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Patient comfort and compliance


One hundred dry mouth volunteers were recruited (90 completed the study) to compare their regular remedy for dry mouth with the bioXtra® system (this involving their use of the toothpaste / mouthwash for normal oral hygiene and the gel for comfort). Their opinions were captured using a simple questionnaire. The study was conducted in the UK.

The increased viscosity of bioXtra® Moisturising Gel appears to have achieved the objective of creating greater patient acceptance – more than 80% of respondents noted a longer duration of lubrication when compared with their ‘regular’ remedy, approaching 90% perceived a greater feeling of moisture and approximately 75% reported greater mouth comfort.

Use of bioXtra® Moisturising Gel in Japanese Dry Mouth Patients.
Dr. Satoshi Nishimura et al, Department of Oral Maxillofacial Surgery, Nihon University School of Dentistry, Tokyo. Kanazawa, Japan, May 2002.

This study aims to record the subjective perceptions of comfort and relief from dry mouth of 7 patients suffering with dry oral cavity as a result of a systemic disorder. All patient’s oral condition and function was evaluated prior to the trial. Subsequent examinations were conducted at the end of weeks 1, 2 and 4. Patients applied bioXtra® Moisturising Gel to the oral cavity whenever the mucosa felt dry. All patients reported an improvement in the feeling of dryness, especially at night. All patients except 1 wished to continue with the treatment.

Efficacy of the bioXtra® dry mouth care system in the treatment of radiotherapy-induced xerostomia.
Per Dine & Sandra Nyström & Vincent Vander Poorten & Pierre Delaere & Roger Van den Bogaert

Xerostomia is a common complication of radiotherapy for head and neck cancer. Symptomatic treatment consists of stringent oral hygiene to prevent oral infections and saliva substitutes to increase comfort. The aim of the study was to evaluate the clinical effectiveness of the bioXtra® (BX) dry mouth care system. A xerostomia questionnaire consisting of 3 parts (xerostomia symptom score, quality of life (QoL) survey and visual analogue scale (VAS)) was completed by 34 patients suffering from radiation-induced xerostomia, before and after 4 weeks of treatment with the bioXtra® moisturising gel, toothpaste and mouthwash. The bioXtra® products significantly diminished the most common symptoms of xerostomia. Mean VAS score at the start of treatment was 59.8. After treatment, this decreased to 46.4 (p<0.001). Twenty-six patients (77%) responded to treatment, 11 of these patients (32%) reported a major improvement. Quality of life significantly improved under treatment: mean QoL score at the start was 59.4; this increased to 70.5 (p<0.001). None of the 34 patients reported any adverse effects and all but 1 patient found the BX dry mouth care system easy to use.

Quality of life score:
Mean QoL score at the start of treatment was 59.4.
This increased to 70.5 after 28 days of BX dry mouth care system (mean difference was -11.1, 95% CI [-28.7 to 6.6], P<0.001)

![Quality of Life Score Graph](image)
How effective are oral hygiene products for patients with Xerostomia?
S. A. Vasina, A. V. Lapatina. The department for the prevention of oral diseases at the Moscow State University of Medicine and Dentistry (MGMCU). Translated from Russian. DENTAL FORUM #119/2006

Forty volunteers took part in the clinical trial, all of whom due to associated pathologies (diabetes mellitus) or having taken certain medicines, suffered from symptoms of xerostomia. After an initial oral examination and instruction in oral hygiene rules, the trial participants were divided into 2 groups of twenty. Patients in Group I were advised to clean their teeth with bioXtra® toothpaste twice a day (in the morning and before going to bed) for no less than three minutes, and the Group I were told to use bioXtra® mouthrinse for thirty seconds after cleaning their teeth, as well as during the day if they experienced any dryness in the mouth. The duration of the clinical trial was set at two months. The patients were given oral check-ups on a regular basis once a month, during which the following points were assessed:
- any local irritation or allergic reactions caused by regular use of bioXtra® products;
- the patients’ oral hygiene levels – evaluated using changes in the Patient Hygiene Performance Index PHP (Podshadley, Haley, 1968);
- the condition of the periodontal tissue – using the Gingivitis Index GI (Loe H, Silness L, 1963), in order to determine the extent of gum inflammation;
- speed of salivation – by collecting patients’ stimulated saliva in a measuring tube before and after applying BioXtra products;
As part of the trial the participants were questioned in order to evaluate the argonaeotic properties of the bioXtra® product range.

A statistical analysis of the results obtained from the clinical trial was done using the Student method. The results of the trial revealed that the hygiene treatments had very good anti-inflammatory action, seen through a reduction in the Gingivitis Index scores compared with the start of the trial (40% reduction in patients who used the toothpaste, and 34% in those using the mouthrinse). During the final oral examination of the participants, a fall in the severity of signs of inflammation of the periodontal tissue was seen, and fewer patients complained of bleeding gums when cleaning their teeth or eating hard food. All patients who had used the bioXtra® range of oral healthcare products commented on a subtle pleasant fresh taste and smell, and feelings of comfort and freshness in the mouth for a long time after use. During the two months there were no cases of localised irritation or allergic reactions caused by these oral healthcare products. Therefore, regular use of these special treatments by patients with reduced salivation leads to a significant improvement in their oral hygiene levels and the condition of their periodontal tissue.

Comparative studies

**bioXtra® versus biotène®: Biofilm Control**

**Novel Methods for the Treatment of Infectious Diseases Involving Microbial Biofilms.**


Two different aspects of the microflora colonisation can be distinguished. The first consists of an isolated form observed mainly in saliva. The second consists of a colonized form which can be observed in dental plaque or on mucosal surfaces.

The use of antimicrobial agents for the prevention and treatment of periodontal and dental plaque – related diseases is attracting considerable interest within the dental profession.

The present study compares the effectiveness in vivo of two toothpaste formulations: Toothpaste A (biotène®) – containing the Lactoperoxidase System producing OSCN- (hypothiocyanite), and a Toothpaste B (bioXtra®) - containing Lactoferrin, Lysozyme, Lactoperoxidase System and Immunoglobulins as antimicrobial agents, and a mixture of Growth (or Wound Healing) Factors. Results indicate Toothpaste A (biotène®) has an inhibitory effect on a limited number of the planktonic bacteria present in the patients’ saliva.

Conversely, Toothpaste B (bioXtra®), containing a mixture of antibacterial agents in conjunction with Immunoglobulins and Growth Factors was shown to be instrumental in removing colonized (biofilm) bacteria and to have a greater effect in controlling the subsequent higher proportion of planktonic bacteria found in the saliva.

The antibacterial activity for both formulations was calculated by an ATP assessment of the bacteria versus the number of bacteria present.

Removal of the biofilm bacteria was demonstrated by observing the number of planktonic bacteria in the saliva of the patients using the Toothpaste B (bioXtra®) compared to the number of bacteria in the saliva of the patients using Toothpaste A (biotène®).

The action of Toothpaste B (bioXtra®) on the biofilm bacteria was also characterised by a reduction in dental plaque and lactic acid production.
BioXtra® toothpaste versus placebo: Efficacy in Oral Health

Biofilm inhibition and antimicrobial activity of a dentifrice containing salivary substitutes.

S Hatzi, S Ravindra, A Satpathy, RD Kulkarni, MV Parande (2007). Department of Periodontics, SDM College of Dental Sciences and Hospital, Sattur, Dharwad, Karnataka, India; Department of Microbiology, SDM College of Medical Sciences and Hospital, Sattur, Dharwad, Karnataka, India; Department of International Journal of Dental Hygiene 5(4), 218–224. Nov. 2007.

Background/aims: A healthy mouth Harbour the continuous combined action of a salivary defence system with that of a salivary peroxidase system, containing lactoferrin, lysozyme, immunoglobulin and growth factors. This system maintains neutral pH and creates an oral environment where harmful bacteria are inhibited, thus preventing the formation of biofilms. The objective of this clinic-co-microbiological trial was to evaluate the anti-plaque effect of a dentifrice containing salivary substitutes (BioXtra®), compared with a placebo-control dentifrice (commercially available-fluoridated toothpaste marketed by Colgate-Palmolive, Mumbai, India) and to assess the effect of dentifrice on oral bacterial count.

Methods: The design was a randomized controlled, double-blind, parallel study comparing a placebo-dentifrice to a dentifrice formulation containing salivary substitutes. Toothpaste slurry rinses were used over a 96-h period by 20 volunteers who refrained from all other oral hygiene procedures. Commercially available fluoride toothpaste was used as control. Plaque was scored and unstimulated salivary samples were collected at day 0 and after 4 days. A microbiological analysis was carried out for the salivary samples.

Data were analyzed by using Student’s t-tests.

Results: There was a statistically significant mean difference in plaque scores after using test paste (1.9 + 0.31) in comparison with those using placebo toothpaste (1.95 + 0.33). The difference between mean increase in colony forming units for the test and the placebo group was (25.2 ± 6) x 10^5 and (17.5 ± 6.01) x 10^5 respectively, which was statistically significant.

Conclusions: The findings of the study support the hypothesis that toothpaste containing salivary substitutes (BioXtra®) prevents dental biofilm formation and exhibits antimicrobial property when compared with a placebo dentifrice (fluoridated toothpaste marketed by Colgate-Palmolive).

bioXtra® versus biotène®: Patient Compliance

A double-blind, crossover study of bioXtra Oralbalance® and bioXtra® systems as salivary substitutes in patients with post-radiotherapy xerostomia.


This study assessed the efficacy of the bioXtra® (BX) and biotène Oralbalance® (OB) systems in the treatment of post-radiotherapy xerostomia. In a double-blind crossover study, 20 patients with post-radiotherapy xerostomia were randomly allocated to receive either OB then BX, or vice versa, each product for 2 weeks, with a 1 week wash-out period in between. Subject-based dry mouth scores derived from 100-mm visual analogue scales were recorded at days 0 and 14 of each 2-week period, together with subjective perception of changes in dry mouth symptoms. Both treatments were effective, resulting in reduction of visual analogue scale scores from day 0–14. Between-groups comparisons identified that BX achieved significantly better improvements compared with OB for the perception of dry mouth and improvements in speech and was also rated as more pleasant to use than OB (P<0.05).

In conclusion, both treatments were effective in alleviating the symptoms of post-radiotherapy xerostomia, although BX achieved superiority in some of the outcomes assessed compared.

Table 4. Mean (SD) VAS scores of additional continuous variables recorded at day 14 by treatment group*

<table>
<thead>
<tr>
<th>BioXtra Oralbalance</th>
<th>bioXtra</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>How effective was the product system at relieving your dry mouth?</td>
<td>45.3 (31.2)</td>
<td>65.5 (27.4)</td>
</tr>
<tr>
<td>How pleasant was the taste of the toothpaste?</td>
<td>57.6 (26.4)</td>
<td>76.3 (24.3)</td>
</tr>
<tr>
<td>How pleasant was the taste of the mouthwash?</td>
<td>61.7 (21.2)</td>
<td>78.7 (24.5)</td>
</tr>
<tr>
<td>How pleasant was the taste of the gel?</td>
<td>52.8 (32.9)</td>
<td>70.0 (34.4)</td>
</tr>
<tr>
<td>How pleasant did your mouth feel after using the gel?</td>
<td>541 (26.5)</td>
<td>672 (81.0)</td>
</tr>
<tr>
<td>How pleasant did your mouth feel after the whole product system?</td>
<td>638 (26.7)</td>
<td>731 (26.7)</td>
</tr>
</tbody>
</table>

Colostrum


Bovine colostrum is rich in antimicrobial substances and growth factors. The purpose of this open study was to examine and compare the interventional effects of daily use of bovine colostrum-containing oral hygiene products (CHP) on oral symptoms and findings in 20 patients with primary Sjögren’s syndrome (pSS) and 20 age-matched patients with oral lichen planus (OLP). Objective oral measures and self-assessment of oral symptoms and general health were conducted before and after 90 days’ use of CHP. The pSS patients had more systemic diseases, medication intake, oral dryness, poorer general health and lower salivary secretion than the OLP patients, who had the highest plaque index (PI) and the most mucosal soreness. Oral dryness and soreness were correlated to general health. In both patient groups unstimulated whole saliva flow rate (UWS) had increased, PI and periodic pocket depth (PPD) were reduced, and general health and oral dryness and soreness had improved after using CHP. A decrease in hyphae was found in candida smears from both groups and in blisterspores in OLP A reduction in the extension of the mucosal lesions was observed in 15 OLP patients. Results suggested beneficial effects of intervention with CHP on oral symptoms, general health, UWS, PI, PPD and candida load in two patient groups—pSS and OLP—representing different oral symptomatology.

Effects of Bovine Immune and Non-immune Whey Proteins on the Composition and pH Response of Human Dental Plaque.


Colostral products from non-immunized cows (CP) and cows immunized with mutants streptococci (IP) were used as mouthrinses in a short-term human study. The acidogenic potential of the products was tested and found to be negligible in vivo before application to subsequent rinsing tests. At first all the participants received a professional tooth cleaning, after which they rinsed with one of the solutions (IP, CP, water) three times per day for 3 days. After each rinsing period the resting pH and decrease in plaque pH after sucrose challenge was determined; the amount of plaque was estimated, and all available plaque was collected. No significant differences were recorded in the composition or in the amounts of accumulated plaque. The resting pH values of plaques with low in situ pH were increased after the IP rinsing period. Surprisingly the lowest pH values after sucrose challenge were recorded in the IP plaques. The number of cultivable facultative flora or total streptococci were not affected by rinsing, but the relative number of mutants streptococci significantly decreased after the IP rinsing period when compared to the CP period. Thus the short term intervention favours effective effects of bovine immune whey on human dental plaque.

Generation of Bovine Immune Colostrum against Streptococcus Mutans and Streptococcus Sobrinus and its Effect on Glucose uptake and Extracellular Polysaccharide Formation by Mutans Streptococci.


Due to potential side effects of active immunization by cariogenic mutants streptococci oral administration of passively-derived antibodies could be a more acceptable way to reduce colonisation and virulence of these microorganisms in human dentition. The aim of this study was to produce antistreptococcal immunoglobulins into bovine colostrums and explore the possible antibacterial mechanisms of these immunoglobulins against S. mutans. Specific serum IgG antibodies to whole cell antigens of both S. mutans and S. sobrinus increased rapidly in cows during immunisation and were high also in the final whey product. Results indicate that bovine colostrum have a significant inhibitory potential against S. mutans, apparently dependent on the presence of specific IgG antibodies against S. mutans and S. sobrinus.

Possible oral health effect of colostrum containing dentifrices. 

Colostrum is milk that is produced during the first days post partum and it contains high concentrations of antibodies, enzymes and nutrients that protect the neonate against infection. Pedersen et al. (2000) recommended use of colostrum containing oral hygiene products for individuals suffering from oral medical problems. Objectives. To examine the clinical effect of three colostrum/enzyme
Lactoperoxidase System

Candida albicans inhibition by thiocyanate / H₂O₂ / peroxidase system in oral gel.

Introduction: In the presence of hydrogen peroxide (H₂O₂), lactoperoxidase (LP) system produces hypohalous acid (HOCl) from chloride (Cl⁻) in vitro. LP inhibits the growth of Candida albicans more efficiently than OCl⁻ (Majerus & Courtois, 1992). However, lactoperoxidase affinity for SCN⁻ is higher than for I⁻ and induces in the oral cavity a preferential oxidation of salivary thiocyanate, making inefficient the use of iodide / I⁻ system in oral care products.

Objectives: This study aimed to document in vitro the competition between both substrates (SCN⁻ and I⁻) and to evaluate the effect of combing the SCN⁻ / peroxidase system with other exocrine proteins (lysozyme, lactoferrin, colostrum extract) in order to inhibit Candida growth.

Conclusion: In the presence of SCN⁻ in saliva makes incorporation of I⁻ in anti-Candida oral gel useless since SCN⁻/I⁻ competition for lactoperoxidase favours the endogenous salivary substrate. Moreover, incorporation of G/GO/SCN⁻/I⁻ with other antimicrobial exocrine proteins in gel can delay yeast growth, opening other ways for further investigations.

Susceptibility of Anaerobic Micro-organisms to Hypothiocyanate produced by Lactoperoxidase.

Inhibition of bacterial metabolism by the lactoperoxidase (LP)-hydrogen peroxide (H₂O₂)-thiocyanate system was studied with representatives of a large number of Streptococcus mutans. The aims were to determine the amount of H₂O₂ released from these catechol-negative bacteria is sufficient to activate the LP system and whether these oral bacteria are resistant to inhibition by the LP system, which is active in human saliva. When the washed, stationary phase cells were incubated aerobically with LP, thiocyanate, and glucose (Glc), greater than 90% inhibition of Glc utilisation and lactate production was obtained with strains that released large amounts of H₂O₂ (BE, PA, OMZ 170) at 10⁻²⁻⁰% inhibition was obtained with strains that released about half as much H₂O₂ (B-13, INB). Inhibition was observed at pH 7.6, whereas release of H₂O₂ and accumulation of the inhibitor (hypothiocyanate ion) were highest at pH 8. With H₂O₂ releasing cells from early stationary phase, preincubation with Glc abolished inhibition; although it did not influence H₂O₂ release. Cells harvested 24 h later were depleted of sulfhydryl compounds or disulfide compounds (reduced or oxidised glutathione, cysteine or cystine). This preincubation increased cell sulfhydryl content but had no effect on H₂O₂ release. All strains were inhibited when incubated with LP, thiocyanate, and added (exogenous) H₂O₂. Smaller amounts of H₂O₂ were required to inhibit cells preincubated with Glc or with Glc and sulfhydryl or disulfide compounds. The results indicate that pH, amount of H₂O₂ cell sulfhydryl content and stored carbohydrate content determine susceptibility to inhibition.

Determination of the production of OSCN⁻ in an enzyme based toothpaste and gel for use in dry mouth sufferers in vitro.

Lactoperoxidase system generated hypothiocyanite ions (OSCN⁻) and hypohalous acid (HOCl) are inhibitory against a number of oral bacteria. HOCl produces the Salivary Peroxidase system in all healthy mouths and which, in conjunction with other oral systems, helps maintain healthy oral conditions by regulating the presence of bacteria and facilitating the mouth’s natural ecosystem. Commercially available products bioXtra® toothpaste and bioXtra® gel comprise the complete lactoperoxidase system. The aim of this study was to assess the levels of HOCl/OSCN⁻ generated by two bioXtra® products – bioXtra® Maintaining Gel and bioXtra® Mini Toothpaste containing the lactoperoxidase system and to check if there are any inhibitory effects due to the presence of the saliva.

1 gr of bioXtra® paste was added to tubes containing 2 ml non-sterilized human whole saliva which was previously incubated at 37°C. After a short period of time (15 seconds to 2 minutes), an 100 µl aliquot was directly withdrawn for analysis of the amounts of HOCl/OSCN⁻ generated. After a longer period of time (3 minutes to 30 minutes), an 100 µl aliquot was added to the tubes and the tubes were vortexed for 30 sec. Experiments with 1 gr of the same paste and the same gel but without containing the lactoperoxidase system served as controls. The peroxidase activity and thiocyanate concentration was determined in the non-sterilized saliva used for each test before the addition of the bioXtra® products. The HOCl/OSCN⁻ yield ranged from 200 – 300 µM for the bioXtra® toothpaste and from 15 to 100 µM for the bioXtra® gel while the salivary levels of HOCl/OSCN⁻ before the addition of each bioXtra® products were respectively between 10 to 40µM and 2 to 5 µM respectively. Our results show that it is possible to significantly increase the levels of the lactoperoxidase system generated antimicrobial component HOCl/OSCN⁻ in saliva by means of a dentifrice or a gel. Toothpastes and gel are important vehicles for delivery of different antimicrobial agents. Moreover, the amounts of HOCl/OSCN⁻ generated are high enough to exert an antibacterial effect on the isolated bacteria but not enough against the biofilm bacteria. In addition, the bioXtra® toothpaste and bioXtra® gel may offer an option for pain relief, and medium-term restoration of a more normal ability to eat and drink, for patients with painful oral lesions of a variety of etiologies.

Lysozyme, Lactoferrin & Lactoperoxidase System

Salivary Lysozyme, Lactoferrin and Peroxidases: Antibacterial Effects on Cariogenic Bacteria and Clinical Applications in Preventive Dentistry.

Many antibacterial agents in human saliva are known to have bacteriostatic or bactericidal effects on cariogenic bacteria, in particular against Streptococcus mutans. Studies have usually been conducted with purified agents (proteins) in vitro. Very little proof exists to show that they also have an effect on oral cariogenic bacteria in vivo. Recent studies have shown that some salivary systems can act synergistically against Streptococcus mutans.

Such synergistic antibacterial activity is evident in the use of free-living, independent existence to a biofilm lifestyle. Because biofilms notoriously resist killing by host defence mechanisms and antibiotics, we hypothesized that the innate immune system possesses specific activity to protect against biofilm infections. Here we show that lactoferrin, a ubiquitous and abundant constituent of human external secretions, blocks biofilm development by the opportunistic pathogen Pseudomonas aeruginosa. This occurs at lactoferrin concentrations below those that kill or prevent growth. By chelating iron, lactoferrin stimulates twitching, a specialized form of surface motility, causing the bacteria to wander across the surface instead of forming cell clusters and biofilm. These findings reveal a specific anti-biofilm defence mechanism acting at a critical juncture in biofilm development, the time bacteria stop roaming as individuals and aggregate into durable communities.

**Lactoferrin**

**A Component of Innate Immunity prevents Bacterial Biofilm Development.**

Pradeep P Singh, Matthew R, Parsa E, Peter Greenberg and Michael J Walsh, Department of Internal Medicine, Department of Microbiology, Howard Hughes Medical Institute, University of Iowa, Iowa City USA. Nature Vol. 417 May 2002; 552.

Antimicrobial factors form one arm of the innate immune system, which protects mucosal surfaces from bacterial infection. These factors can rapidly kill bacteria deposited on mucosal surfaces and prevent acute invasive infections. In many chronic infections, however, bacteria live in biofilms, which are distinct, matrix-covered communities specialized for surface persistence. The transition from a free-living, independent existence to a biofilm lifestyle can be devastating, because biofilms notoriously resist killing by host defence mechanisms and antibiotics. We hypothesized that the innate immune system possesses specific activity to protect against biofilm infections. Here we show that lactoferrin, a ubiquitous and abundant constituent of human external secretions, blocks biofilm development by the opportunistic pathogen Pseudomonas aeruginosa. This occurs at lactoferrin concentrations below those that kill or prevent growth. By chelating iron, lactoferrin stimulates twitching, a specialized form of surface motility, causing the bacteria to wander across the surface instead of forming cell clusters and biofilm. These findings reveal a specific anti-biofilm defence mechanism acting at a critical juncture in biofilm development, the time bacteria stop roaming as individuals and aggregate into durable communities.

**Xylitol**

**Comparison of Erythritol and Xylitol Saliva Stimulants in the Control of Dental Plaque and Mutans Streptococci.**


The effect of 2-month usage of saliva-stimulating pastils containing either erythritol or xylitol was studied in a cohort of 30 subjects assigned to the respective polyol groups (n = 15). The daily consumption level of both polyols was 5.2 g, used in 5 daily chewing episodes. The mean weight of total plaque mass (collectable during a standard period of 3 min from all available tooth surfaces) was reduced significantly in the xylitol-group, while no such effect was observed in the erythritol-group. This reduction in plaque mass was accompanied by a significant reduction in the turbidity readings (A660) of aqueous plaque suspensions; no such effect was observed in the erythritol-group. However, plaque protein levels did not differ between baseline and endpoint in either polyol group. The plaque and salivary levels of Streptococci mutans and plaque levels of total streptococci were reduced significantly in the xylitol-group, while no such effect was detected in the erythritol-group. However, either polyol regimen had no effect on plaque levels of S. sobrinus. The results suggest that systematic use of xylitol-containing saliva stimulants may be more effective in controlling some oral-hygiene-related effects than use of erythritol-containing products. The results also speak for a special relationship between xylitol and S. mutans. However, owing to the great potential of erythritol as a caries-reducing agent – based on the natural nature of erythritol – the present laboratory results should be considered preliminary and subject to verifying clinical studies.

**Efficacy against Candida albicans**

**Effect of saliva-mimicking oral care compounds upon Candida albicans ATCC 10231.**

Ahariz M., Courtois P ... shown a higher and a longer candida-cidal activity than other oral care products incorporating only the last ones.

This investigation aimed to evaluate, by a radial diffusion test, the effect of 5 different oral care products containing proteins from bovine milk against Candida albicans. For this purpose, 25 μl of yeast suspension (Candida albicans ATCC 10231 in 50 g/l Sabouraud liquid medium) was adjusted to 600 nm absorbance of 0.800 was dispensed on Sabouraud/ Gentamyacin/ Chloramphenicol agar solid medium in centrally gel-punched plates and then 1g of oral care product was deposited in the central well. Inhibition radius after a 48-hours incubation was significantly higher with oral care products containing lactoperoxidase, lactoferrin, lysozyme plus coluraminidase whey factors. Inhibition has been shown reversed after a one-week incubation at 37°C but in a less extent when oral care products contain lactoperoxidase system, lactoferrin, lysozyme plus coluraminidase whey factors. In conclusion, toothpaste (bioXtra®) and oral gel (bioXtra™) containing coluraminidase whey factors besides antimicrobial proteins have shown a higher and a longer candida-cidal activity than other oral care products incorporating only the last ones.

**Sodium Lauryl Sulfate (SLS)**

**Sodium lauryl sulfate and recurrent aphthous ulcers - A preliminary study.**


Sodium lauryl sulfate (SLS), anesthetic detergent commonly used in dentifrices, is an effective desensitizing agent. The aim of the present study was to investigate the effect of SLS in patients with recurrent aphthous ulcers (RAU). Ten patients with multiple minor RAU participated in the study. The mean incidence of RAU was 17.8 during a 3-month period before the study. The patients used a dentifrice containing 1.2% SLS for a test period of 3 months followed by a dentifrice without SLS for the same time period. The results showed a statistically significant decrease in the number of aphthous ulcers from 14.8 after using the SLS-containing dentifrice to 5.1 ulcers after brushing with the SLS-free dentifrice (p<0.05). It is suggested that the denaturing effect of SLS on the oral mucin layer, with exposure of the underlying epithelium, induces an increased incidence of recurrent aphthous ulcers.

**Importance of Saliva in Oral Health**

**Antimicrobial Function of Human Saliva – How Important is it for Oral Health?**


Human saliva contains a number of physical physiochemical and chemical agents that protect oral tissues against noxious compounds, in particular those produced by various microorganisms. Among such protective factors, the flushing effect of saliva flow is the most important one, not only because it so effectively removes exogenous and endogenous microorganisms and their products into the gut but also because a steady supply of saliva guarantees continuous presence of both non-immune and immune factors in the mouth. A great number of studies with controversial results have been published regarding various individual agents and their possible associations to oral health, particularly to dental caries. It appears that no single chemical agent is far more important than the others. For example patients with IgA deficiency have normal levels of non-immune defence factors and often display a compensatory increase in the other immunoglobulin isotypes. The concerted action of all agents in whole saliva, both salivary and serum-derived, provides a multifunctional protective network that is collapsed only if salivary flow rate is substantially reduced. In this mixture of defence factors, many show additive or even synergistic interactions against oral pathogens. Increased knowledge of molecular functions of various agents has made it possible to prepare oral hygiene products that include host-derived antimicrobial agents instead of synthetic agents. Although clinical efficacy of some products is still unsatisfactory and poorly described, new technologies, for example the production of specific antibodies against oral pathogens, may considerably improve the anti-microbial power of these products.