription drugs.) To test whether the sweet root could combat the bacteria that cause gum disease and cavities, the researchers took a closer look at various substances in licorice. They found that two of the licorice compounds, licoricidin and licorisoflavan A, were the most effective antibacterial substances. These substances killed two of the major bacteria responsible for dental cavities and two of the bacteria that promote gum disease. One of the compounds - licoricidin - also killed a third gum disease bacterium. The researchers say that these substances could treat or even prevent oral infections.
British woman coughs up oral tumour

COVENTRY, UK: A woman from Coventry has coughed up a cancerous tumour. According to reports, 57-year-old Claire Osborn had two coughing fits, both of which produced pieces of the tumour. It is believed that the lump, which is thought to have been growing on the back of her throat, became dislodged before the coughing fits.

Osborn took the 2 cm heart-shaped lump to the doctors. “I knew something was very wrong so I went straight to my GP,” Osborn was reported to have said. Scans showed that the tissue was in fact an aggressive throat and mouth cancer. Osborn was informed that there was a chance that the tumour may not be the only one in her body.

“I was devastated. I just thought I was going to die,” Osborn was reported to have said. However, doctors were amazed to find that the cancerous tumour was in fact the only one in her body and after a scan at University Hospital Coventry she was given the all clear. According to one report, Osborn said: “The consultant turned round to me and said ‘It appears you have coughed up your cancer. Congratulations!’.”

Fewer than 50 similar cases have ever been recorded in the world. Head and neck surgeon Gary Walton was reported to have said: “We suspect the tumour grew on a stalk at the back of her mouth which is very difficult to detect. Somehow she dislodged this, the stalk snapped and she coughed up the tumour.”