The Skin of our Teeth

Dental Enamel is a remarkable substance with some very contradictory properties. It is both the hardest material in the body and one of the most fragile. And it is totally lacking in regenerative power.

Anything with those qualities that is of any usefulness at all would call for great care in its maintenance, and sure enough, we have a whole profession out there devoted almost exclusively to preserving, altering or replacing enamel and its supporting structures. Orthodontics is a part of that profession, and for many years orthodontists were among those who rarely used destructive procedures in dealing with enamel.

Gradually, occlusal adjustment and then reproximation came into vogue, with interproximal enamel as well as occluding surfaces subject to therapeutic removal. More recently, we have the boon of bonding with its acid-etch procedures that remove a thin surface layer. Estimates of net enamel loss in bonding usually range somewhere between 15 and 50 microns, with a major part of that loss caused by the preliminary abrasive surface preparation.

There is something about a micron that seems to nurture complacency; it's too small to see or feel with our unaugmented senses, so we tend to think of it as a technical term for "insignificant." But is it really that insignificant? It may be only a thousandth of a millimeter, but a millimeter is just about all the enamel that we have to last us for a lifetime. When we look at *all* of the possible "insignificant" attacks on that enamel over a lifetime, those little microns begin to add up.

Adult orthodontics is revealing some alarming examples of enamel loss in young adults. Bonding these teeth provides an intimate look at the labial enamel, and it is distressing to see so many incisors totally devoid of their original contours and surface texture. Some of these teeth are already abraded so deeply into that lifetime supply of enamel that the color is yellowed by the dentin showing through. This is cause for real concern in someone with three-fourths of the normal life span of those teeth ahead of them; it is doubtful that some even have that much of their labial enamel remaining.

The big losses are most probably caused by mechanical abrasion, some combination of highly abrasive "whitening" dentifrices, aggressive brushing, and overzealous "prophylaxis." Prophylaxis intended to prevent short-term disease conditions should not cause long-term harm. The labial surfaces of incisors are unlikely candidates for disease even in an average mouth, much less the clean mouths where we usually see this iatrogenic destruction.

Orthodontists like to think constructively. Most of our work is making things better than they ever were before, and anything less makes us uncomfortable. It is encouraging to see the beginnings of a new generation of

adhesives that promises to all but eliminate the chemical attack of the acid etch, which leaves the abrasive attack in the preparatory procedures as the only significant remaining threat to the enamel. Unfortunately for our patients, bonding is not where most of those abrasion losses are happening, but every little bit counts.

Is it really necessary that we remove more enamel by abrasive polishing than will be removed by the chemical etch? The objective is to remove *surface deposits* to assure that the etchant reaches the surface of the tooth, so why must we remove the entire surface far beyond the material that we intended to etch? A light wiping with prohylaxis paste on a cotton pellet is all that is needed to clean these well-cared-for surfaces for bonding.

Abrasive polishing is *not* cleaning; it is an inherently destructive process that works by actually removing surface material. All that it would take to completely denude a labial surface is the removal of a mere 10 microns in each semiannual polishing for fifty years. *Any* removal of healthy tissue exceeds the bounds of prevention and becomes something that should itself be prevented.

Low-etch bonding materials and conservative cleaning can easily make orthodontics a disappearing threat. Two years of protection with an orthodontic attachment could actually provide many people with a net gain in enamel over two years of "preventive" attack.

What these patients need most is one more component in their aramentarium for prevention — a renewed awareness of their precious enamel and the difference between the objectives and effects of cleaning and polishing.

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