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# THE EDITOR'S CORNER

## Preventing and Treating White-Spot Lesions

Few treatment outcomes are more disappointing to both the patient (or parent) and the orthodontist than the appearance of white-spot lesions on the teeth at the time the braces are removed. More often than not, the orthodontist has treated the case to an excellent result with respect to both occlusal function and positional esthetics. But when those white bull's-eyes appear around the periphery of where the brackets used to be, the overall effect is deeply disappointing. Even worse, any of these white spots could turn out to be a pre-carious or even early carious lesion.

The etiology of white-spot lesions is the same as that of carious infections and lesions that develop in the absence of orthodontic treatment: degradation of the mineralized structure of the dental enamel. The latest research has now identified a few key features. Such infection is not pathogen-specific; it is a biofilm disease involving 23 currently identified strains of bacteria, any combination of which may contribute to an individual carious or white-spot lesion. The pH measurement is the strongest "selection pressure" that determines whether these cariogenic strains are present at levels capable of degrading the dental enamel.

Of course, nothing contributes more to the development of white-spot lesions, overt dental caries, or gingivitis and periodontal disease than poor oral hygiene. As long as dental plaque is present on the enamel surface, there is a potential for the development of white-spot lesions. It is of utmost importance that the treating orthodontist provide the patient with adequate training in oral hygiene, but even more important that the patient adhere to those instructions and maintain a healthy, plaque-free oral environment. That this critical function is almost entirely dependent on patient cooperation can be extremely frustrating to the clinician.

Another factor contributing to white-spot lesions is excessive fluoride intake; in fact, the practice of prescribing systemic fluoride supplements for children is now coming under heavy scrutiny by the world scientific com-

munity. Genetics can play a part as well, but since neither the doctor nor the patient has any control over heredity, we can only try to minimize the effects of other causative factors. Nutrition is certainly one of these: the cariogenic bacteria present in dental plaque act on any fermentable carbohydrates in the diet to produce the acids that initiate the decalcification process, eventually resulting in white spots and dental decay. Sources of fermentable carbohydrates include the obvious sugary substances such as candy, pastries, and soft drinks, but also less obvious foods such as bread, crackers, bananas, and breakfast cereals. How often a patient eats fermentable carbohydrates is as important as dietary content; whenever a fermentable carbohydrate is chewed, the pH in the plaque drops below the point at which decalcification begins. In other words, sipping on a sugary soft drink all afternoon is much more likely to result in white-spot lesions than eating one large sugary dessert right after dinner. Appropriate dietary counseling is as crucial as oral-hygiene instruction at the outset of orthodontic treatment.

In addition to patient-dependent efforts, there are certain measures the orthodontist can take to prevent white spots and cavities. Chief among these is the application of topical fluorides. In contrast to systemic fluorides, topical fluorides in low concentrations act to reduce demineralization and enhance remineralization. Higher and more preventive concentrations of topical fluoride can be achieved through the in-office application of varnish around the base of each bracket, as described in this month's article by Drs. Demito, Rodrigues, Ramos, and Bowman. It appears that the optimal spacing between var-

nish applications is six to 12 weeks, and that this program should be supported by at-home use of fluoride-containing toothpastes and mouthrinses.

Among other approaches to preventing white spots, the most promising is the application of a resin-based sealant prior to bracket placement. This method has been espoused by various authors and speakers for some time, but few well-designed, well-controlled scientific clinical trials have been published. A variety of other procedures, most involving antibacterial measures, have been investigated, but again, there is inadequate evidence currently available in the world literature.

Post-orthodontic treatment of white-spot lesions may involve conservative practices such as continued topical fluoride therapy to promote remineralization. In the October 1989 issue of JCO, Kamp presented a technique for the removal of white-spot lesions by the use of controlled acid-pumice abrasion. I have personally found this to be an effective procedure, in terms of both efficacy and cost-effectiveness. More aggressive means of eliminating white-spot lesions include restorative techniques such as bleaching, composite fillings, labial veneers, or even ceramic crowns in extreme cases.

White-spot lesions have been a discouraging complication of treatment throughout the history of fixed-appliance orthodontics. When one reviews the scientific literature on the subject, one thing becomes obvious: much more research needs to be done. Clearly, we don't have the evidence we need to make decisions in the best interests of our patients. This month's article is one step in that direction.

RGK