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 counteract oral microorganisms and remove 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 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 antibacterial products are formulated with active ingredients such as triclosan, desquamating fluoride or CPC as their active ingredient.

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

Currently, the majority of mouthwashes and toothpastes are 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 action 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 desquamation1. 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.
Germany

The vital amputation (VA) of deciduous teeth with the goal of maintaining their functionality for a limited period is a widely accepted measure. Vital gate (MTA) are recommended however, is only approved for calcium hydroxide (Ca(OH)2) limited indications. While amputations are free of calcium hydroxide or min- eral trioxide aggregate (MTA) are recommended for VAs, formaldehyde (CH2O) containing agents are a contro- versial subject.

The European Society of En- dontology (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 the option of a later definitive root canal treatment (RCT).

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

Stern considers difficulty in opening the mouth an indication for VA of molars.

McDougal et al. extend the indi- cation for pulpotomy when there are economic concerns, as some patients are unable or unwilling to bear the expense of a RCT.

According to Swift et al., a suc- cessful VA may be expected follow- ing pulpotomies on teeth with carious pulp exposure. 5.W e con- sider predictable success with the following prerequisites: non-infected pulp; bacteria-proof closure; and use of a pulp-compatible capping material.

Seidler states the following regarding the success of VA:2

A higher rate of success is observed in cases of intragenic pulp exposure.

- Treatment success is re- duced in cases of complete root growth.

- Molars are more success- fully treated than incisors.

A pulpotomy with Ca(OH)2, Jensen presup- poses that there is no pain existing anamnestically.6

Teixeira et al. corroborate the significance of pain prior to VA. 7 In their study of 41 Ca(OH)2 vi- tally am- putated 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 premol- lars. 4 A clinical success rate of 90% after six months and 78 % after 12 months was ob- served. The teeth, which were completely anesthetized, radiologically controlled and it was shown that 40 % of the teeth were free of pathological findings after six months and 42 % after 12 months.

According to Jensen, pulpo- tomy is an attempt to stimulate hard tissue healing at the area of amputation. 6 Fountain and Camp point out that a pulpotomy may result in canal calcification, internal resorption or necrosis of the pulp. 8 Kozlow 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. 9 In human teeth, the bridging under Ca(OH)2 was successful in 45 % of the cases under all probabilities in 23 % of the cases. During their own tests on rat teeth, the authors assessed good reparative reac- tions with complete bridging fol- lowing pulpotomy with Ca(OH)2, zinc oxide-eugenol, cortisone and silver amalgam.

According to Alaçam, various materials are rec- ommended for pulpotomy: Ca(OH)2, formocresol, gluteraldehyde, ferrous sul- phate, zinc oxide eugenol and poly-carboxylate cement.10 Salako et al. comp. pared MTA, formocresol, ferrous sulphate and bio-active glass with regard to their pulpotomy compatability and found MTA to be the ideal pulpotomy agent. 11

Agents that contain CH2O- containing VA agent on hum an teeth. He observed that for sev- eral weeks fol- lowing VA appli- cation there was a possibility of a hard substance barrier form- ing. 18

Over a period of 12 years, Stern carried out 175 N2 pulpo- tomy did not have a clear diagnostic purpose, but was used to evaluate the success of VAs.

The most frequently used VA agent for deciduous teeth is formocresol, a mix of CH2O, cresol, glycerine and water. A survey showed that formocresol pulpo- tomy on deciduous teeth were performed by general den- tists in 75 % of the cases and by paediatric dentists in 50 % of the cases. 16 The frequency of use on permanent teeth was lower: 18.9 % for general and 55.4 % for paediatric dentists.

Fisch published the results of pulp amputations of 600 teeth, which were performed with the CH2O- containing preparation Tripaste. 17 Check-ups were done between six months and 18 years after amputation. Exami- nation of the X-ray controls re- vealed a patho- logical apex in 9 %.

Eleven teeth were histologi- cally examined. Hard substance formation was observed in the form of apical foramen closures and aposition at the lateral canal walls, which partially led to obliterator- ation of the canal lumen.

During an accelerated test lasting up to 2.5 months, Overdiek tested N2 as CH2O- containing VA agent on human teeth. He observed that for sev- eral weeks fol- lowing VA appli- cation there was a possibility of a hard substance barrier form- ing. 18

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The authors suggest several reasons for this failure: _pulp already heavily inflamed initially;_ too much pressure applied dur- ing application; and _disposal of the blood coagulum via haemostatic agents.

Møhlen states that there were no pathological findings in 1,591 root-filled roots in 51.6 % of the cases and in 256 pulpomatized roots in 65 % of the cases. 14 As- gary and Eghbal report the suc- cessful use of a new VA agent _CEM_, a cement mixture enriched with Ca, in 205 pulpo- tomy on molars. 15

For comparison, 202 molars were extrapitated vitally. The root- canal filling (RCF) was per- formed via lateral condensation with _AH Plus (DENTSPLY De- Trey) as sealant. After seven days, 58 % of the pulpotom- y-treated and 60 % of the root- canal-treated patients reported needing analgesics. After six months, 89.94 % of the patients underwent a radiological check- up. The pulpotomy patients re- vealed a significantly higher suc- cess rate (p < 0.001).

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According to the literature, N2 VA on deciduous teeth tends significantly better than VA on second molars failures since Ca(OH)2 pulpotomy. Therefore, Frankl performed N2 pulpotomies on permanent teeth. Well, 19.20 He selected only asymptomatic teeth whose pulp had been accidentally exposed 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 follow-up period. Of the 232 patients remained between 22 and 55 years. Failures manifested by pain within 48 hours amounted to 2%. The aim of the following study was to analyse the success and compare N2/VA2 pulpotomies, and to compare this rate of necrotic molar extractions done within the same period.

Results

Of the VA patients 47.6% were male and of the VE patients 52.4% were male. The practice owner treated 70.1% (n = 460) of the VA patients and all the rest were treated by an assistant. The average age of VA patients was 44.6 years and that of VE patients was 50.6 years. The average observation period was 55 months (max. 165) for VA and 49.4 months (max. 169) for VE. Of the 710 VA cases (39.6% of the VA and 65.2% of the VE cases) 96.1% (n = 710) were subject to follow-up-Mi1 controls. A total of 61 VA and 77 VE failures were registered and classified as not having accompanied X-rays (Mi1) or with accompanying X-ray (Mi2). Fifty-one of the 61 VA failures were followed-up with X-rays. Not all of the accompanying X-rays of the Mi2 failures revealed a failure. Two VA and 77 VE failure X-rays were wrongly evaluated as negative. Ten VA Mi2 cases were removed because of pain, three of them within a few hours after VA. In two cases, a granuloma at an extracted root was indicated in the patient files. In two additional cases, the failure occurred after six and 11 days. In 12 of the 16 VE cases, extractions were performed because of pain (one day after VE). Patients who visited the practice after pulpotomy made positive a negative reference to anaministic symptom pain. 241 times and 157 times, respectively. Subsequently, the failure rate was 10.8% (n = 26) in the first and 7.0% (n = 11) in the latter case. The difference was in- significant statistically (p = 0.114).

The failure diagnosis after VA was most frequently made for the lower second molar (18.5%) and after VE for the lower first molar (19%). The lower wisdom teeth were conspicuous because the failure rate was only 4.7% after VA, and no failure at all was observed for VE. Not every failure diagnosis led to therapeutic consequences such as extractions.

Tooth 26/46 and 12/45 (14.7%) VA and 125 (14.4%) VE teeth were extracted during the follow-up phase (statistically significant difference; p = 0.000). The largest number of extractions, namely 51.9% (n = 107) of the VA patients (56.5%: n = 57) of the VE were performed because the teeth had been destroyed or fractured. The lower wisdom teeth were the most frequently affected in the case of pulpotomy (61.8%: n = 21) and the upper second molars in the case of VE (84.6%: n = 16).

A failure was decisive for the removal of 25.3% (n = 48) of the VA teeth and 55.7% (n = 13) of the VE teeth. Most frequently extracted due to failure were the vital amputated upper sec- ond molars (54.5%: n = 8), and the vital extrirpal lower second molars (52.1%: n = 15). The lower wise- dom teeth (34 extractions (n = 5.8% in the pulpulo-pomoy group) and the upper second molars (42 ex- tractions (n = 15.5%) in the VE group) were extracted least of all. The results are shown in Tables III and IV.

In the following section, the question of whether the BAVE level following VA had any significance with regard to the failure rate was pur- sued. The BAVE levels were divided into three levels. The failure rates of these three groups were calculated as described under material and method (Table V).

Without considering the indication range, anaministic symp- toms, position and RCF level, the total failure rate was 11.9% for VA and 5% for VE (statistically insignificant; p = 0.064). The VE failure rate of the RCF level -1 (p = 0.229) corresponded exactly to the VA failure rate of 11.9%. There was no statistically significant difference (p = 0.229) in failure rate between VE failures and VA failures with respect to the study of molars and molars failures. Molven attributes a more beneficial peri-apical situation to pulpotomies rather than to root-

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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 reportedly to have generated over ¥80 billion (US$1.04 billion) revenues in Japan only.

Osteoporosis drug ingredient found useful against periodontitis

Most of the information on osteoporosis drug ingredient

BANGALORE, India/CHICAGO, Ill, 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 postmenopausal 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 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 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 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 Clesfia II epitomizes Belmont’s reputation for innovation, style, practicality and reliability. Technologically advanced and superbly engineered it represents a new generation of dental systems.

Clesfia II

Clesfia-II Socket type

Clesfia-II Holder type

Detachable, rotatable cuspidor

Aluminum base

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Planmed Verity Extreme Scanner receives CE mark

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-shaped bore 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 Galfer 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.”

What research has Dentaid carried out on the CPC molecule?

At Dentaid, a number of studies have been performed using this molecule, that have led to the confection of diverse formulations that currently aid in human oral hygiene. Also, among these, we have studies on antimicrobial activity, stability studies of the formulations for replacing ethanol in mouthwashes and improving CPC’s bioavailability.

We have also carried out different clinical studies with national and foreign universities that have shown that products containing this molecule are among the most efficient on the market.

Having proven the properties of this molecule, how is Dentaid applying it in its products?

Dentaid has developed a line of products that contain CPC among its active ingredients, products that are meant for care and treatment of pathologies like periodontitis, gingivitis, halitosis or maintenance in patients that have been treated for periodontitis. Currently, a group of products is being developed where this molecule has greater bioavailability.

“Dentaid has developed a line of products that contain CPC among its active ingredients”.