Non-carious Cervical Lesion: A Review Article

Anil K Tomer¹, Anjali Miglani², Sagarika Muni³

¹Professor and Head, Department of Conservative Dentistry and Endodontics, D.J. College of Dental Science and Research Centre, Modinagar, Uttar Pradesh, India, ²Reader, Department of Conservative Dentistry and Endodontics, D.J. College of Dental Science and Research Centre, Modinagar, Uttar Pradesh, India, ³Post-graduate Student, Department of Conservative Dentistry and Endodontics, D.J. College of Dental Science and Research Centre, Modinagar, Uttar Pradesh, India

Non-carious cervical lesions are usually described as “tooth substance loss.” Such process includes attrition, abrasion, erosion, abfraction, localized non-hereditary dentinal hypocalcification, localized non-hereditary dentinal hypoplasia, amelogenesis imperfecta, dentinogenesis imperfecta, and tooth trauma. The non-carious cervical lesion is complex lesions in which there is a loss of enamel, dentin, cementum, bone and keratinized attached gingiva. Furthermore, there is gingival crest disharmony, poor emergence profile, loss of identifiable cemento-enamel junction, Miller’s recession class, and dentin/root sensitivity. The treatment of this non-carious lesion includes restorations such as glass-ionomer cement (GIC), composites, and Resin-modified GIC. We can even restore them with porcelain fused metal crowns or full ceramic crowns.

Keywords: Abfraction, Abrasion, Erosion, Tooth wear index

INTRODUCTION

The loss of tooth wear has proved a fascination to mankind since the dawn of history. The main logic behind this is that any part of a human body can repair by themselves to a degree and; therefore, the influence of life’s events is eliminated as the individual gets older. However, this is not in the case of teeth, which is biologically almost inert, and in a gross sense, they are incapable of repair, in a healing sense.

Since the dawn of restorative dentistry, the non-carious cervical lesion raised a red flag to the dentists. The non-carious loss of tooth structure was first mentioned in the dental literature by Dr. Hunter in 1728. Many dental researchers were very much curious about this non-carious lesion at the cervix of the teeth, which they named the “mysterious non-carious cervical lesion.”¹

Commonly literature offers a description of all non-carious lesions as if they were one entity and begin with a description of “tooth substance loss.” Such process includes attrition, abrasion, erosion, abfraction, localized non-hereditary dentinal hypocalcification, localized non-hereditary dentinal hypoplasia, amelogenesis imperfecta, dentinogenesis imperfecta, and tooth trauma.²

Miller, in 1907, characterized the non-carious cervical lesion as a slow and gradual loss of tooth substance resulting in smooth, wedge-shaped defects along the cemento-enamel junction (CEJ).³ The non-carious cervical lesion is complex lesions in which there is a loss of enamel, dentin, cementum, bone, and keratinized attached gingiva. Furthermore, there is gingival crest disharmony, poor emergence profile, loss of identifiable CEJ, Miller’s recession class, and dentin/root sensitivity.⁴

Non-carious cervical lesions present a variable morphology ranging from shallow grooves to broad ditched out lesions to large notched or wedge-shaped defects. The reported prevalence of non-carious cervical lesions regardless of form and etiology is shown to vary from 5 to 85%. Both prevalence and severity are known to increase with age.⁵

The non-carious cervical lesion is becoming as an increasingly important factor when considering the long-term health of the dentition. Because these lesions can affect the tooth sensitivity, plaque retention, caries incidence, structural integrity, and pulp vitality, and they present unique challenges for successful restoration.⁶

The treatment for the sensitivity in these non-carious cervical lesions can be. “In office use of iontophoresis,” in
which, NaF is applied to the sensitive dentin. Lasers are also a mode of treatment in these lesions. Neodymium-doped: Yttrium aluminum garnet laser is used to treat patients with cervical sensitivity to cold air. We can also enhance the acid resistance mechanism in the patient by advising topical fluoride, can decrease the abrasive component of toothpaste, use of mouth guards are also an option for treatment of these lesions.\(^7\)

**ETIOLOGIC FACTORS OF ABFRACTION**

**Stress Factors**

*Endogenous*
- Parafunction habits such as bruxism and clenching
- Occlusion: Premature contacts or eccentric loading
- Deglutition.

*Exogenous*
- Mastication of hard and resistant foods
- Habits: Biting objects such as pencils, pipe stems, and fingernails
- Occupations: Holding nails with teeth, playing wind instruments
- Dental appliances: Orthodontic appliances, partial denture clasps, and rests.\(^8\)

**Biocorrosion**

*Endogenous (acid)*
- Plaque: Acidogenic bacteria
- Gingival crevicular fluid
- Gastric juice in patients with gastro-esophageal reflux disease, bulimia.

*Exogenous (acid)*
- Consumption of acidic beverages, citrus fruits, and juices
- Occupational exposures to acidic industrial gases and other environmental factors.

**Proteolysis**
- Enzymatic lysis (caries)
- Proteases (pepsin and trypsin).\(^9\)

Non-carious cervical lesions are characterized by structural lesions near the CEJ, without the presence of caries. There are various forms of these lesions such as abrasion, erosion, and abfraction.

**ABFRACTION**

Abfraction lesions are defined as wedge-shaped defects in the cervical lesions of the tooth and are hypothesized to be a result of tensile stress concentrated in this area consequent to occlusal force in some remote area.\(^10\)

**MECHANISM FOR FORMATION OF ABFRACTION LESIONS**

The masticatory system during function exposes the teeth to three types of stress: Compressive, tensile, and shear stress. As a general rule, both dentin and enamel have high compressive strength but are relatively weak in tension. Dentin is substantially stronger than enamel in counteracting tensile stresses.

Comparatively, enamel moves as a rigid unit, are brittle and liable to fracture at small deformation load. The ability of the enamel to withstand stress depends significantly on the direction of force in respect to the orientation of enamel rods. Forces are best withstood when they are in line with the rods, whereas under tensile forces that tend to pull the rods away from each other, enamel generally surrenders. There occurs disruption of chemical bonds between hydroxyapatite crystals, and as bonds are broken, small intercrystalline spaces are created which allow penetration of water and other molecules. The disrupted crystalline structure is then much more susceptible to chemical dissolution and breakage from physical forces such as brushing, compression, tension, mastication, and bruxism.\(^5\)

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Abfraction lesions are mostly seen on the buccal surface of the mandibular teeth, as can be evidenced from the Figure 2 in which the buccal surface of maxillary teeth will not be stressed to tension rather will be placed under compression.\(^5\)

![Figure 1: Lateral forces creating tension (T) and compression (C) at the cervix that are indicated by arrows. In the enlarged section, disrupted bonds between the enamel rods are shown Sikri](image-url)
RESTORATIONS OF ABFRACTION LESIONS

These lesions can be restored with Amalgam, glass-ionomer cement (GIC), resin-modified GIC, composites, and ceramic inlays. The newer methodology includes computer-aided design-computer-aided manufacturing technology, G-bond, One UP bond F with palfique estelite resin. Flowable composite (3M ESPE) Packable Composites.

Bulk Fill Composite:
1. Ever X-composite
2. Smart dentin replacement from dentsply.

CONCLUSION

Based on the information given in this article, we can conclude that the most significant consideration in the restoration of non-carious cervical lesions is the correction of possible prematurities before restoring the tooth. To do so, an accurate diagnosis is required, and evidence-based treatment for loss of dental tissue should consider restoration and the choice of material.8

REFERENCES


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