IJIMM, Volume 4, Issue 02, 2026 ISSN: 2995-5319
http://medicaljournals.eu/index.php/IJIMM/issue/view/3

INTERNATIONAL JOURNAL OF INTEGRATIVE AND MODERN MEDICINE

# A Modern Approach to The Treatment of Non-Carious Lesions (Literature Review)

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**Abstract:** This scoping review presents modern methods for restoring teeth with non-carious lesions. It analyzes clinical cases involving enamel erosion, wedge-shaped defects, and pathological tooth wear. Particular attention is paid to the selection of restorative and orthopedic structures that ensure not only functional restoration but also a highly aesthetic outcome. Minimally invasive techniques, the use of composite and ceramic materials, and the specifics of an individualized approach to patient treatment are discussed.

**Keywords:** Non-Carious Lesions, Dental Restoration, Composite Restorations, Ceramic Veneers, Clinical Observations, Minimally Invasive Techniques, Individualized Approach

## Introduction

Non-carious tooth lesions are a pressing dental problem. These conditions negatively impact chewing efficiency, aesthetics, and quality of life.

The term "non-carious dental lesions" (NCDL) refers to the loss of dental tissue caused by processes unrelated to bacteria1. Their etiology is multifactorial and complex, involving processes such as biocorrosion, abrasion, and abfraction.[2]

Generally, NCDLs are located in the cervical third of the tooth at the level of the cementoenamel junction and tend to extend from the latter toward the tooth root [4]. The cementoenamel junction proves to be more prone to loss of substance because the thickness of the enamel is greatly reduced and, consequently, the enamel–dentin bond is much weaker [5].

Dental biocorrosion is characterized by the chemical dissolution of mineralized dental tissues by nonbacterial acids. Abrasion occurs under the influence of objects or substances that frequently come into contact with tooth surfaces, such as brushing and abrasive toothbrushes, leading to mechanical wear. The theory of abfraction is based primarily on stress concentration in the cervical region, which causes tooth bending, leading to microcracks and enamel loss. Given that occlusal forces can cause stress concentration, occlusal interference, premature contact, bruxism, and clenching may contribute to the etiology of noncarious occlusal lesions. However, some studies suggest a combination of occlusal stress, abrasion, and biocorrosion in the development of lesions, leading to the conclusion that abfraction progression is multifactorial.

In recent years, clinical practice has seen an increase in the number of patients seeking treatment for these problems. Modern approaches to their treatment include not only restoring the anatomical shape of teeth but also the use of innovative materials aimed at achieving long-lasting and aesthetically pleasing results. Research shows that non-carious dental lesions develop under the influence of mechanical (bruxism), chemical (acidic drinks, GERD), physiological, and biological factors. Modern restoration methods are based on:

- the use of composite materials;
- the use of ceramic restorations (veneers, inlays);
- minimally invasive techniques;
- comprehensive prevention.

Many authors emphasize that the key is the individual selection of a treatment method based on the severity of the defect and the clinical picture.

## Materials and Methods

Nowadays, there is a noticeable increase in the percentage of adults suffering from tooth surface loss (TSL) from 3% in young people to 17% in those over the age of 70 [1,7,4]. According to Zuza et al. [10,14] the prevalence of NCLs ranges from 0.8% to 85% as elderly people have higher numbers and more severe lesions due to longer exposure to different etiological factors.

Non-carious defects are not associated with cariogenic microorganisms. They arise from prolonged exposure to external and internal factors.

Main types:

1. Dental attrition: It is the loss of tooth enamel either on the incisal or occlusal surface due to masticatory forces between the opposing teeth. Small facets on the cusp edge or flattening in the incisal edge are considered an early clinical sign of attrition. Shortening of the clinical crown may end up with pulp exposure in severe cases [22].
2. Dental erosion: It is the loss of hard tooth substances either on the cervical, lingual or palatal enamel by chemicals such as acidic substrate. It may occur due to internal causes such as acid reflux or external causes such as carbonated drinks. The lesions can vary in severity from minute defect to severe involvement of dentin [22].
3. Dental abrasion: It is a physical loss of tooth substance due to certain mechanical processes either by an object or material or both of them contacting the tooth surface. The most common cause of abrasion is faulty tooth brushing technique. The lesion is located on the buccal or labial cervical area of the tooth in the form of rounded ditches [22].
4. Dental abfraction: It is the loss of tooth substance due to eccentric occlusal load that results in the formation of compressive and tensile forces at the cervical area of the facial surface. The lesion is characterized by its wedge V-shaped appearance with sharp rims at the CEJ [15].

Monitoring NCCLs is a treatment option in early lesions and should be based on the progression of the lesions and how they compromise the vitality, function and aesthetics of teeth [16,17]. Other treatment options are techniques to reduce dentin hypersensitivity and techniques to restore the lost tissues using restoration, possibly in combination with a surgical root-covering procedure [16,18, 19].

Various treatment modalities were applied in the management of different non-carious lesions (NCL) [20,21,22,23]. However, the effectiveness and durability of these treatment options are still questionable despite the large variety of applied materials and advanced techniques. Controversy exists on the most suitable material that can restore such NCLs and even the decision to initiate a restorative treatment .

Modern restorative methods.

1. Composite restorations allow for the restoration of minor defects. Characterized by their aesthetic appeal and good adhesion. As mentioned by Pumans et al., direct resin composite should be placed in increments of 1.5 to 2.0 mm thickness in areas subjected to high functional load to obtain a durable restoration. Also, they had recommended high-quality clinical procedures; isolation, preparation, restorative phase, finishing and polishing, to obtain more durable restoration. Based upon a review article, the most successful composite protocol can be achieved either with a 3-steps etch-and-rinse or a 2-step self-etch to obtain a durable restoration in NCCLs [22].
2. Ceramic veneers and inlays are used for more significant defects. Ensure durability and high aesthetics [5].
3. Minimally invasive methods preserve the maximum volume of healthy tooth tissue. Use of thin restorative structures.
4. Prosthetic treatment for extensive lesions in cases of significant tissue loss, crowns, bridges, or implants are used.

Clinical observations several typical cases can be identified in clinical practice:

- Patients with wedge-shaped defects are successfully treated with composite materials, which allows for rapid restoration of aesthetics and chewing function.
- In cases of pathological tooth abrasions, the use of ceramic veneers and crowns is a more effective solution.
- In cases of multiple enamel erosions, combined methods are used, including reparative therapy and subsequent microprosthetic restoration.

## Results

Results of clinical observations: 1. In patients with wedge-shaped defects, the use of composite restorations allowed for the restoration of the anatomical shape of the teeth, reduced sensitivity, and improved aesthetics. 2. In cases of pathological tooth abrasions, the use of ceramic veneers and crowns proved successful, ensuring the restoration of chewing function and the aesthetic appearance of the dentition. 3. In cases of multiple enamel erosions, a combination of reparative therapy followed by microprosthetic restoration has proven effective. 4. Clinical practice shows that the choice of treatment method should be based on the severity of the defect and the individual characteristics of the patient [1–3].

## Conclusion

1. Non-carious dental lesions remain a pressing problem in dentistry, requiring a comprehensive approach. 2. Modern restoration methods include the use of composite and ceramic materials, minimally invasive techniques, and the use of orthopedic structures. 3. Clinical observations confirm that the greatest effectiveness is achieved with individualized treatment selection. 4. Prevention plays a crucial role: patient education on hygiene rules, nutritional correction, and regular dental monitoring [4–5]. 5. A promising direction is the introduction of innovative materials and technologies that improve the durability and aesthetics of restorations.

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