

Dr. Robin Whyman, the NZDA's Director of Dental Policy
responds to the RealityCheckRadio's Alistair Harding's questions

Comments in **red** by Dr. H.Limeback BSc PhD DDS,
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**Fluoride inhibits demineralization better
than it promotes remineralization**

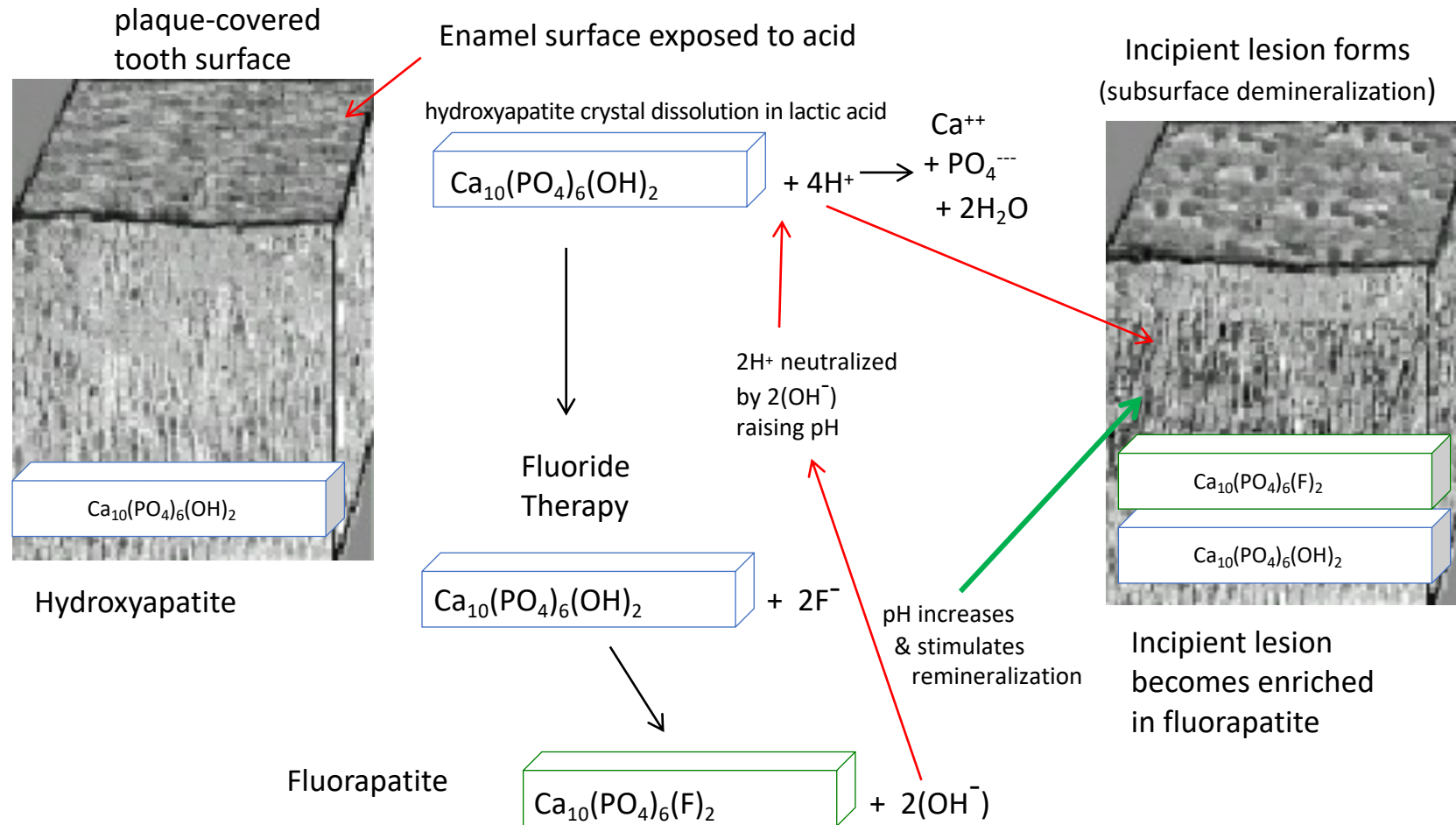
RCR: In your understanding, how does fluoride work?

DR. ROBIN WHYMAN: Fluoride works on the surface of the teeth, especially on the dental enamel, by changing the balance between factors demineralising the tooth surfaces (taking out the calcium and phosphates from the dental enamel) and remineralisation.

Fluoride changes the balance and becomes incorporated in the dental enamel, building a small amount of fluoride into the enamel crystals of the dental enamel and making them more resistant to demineralisation. It also assists remineralisation of dental enamel that has been exposed to acids from the diet.

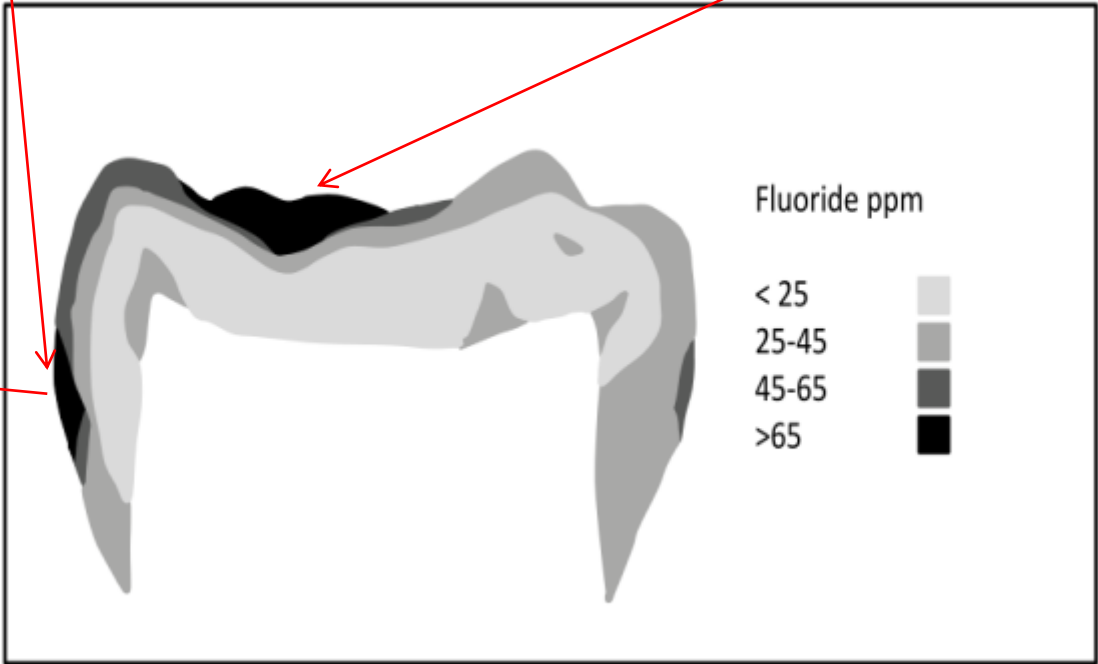
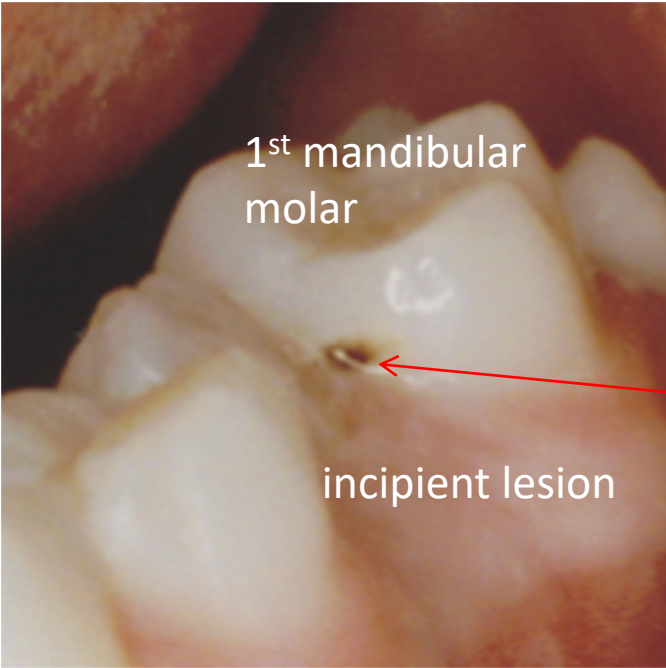
The formation of fluorapatite (FHAP) provides some resistance (not complete protection) against further acid 'attacks' but once formed FHAP does not 'assist' in remineralization

Fluoride's role in the demineralization-rem mineralization cycle of dental decay



When fluoride is introduced during a dental plaque acid attack, fluorapatite forms, releasing hydroxyls, which neutralize plaque acid, raising the pH (slightly) and encouraging remineralization of the enamel.

Cross section of a molar showing accumulation of fluorapatite in enamel where plaque is not fully removed [contact areas (interproximal) and pits/fissures]



RCR: Can you talk about the difference between fluoride being used topically, and in our water supply?

DR. ROBIN WHYMAN: Fluoride from the water supply exposes teeth to a low level of fluoride on a frequent basis each day as people drink water and consume other food or drinks made from fluoridated water.

It is also absorbed once swallowed and increases the fluoride levels in saliva by a small amount, increasing the remineralising environment throughout the day. ←

→ Topical fluorides come in two main forms – toothpastes and professionally applied fluorides.

→ Fluoridated toothpaste is an important part of everybody's daily tooth care. and contains around 1000 to 1450ppm fluoride. When teeth are brushed the fluoride is brushed across the teeth and works as explained to encourage remineralisation and repair of the teeth.

→ The most common professionally applied topical fluoride is fluoride varnish. It also works topically. However, it contains very much higher levels of fluoride (approx. 22600ppm fluoride) and is designed to be used when a person has at risk areas of dental decay and to help rebuild the dental enamel. It doesn't provide the same day to day protection that fluoridated water and toothpastes can. In fact, fluoride varnish needs to be supported by regular use of fluoridated toothpastes and fluoridated water to be effective. Fluoride varnishes are only recommended for use in professional dental decay reduction programmes for at risk children, adolescents, and adults.

Fluoridated water is the greatest source of topical fluoride

There are alternatives to fluoride toothpaste

Remineralization is a minor role for fluoride -the build up of fluorapatite is the main mechanism

yes it does -it forms slow release calcium fluoride, a daily source of localized fluoride

The topical exposure from fluoridated water is 2500 times higher than than topical fluoride exposure from ingested fluoridated water that is excreted through the saliva (Oiveby et al, 1989 J.Dent.Res. 68:146-9)

-the "increase in remineralization environment" from this fluoride source is so negligible that it is clinically irrelevant

There is no evidence for this, especially for the claim that fluoridated water is still needed

RCR: What are your views on its toxicity?

DR. ROBIN WHYMAN: Fluoride consumed in high doses over a very short period can create acute toxicity. This is associated with a number of symptoms but particularly gastric issues such as nausea and vomiting.

However, this occurs at levels well above those from fluoridated water or from toothpastes used correctly.

Longer term or chronic exposure to high fluoride levels in early childhood while tooth development occurs can cause dental fluorosis. This is a tooth enamel defect characterised by opaque white areas in the enamel, caused by excess exposure to fluoride while the teeth are forming in the jaws and before they erupt into the mouth. Tooth development occurs during the first 8 years of life; beyond this age children are no longer susceptible to fluorosis.

The New Zealand Oral Health Survey in 2009 showed the overall level of moderate fluorosis to be very low, indicated that dental fluorosis prevalence is not increasing, and that levels of fluorosis are similar between fluoridated and non-fluoridated areas.

Fluoride as used in fluoridated water with a maximum acceptable value of 1.5mg/L (ppm) and recommended level of 0.7-1mg/L (ppm) is not toxic and in New Zealand it is not associated with increasing levels of dental fluorosis.

It also causes fluoride deposits in the skeletal system, which are then released over time -this is important for the jaw that houses developing teeth because they can get dental fluorosis

Fluoride accumulation from fluoridation can far exceed the levels from occasional acute exposures

An obviously biased 'survey' since scientific studies show that significant dental fluorosis results from fluoridation -exposure to 1.5 mg/L fluoride will DEFINITELY cause objectionable fluorosis in a large % of the population

RCR: Can you comment on the NTP report and the evidence that opponents of fluoride cite of its toxicity?

DR. ROBIN WHYMAN: The National Toxicology Programme (NTP) report was a systematic review of the research on fluoride exposure and neurodevelopmental and cognitive effects in humans. It started in 2016. It has been subject to much ongoing debate and review, including issues of the accuracy and precision of the text. A draft report and meta-analysis of the data was accepted by a Board of Scientific Counselors of the National Toxicology Programme in May 2023. The draft reports were sent to the Director of National Institute of Environmental Health Sciences. It remains for the Director to make final decisions about the recommendations of the report and the meta-analysis.

The issue of whether fluoride in drinking water at levels in New Zealand communities with community water fluoridation affect neurological development or IQ was considered by New Zealand's Chief Science Advisor in his report in 2014.

He reported that in the studies that have raised concerns the fluoride exposures "were many (up to 20) times higher than any that are experienced in New Zealand or other CWF communities, the studies also mostly failed to consider other factors that might influence IQ, including exposures to arsenic, iodine deficiency, socioeconomic status, or the nutritional status of the children. Further, the claimed shift of less than one standard deviation suggests that this is likely to be a measurement or statistical artefact of no functional significance."

Obviously, the Chief Science Advisor is behind the times. Why haven't the published NTP results been considered?

Far out of date and, incorrect statements about confounders and seriously flawed conclusion here!

RCR: How dangerous to children's IQ do you think fluoride is?

DR. ROBIN WHYMAN: The report of the New Zealand's Chief Science Advisor and Royal Society of New Zealand in 2014 did not support the suggestion that fluoride at the levels used in community water fluoridation is a risk to children's IQ or their cognitive function.

Similarly a 2016 report by the National Health and Medical Research Council (NHMRC) in Australia reviewed the literature. It states "Overall, the body of evidence for an adverse effect of fluoride on IQ and cognitive function is largely of very limited quality and is not particularly relevant to the Australian context. The best and most relevant evidence is from the only high-quality study (Broadbent et al 2014) which found no evidence for an adverse effect of fluoridated water at levels comparable to that seen in Australia on intelligence in children (as measured by IQ)."

The study cited by Broadbent et al is a New Zealand study from the highly reputed Dunedin study. Combined with the wider reviews by the Chief Science Advisor and the NHMRC it gives a strong level of confidence that data in New Zealand does not support the suggestion of a risk to children's IQ from community water fluoridation in our environment.

**Seriously
out of date
conclusions**

**The Broadbent study
was unable to draw
any conclusions because
the test and controls
had similar fluoride
exposures. See
Osmunson et al,
Am.J.Pub.Health. 2016,
106:212-3**

RCR: Why are Māori and Pacifica children affected more than the “others” group in MOH statistics?

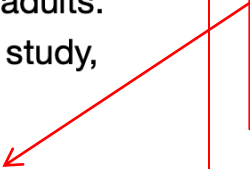
DR. ROBIN WHYMAN: Māori and Pacifica health is influenced by a complex interplay of factors including culture, poverty and deprivation.

Societal poverty and deprivation is well established to influence diets and overall health. Families with lower incomes are more likely to consume energy rich processed foods that are high in sugars.

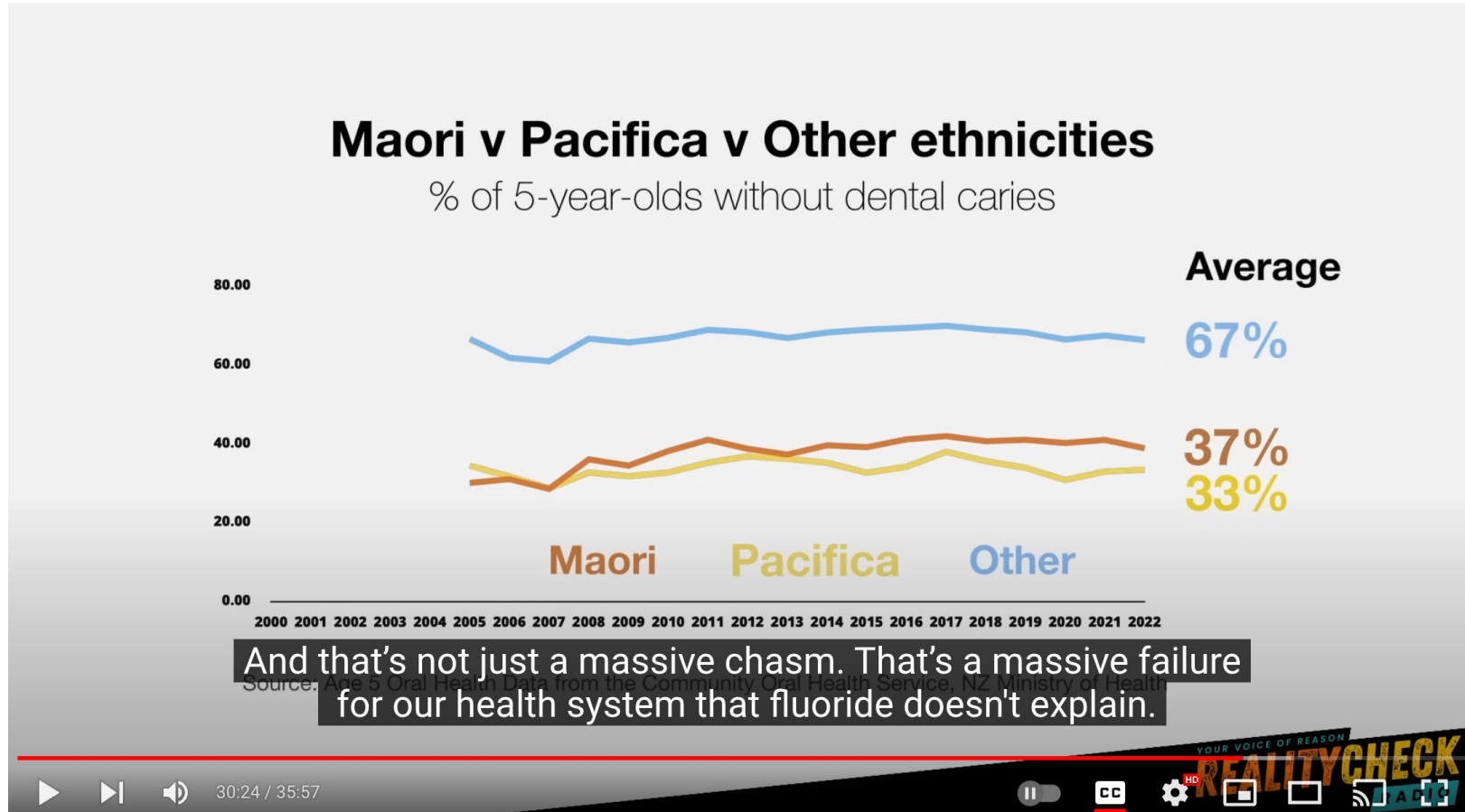
Māori and Pacifica adults also experience poorer oral health than non-Māori and Pacifica adults. Intergenerational effects on oral health have been shown in research such as the Dunedin study, where adults with poor oral health also have children with poor oral health.

Recent research is also indicating that slightly a greater proportion of Māori and Pacifica families appear to live in communities that do not have access to fluoridated water.

Fluoridation does not appear to help these populations based on New Zealand's own data.



New Zealand's own dental decay data fails to show any benefit for some populations, as show here in the RealityCheckRadio video.





Dr Robin Whyman, Dental Specialist and Chief Medical and Dental Officer Hawke's Bay DHB.

Dr. Robin Wyman in a Ministry of Health video promoting fluoridation in New Zealand

<https://www.youtube.com/watch?v=ep9X5QlaoVw>

Incorrect statements

Reality

-0:20 "Population protection of 20-40%"



-current research shows only a 2% reduction
See Moore et al, 2024 <https://doi.org/10.1111/cdoe.12930>

-0:54 "Decay that's more aggressive and harder to treat" (in the non-fluoridated area)



-this is anecdotal, no scientific evidence whatsoever for this

-1:07 "I have to take more teeth out"



-also anecdotal- recent research shows no difference in tooth loss in fluoridated vs non-fluoridated areas

-1:23 New Zealand Oral Health Survey 2009... 40% lower dental decay in the fluoridated area



-the NZ Oral Health 'survey' was not scientific and clearly biased

-1:54 Lower levels of dental decay in children AND adults in fluoridated areas



-there is no evidence fluoridation reduces adult dental decay (Cochrane Library)

-2:23 "if you remove fluoridation we're going to see ...harder to treat dental decay"



-no evidence at all for this claim

-3:07 "in 2009 6000 children had dental work in hospital



-recent research shows that hospital treatment for dental decay is unaffected by fluoridation