

A1- DETECTION OF FLUORIDE IN NAILS OF ADULT VOLUNTEERS AFTER INCREASED FLUORIDE INTAKE: CORRELATION WITH NAILS GROWTH RATE

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Objective: This study determined the lag time between increased fluoride (F) intake and F detection in human nails, as well as the influence of nails growth rate and length on this. Methods: Ten 20-35-year-old volunteers received 1.8 mg F daily, for 30 days. Nail growth rate was determined for all fingernails and toenails, using a digital caliper. Nails samples were collected at the beginning of the study and every 2 weeks, totalizing 15 collections. F concentrations in nail samples were determined after HMDS-facilitated diffusion. Data were analyzed by 2-way and 3-way ANOVA, Tukey's test, paired t test and linear regression ($p < 0.05$). Results: The growth rate was statistically higher for fingernails when compared to toenails. No statistically significant differences were observed between right and left sides. A significant increase in growth rate was observed for big toenails when compared to the other toenails, but the same was not found for fingernails. The estimated mean lag time for F detection in fingernails and toenails was 87 and 109 days, respectively. An apparent increase in fingernails F concentrations was seen after 84 days, although this was not statistically different from baseline. As for toenails, statistically significant increases in F concentration in respect to baseline were observed after 112 and 140 days after increased F ingestion. A positive significant correlation was found for the growth rate of fingernails and toenails. Conclusion: These data suggest that big toenails are more suitable as biomarkers of fluoride intake, since they provide an enough mass to be analyzed, have a higher growth rate and are less prone to environmental contamination.

A2-TRENDS IN DENTAL FLUOROSIS OF ADOLESCENTS FROM 12 TO 15-YEARS-OLD IN SALVADOR-BA, 2001 - 2004

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Many agents providing fluoride to adolescents in Salvador have been employed, including drinking water, toothpaste and others to prevent dental caries. Overall, there was little evidence indicating that prevalence and severity of dental fluorosis may be increasing in the city. Objective: The aim of this work was to compare data of prevalence and severity of dental fluorosis in the years 2001 and 2004 to identify trends of dental fluorosis in schoolchildren of 12 to 15 years-old in Salvador-BA. Methods: Data were obtained from surveys developed in 2001 and 2004, which collected data on dental

fluorosis in Salvador, BA. Both sets were developed using WHO criteria (Dean Index) with a multiple stage ruffled probabilistic sample from public and private schools ($n=3,313$ in 2001 and $n=2,110$ in 2004). A descriptive analysis was performed and the differences between groups were tested with chi-square test ($\alpha=5\%$). Results: The prevalence of dental fluorosis had a little increase in 12 years-olds, (31.4% to 32.8%, $p=0.82$) not statistically significant and there were no trends of increment at that age. In the 15-years-old age group, we noted a decrease in the percentage of adolescents with the disease (27.6% to 17.0%). This difference was statistically significant ($p < 0.01$). In both years and in all sampled age groups predominance of a "very mild" form was observed. Conclusion: Trends of increment in prevalence or severity of dental fluorosis in adolescents in Salvador-BA were not observed.

A3-AN IN VIVO COMPARATIVE STUDY OF TWO DIFFERENT ACIDS FOR ENAMEL OPACITIES REMOVAL. THREE YEARS RESULTS

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Objective: Computerized analysis assessed quantitatively the efficacy of micro-abrasion using 37% phosphoric (G1) and 18% hydrochloric acids (G2) with pumice on removal of enamel opacities. Methods: Fifteen children aged 8 to 13 years with diffuse opacities on enamel surfaces of upper incisors suggestive of dental fluorosis were selected. The opacities were classified according to Thylstrup & Fejerskov index (TF) and ranged 1 to 4. Upper incisors were chosen and baseline photos were taken. Micro-abrasion technique using 37% phosphoric acid was used on teeth 11 and 12 while teeth 21 and 22 were submitted to 18% hydrochloric acid. Immediately and after 1 month follow up photos were taken and analyzed by the Paint Shop Pro 7 software for establishment of the white spot limits. The Image Pro Express 4.0 was used to measure the total surface and opaque areas. Results: Nonparametric Mann-Whitney and Wilcoxon tests were used. Wilcoxon test depicted high significant difference ($P < 0.000$) when immediate versus 1 month follow up was compared for both groups. New photos were taken after three years and G1 and G2 showed a significant reduction of the opacities area [92.86% and 96.67% ($P < 0.001$)] when compared to the immediately (61.06% and 70.26%) and one month (86.18% and 89.72%) results respectively. Conclusion: It could be concluded that both acids can be used indistinctly and time was an important factor in the opacities reduction in both groups.

A4-FINGERNAILS AS BIOMARKERS OF CHRONIC FLUORIDE EXPOSURE FROM DRINKING WATER

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Objective: To evaluate the use of fingernails as biomarkers of chronic fluoride (F) exposure in subjects exposed to different F levels in the drinking water. **Methods:** Twenty-four 14-20 year-old volunteers participated in the study. Volunteers were permanent residents of 3 cities with different drinking water fluoride concentrations: Group I, Pirajuí-SP (non-fluoridated drinking water); Group II, Bauru-SP (artificially fluoridated drinking water- 0.6-0.8ppm); Group III, São João do Rio do Peixe-PB (naturally fluoridated drinking water - 2.6 ppm). F in fingernails was determined with the electrode following HMDS-facilitated diffusion. Data were analyzed by ANOVA and Tukey's test ($p < 0.05$). **Results:** Mean \pm sd (95% confidence interval) fingernails F concentrations ($\mu\text{g/g}$) for groups I, II and III were, 1.73 ± 0.82 (1.04-2.41), 1.37 ± 0.18 (1.22-1.52) and 5.08 ± 1.08 (4.18-5.98) respectively. There were not statistically significant differences between groups I and II, but group III had significantly higher fingernails F concentrations when compared to groups I and II ($p < 0.001$). The 95% confidence intervals showed no overlap for group III when compared to groups I and II. **Conclusion:** The results suggest that fingernails F of 14-20 year-old individuals is a useful biomarker to differentiate those exposed to high fluoride levels in the drinking water from those drinking optimally fluoridated water or non-fluoridated water. However, these last two situations cannot be differentiated from each other using fingernails F concentrations as a biomarker.

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A5-FLUORIDE STABILITY IN RAT NAILS GROWTH PORTION AS A FUNCTION OF THE TIME AND TEMPERATURE OF STORAGE

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Objectives: The aim of the present study was to determine whether the fluoride (F) content rat nails growth portion remains unchanged as a function of time after they have been clipped, as well as the temperature of storage. **Methods:** Weanling male Wistar rats received deionized water and food containing 25.9 ppm F for 77 days. The animals were assigned to 5 groups (n=16), that differed with respect to time elapsed between nails collection and analysis: immediate (G1); or after 7 d (G2); 14 d (G3); 28 d (G4), 56 d (G5). These groups, except for the first one, were subdivided into 3 groups that differed with respect to temperature of nails storage (A= room

temperature; B= 4°C; C= -20°C). F analysis in blood and nails were made using the electrode following HMDS- facilitated diffusion. After the initial analysis, nails were ashed (600°C) overnight and the ashes were analyzed for F by the same methods. The data were tested for statistically significant differences by ANOVA and Tukey's post hoc test, as well as and linear regression ($p < 0.05$). **Results:** A reduction in nail F concentrations was observed for samples stored at room temperature and 4°C, when compared to control group (immediate F analysis) and this difference was statistically significant for all the intervals of storage. The samples stored at -20°C did not show a statistically significant reduction in F concentrations along time, except for the samples that were stored for 28 days before analysis (G4). After ashing, only the groups stored at room temperature for 7 and 14 days had a F concentration significantly higher in respect to control, and the F concentrations found were lower than those detected before ashing. No significant differences were observed for plasma F concentrations among the groups. **Conclusions:** When the F analysis of rat nails cannot be accomplished immediately after collection, samples must be stored at -20°C for up to 2 weeks only. Otherwise, F concentration may be reduced. The cause of this reduction is not known and does not seem to be due to the formation of a F compound that is not diffusible using the HMDS method.

A6-BIOMARKERS OF FLUORIDE EXPOSURE FROM DENTIFRICE AND VARNISH IN CHILDREN

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Objectives: To evaluate the use of fingernails and urine as biomarkers of exposure to fluoride (F) from dentifrice and varnish. **Methods:** Twenty 4-7 year-old children were divided into 2 groups: G-A (n=9) and G-B (n=11). They used a placebo dentifrice for 28 days, fluoridated dentifrice (1,570 ppm F) for the following 28 days, and then placebo dentifrice for additional 28 days, when returned to their usual dentifrices. G-B children also received 4 weekly applications of a varnish (Duraphat, 2.26% F) while they used the fluoridated dentifrice. Urinary collections were performed 24h before the use of fluoridated dentifrice and 24h (G-A) or 48h (G-B) after. Fingernails were clipped every 2 weeks, totalizing 14 collections. Fingernail F concentrations were analyzed with the electrode following HMDS-facilitated diffusion. F analysis in urine samples was made with the electrode. Total F intake from diet and dentifrice was estimated. Data were analyzed by ANOVA and t test ($p < 0.05$). **Results:** No significant differences in total F intake were found between the groups. Fingernails F concentrations did not vary significantly throughout the study. Results of 24h urinary F output (mean \pm SD, μg) were: 414.4 ± 199.8 and 468.0 ± 252.8 for placebo and F dentifrices, respectively (G-A) and 401.6 ± 206.2 , 691.2 ± 344.6 and 492.1 ± 243.0 for placebo dentifrice, F dentifrice

plus varnish and F dentifrice, respectively (G-B). The use of F dentifrice did not increase significantly the urinary F output. However, when varnish was used, a transitory increase in the urinary F output was detected, returning to baseline levels in the next 24 h. Conclusions: According to the protocol of this study, nails were not indicators of exposure to F from dentifrice and varnish, while urine was a suitable biomarker of exposure to F from dentifrice plus varnish, but not from dentifrice alone. Financial support: FAPESP (01/00237-3 and 00/04303-8).

A7-FLUORIDE DOES NOT CAUSE DNA DAMAGE ON CHINESE HAMSTER OVARY CELLS IN VITRO

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Due to its properties, fluoride (NaF) is widely used in dentistry, as a tool for dental caries control and prevention, nevertheless, the inadequate use of fluoride may cause odontogenesis disturbance and cytotoxicity on soft tissues. Genotoxicity tests form an important part for cancer research and risk assessment of potential carcinogens. Objectives: In this study, we tested fluoride for the genotoxic potential by the single cell gel (comet) assay in vitro. This assay detects DNA strand breaks of individual cells under alkaline conditions. Methods: NaF was exposed under following concentrations: 7-100 µg/mL, on Chinese ovary hamster cells in vitro. Results: The results showed that NaF, in different concentrations analyzed, did not contribute to the DNA damage on Chinese ovary hamster cells. Based on the results, it concluded that NaF, in these concentrations tested, is not genotoxin. Conclusions: These findings are important a time that represent an contribution for the correct evaluation of the risks to the health associated with exposition the agents used in the Dentistry. Support: CNPq/FAPESP/TOXICAN.

A8-ANTIMICROBIAL EVALUATION OF THREE CHILDREN DENTIFRICES: IN VITRO ANALYSIS

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Objective: The aim of this study was to evaluate the Minimum Inhibitory Concentration (MIC) of three dentifrices with the following characteristics: lack of fluoride; 500 ppm of NaF; 1,100 ppm of NaF, using follow microorganisms for analysis: *Staphylococcus aureus*, *Streptococcus mutans*, *Enterococcus faecalis* and *Escherichia coli*. Methods: The dentifrices' volume were measured through disposable syringes for the preparation of the serial dilutions(1:2 to 1:128) in TBS. The bacteria were cultivated in agar TSA 37°C/

24h. After the preparation of 0.5 model bacteria suspension of *Mc Farland*, a 10µL sample was transferred for each dilution. The negative controls were incubated in TSB without the addition of the toothpaste. Microorganisms were inoculated in the cultures containing the dentifrices' dilutions; and were then incubated at 37°C/48h. Since the constituents of the dentifrice in the smallest dilutions become bleary, 10µL of each test tube were transferred to Petri dishes containing TSA and then were incubated at 37°C/48h. Results: Antimicrobial activity for non-fluoride toothpaste could not be observed. Both dentifrice fluoride-containing showed antimicrobial activity for all microorganisms tested. The MIC obtained for the following dilutions for 500 and 1,100 ppm of the NaF dentifrice were respectively: *S.aureus* (4.4), *E. faecalis* (64.128), *S.mutans* (4.8) e *E.coli* (2.2). Conclusions: It is concluded that the non-fluoride dentifrice did not present antimicrobial activity towards the bacteria tested. Both fluoride-containing toothpastes present similar MICs and antimicrobial activity towards the microorganisms tested.