COMPARISON OF CSDS AND DURAPHAT VARNISH

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• The recommended dosage for Duraphat for children of nursery age is 0.25 ml of varnish per child. This gives a child a potential exposure to 5.56 mg of fluoride.
• For the same age group 3 full microbrush applications from one drop of 40% AgF gives a potential exposure of 1.8 mg fluoride (Background: A standard microbrush holds 0.01 ml of solution and one drop of AgF is 0.03 ml).
• If the application of 40% AgF is followed up with an application of one drop of 10% stannous fluoride the additional potential exposure is 0.73 mg fluoride.
Summary:
• If AgF is used alone using the recommended one drop the potential exposure to fluoride is 68% lower than that from Duraphat varnish.
• If the AgF application is followed up by the application of one drop of stannous fluoride the total fluoride exposure is 54% lower than that from Duraphat varnish.

Both CSDS (Creighton Dental) and Riva Star (SDI) have passed the stringent safety assays and have been approved by the Therapeutic Goods Administration.
(Note: The TGA when assessing safety breaks a product down into its individual constituents as shown below.)
No detailed information is available to the author on Riva Star but in terms of CSDS the following applies using one drop of AgF (0.03 ml) and one drop of SnF2 (0.03 ml) as the standard treatment dose.

Silver in one drop of AgF = 10.2 mg which is 99.8% lower than an acute oral toxic dose.
Criteria and Assessment Office, Cincinnati, OH. ECAO-CIN-026, PB86-118288.
Tin in one drop of SnF2 = 2.78 mg which is 95.5-96.75% lower than an acute oral toxic dose for a 10 Kg child and 97.7-98.35% lower than an acute toxic dose for a 20 Kg child.
(WHO (2004). Inorganic Tin in Drinking-water. Background document for development of WHO Guidelines for Drinking-water Quality. WHO/SDE/WSH/03.04/115.
Winship KA (1988). Toxicity of tin and its compounds. Adverse Drug React Acute Poisoning Rev.7:19-38.

Fluoride in one drop of AgF plus one drop of SnF2 = 2.53 mg which is 94% lower than a possible acute oral toxic dose for a 10 Kg child and 97.47 lower than a possible acute toxic dose for a 20 Kg child. Whitford GM (1992). Acute and chronic fluoride toxicity. J Dent Res. 71:1249-1254.

Given that the recommended technique for using CSDS is to apply AgF with a microbrush leave it on the tooth for a minimum of 1 minute ideally for 3 minutes and then apply SnF also with a microbrush; also one standard microbrush holds 0.01 ml of solution. As can be seen from the above the safety margins for CSDS are extremely high.

Furthermore, CSDS and Riva Star are not used as topical application liberally applied to all the teeth. They are treatments for carious lesions applied directly on the affected tooth. The silver component is used to attack and destroy bacteria and the fluoride to facilitate remineralisation. They are not applied to all teeth in the oral cavity where some may be ingested and absorbed systemically through the GIT.

The comparison between Duraphat varnish and CSDS was to show the relative safety of the latter when used according to directions. You need to understand that the two products are designed for entirely different purposes. Duraphat is applied topically to prevent caries occurring and CSDS is for arresting or slowing down the progression of established lesions that have reached dentine. As for the stability, you understand that silver fluoride is less stable than fluoride varnish; that is true to some extent, however, this is conditional. Silver fluoride has a shelf life of 30 months at present (tested by a TGA registered laboratory, testing continues and in July we expect it will be 36 months), duraphat varnish is stable for 36 months; most importantly one should read the fine print, under heading 6.4, Special precautions for storage:' it is recommended not to store above 25 degrees C. The real significance of this is that the 36 month stability of Duraphat varnish is conditional to it being stored at 25C and below. Silver Fluoride has no such precautions for storage. (http://www.mhra.gov.uk/.../spcpil/con1497592027775.pdf)

Furthermore, 6.3 (same reference) duraphat varnish, after opening it is recommended to," use within 3 months!" Once again no such recommendation is given for silver fluoride after opening. Your understanding; therefore, that Duraphat varnish is more stable than silver fluoride is not the complete picture. CSDS's silver fluoride, is silver fluoride powder (40%) dissolved in water, Duraphat varnish is: a suspension of sodium fluoride; I ml of which contains 50mg of sodium fluoride; as already stated above, they are two different products designed for different purposes.

The reference you make to the paper by Gotjamanos and Orton (1998) as to the need for caution when using silver fluoride is totally irrelevant. Those who have read and understood the paper would know that the products tested, which are no longer available, were not straight silver fluoride. They contained, a mixture of ammonium fluoride, sodium or potassium fluoride, and silver fluoride in addition silver difluoride and hydrofluoric acid, as well as some unidentified additive, which gave the products around 40% more fluoride than the current versions. A subsequent paper by Pai et al., (2007) failed to confirm their findings.