

## Non-Carious Cervical Lesions: From Diagnosis to Treatment

Amira Kikly<sup>1\*</sup>, Sabra Jaâfoura<sup>2</sup>, Afif Bouslema<sup>3</sup>, Emna Garouachi<sup>4</sup>, Ameni chadlia Belghuith<sup>4</sup>, Wided Gllii<sup>4</sup>, Neila Zokkar<sup>5</sup>, Nabiha Douki<sup>5</sup>

<sup>1</sup>DDS, Associate professor, Department of Dentistry, university hospital, Sahloul, Tunisia  
Faculty of Dental Medicine, University of Monastir, Avicenna Street, 5000 Tunisia.  
Research Laboratory LR12ES11, University of Monastir.

<sup>2</sup>DDS, Msc, Associate professor, Department of Dental Biomaterials, Faculty of Dental Medicine, University of Monastir, Avicenna Street, 5000 Tunisia.

Laboratory of Dento-Facial, Clinical and Biological Approach (ABCDF) LR12ES10, University of Monastir.

<sup>3</sup>DDS, Assistant, Department of Dentistry, university hospital, Sahloul, Tunisia  
Faculty of Dental Medicine, University of Monastir, Avicenna Street, 5000 Tunisia.  
Research Laboratory LR12ES11, University of Monastir.

<sup>4</sup>DDS, Department of Dentistry, university hospital, Sahloul, Tunisia  
Faculty of Dental Medicine, University of Monastir, Avicenna Street, 5000 Tunisia.  
Research Laboratory LR12ES11, University of Monastir.

<sup>5</sup>DDS, Professor, Department of Dentistry, university hospital, Sahloul, Tunisia  
Faculty of Dental Medicine, University of Monastir, Avicenna Street, 5000 Tunisia.  
Research Laboratory LR12ES11, University of Monastir.

\***Corresponding author:** Amira Kikly, 1DDS, Associate professor, Department of Dentistry, university hospital, Sahloul, Tunisia  
Faculty of Dental Medicine, University of Monastir, Avicenna Street, 5000 Tunisia. Research Laboratory LR12ES11, University of Monastir. kiklyamira@hotmail.fr

**Citation:** Kikly A, Jaâfoura S, Bouslema A, Garouachi E, Belghuith AC, et al. (2024) Non-Carious Cervical Lesions: From Diagnosis to Treatment. *Ameri J Clin Med Re: AJCMR-116*.

**Received Date:** 22 January, 2024; **Accepted Date:** 31 January, 2024; **Published Date:** 07 February, 2024

### Abstract

Non-carious cervical lesions have always posed difficulties in terms of etiological diagnosis, prevention and restoration. Interception of the causative factors is sometimes not enough to meet patients' needs, and curative treatment is required. Restoration of the loss of substance with an adhesive biomaterial is essential, to reduce thermal sensitivity and improve aesthetics. Such restoration is a complex exercise for the clinician, due to the difficulties that may be encountered. These difficulties are indeed linked to the particular location of these lesions, making their isolation, visibility and access complex. The aim of this paper is to describe the management of non-carious cervical lesions, detailing both the therapeutic and preventive approaches.

**Keywords:** Cervical lesion, Sclerotic dentin, Adhesion, Composite resin.

### Introduction

The incidence of carious disease has declined over the last few decades, due in particular to preventive measures and the development of fluoride therapies. Nevertheless, another form of lesion has emerged in parallel, and has increased in prevalence and severity. This is non-carious tissue loss. The development of these lesions is associated with changes in lifestyles and the longevity of teeth on the arch. They have aesthetic, functional and biomechanical consequences. Depending on the etiology, the clinical appearance is different. It's important to differentiate between possible etiologies to adapt preventive treatment, as opposed to restorative treatment, which will be similar [1].

Dental abrasion is the abnormal loss of tooth substance or structure through a mechanical process. It is considered a pathological process. A 3-body abrasion is the displacement of two bodies against each other, but with the interposition of abrasive particles between them, constituting the third body. The presence of an abrasion lesion and gingival recessions, coupled with good oral hygiene, confirms the involvement of the "brushing" factor in the etiology of these lesions. Brushing parameters (brushing technique, brushing frequency, force

exerted during brushing, duration of brushing) and the equipment used (toothbrush, toothpaste) must therefore be analyzed [2].

The aim of this paper is to illustrate, through a case report, the keys to successful management of non-carious cervical lesions.

### Case Report

This is a 60-year-old patient who consulted the dental medicine department of the sahloul university hospital, Tunisia, for cold sensitivity in the lower left premolo-molar sector. Interrogation revealed the notion of traumatic brushing using a horizontal technique. Endobuccal clinical examination revealed non-carious cervical lesions on 33, 34 and 35 (Fig.1), compromising aesthetics and associated with gingival recession and traumatogenic occlusion. The treatment plan was based on eliminating the factors that had led to the development of non-carious cervical lesions. The aim of treatment in this situation was to restore the loss of tooth substance and re-establish function and aesthetics, thus resolving the problem of hypersensitivity. The light-curing dam was placed opposite the causal teeth (Fig.2). Fluid composite resin restorations were performed on 33, 34 and 35. (Fig.3-5).



**Figure 1:** Preoperative clinical view showing non-carious cervical lesions on 33, 34 and 35.



**Figure 2:** Light-curing dam installation.



**Figure 3:** Etching with 35% orthophosphoric acid.



**Figure 4:** Adhesive application and light-curing.



**Figure 5:** Final result after fluid resin application.

## Discussion

The clinician must have a good knowledge of the clinical characteristics and etiological factors of non-carious cervical lesions in order to make an accurate diagnosis and identify potential etiological factors. A clinical investigation must be carried out on the basis of these characteristics. It is generally accepted that lesions are not caused by a single etiology, but by a combination of factors. [3] Abrasion is the abnormal loss of tooth substance through a mechanical process. It is considered a pathological process.

Two types of abrasion exist:

\*2-body abrasion, which is friction between two solid bodies in movement and in direct contact (dento-dental contacts or wear by interposed objects).

\*3-body abrasion, in which two bodies move against each other, with abrasive particles interposed between them to form a third body.

In our case, we're talking about a focal 3-body abrasion caused by brushing with toothpaste interposition in the cervical region, with soft tissue integrity compromised by the appearance of recessions. Traumatic brushing can cause gingival lesions, which should alert the clinician. The presence of non-carious cervical lesions and gingival recessions, coupled with good oral hygiene, confirms the involvement of the "brushing" factor in the etiology of these lesions. We therefore need to analyze brushing parameters (technique, frequency, force exerted during brushing, duration) and the equipment used (toothbrush and toothpaste). Horizontal brushing has been shown to be the most traumatic method, causing two to three times more abrasion than adapted brushing. It has also been shown that brushing twice a day or more increases the risk of developing non-carious cervical lesions. However, it is still advisable to brush twice a day. Excessive pressure on the brush seems to aggravate the abrasive process. Ganss et al. found a brushing force of 2.9 N in patients with wedge-shaped lesions, compared with 2.1 N in patients with no abrasion. It has also been shown that areas at the start of brushing are the most affected. These areas were brushed longer and with greater intensity than others [4].

Excessive brushing times, coupled with a faulty brushing method, can however exacerbate the abrasion phenomenon. It has been shown that the use of a hard-bristled and/or worn brush is correlated with gum damage, so a soft-bristled brush is still recommended [5].

Toothpastes contain abrasive agents to remove stains and surface deposits from tooth surfaces. Toothpaste compositions vary, and an index is used to indicate the degree of abrasivity: the RDA (relative dentine abrasivity). A higher RDA score makes a toothpaste more abrasive. Researchers have attempted to verify the correlation between RDA and the appearance and development of non-carious cervical lesions. They concluded that there is a weak correlation between RDA values and abrasiveness on dentine. He adds that, when used excessively, toothpaste brushing has little effect on enamel, but can reach pathological proportions on dentine [4].

Toothpaste thus contributes to the abrasive phenomenon, as does bristle hardness, but both in minor proportions compared to brushing method and frequency. The degree of abrasion thus depends on the technique, frequency and duration of brushing, the material used and the abrasivity index of the toothpaste. Horizontal brushing combined with hard bristle toothbrushes

and abrasive toothpaste can cause damage to the cervical region. Because of their location, they may be accompanied by gingival recession and hypersensitivity. These lesions present a hard, smooth, polished surface. Slight striations caused by toothbrush bristles can also be observed. Localization varies according to the etiology. In the case of traumatic brushing, they are seen on the vestibular surfaces of maxillary canines and premolars, with greater involvement on the opposite side of the brushing hand [4].

Parafunctional masticatory forces may also expose one or more teeth to cervical stresses. These will cause flexion of the affected tooth, resulting in microcracks in the hard tissue, which may be a starting point for the abfraction lesion. The tooth would then be more susceptible to cofactors such as abrasion.

Abfraction occurs mainly in the V-shaped cervical region, with sharp, clean edges and extends towards the root. The depth of these lesions may be more than their width, leading to hypersensitivity. It has been shown that a combination of traumatic brushing and occlusal stress can lead to increased tissue loss. This is a phenomenon of synergy between abfraction and abrasion. Abfraction is confirmed by the deep wedge shape and the presence of sharp edges, and abrasion is confirmed by the presence of horizontal grooves, gingival recessions and the notion of traumatic brushing. The final lesion is thus the result of different factors, which may coexist and potentiate the effects of one through the action of another. Consequently, it is difficult to classify a lesion in a distinct category (abrasion, abfraction), as the different etiologies may act together in varying proportions to form the final lesion [6,7].

Management of non-carious cervical lesions requires patient information and motivation. It is vital to make patients aware that their hygiene habits have potentially harmful characteristics. Patients should be encouraged to learn atraumatic brushing techniques, and an electric toothbrush should be prescribed if necessary, as some have an "off" function when brushing becomes too aggressive for tooth tissue [8].

This is followed by restoration of the loss of substance with an adhesive biomaterial, to reduce thermal sensitivity and improve aesthetics. Restoration is a complex exercise for the clinician, due to the difficulties that can be encountered. These difficulties are indeed linked to the particular location of these lesions, making their isolation, visibility and access complex. They are also linked to the difficulty of achieving optimal bonding on sclerotic dentine. For this reason, etching with ortho-phosphoric acid is essential. The combination of an adhesive system and a flowable composite resin remains the procedure of choice. Indeed, given its excellent aesthetic properties and satisfactory clinical performance, composite is the material of choice for non-carious cervical lesions. It has been shown that cervical lesions, whose initial cause is abfraction, should be restored with a micro-filled composite resin or a flowable resin with a low modulus of elasticity, so that the latter can flex with the tooth without compromising retention. Like glass ionomer cements, resin-modified glass ionomer cements can chemically adhere to dentin. Surface pre-treatment is required. The addition of resin enables the establishment of mechanical bonds similar to those of the hybrid layer. Compared with glass ionomer cements, resin-modified glass ionomer cements have better marginal

integrity. This integrity degrades over time more rapidly than that of composites [9].

The coefficient of thermal expansion is very similar to that of the tooth, thus avoiding joint failure due to variations in oral temperature. Aesthetics remain a major problem with resin-modified glass ionomer cements. The porosity of the surface makes it difficult to maintain good shade stability [10,11].

Although there in vitro results are not as good as those of composites, they give very good clinical results. To overcome the defects of resin-modified glass ionomer cements, the Sandwich technique can be used. This technique preserves the advantages of each material. The Sandwich technique reduces composite setting contraction and preserves bioactivity and chemical adhesion. Due to the presence of resin in resin-modified glass ionomer cements, a bond between the two materials is easily established. However, this technique is time-consuming and complex. It is indicated for deep lesions [12].

Some authors recommend occlusal equilibration to remedy the abfraction phenomenon and halt the progression of damage. Indeed, pathological interfering contacts are thought to contribute to the evolution of these lesions [13,14,15].

A periodontal approach may be considered when a large lesion causes aesthetic discomfort, hypersensitivity or rapid progression. In order to achieve quantitative and qualitative tissue reconstruction, it is important to achieve rapid healing, with primary healing being an essential factor for success [16].

The choice of surgical approach depends on several factors:

- Defect-related factors: number and size of recessions, quality/quantity of keratinized tissue apical and lateral to the defect, height and width of the papilla.
- Patient factors: Aesthetic demand and the need to reduce post-operative discomfort.

In addition, the clinician must consider literature data in order to select the most predictable and reproducible surgical approach among those achievable in a given clinical situation [17].

Long-term maintenance of restorations requires follow-up care. Because these lesions usually develop silently, the patient does not become aware of them until later, and bad habits quickly return. For this reason, it is advisable to monitor the evolution of these lesions at regular intervals, every 6 to 12 months, depending on their severity. Macroscopic photographs and plaster casts enable clinicians to follow the evolution of lesions. This can also be used to illustrate the problem to the patient, motivating them to change their habits [18].

## Conclusion

As non-carious cervical lesions can be the cause of aesthetic discomfort, this factor is a frequent reason for consultation. The multi-factorial origin of non-carious cervical lesions explains the difficulties in diagnosing and implementing effective preventive treatment, given the large number of risk factors involved. Restorative treatment is required in cases of compromised tooth structural integrity, cervical hypersensitivity with exposed dentine or unacceptable aesthetics for the patient. Restoration is a complex exercise for the clinician because of the difficulties that can be encountered. Today, effective bonding is the key to the success and longevity of aesthetic restorations. It is essential to understand the obstacles and



difficulties of adhesion, especially in the case of cervical wear lesions. Follow-up care is essential for the long-term maintenance of restorations.

## References

1. Patano A, Malcangi G, De Santis M, Morolla R, Settanni V, Piras F, Inchingolo AD, Mancini A, Inchingolo F, Dipalma G, Inchingolo AM. Conservative Treatment of Dental Non-Carious Cervical Lesions: A Scoping Review. *Biomedicines*. 2023;11(6):1530.
2. Bhundia S, Bartlett D, O'Toole S. Non-carious cervical lesions - can terminology influence our clinical assessment? *Br Dent J*. 2019;227(11):985-988.
3. Goodacre C.J, Eugene Roberts W, Munoz CA. Noncarious cervical lesions: Morphology and progression, prevalence, etiology, pathophysiology, and clinical guidelines for restoration. *J. Prosthodont*. 2023; 32:1–18.
4. Ganss C, Schlueter N, Preiss S, Klimek. J Tooth brushing habits in uninstructed adults--frequency, technique, duration and force. *Clin Oral Investig*. 2009;13(2):203-8.
5. Heasman PA, Holliday R, Bryant A, Preshaw PM. Evidence for the occurrence of gingival recession and non-carious cervical lesions as a consequence of traumatic toothbrushing. *J Clin Periodontol*. 2015;42(16):237-55.
6. Senna P, Del Bel Cury A, Rösing C.J. Non-carious cervical lesions and occlusion: a systematic review of clinical studies. *Oral Rehabil*. 2012;39(6):450-62.
7. Walter C, Kress E, Götz H, Taylor K, Willershausen I, Zampelis A. The anatomy of non-carious cervical lesions. *Clin. Oral Investig*. 2014; 18:139–146.
8. Colon P, Lussi A. Minimal intervention dentistry: part 5. Ultra-conservative approach to the treatment of erosive and abrasive lesions. *Br Dent J*. 2014;216(8):463–8.
9. Sidhu SK. Clinical evaluations of resin-modified glass-ionomer restorations. *Dent Mater*. 2010;26(1):7–12.
10. Francisconi LF, Scaffa PMC, de Barros VR dos SP, Coutinho M, Francisconi PAS. Glass ionomer cement and their role in the restoration of non-carious cervical lesion. *J Appl Oral Sci*. 2009;17(5):364–9.
11. Burrow MF, Tyas MF. Restoring noncarious cervical lesions. *Dent Abstr*. 2007;52(5):288–9.
12. Peumans M, De Munck J, Mine A, Van Meerbeek B. Clinical effectiveness of contemporary adhesives for the restoration of non-carious cervical lesions. A systematic review. *Dent Mater*. 2014;30(10):1089–103.
13. Pegoraro LF, Scolaro JM, Conti PC, Telles D, Pegoraro TA. Noncarious cervical lesions in adults: Prevalence and occlusal aspects. *J Am Dent Assoc*. 2005;136(12):1694–700.
14. Litonjua LA, Andreana S, Bush PJ, Tobias TS, Cohen RE. Noncarious cervical lesions and abfractions: A re-evaluation. *J Am Dent Assoc*. 2003;134(7):845–50.
15. Brandini DA, Trevisan CL, Panzarini SR, Pedrini D. Clinical evaluation of the association between noncarious cervical lesions and occlusal forces. *J Prosthet Dent*. 2012;108(5):298–303.
16. Jindal U, Pandit N, Bali D, Malik R, Gugnani S. Comparative evaluation of recession coverage with sub-epithelial connective tissue graft using macrosurgical and microsurgical approaches: A randomized split mouth study. *J Indian Soc Periodontol*. 2015; 19:203-207.
17. Zucchelli G, Mounssif I. Periodontal plastic surgery. *Periodontology 2000*. 2015; 68:333-368.
18. Colon P, Lussi A. Minimal intervention dentistry: part 5. Ultra-conservative approach to the treatment of erosive and abrasive lesions. *Br Dent J*. 2014; 216(8):463–8.