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Author version. *Evidence-Based Dentistry*, Volume 12, No. 4, pp 104–105 (2011). DOI: 10.1038/sj.ebd.6400823. © Nature Publishing Group 2011. Used with permission.

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Fluoride Varnish May Improve White Spot Lesions

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Abstracted from:

Du M, Cheng N, Tai B, Jiang H, Li J, Bian Z.

Randomized controlled trial on fluoride varnish application for treatment of white spot lesion after fixed orthodontic treatment.

Clin Oral Investig 2011; Feb 18. [Epub ahead of print]

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Commentary:

The authors' rationale for conducting this study was that while there have been numerous clinical trials evaluating white spot lesions (WSL's) *during* orthodontic treatment, there is very little information on the use of fluoride treatment for WSL's *after* orthodontic therapy. A

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2004 Cochrane Review, whose focus was on randomized controlled trials in the prevention of WSL's with the use of fluoride *during* orthodontic treatment, is one of the most noteworthy sources of information on this topic. This Cochrane Review concluded that while the evidence at the time was not strong, patients undergoing orthodontic therapy would benefit from a daily 0.05% sodium fluoride mouth rinse. They also concluded that higher quality clinical based research was needed in the use of alternative methods of fluoride delivery. {Benson:2004eq}

The aim of the study reviewed for this commentary was to evaluate one such alternative method, topical fluoride varnish, and its ability to revert white spot lesions (WSL's) *after* the debonding of orthodontic brackets. It has been shown that orthodontic patients have a significantly higher incidence of WSL's than patients who have not had orthodontic therapy {Ogaard:1988tx}, and more recent investigations have put the incidence of WSL's during orthodontic treatment with fixed appliances at 73% to 95%. {Richter:2011fm}{Lovrov:2007kk}

Topical fluoride varnish has been demonstrated to reduce WSL's during orthodontic treatment {StecksenBlicks:2007ip}, so one could logically assume that the same effect could be achieved following orthodontic therapy. The purpose of this study was to discover whether or not topical fluoride varnish, when applied in those patients who have WSL's evident following debonding, would be a successful intervention and a preferential method of fluoride delivery. As a delivery mechanism, fluoride varnish applied topically, addresses the issue of patient compliance better than any other current application method and can be applied by auxiliary personnel during routine appointments. {Behnan:2010kw}

The authors study design was one in which 12-year to 22-year old children, adolescents and young adults were blindly randomized to receive topical fluoride varnish or a placebo (saline) during the first six months following debonding. A unique aspect of this randomized, parallel group, controlled clinical trial was that the WSL's were evaluated by the use of laser fluorescence (Diagnodent Pen®, KaVo, Inc.), which has been shown to have a high degree of reliability and

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validity at quantification of smooth surface lesions. {DeBenedetto:2011iw} {Aljehani:2007ch} Even though this method of evaluation has been shown to be adversely influenced by a number of variables in the oral environment {Aljehani:2007ch}, care was taken by the researchers to minimize these variables prior to the In Vitro scans. Baseline readings were taken at the debonding visit and further readings were taken at three and six month intervals. A major strength of this study was that all assessments were carried out by the same evaluator who was blinded as to the subject's group allocation, while other studies have relied strictly on photographic interpretation for inter-observer agreement on WSL progression or regression. {StecksenBlicks:2007ip}

The results showed that there was no statistically significant difference in the intervention group between the third and sixth month, and even though this might indicate that lesion regression had capped at the three-month mark, it would be difficult to draw the conclusion that the WSL's were effectively reversed and that one should halt the administration of topical fluoride varnish at this point. While the author's do suggest that there should be a continuation of professional fluoride varnish application during the first six months following debonding; to their credit, they do mention that longer observation is needed to confirm whether or not the greater change in WSL's is maintained over time. Even with the safety of topical fluoride varnish being well documented, without studies that are longer in term and which were to utilize a larger sample size, it would be difficult to support the six-month timeframe as the de facto standard of care following the debonding of orthodontic brackets.

To summarize, the author's conclusions were not only reasonable but their results add to the existing body of evidence supporting the use of topical fluoride varnish as an effective way of managing WSL's. However, further research is needed to detail more specifics in terms of the duration of topical fluoride varnish application following orthodontic debonding. Their technique also provides the clinician a practical way to monitor and manage a White Spot Lesion's progression or regression after the debonding of orthodontic brackets.

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Key Practice Points:

Topical fluoride varnish is a safe, effective method of remineralizing tooth structure and as a delivery mechanism, it readily addresses the issue of patient compliance better than almost any other method of fluoride application and can be applied by auxiliary personnel during routine follow-up appointments.
The use of laser fluorescence (Diagnodent Pen®, KaVo, Inc.) can be a practical way to monitor a White Spot Lesion's progression or regression following the debonding of Orthodontic brackets.

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