# DENTAL BIOCORROSION: A LITERATURE REVIEW

## *BIOCORROSÃO DENTÁRIA: UMA REVISÃO DE LITERATURA*

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## ABSTRACT

Biocorrosion is the tooth demineralization caused by frequent exposure to intrinsic and/or extrinsic acids. The aim of this study was to review the literature on the prevalence, etiology, diagnosis, prevention, treatment and monitoring of biocorrosion. An advanced search was carried out in the databases PubMed, Biblioteca Virtual em Saúde (BVS) and Portal Periódicos CAPES using the health sciences descriptors DeCS and MeSH. Articles published in scientific journals in the last 10 years were included, in their full versions, in Portuguese, English and Spanish. Duplicate articles, books and theses were excluded. In the end, 5,474 articles were found and, after reading the titles and abstracts, 40 articles were selected for full reading. Biocorrosion of dental tissues is increasingly common in the general population; currently, around 29% of adults show signs of the disease. For this reason, it should be diagnosed as early as possible to avoid serious damage to the tooth structure. Thus, dental surgeons should be aware of oral exposure to gastric acids and eating habits with frequent consumption of acidic foods or drinks, which are the main etiological agents of this condition, while recognizing the associated clinical signs. Prevention is important at all stages, and treatment varies among direct restorations, indirect restorations or full crowns. In addition, patient counseling and monitoring of this condition are fundamental. Therefore, preventive measures are indispensable to avoid or halt the progression of the disease. Treatment should prioritize minimally invasive approaches, and it is crucial to monitor them to ensure good control of this condition.

**Keywords:** Dental etching; Tooth erosion; Tooth wear; Oral health; Feeding behavior; Demineralization.

## RESUMO

A Biocorrosão é a desmineralização do dente causada pela exposição frequente a ácidos intrínsecos e/ou extrínsecos. O objetivo deste trabalho foi realizar uma revisão de literatura sobre prevalência, etiologia, diagnóstico, prevenção, tratamento e acompanhamento da biocorrosão. Realizou-se uma pesquisa avançada nas bases de dados PubMed, Biblioteca Virtual em Saúde (BVS) e Portal Periódicos CAPES com os descritores em ciências da saúde DeCS e MeSH. Foram incluídos artigos publicados em revistas científicas nos últimos 10 anos, em suas versões completas, em português, inglês e espanhol. Artigos duplicados, livros e teses foram excluídos. Ao final, 5.474 artigos foram encontrados e, após a leitura dos títulos e resumos, 40 artigos foram selecionados para a leitura completa. A biocorrosão dos tecidos dentários está cada vez mais comum na população em geral; atualmente, cerca de 29% dos adultos apresentam sinais da doença. Por isso, seu diagnóstico deve ser feito o mais precocemente possível, evitando danos graves à estrutura dentária. Para isso, os cirurgiões-dentistas devem estar atentos à exposição bucal a ácidos gástricos e a hábitos alimentares com consumo frequente de alimentos ou bebidas ácidas, os quais são os principais agentes etiológicos dessa condição, enquanto reconhecem os sinais clínicos associados. A prevenção é importante em todos os estágios, e o tratamento varia entre restaurações diretas, indiretas ou coroas totais. Além disso, a orientação do paciente e o acompanhamento dessa condição são fundamentais. Conclui-se que medidas preventivas são indispensáveis para evitar ou paralisar a progressão da doença e o tratamento deve priorizar abordagens minimamente invasivas, sendo crucial acompanhá-las para garantir um bom controle dessa condição.

**Palavras-chave:** Corrosão dentária; Erosão dentária; Desgaste dentário; Saúde bucal; Hábitos alimentares; Desmineralização.

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## INTRODUCTION

Tooth wear is physiological and occurs over time, but when the destruction is excessive enough to compromise function, aesthetics and quality of life, it is considered pathological (1-4). Approximately 2 to 4% of the adult population has a small amount of severe wear; however, this percentage increases to 10% in old age (5).

Conceptually, erosion is a physical mechanism, while the term corrosion is more appropriate for describing chemical, biochemical and electrochemical phenomena. The term corrosion differs from biocorrosion by the presence of the prefix “bio”, which in this case refers to dental tissues (6 - 8).

Biocorrosion is defined as the chemical loss of mineralized tooth substance caused by exposure to acids not derived from oral bacteria (9). The prevalence of this condition has increased recently, especially in the young population (10).

Teeth are routinely exposed to acids of exogenous and endogenous origin from the diet and gastric disorders, respectively. To be considered a risk, exposure must be continuous, i.e. over several days and for a prolonged time in the mouth, which is considered a serious condition (2). Gastroesophageal reflux disease (GERD) is often responsible for high levels of intraoral exposure to endogenous acids (11). Acids from food are considered an exogenous factor, as are medications and the work environment (11,12).

Prevention of biocorrosion is very important (5), as is early diagnosis in order to avoid excessive tooth wear. Therefore, the dental surgeon must be aware about the patient’s health conditions and diet, in addition to the clinical aspect of biocorrosion (13). In certain cases, restorative treatment may be necessary since it reduces thermal sensitivity, prevents pulp involvement, increases tooth strength, restores tooth shape, function and aesthetics (14).

Although the incidence of this condition is high, it is still underestimated (10), prompting the need for a better understanding of its clinical characteristics. Therefore, the aim of this study was to disseminate information on the etiology, prevalence, diagnosis, prevention, treatment and monitoring of dental biocorrosion through a narrative literature review, based on current scientific literature.

## LITERATURE REVIEW

### *Methodology*

The study was based on an integrative literature review using an advanced search in the PubMed, Virtual Health Library (VHL) and CAPES Periodicals Portal databases with the Health Sciences Descriptors (DeCS): “Tooth Erosion”, “Tooth Wear”, “Endogenous Acids” and “Acid Feed”, both in MeSH (Medical Subject Headings) and TIAB (title and abstract), and with the Boolean operators AND and OR. The initial search resulted in 5,474 articles and, after applying the inclusion and exclusion criteria (Table 1), 40 papers were selected to this literature review, as shown in the flowchart below (Figure 1).

### TABLE 1. INCLUSION AND EXCLUSION CRITERIA FOR THE ARTICLES

| INCLUSION | EXCLUSION |
|---|---|
| Articles in full and free versions or available on the CAPES platform; | |
| Published between 2013 and 2023; | Duplicate articles; |
| Languages: Portuguese, English and Spanish; | Books and theses; |
| Articles related to the topic. | |
| No restrictions on the type of study; | |

### *Biocorrosion*

Tooth enamel is able to resist to aggression of the oral environment throughout life (7). However, when associated with acids, the loss of mineral structure is notorious and of great clinical concern (12,15).

Thus, biocorrosion is a complex process caused by the activity of acids of different origins, which, when they come into contact with teeth, promote chemical reactions and a biochemical degradation process takes place (8). These reactions involve the demineralization of enamel by dissolving calcium and phosphate (8).

Frequent, intense, and prolonged exposure to acids results in softening of the tooth surface (16,2), which begins with microscopic loss of structure until it develops into a clinically visible lesion (8). Besides, acid-weakened cheeks become more vulnerable to abrasive forces, leading to severe mineral loss during oral hygiene (16).

The severity of biocorrosion is mostly restricted to enamel, but without proper control and treatment it can reach dentin and the patient may experience hypersensitivity (14). Once the dentin is exposed, its loss progresses faster than that of the enamel, with "excavations" appearing on the occlusal surface of the teeth (13).

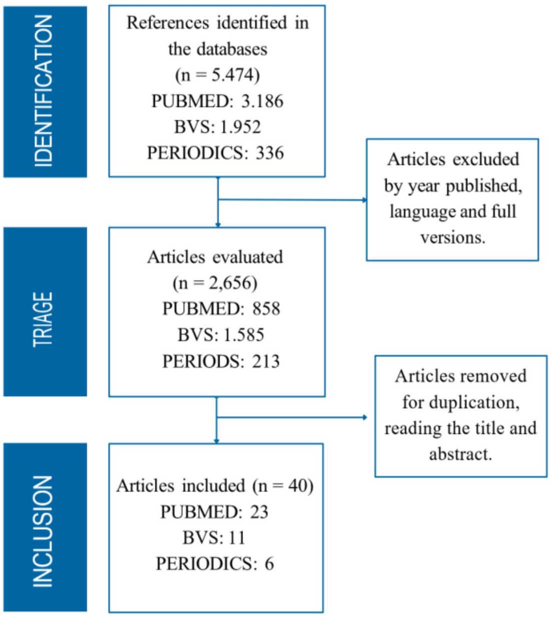



**Figure 1.** *Flowchart of study inclusion.*

## *Prevalence*

Biocorrosion is a multifactorial and irreversible condition of growing concern to researchers and dentists (15,16). Older age groups are the most affected, due to the longer period of use and dental exposure (5).

However, studies show that primary teeth are more susceptible to biocorrosion than permanent teeth, due to their lower mineralization and structural morphology (17,18). It should not be considered a short-term physiological process, but rather a predictive indicator of wear in the permanent dentition (15).

Worldwide, around 30 to 50% of deciduous teeth are affected by this condition, while permanent teeth have an estimated prevalence of 20 to 45% (19). In Brazil, adolescents show a prevalence of 13 to 34% (19).

## *Etiology*

GERD affects approximately 10% of the Brazilian population (9) and is often diagnosed through oral manifestations (13). Eating disorders, such as anorexia, bulimia and rumination, also contribute as an intrinsic etiology (2,15), exposing teeth to endogenous acids on a regular basis (11).

The chemical degradation of mineral tissue is related to the length of time, the duration interval and the frequency of acid attacks, which are directly proportional to the level of wear (20).

Dietary acid is the predominant extrinsic cause. A case-control study suggests that regular consumption of two acids a day could result in tooth wear. An apparently healthy diet, such as fruit juice in the morning, lunch with salad dressing, an apple in the afternoon and a glass of wine in the evening, represents consecutive acidic challenges during the day (11).

The risk of biocorrosion increases with the amount and frequency of ingestion of acidic products and their composition determines their corrosive potential (8). pH values below 5.5 are critical for dental corrosion (8). Moreover, the buffering capacity, adhesion, chelating effect and phosphate and fluoride content of the food must also be taken into account (21).

The calcium present in the formulations is the main protective factor, inhibiting enamel demineralization when present in salivary fluids, causing a reduction in the rate of tooth softening (15,2,22). One study indicated that the consumption of milk and yogurt is linked to a lower prevalence of biocorrosion, precisely for this reason (2).

Vinegars, vegetables and fruits rich in acids such as citric, tartaric, phosphoric and lactic increase the risk of biocorrosion (8). A clinical study revealed greater biocorrosion wear in vegetarians due to frequent consumption of acidic foods such as vinegar (23). In this experiment, the enamel wear caused by vinegar-based sauces (9.4 to 14.2 µm) was statistically higher than the average wear induced by orange juice (2.4 µm) (23).

Lifestyle changes have recently increased the consumption of acidic drinks (10), such as isotonic drinks, wines and citrus fruit juice (15). Drinking habits are a determining factor, with a lower risk of biocorrosion when drinking quickly rather than several sips during the day, as well as using a straw positioned towards the palate rather than in front of the teeth (2). Temperature also matters: high temperatures accelerate the chemical reaction, dissolving the enamel more quickly (22).

People drink various liquids with biocorrosive potential throughout the day. Pure mineral water is not harmful, but when added to lemon and citric acid, the pH drops to 3.2 and the enamel is easily demineralized (22). Other everyday drinks, such as soft drinks and fruit juices, have a critical pH and cause enamel and dentin structure loss. Figure 2 (21) shows that Coke and lemon juice have a high biocorrosive potential due to their low pH. Alcoholic beverages also have this potential, when pure and with a pH between 4.1 and 4.4, causing no change in the enamel's surface hardness, but when citric acid is added, they become biocorrosive (22).

| ACID POTENTIAL OF DRINKS | | | |
|---|---|---|---|
| **Drink** | **Initial pH** | **Enamel** | **Dentin** |
| Coke | 2.47 | 7.5 | 6.6 |
| Diet Coke | 2.59 | 5.2 | 3.5 |
| Sprite | 2.68 | 26.1 | 17.7 |
| Apple juice | 3.38 | 27.1 | 15.2 |
| Orange juice | 3.87 | 24.3 | 20.2 |
| Lemon juice | 2.50 | 32.0 | 28.3 |
| Red Bull | 3.38 | 16.6 | 17.0 |

**Figure 2.** *Initial pH of the drinks and average mass loss (mg) of enamel and dentin after seven days of exposure to acidic liquids. Source: Adapted from Zimmer S et al., 2015 (21).*

The rehydration and electrolyte replacement properties of carbonated and isotonic drinks lead to their widespread consumption by athletes during intense aerobic physical activity (15). However, the pH of these drinks can be as low as 2.9 (22). However, these drinks are increasingly being used by children and young adults due to their popularity (15,19).

Most of them have a critical pH for the oral environment and contain high concentrations of fermentable carbohydrates, promoting demineralization (15). In addition, the product's biocorrosive potential increases during and after exercise due to reduced salivary secretion. Therefore, athletes are often exposed to these risk factors, and their oral health is linked to sports performance (15).

Certain medicines and supplements have biocorrosive potential if they are in the formula of chewable tablets or effervescent drinks. Examples include acid saliva stimulants, products containing acetylsalicylic acid, vitamin C tablets and drugs that have the side effect of reducing salivary flow (2).

Included in the extrinsic factors is occupational exposure to acidic environments (15). The mist and acidic solutions present in battery factories and electroplating companies can cause varying degrees of tooth loss (24). One study reported that 31% of workers suffered from biocorrosion when exposed to sulphuric acid mist (24). Also, professional wine tasters present a hidden risk due to the high acid content of this drink, identifying a direct correlation between years of tasting and the rate of biocorrosion (25).

As a result, teeth become vulnerable and structural loss can be exacerbated by certain behaviors, such as bruxism, which causes wear by grinding teeth (1,3). Cigarette smoking can also be considered a modulator of biocorrosion, as heating by smoke can lead to changes in the morphology of hydroxyapatite crystals and greater mineral loss (26).

### *Saliva*

Saliva is the most important natural agent against this issue (27), as it is able to prevent acid demineralization and promote remineralization of the tooth surface (27,19). By balancing calcium and phosphate concentrations, saliva keeps the oral pH close to physiological (19,1) and neutralizes and dilutes acids that cause biocorrosion (8,13,28). Furthermore, calcium and saliva proteins form a film that preserves the integrity and mineral homeostasis of the tooth (8,27).

The frequency of acid exposure reduces salivary pH, prolonging the critical period and decreasing its buffering capacity. In contrast, high-risk patients with no signs of tooth decay probably have enhanced salivary protective properties, with a greater amount of collagen phosphoproteins and increased salivary flow, resulting in a thicker salivary film (8).

Salivary flow is influenced by various factors, such as radiotherapy in the head and neck region, medication (benzodiazepines, antihistamines and medication for Parkinson's disease), intense physical activity and systemic conditions such as Sjogren's Syndrome (2,22). Such conditions can lead to a reduction in salivary flow, and the use of artificial saliva formulations is indicated to treat the symptoms of dry mouth (27). Salivary tests can also be recommended to identify patients at greater risk of biocorrosion, making it possible to prevent more severe damage to the tooth structure (8).

### *Wear Index*

The Basic Erosive Wear Examination (BEWE) is the index commonly used in epidemiological research to quantify the level of wear. It's a practical screening method that allows identification and documentation to be carried out quickly and cost-effectively (11). Its criteria range from 0 to 3 depending on the tooth surface, in which each sextant is scored based on its most affected surface and the sum of all the scores results in the score, which ranges from 0 to 18. The cumulative BEWE score of all the sextants will determine the level of risk between low, medium or high. Clinical management is indicated for each level (29), as shown in the following diagram (Figure 3).

### *Diagnosis*

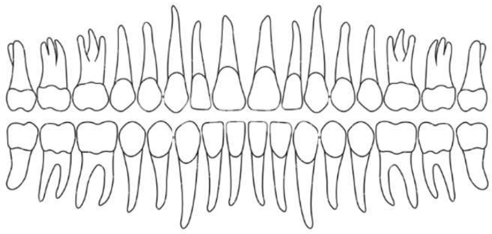
Considering that the condition is multifactorial, patient assessment should be comprehensive following a diagnostic protocol that includes medical history, dietary description, explanation of work environment, oral hygiene habits, dental report, extraoral and intraoral clinical examination, as well as complementary salivary (13).

The first clinical signs of change are difficult to diagnose clinically, as they are subtle alterations involving superficial loss of the acid-etched surfaces and can be easily confused with the tooth's natural appearance (5). But as it progresses, biocorrosion can be visualized more easily (5).

Incipient lesions located on the occlusal surface of posterior teeth show loss of enamel shine, flattening of scars and fissures, rounded and polished surfaces and even exposure of dentin (Figure 4) (13,18,30).

In anterior teeth, incipient lesions are characterized by the presence of more translucent incisal edges (Figure 5), while the enamel in the cervical region is intact due to the accumulation of biofilm in this region, which becomes a barrier to the action of acids (13,18).

| BEWE SCORES |
|---|
| **0** - No tooth wear due to erosion |
| **1** - Initial loss of surface texture |
| **2** - Loss of hard tissue on < 50% of the surface area |
| **3** - Loss of hard tissue on > 50% of the surface area |



highest score in 1st sextant + highest score in 2nd + 3rd + 4th + 5th + 6th

Sum of the scores of the 6 sextants (min 0 and max 18)

**CLINICAL MANAGEMENT GUIDE BASED ON THE RISK OF EROSION**

| Risk | Sum of the scores | Clinical Management |
|---|---|---|
| None | ≤ 2 | Routine maintenance + Check-up every 3 years |
| Low | 3- 8 | Assessment and advice on eating habits/oral hygiene + Routine maintenance and observation + Consultation every 2 years |
| Medium | 9- 13 | Assessment of eating habits and oral hygiene + Identification of etiological factors + Developing strategies to eliminate impacts + Consider using fluoride or another strategy + Avoid restorations + Monitor with plaster models, photographs or silicone molds + Consultation at 6-12 month intervals |
| High | 14 or more | Assessment of eating habits and oral hygiene + Identification of etiological factors + Develop strategies to eliminate impacts + Consider using fluoride or another strategy + Avoid restorations + Monitor with plaster models, photographs or silicone molds + In cases of severe progression, consider the need for restorations + Consultation at 6-12 month intervals |

**Figure 3.** *Diagram of the BEWE scores, their sum and the clinical management guide. Source: Adapted from Aránguiz et al., 2020 (29).*

**Figure 4.** *Initial level of biocorrosion in posterior teeth. On the occlusal face, loss of enamel shine, flattening of scars and fissures, rounded and polished surfaces and dentin exposure can be observed.*

**Figure 5.** *Initial level of biocorrosion in anterior teeth. On the buccal side, there is greater translucency on the incisal edges and intact tooth enamel in the cervical region.*

In Europe, the prevalence of moderate levels of wear is approximately 29%, while for severe levels is 3% (1,5). In moderate cases, saucer-shaped lesions, dentin concavities, rounded edges and dentin exposure can be seen on the occlusal surface of the posterior teeth (Figure 6) (18,13,2,31).

**Figure 6.** *The lower first molar is at an intermediate level of biocorrosion, with a saucer-shaped lesion, concavities in the dentin, rounded edges and dentin exposure.*

In more severe cases, the disappearance of occlusal morphology can be seen (Figure 7), with great loss of enamel and dentin, great exposure of dentin, rounded edges and even pulp exposure (18,13).

**Figure 7.** *Advanced level of biocorrosion in posterior teeth. There is a marked loss of enamel and dentin on the occlusal and palatal faces, pronounced dentin exposure and rounded edges.*

Biocorrosion alters the physical properties of enamel, which can affect its interface with the restoration (31,32). In this context, the amalgam can be seen to be quite polished and appear to be above the tooth surface (13). This is due to the loss of minerals, making the organic content more evident and causing damage to the durability of restorations (31).

Wear due to gastric disorders is frequent on the palate, with 41.6% of lesions located in this area (20); the occlusal surface of the lower molars is also affected (13). Extrinsic biocorrosion, on the other hand, occurs mainly on the buccal surfaces of the upper front teeth and on the buccal and occlusal surfaces of the posterior teeth (13).

Biocorrosion can be classified according to pathogenic activity into two types: the active lesion is the one in progress, characterized by the thin thickness of the enamel walls with a honeycomb appearance, and presents clinically as a dull, opaque enamel surface. The inactive, latent or paralyzed lesion, on the other hand, has a thinner enamel thickness and is clinically shiny (33).

## *Prevention*

Regarding biocorrosive challenges, if the condition is not early solved, controlling tooth wear will be even more complex (31). Based on an analysis of the patient's profile and conditions, an individualized preventive program should be suggested by the dentist (2). Although it focuses more on early lesions, prevention is indicated at all stages because, regardless of severity, preventive counseling can slow down progression. Most preventive actions involve toothpaste, mouthwash and dietary changes (5).

The daily use of toothpaste is the main source of active substances in teeth, especially fluorides and stannous compounds (15). Fluoride has a well-recognized ability to increase remineralization and prevent demineralization (4). Stannous fluoride, on the other hand, improves both the quality and quantity of the film acquired on the enamel, providing protection against chemical aggression. However, it is important to note that toothpastes contain abrasive agents that can neutralize the beneficial effect of these active substances (17).

Rinses with stannous fluoride have a protective effect, increasing the quantity and quality of the acquired film (4). However, they can cause stains on the teeth and tongue, so it is advisable to follow the instructions for use and guidance provided by the dentist (4).

Acid from food is the main controllable factor in the biocorrosion process. Although challenging, altering daily eating habits can lead to a reduction in tooth wear, consequently promoting greater tooth longevity (5). Minimizing the frequent intake of potentially harmful foods and drinks is extremely important in this context.

Interestingly, fluoride varnishes showed to be a good option to prevent biocorrosion. An in vitro study revealed that its application can prevent surface loss for up to 70 minutes in biocorrosive challenges, when not associated with abrasion (4). The protective effects of laser application on the demineralized surface have also been observed, as it promotes a smoother surface (13). Besides, the effectiveness of ionized alkaline water (pH between 9 and 10) in preventing dental biocorrosion caused by acidic drinks has been investigated and proven (34).

The success of such prophylactic strategies is difficult to achieve, though, since most of them depend on patient compliance (28).

### Treatment

To choose a treatment, the dentist must consider the structural integrity of the teeth, hypersensitivity, the amount of structure lost, whether there is a loss of Vertical Occlusion Dimension (VOD), loss of function and the patient's aesthetic complaint (13).

Direct procedures have often been recommended, especially for young patients (35, 31), as they are conservative and economical (36). Composite resin-based materials can relieve hypersensitivity, increase resistance to acid attacks, reinforce the surface of teeth, as well as other advantages such as the fact that they vary in shade and are more resistant than glass ionomer-based materials (31). However, the main difficulty encountered in this approach lies in the preservation of composite resin restorations (5). This is due to the understanding that biocorrosion progressively compromises the quality of adhesion over time (14).

In the intermediate stages, treatment may involve direct and indirect dental restorations (10). In certain cases, ceramic veneers can be a good option when coupled with minimal intervention. Its use is becoming increasingly popular due to improvements in fracture resistance and better adhesive cementation (37). CAD-CAM anterior veneers and ultra-thin occlusal laminates have been proven to be effective over time, as shown by a case report that carried out a reassessment approximately 3 years after the initial procedure and revealed only a slight increase in roughness (38).

If biocorrosion reaches a severe stage, resulting in the loss of 50% or more of the dental crown, composites may not have longevity, especially in cases with an underlying component such as bruxism. In such circumstances, full ceramic crowns can be recommended due to their proven durability (5).

In deciduous teeth, the management of biocorrosion differs from the protocol used in permanent teeth. When there are no painful symptoms, the condition needs to be monitored. Small areas of sensitivity can be restored with composite resin. In more severe cases, steel crowns may be indicated (39).

### Follow-up

Assessing the progress of biocorrosion or the treatment carried out is extremely important for longitudinal clinical monitoring (2). In this context, it is possible to determine preventive measures to be implemented and the need for new interventions (5).

Long-term clinical follow-up can be done via intraoral scanning, study models (Figure 8), standardized photographs or index classification (2,11). This will provide information on the rate of normal or pathological progression of biocorrosion, the severity of any underlying health condition of the individual, as well as protecting the dentist from litigation (11).

**Figure 8.** *Study model that makes it possible to visualize biocorrosion on copied teeth.*

## DISCUSSION

Biocorrosion is highly prevalent in the population, and the dentist must be able to identify it promptly and monitor this condition effectively (9). The trend is for the prevalence to increase even further due to the new generation's dietary changes, where the consumption of acidic foods is routine (31).

Early diagnosis is essential to prevent serious and irreversible damage (13), but it is known that it is neglected due to the difficulty in carrying it out (40). Thereby, the dentist must be aware of the causes, risk factors and clinical manifestations of this condition, in order to indicate effective and individualized preventive habits, as well as determining the best treatment according to each case (13,18).

A study evaluating the quality of referrals to secondary care services revealed that most dentists do not attempt to quantify the degree of wear (40). This underscores the need to expand knowledge about biocorrosion quantification indices, such as the BEWE index, which is a fundamental tool for recording and monitoring this condition (5).

To effectively integrate the diagnosis of biocorrosion into clinical practice, a detailed anamnesis is essential, addressing crucial points. These include the patient's profession and/or work environment, their history of physical exercise (frequency and consumption of energy drinks), smoking or the presence of bruxism, medical history of systemic diseases and/or gastric disorders, as well as keeping a detailed food diary for approximately four days (13).

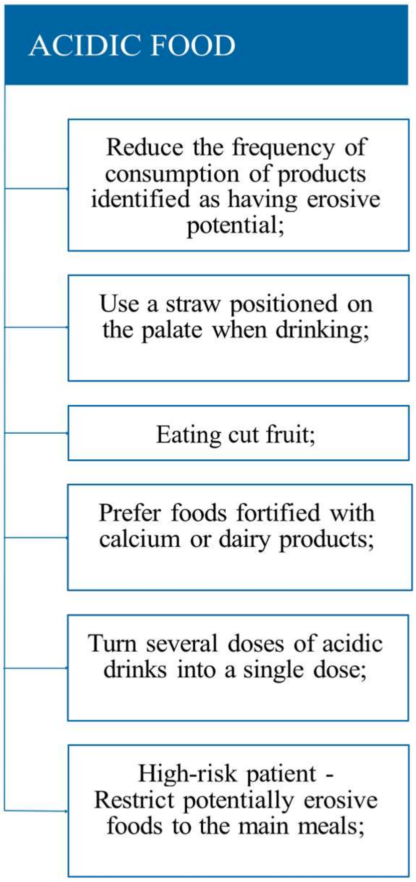



**Figura 9.** *Guidance for patients with an acid food diary.*
*Source: Adapted from Dundar A et al., 2014 (13).*

Linked to this is the extraoral clinical examination and the intraoral clinical examination. In the latter, each dental surface is observed in a clean, dry and well-lit environment (18). In certain cases, complementary tests, such as salivary function and flow, may be valid (11).

According to one study, adults with a higher level of knowledge about biocorrosion tend to consume fewer acidic drinks per day, indicating that a lack of knowledge is an obstacle to controlling and preventing biocorrosion (30). It is a role for the dentist to educate patients about this condition, in order to prevent the progression of wear and the occurrence of serious cases (Figure 9).

Controlling the etiological factors is fundamental to successful treatment (19), but changing the diet is a challenge. Although foods with a high biocorrosive potential, such as orange juice, are harmful, it is important to emphasize that certain nutrients are valuable for health and should not be eliminated from the diet (21).

With regard to GERD, if the demineralization of tooth structure is diagnosed early enough, before the damage is irreversible, the enamel can be remineralized through preventive behavioral and dietary modifications, as well as the use of medications mentioned in the image below (13).

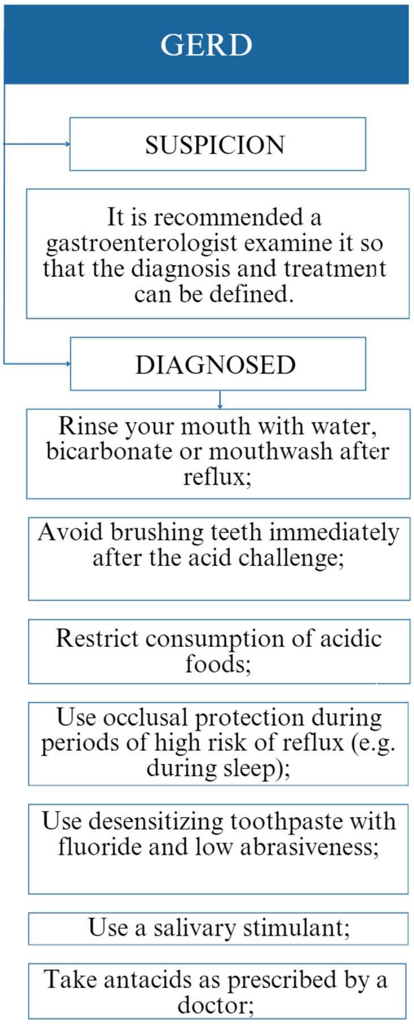



**Figura 10.** *Orientações aos pacientes com DRGE.*
*Fonte: Adaptado de Lourenço et al., (13).*

Biocorrosion is an irreversible process that can compromise the dentition for life, thus requiring dental interventions (18). There are different treatment options, but it is known that the dental surgeon´s approach should prioritize minimally invasive intervention (36), as well as seeking strategies for the potential use of materials, assessing the cost-benefit for the patient and examining the long-term performance of such an approach (31).

The limitations of this study include the need for further studies into emerging risk factors associated with new dietary trends that contribute to increased biocorrosion. Likewise, it is important to develop and evaluate new diagnostic techniques capable of identifying this condition in the early stages.

## CONCLUSION

Biocorrosion is a condition commonly found in the world's population, which continues to grow steadily. It is crucial to understand it to promote both the patient's oral and general health, as it is closely linked to their well-being. To diagnose it, it is essential to take a detailed medical history, identifying the factors that cause it and recognizing its clinical characteristics. In addition, preventive measures are essential to avoid or halt its progression. Treatment should prioritize minimally invasive approaches that are effective, and it is crucial to monitor them to ensure good control of this condition.

The authors declare no conflict of interest.

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