REVIEW ARTICLE

CONTENTS

Etiology of gingival recession – a literature review

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ABSTRACT

Gum recession is a common problem that in most cases does not cause any bothersome symptoms to the patient. They can affect people of any age and are most often diagnosed on the vestibular surfaces of the teeth. They are manifested by the exposure of part of the root through the apical migration of the gingival margin. Its etiology is not fully understood, but it is known that it consists of many factors. The authors discussed such factors as inflammation, gum biotype, patient's age, mechanical and chemical damage, smoking, presence of tartar, cervical defects and their reconstruction, orthodontic treatment, occlusal overload and iatrogenic factors. Additionally, important risk factors also include genetic predispositions and abnormalities in the immune system. In addition, certain hygiene habits, such as improper brushing techniques or lack of regular check-ups at the dentist, may also contribute to the development of gum recession. Understanding the comprehensive nature of these factors is crucial to the effective treatment and prevention of this common condition. It is also worth taking into account the importance of educating patients on proper oral hygiene and regular dental check-ups to prevent gum recession.

KEY WORDS: gingival recession, stomatology, medical prevention

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INTRODUCTION

Gum disease is one of the most common conditions that dentists encounter in their offices. It is rare for a patient to come to the doctor citing the occurrence of gum recession as the main problem. In most cases, it proceeds without bothersome symptoms for the patient, or at least they are not associated with the problem [1]. Gingival recession is defined as apical migration of the gingival margin toward the cemento-enamel junction (CEJ) [2]. This condition, although not associated with increased tooth loss, is considered an aesthetic problem and is often associated with dentin hypersensitivity and carious/non-carious cervical lesions on the exposed root surface. It can also lead to excessive abrasion of the root surface and even, in extreme cases, tooth loss [3,4].

According to Rodier [5], 17% of recessions have no obvious clinical etiology. However, two groups of etiological factors can be distinguished:

- predisposing factors, which are necessary for the occurrence of recession and which are essentially anatomical;
- initiating factors, which in the risk area will promote the occurrence of recession. These are mainly related to the behavior of the patient or practitioner [6].

Gingival recessions are most often observed in mandibular incisors (43.0%), followed by maxillary molars (13.2%), mandibular premolars (12.2%), maxillary incisors and premolars (8.9%), mandibular molars (4.9%), maxillary canines (4.6%) and mandibular canines (4.3%). Recession was more frequently observed in the mandibular arch (66%) than in the maxillary arch (34%) [7].

The current classification of gingival recessions was proposed in 2011 by Cairo et al. It was based on the loss of connective tissue attachment (CAL - Clinical Attachment Loss) in the interdental spaces [8]. This classification was incorporated into the new WWC2017 classification as follows (Table 1) [4].

AIM

The aim of this study is to develop an understanding of the multi-faceted factors influencing gum recession

Table 1. WWC2017 standings

Recession type 1 (RT1)	- Gingival recession without loss of interdental attachment. - The interdental CEJ is clinically undetectable in both the mesial and distal parts of the tooth.
Recession type 2 (RT2)	- Gingival recession associated with loss of attachment in the interdental spaces. - The amount of interdental CAL (measured from the interdental enamel-cementum junction to the depth of the interdental sulcus/pocket) is less than or equal to the loss of buccal attachment (measured from the buccal CEJ to the apical end of the buccal sulcus/pocket).
Recession type 3 (RT3)	- Gingival recession associated with loss of interdental attachment. - The magnitude of the interdental CAL (measured from the interdental CEJ to the apical end of the fissure/cheekbone) is greater than the loss of buccal attachment (measured from the buccal CEJ to the apical end of the fissure/cheekbone).

and to examine their role in the development of this common condition.

REVIEW AND DISCUSSION

CAUSES OF GINGIVAL RECESSIONS

INFLAMMATION OF THE GINGIVAL TISSUES

The main etiological factors associated with the occurrence of gingival recession are periodontal inflammation associated with bacterial plaque accumulation due to poor oral hygiene [7].

GINGIVAL BIOTYPE

The term gingival biotype refers to the width of the gingiva in the vestibulopontine segment, which is genetically determined [9]. In the 20-35 age group, 43.25% of individuals were found to have a thin gingival biotype. Such a condition requires special care during aesthetic, restorative and periodontal therapy. Patients are more prone to connective tissue loss and epithelial damage. Treatment for them should be atraumatic, while they should use appropriate oral hygiene techniques adapted to their mucosal condition on a daily basis [10]. Thin gingival biotypes are less stable, and the occurrence of papillary and marginal recession is more common in them [3,10]. Das and Shenoy determined that there is a relationship between gingival thickness and cigarette smoking. Smokers were observed to have significantly less gingival thickness [9]. However, biotype alone does not affect the effectiveness of surgical coverage of recessions [11]. Yared et al (2006) found that 93% of teeth in which recession developed had a gingival thickness of less than 0.5 mm [12].

MECHANICAL INJURIES

Tooth brushing

An incorrect brushing technique, or too much pressure of the toothbrush against the tooth surface, are among the most common etiological factors associated with the development of gingival recessions. It has been observed that when the method was corrected, there was a halt in the progression of recession development [13]. In addition to technique and pressure, the timing of brushing, the hardness of the bristles in the toothbrush and the frequency of toothbrush replacement are also important [14].

Prosthetic restorations

Incorrectly designed or cemented fixed dental restorations result in areas that promote plaque accumulation, making it difficult to maintain proper hygiene. This leads to local inflammation, as well as tartar deposition. The same is true for poorly made or fitted partial dentures or their retaining components. Inadequate oral hygiene and the denture itself leads to inflammation of the gums and plaque accumulation. In addition, gingival recession occurs at the junction of the denture plate and/or its retention elements with the tooth as a result of their pressure on the surrounding tissues. This sets the stage for developing periodontal disease. In addition, if the restoration does not meet the patient's expectations in terms of aesthetics then the patient may experience discomfort and avoid proper oral hygiene, which increases the risk of inflammation and the development of recession. This is why it is so important not only to make but also to fit the prosthetic restoration accurately, but also to have regular dental check-ups and proper oral hygiene [15].

Oral self-inflicted injuries

Oral self-injuries can be intentional, accidental or the result of an unusual habit. These injuries are usually the result of the presence of parafunctions or the presence of a foreign body in the mouth , which cause erosion of the gingival tissue in a specific area [16]. Dilsiz and Aydin described a case of gingival recession of the lower incisors after habitual scratching of this area with a nail [17].

Gingival retraction

Phatale et al. stressed the need for special care when performing the gingival retraction procedure with mechanical methods, as recessions of the exposed gingiva can occur if care is not taken and the surrounding tissues are traumatized [18]. When using conventional retraction sutures, healthy epithelium can be damaged not only by using too much force, but also by too long a retraction time. The recommended time for placing the floss in the gingival crevice is between 5 and 15 minutes [19]. Both rotary curettage and electrosurgical methods of gingival retraction are also associated with the postoperative occurrence of gingival recession [20]. A meta-analysis by Yijing et al. showed that retraction pastes such as Expasyl or FoamCord are a much safer alternative to popular retraction threads [21]. In contrast, Kazakova et al. identified erbium yag and diode lasers as safe tools for performing gingival retraction [22].

IMPACT OF TOBACCO PRODUCTS

Cigarettes

A study from the Baltimore Longitudinal Study of Aging found that cigar and/or pipe users had more missing teeth and more sites with severe loss of connective tissue attachment and advanced recession compared to non-smokers [23]. The nicotine in cigarettes causes blood vessels to shrink, so less blood reaches the tissues causing gingival recession. It can also cause the formation of gingival pockets , the presence of which leads to inflammation of the area, decreased epithelial attachment, infection and other health complications [24].

Tobacco chewing

Gingival recessions and loss of connective tissue attachment can also be caused by the local effects of tobacco during snuff chewing. In such situations, recessions are most often located unilaterally within the lower dental arch [23]. It has been shown that patients who chew tobacco were twice as likely to have gingival recessions compared to the rest of the patients. This is related to the fact that chewing tobacco also contains large amounts of fermentable sugars, which stimulate the development of plaque, a direct factor responsible for the formation of gingival recessions [25].

AGE

Based on the studies conducted by Woofter, it can be assumed that the formation of gingival recessions may also be a result of the physiological aging process of the soft and bony tissues of the alveolar process. Studies conducted by other authors also show that the incidence and frequency of gingival recessions increase with age [26].

A long period of exposure to risk factors leading to gingival recessions may explain the association between the occurrence of gingival recessions and age. In younger patients, there is a predominantly local occurrence of gingival recessions at single teeth, which is associated with various etiological factors, paraphunctures characteristic of this age group (e.g., nail biting, holding a pencil in the mouth). In adults, on the other hand, the presence of common gingival recessions may be the result of a multifactorial effect of certain etiological factors, such as previous periodontal therapies combined with traumatic brushing [27].

TOOTH OCCLUSAL OVERLOAD

The relationship between gingival recession and occlusion, although often discussed in dentistry, is a contentious issue. Solnit and Stambaugh [28]. reported spontaneous partial or complete root coverage after occlusal alignment of 25 teeth with gingival recession. However, Harrel and Nunn showed no statistically significant difference between occlusal overload and gingival height, or between correction of occlusal height and change in gingival height. They conclude that there is no relationship between occlusal overload and gingival recession [29]. Similar results were obtained by Dodwad, who indicated that occlusal overload only in interaction with other factors can cause the occurrence of gingival recession [30]. Tayman and Sarıçam, however, showed that chronic stress on the lower incisors has the effect of increasing the incidence of gingival recessions [31].

ORTHODONTIC TREATMENT

Orthodontic braces can damage periodontal tissues by creating retention areas for plaque. Even with excellent oral hygiene, braces cause a change in the oral microflora, leading to the growth of bacteria similar to those present in areas affected by periodontal disease. Orthodontic treatment affects some of the periodontal problems, such as deepening the depth of probing pockets, loss of connective tissue attachment and gingival recessions [32]. Amid et al. in their meta-analysis showed that the incidence of recession with orthodontic treatment is inversely proportional to the width of the keratinized gingiva and the thickness of the gingiva [32]. These findings were confirmed in the 2023 study by Koppolu et al [33].

IATROGENIC CHEMICAL DAMAGE

Gingival recessions can also occur through iatrogenic chemical damage to the soft tissues around the treated tooth. The substance causing such damage can be an etchant or a self-etching bonding system [34]. Such effects

can also occur with chemomechanical gingival retraction [18]. Ozcelik et al. also described the occurrence of gingival recession after inadvertent soft tissue contact with formocresol and ferrous sulfate [35].

NON-CARIOUS CERVICAL LESIONS OF CARIOUS ORIGIN

Non-carious cervical lesions (NCCLs) involve destruction of the hard tissue in the cervical area of the tooth crown and underlying root surface by pathologies other than caries (without microbial involvement) [36].

On clinical examination, NCCLs manifest as deep, round or wedge-shaped craters close to the CEJ [37]. Such lesions affect the structural integrity of the tooth, facilitate the persistence of bacterial plaque and contribute to tooth sensitivity. This is often associated with gingival recession, which causes architectural fragility associated with a low crown-to-root ratio [36]. The cervical part of the tooth differs morphologically and histologically from the crown and root. The enamel gradually becomes thinner approaching the CEJ, and because of this, the cervical area becomes the most sensitive area where dentin can be exposed to irritants. If the NCCL involves only the crown of the tooth then only conservative treatment is possible, while if it also involves the root or only the root itself, surgical treatment is necessary [38].

FILLINGS OF CERVICAL DEFECTS

In the case of improperly performed restorations in the cervical region, the edges of the fillings may be located subgingivally. They can then directly cause mechanical trauma to the soft tissues. When improperly shaped cervical restorations are present, plaque retention and accumulation causing inflammation can be facilitated. Teeth with minimal or no keratinized gingival tissues and restored with abnormal subgingival cervical margins have been shown to be more predisposed to gingivitis, leading to the development of gingival recession [39]

DENTAL CALCULUS

Tartar has been shown to be an important factor in the etiology of gingival recessions, and especially in young patients [40]. Dodwad has shown that subgingival tartar is a much stronger determinant of recession than supragingival tartar. Regular tartar removal may therefore be an effective prophylaxis in the formation of gingival recessions [30].

CONCLUSIONS

Analysis of gingival recession reveals its complex nature, resulting from many potential causes and risk factors. It is influenced both by patient behavioral factors, such as toothbrushing technique, the type of toothbrush used or smoking, as well as by genetic determinants of the gingival biotype. Age, bite overload, orthodontic treatment and chemical and mechanical damage can also contribute to the problem. Understanding these correlations is key to effective management and prevention of gingival recession to ensure patients' long-term oral health.

The quest to avoid gingival recession requires a holistic approach that combines educational, preventive and therapeutic aspects. Preventing gum recession plays a key role in maintaining oral health and preventing many dental problems.

The primary step in recession prevention is patient education. Patients should be informed about proper tooth brushing technique, flossing and rinsing, as well as the impact of parafunctions, (such as smoking) on gum health. Regular check-ups with the dentist allow earlier detection of problems and implementation of appropriate preventive and therapeutic measures.

When gingival recession occurs , appropriate therapies are essential. This may include surgical techniques such as gingival grafts to restore tissue integrity and reduce hypersensitivity. However, proper planning and execution of cervical restoration also plays a key role, minimizing the risk of recession recurrence and further damage.

It is worth noting that prevention of gingival recession is important for both the aesthetics of the smile and oral health. Prevention of gingival recession has a positive impact on the overall health of patients, reducing the risk of periodontal and systemic diseases. Therefore, regular dental care, proper education and attention to oral hygiene are key to maintaining healthy gums and an aesthetically pleasing smile.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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