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Non-Carious Lesions: A Review Article

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Abstract

Non-carious lesions (NCCLs) represent a category of dental conditions characterized by the loss of tooth structure at the cementoenamel junction without the involvement of dental caries. These lesions can compromise dental function and esthetics and arise from a combination of mechanical, chemical, and developmental factors. Understanding their etiology, clinical presentation, and management strategies is crucial for effective treatment and prevention.

Keywords: Non-carious cervical lesions, abrasion, erosion, abfraction, attrition, enamel hypoplasia, Dentinogenesis imperfecta, amelogenesis imperfecta, dental wear, restorative dentistry.

Introduction

NCCLs are commonly observed in clinical practice and can affect enamel, dentin, and cementum. Unlike carious lesions, they are not caused by bacterial activity but rather by factors such as abrasion, erosion, attrition, and abfraction. Their multifactorial origin makes diagnosis and management challenging. With increasing tooth retention into older age, the prevalence of NCCLs is rising, necessitating a deeper understanding among dental professionals.

Classification of NCCLs

NCCLs can be classified based on their etiology:

Mechanical Wear

1. Attrition: Tooth-to-tooth contact leading to flattened occlusal or incisal surfaces. Commonly associated with parafunctional habits like bruxism(fig.1).
2. Abrasion: External mechanical forces such as overzealous tooth brushing, use of abrasive toothpaste, or habits like nail-biting(fig.2).
3. Abfraction: Cervical enamel loss resulting from occlusal forces causing tooth flexure, typically presenting as wedge-shaped defects(fig.3).

Fig. 1

Fig2

Fig.3

Chemical Wear

Erosion: Loss of tooth structure due to chemical dissolution by non-bacterial acids. Sources can be intrinsic (e.g., GERD, vomiting) or extrinsic (e.g., acidic diets, carbonated beverages)

Fig 4

Developmental and Genetic Factors

Enamel and Dentin Hypoplasia/Hypomaturation: Underdeveloped or poorly mineralized tooth structures resulting from systemic illnesses, nutritional deficiencies, or trauma during development.

Fig.5

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Amelogenesis and Dentinogenesis Imperfecta: Inherited conditions affecting enamel and dentin quality and resilience.

Fig.6

Clinical Presentation and Diagnosis

Clinical Presentation:

NCCLs present with a range of features depending on their cause and severity:

1. Morphology: Typically wedge-shaped, V-shaped, or saucer-shaped defects at the buccal cervical regions of premolars and canines.
2. Texture and Color: Lesions may have smooth, hard, and shiny surfaces or appear dull and soft in cases of erosion. Discoloration may vary from white to yellow-brown.
3. Sensitivity: Commonly reported due to dentin exposure, particularly to thermal, osmotic, or tactile stimuli.
4. Progression: Lesions may remain static or progress if causative factors persist.

Diagnosis:

Accurate diagnosis involves a multifactorial assessment:

1. Patient History: In-depth inquiry about oral hygiene practices, dietary habits (acidic food/beverages), stress or anxiety (bruxism), and history of systemic illnesses.
2. Clinical Examination: Visual inspection for location, shape, and severity of lesions; tactile probing for surface hardness.
3. Occlusal Analysis: Evaluation for signs of bruxism, malocclusion, or occlusal interferences.
4. Radiographic Imaging: Useful in ruling out caries and assessing the extent of dentin involvement.
5. Differential Diagnosis: Exclude similar presentations such as caries, root resorption, or restorative defects.

Management Strategies

Preventive Measures:

1. Educating patients on proper brushing technique using a soft-bristled brush and non-abrasive toothpaste.
2. Modifying diet to reduce acidic food and drink consumption.
3. Stress management programs, use of occlusal splints or nightguards for bruxism.
4. Regular monitoring of lesion progression.

Restorative Treatments:

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1. Indicated in cases with sensitivity, aesthetic concerns, or risk of pulp exposure.
2. Materials include glass ionomer cement (GIC), resin-modified GIC, or composite resin based on location and esthetic demand.
3. Full crowns or veneers may be needed in advanced lesions.
4. Desensitizing agents (fluoride varnishes, potassium nitrate) may be used in mild sensitivity cases.

Treatment of Underlying Conditions:

1. Management of systemic conditions like GERD or eating disorders.
2. Addressing genetic enamel/dentin defects through multidisciplinary approaches involving restorative, preventive, and orthodontic care.

Fig.7

Conclusion

NCCLs are multifactorial in nature and require a comprehensive approach for diagnosis and management. Preventive strategies, coupled with timely restorative interventions, are key to maintaining dental function and aesthetics. Dental practitioners must be well-versed in recognizing the diverse causes and manifestations of these lesions to deliver optimal patient care.

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