

NIOM scientists at the Norwegian Dental Association Convention.

Scientist at NIOM in collaboration with scientists from the University of Oslo, contributed with lectures at the annual Norwegian Dental Association Convention.

Daily use of antimicrobials?

Håkon Valen
 Senior Scientist



In the session “Chemical control and eradication of dental biofilm”, senior scientist Håkon Valen and professor emeritus Anne Aamdal Scheie from the University of Oslo stated that antimicrobials for daily prevention of dental biofilm-associated diseases should be limited and used only when mechanical cleaning and change in patient behavior is insufficient for disease control. There is considerable research activity to discover new compounds in order to eradicate, control or prevent formation of dental biofilms.

- Antimicrobial compounds are incorporated into dental materials for the purpose of reduction of biofilm formation.
- Antimicrobials may also be used by patients on a daily basis for prevention of dental biofilm-associated diseases. The rationale for such use of antimicrobials is that mechanical biofilm control is inadequate to prevent the development or progression of dental diseases.
- Daily use of antimicrobial substances may increase the selective pressure for resistance against the active substances and may lead to cross and co - resistance to other antimicrobial and antibiotic substances.

Clinical implication:

Antimicrobials for daily prevention of dental biofilm-associated diseases should only be advised when mechanical cleaning and change in patient behavior is insufficient for disease control.

The use of fluoride as caries prophylactic does not pose a health risk

Aida Mulic
 Senior Scientist



Jon E. Dahl
 Managing Director



Fluoride skepticism “FluUro”. The use of fluoride as caries prophylactic does not pose a health risk, Professor Jon E. Dahl, stated at the annual convention for the Norwegian dental association. He discussed the kinetics and the general toxicity of applied fluoride. A negligible amount of fluoride is absorbed through the oral mucosa; however, about 90% of a swallowed dose is taken up in the blood and distributed. Between 30 and 50% of the absorbed fluoride is deposited in the teeth during their formation and in the bones. Fluoride that is not taken up in the hard tissues is secreted by the kidney (40-60%) or the gut (about 10%).

Acute toxicity may occur on intake of more than 5 mg of fluoride per kg body weight. (Table 1) This corresponds to such a large dose of that accidental poisoning can be ruled out. Skeletal fluorosis is a bone disease caused by excessive accumulation of fluoride in the bones. It is seen

Antimicrobials for control of biofilm

Caries-prophylactic use of fluoride is regarded as safe

in countries where there is natural high level of fluoride in the drinking water, such as China and India, and it is not relevant for the Nordic countries. Studies from areas with water fluoridation do not provide evidence that the daily uptake of fluorides presents any health hazards.

Table 1: Examples of added amount that trigger acute toxicity reactions in children and adults

Age	Weight	Amount toothpaste (1450 ppm F ⁻) 75 mL	Tablets (0.5 mg)
1 yr	10 kg	1/2 tube	100
5 yrs	20 kg	1 tube	200
12 yrs	30 kg	1.5 tubes	300
Adult	70 kg	3 tubes	700

The “FluUro” session at the convention concluded with senior scientist Aida Mulic who discussed the recommended use of fluorides. According to Mulic, the effect of local fluoride treatment depends on concentration of fluoride, length of time of application, frequency of treatment, the pH of the fluoride product, and the presence of metal fluorides (tin or titanium) used in combination with NaF.

Table 2: Overview of available fluorid prophylactics and their concentration of F⁻ (ppm)

Fluorid prophylactic	F ⁻ (ppm)
Toothpaste	1000-1500
Daily fluorid rinse (0.2% NaF)	920
Duraphat® toothpaste	5000
Fluor Protector	1000
Fluorid varnish 2% NaF	9200
Duraphat® varnish with 5% NaF	22600

Fluoride can be administered either by at home or by a professional. For the majority of children, adolescents and adults, the use of fluoride toothpaste twice daily, has the most important effect in preventing caries. However, for patients at risk such as those with dry mouth syndrome or with high caries activity, we have more to offer. (Table 2) Fluoride toothpaste with a high concentration of fluoride (e.g. Duraphat toothpaste®, 5000 ppm) has a well-documented effect. These patients are also recommended the daily use of 0.2% NaF solution and fluoride tablets.

Regarding professional treatment offered at the dental clinics, fluoride varnish (5% NaF / 2% NaF) applied at least twice a year gives caries reduction of 42-46%. Although the scientific evidence for the use of fluoride gel is limited, this treatment is recommended for a limited period for patients with severe dental caries for a limited period until the caries situation is under control.

Clinical implication: Caries prevention by daily use of fluoride containing toothpaste is documented as safe and effective



KNOWLEDGE – INNOVATION – QUALITY

The Nordic Institute of Dental Materials (NIOM) is responsible for promoting a continuing Nordic collaboration in the field of dental biomaterials. NIOM maintains a distinct Nordic profile through broad contacts with the Nordic dental educational institutions and research centres. The Institute undertakes research, materials testing, standardisation and research-based consulting directed towards health authorities and dental health services in the Nordic countries. Our research and consulting are required to be scientifically founded and applicable to clinical dentistry.

High risk patients need
fluoride supplement