

TREATMENT OF NCCLS

Once a decision has been made with the patient to restore a tooth to a more esthetic or hygienic state, several options for repairing NCCLs exist. Since most NCCLs are accompanied by some form of recession, one question to address is whether the gingiva are healthy in their receded location.

If there is adequate thickness of gingival tissue, lack of inflammation, and esthetics are not a concern, then gingival grafting may not be part of the restorative process, and deciding on the type of restorative material would be the next step (ideally glass ionomer subgingivally or on the root surface, and composite for esthetics coronally or layered over the glass ionomer).

However, if the gingiva do need augmentation, a decision is to be made whether a root surface restoration is necessary or not. If the NCCL is shallow and does not significantly involve the enamel, the root surface and any sharp enamel edges can be planned smooth at the time of gingival grafting, and no restoration is necessary (see photo below of treated case from front panel).



However, if the defect is deep, or the enamel has been significantly undermined such that gingival grafting and root shaping will not address the lost enamel esthetically, or resolve tooth hypersensitivity, then restoration should be performed.

*All cases are patients of Dr. Pamela Nicoara

DEFINITIONS

Non-carious cervical lesions (NCCLs) are defined as tooth wear or loss of tooth substance at the cemento-enamel junction. This can lead to hypersensitivity, plaque retention, pulpal involvement, root fracture, and esthetic problems. NCCLs are also synonymous with terms such as 'cervical wear', 'abfraction', 'cervical erosion', and 'abrasion.' There are a few terms to define first, which will be important in understanding the possible etiology of NCCLs.

Attrition: the loss of enamel, dentin or restoration by **tooth-to-tooth** contact.

Abrasion: the loss of tooth structure from factors other than tooth-to-tooth contact such as coarse **foods, or instruments** for oral hygiene. Usually sharp, angled lesions.

Erosion: the loss of tooth structure from **chemical dissolution** from a source other than bacterial acids. This could be from internal stomach acids (acid reflux) or from external acidic foods (citrus or carbonated drinks). Typically rounded, shiny lesions.

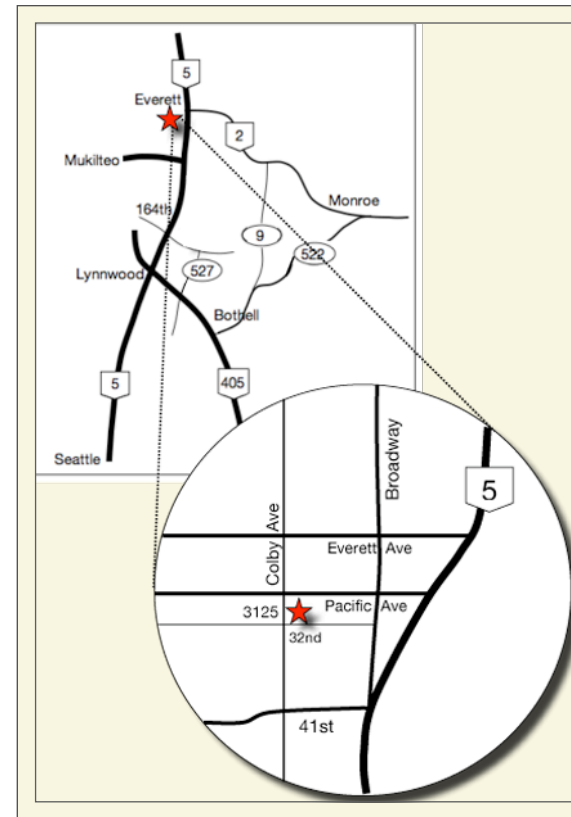
Abfraction: describes a process whereby **occlusal forces** create stresses in enamel and dentin along the cervical area and predispose it to erosion and abrasion.

Some terms above are widely accepted in dentistry to occur with regular frequency, others, such as abfraction, are more controversial. This issue of **ProbeTips** will review the most recent literature regarding the controversial topic of the etiology of non-carious cervical lesions, and the treatments available to potentially prevent, or restore such lesions.

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NEWSLETTER

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Non-Carious Cervical Lesions



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GENERAL CONSIDERATIONS

Tooth wear over time is normal. Based on examining skulls of hunter-gatherer populations, as well as other species of the animal kingdom, phenomenon such as occlusal wear, continual eruption, mesial tooth migration, reshaping of the TMJ, and widening of the masticatory cycle support the idea of perpetual change over time. Because joint components of the masticatory system can adapt to changes in the teeth over time, provided these changes do not lead to loss of function, we can expect that it is normal for our teeth to change over our lifetime. It is the deeper question to decipher when those changes progress too rapidly such that the teeth, although worn, may not function for one's lifetime, and preventive or restorative intervention is necessary. Further is to consider our role as dentists to treat such negative or pathologic changes, and whether restoring to ideal newly erupted tooth shape is esthetically pleasing or functional for the individual.

NCCLs can take on a variety of forms: wedge shaped, disc shaped, shallow or deep, flattened or with sharp edges. The significant variation in patterns of NCCL indicate that there may be more than one single etiology. NCCLs generally occur on the buccal surfaces of teeth and rarely present lingually. They occur more frequently in the maxilla, and affect premolars and canines over incisors and molars. They affect non-mobile teeth more than mobile teeth. Their prevalence and severity seem to increase with age. Of particular interest is that these lesions appear to be a modern pathology. One interesting review from an anthropologist perspective notes that

cervical lesions are not present in skulls ranging many thousands of years from hunter-gatherer populations. Even in modern skulls from 1920-1958, less than 1% of teeth had any cervical wear.

THE ROLE OF ABRASION AND EROSION

The earliest studies of NCCLs attributed the lesions to tooth-brush abrasion. Either the firmness of the bristles, the aggressiveness or frequency of the stroke, or the coarseness of the toothpaste were believed to be causative factors. Laboratory

and in situ studies did demonstrate scratches and wear on the tooth surface, however, these values were less than 1 micrometer, and are not believed to be clinically significant in and of themselves. Similarly, erosion alone does not seem to be able to create the sort of lesions seen in the mouth.



THE ROLE OF ABFRACTION

Because there are NCCLs which appear to be free-standing where the adjacent teeth are unaffected, such that abrasion and erosion cannot account for these situations, it was proposed that flexure of the teeth caused by occlusal forces may be responsible. However, despite many computer generated finite element analysis studies, there is little clinical evidence of excessive flexure alone causing NCCLs. In addition, there are many patients with significant occlusal wear that do not

have cervical wear. This is evidenced by the hunter-gatherer skulls which had no cervical wear, and the modern skulls with very little cervical wear, but both of which had significant occlusal wear.

MULTIPLE ETIOLOGIES

As mentioned previously, the wide variation in the shape and size of NCCL indicates that multiple etiologies are at play. More recent studies have examined the combination of acid-softening of the teeth with the use of abrasive oral care products which appears capable of creating significant damage. One six-year longitudinal study indicated that long term consumption of dietary acids and frequent tooth brushing correlated to increased cervical wear. In another laboratory study on thin sections of enamel and dentin of extracted unworn teeth, there was increased loss of mineralized tissue after cervical

stress and immersion in acid. Therefore, new terms such as



'stress corrosion' or 'dental compression syndrome' have been applied to NCCLs which appear to be related to excess occlusal forces.

PREVENTION

If there are multiple etiologies for the formation

of a NCCL, then there are multiple methods available for prevention. If erosion seems to play a significant role, then reducing the intake of acidic foods, and testing for acid reflux are indicated. In addition, from the six-year longitudinal study noted earlier, it was surmised that waiting one hour to brush after consuming acidic foods could increase the resistance of the tooth to abrasion. Clinically, the application of fluoride varnish, or the use of toothpastes or gels with increased fluoride levels is also indicated. If occlusal wear is evident, fabrication of an occlusal guard may help reduce the risk of developing NCCLs. If abrasion seems the strongest factor, educating patients in the practice of less aggressive brushing styles and the use of less abrasive oral care products, particularly those with whitening agents, are obvious. Of course, a combination of some or all of these methods are likely necessary for most patients.



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complete references available on request
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