

THE USE OF XYLITOL IN PERIODONTAL TREATMENT. CASE REPORT

Magda ANTOHE¹, Dana BACIU^{2,*}, Dragos Nicolae FRATILA^{1,*}, Ramona FEIER²

¹ Faculty of Dental Medicine, University of Medicine and Pharmacy Gr.T.Popa, Iasi, Romania

² „Dimitrie Cantemir” University, Faculty of Medicine, Târgu Mureş, România

Abstract

*Periodontal treatment is an important branch of dentistry that deals with the diagnosis and treatment of periodontal diseases, which affect the supporting tissues of the teeth. These diseases include gingivitis and periodontal disease, both having an impact on the patient's oral and general health. Over time, researchers and dentists have made significant progress in understanding and treating these conditions, and this article explores the evolution of this fascinating field. The use of xylitol in periodontal diseases has been the subject of a significant number of studies and research. Xylitol is a natural sweetener that has beneficial effects on oral health. Below are some important conclusions from studies to date: Reduced bacterial plaque formation: Xylitol has demonstrated the ability to inhibit the formation of bacterial plaque, especially cariogenic bacteria, such as *Streptococcus mutans*. By reducing plaque formation, xylitol can help prevent the onset and progression of periodontal disease. Antibacterial and anti-inflammatory effects: Xylitol has antibacterial properties, helping to combat the growth of pathogenic bacteria in the oral cavity. Xylitol has also been observed to have anti-inflammatory effects, reducing gingival inflammation associated with periodontal disease. Remineralization and protection of dental enamel: Regular consumption of xylitol can contribute to the remineralization of dental enamel and increase its resistance to the action of acid. By protecting the enamel, xylitol can help prevent cavities and dental injuries that can aggravate periodontal disorders.*

Keywords: *periodontal bags; xylitol; periodontometry; sanitation*

Introduction

The article presents a short history of the evolution of periodontal treatment and the therapeutic methods used in this case. From the first descriptions of periodontal disease in antiquity to modern and innovative approaches, progress in periodontal treatment has been significant. The article highlights the main historical moments, such as discovering the connection between oral hygiene and gum health, developing scaling and subgingival techniques, introducing periodontal surgery, advances in laser therapy, and using regenerative therapy [1,2].

Periodontal treatment is an important branch of dentistry that deals with the diagnosis and treatment of periodontal diseases, which affect the supporting tissues of the teeth. These diseases include gingivitis and periodontal disease, both having an impact on the patient's oral and general health. Over time, researchers and dentists have made significant progress in understanding and treating these conditions, and this article explores the evolution of this fascinating field [2-4].

Over time, therapeutic approaches in the field of periodontology have developed and evolved significantly, as researchers and doctors have accumulated knowledge and discovered new techniques in this field. In this article, we will explore the evolution of periodontal treatment throughout history, highlighting the main stages and discoveries that have led to current therapeutic approaches [3-5].

Evolution of knowledge about periodontal diseases:

The evolution of knowledge about periodontal diseases was a complex and continuous process, which was influenced by research and discoveries in the fields of dentistry, bacteriology, immunology, and genetics. The main stages of the evolution of knowledge about periodontal diseases include [3-6]:

Initial remarks and descriptions: Since ancient times, people have been aware of gum and tooth disease. Medical writings from ancient civilizations, such as those in ancient Egypt or ancient Greece, mention problems with gums and teeth. However, knowledge of these conditions was limited and treatments were largely empirical [4-7].

Anatomical studies and clinical observations in the 19th century: In the 19th century, researchers such as Jean-Baptiste Michel Léonard Orban and GV Black, did detailed anatomical studies and detailed clinical observations on the gums and periodontium. They identified the connection between poor oral hygiene and periodontal disorders. This first knowledge was fundamental to the subsequent understanding of periodontal diseases [7,8].

Discovery of pathogenic bacteria: A crucial moment in the evolution of knowledge about periodontal diseases was the discovery of pathogenic bacteria associated with these diseases. In 1890, American bacteriologist William Hunter first identified and described bacteria that colonize gums and contribute to the development of periodontitis. The discovery of pathogenic bacteria changed the complete way periodontal diseases were understood and treated [8-11].

Development of knowledge in the field of immunology and genetics: As research in the fields of immunology and genetics has advanced, a deeper development of the immune mechanisms involved in the emergence and progression of periodontal disorders has developed. Thus, genetic factors have also been identified that predispose some people to faster development of periodontitis compared to others [9-11].

Therapeutic approaches in the evolution of periodontal treatment:

Therapeutic approaches in the evolution of periodontal treatment have experienced significant development over time. From initial empirical and non-surgical methods to complex surgeries and personalized therapies, therapeutic approaches have become increasingly advanced and effective. Here are some important steps in the evolution of periodontal treatment:

Non-surgical treatments: In the initial stages of the evolution of periodontal treatment, therapeutic approaches focus largely on non-surgical treatments [10-12].

These include procedures such as scaling and professional brushing, which have the role of removing bacterial plaque and tartar from the surface. They also use antiseptics and topical medications, such as chlorhexidine or antibacterial gels, were used to fight infections and reduce gingival inflammation [12-14].

Conventional periodontal surgery: As knowledge of periodontal disorders has advanced, surgical methods have been developed to treat them. Conventional periodontal surgery includes procedures such as periodontal flap, resection and leveling of the alveolar bone, removal of periodontal bags, and correction of gingival tissue defects [11,12].

These surgeries aim to remove inflamed and infected tissue, as well as to reconstruct the support tissues of the teeth [13-15].

Regenerative therapies and tissue reconstruction: With a deeper understanding of the biology and mechanisms of healing of periodontal tissues, regenerative therapies, and tissue reconstruction techniques have been developed [12-14].

These include the use of bone replacement materials, regeneration membranes, and growth factors to stimulate the regeneration of damaged tissues. Gingival and bone tissue transplants have also become common methods for rebuilding affected areas [14-17].

Personalized periodontal therapies: As personalized medicine has evolved, therapeutic approaches in periodontal treatment have become increasingly personalized. By using genetic testing and microbial analysis, dentists can assess the patient's individual risk for periodontal disease and develop personalized treatment plans. Adjuvant therapies such as laser therapy, local antimicrobial therapy and anti-inflammatory therapy [13-17].

Materials and methods

A 44-year-old patient presents at the dental clinic for dental sanitation and dental mobility. In this process for the purpose of rehabilitating and treating periodontal bags, the clinical examination was performed and serial photos, study models, retro alveolar dental radiographs, and special scoring systems in the periodontogram were used. In this endeavor we have filed the Periodontal Chart software online, this is a software for monitoring patients' periodontal health.

It provides a digital environment for recording and tracking dental-specific information, including gingival level, periodontal survey depth, the presence or absence of periodontal bags, loss of attachment, and other relevant parameters.

Functions and benefits that Periodontal Chart Online software can offer:

Detailed recording of periodontal data: The software allows the dentist to enter and record all relevant measurements and periodontal evaluations.

This information can be stored electronically and can be accessed later to monitor the evolution of patients' periodontal health.

Generation of charts and reports: The software can generate graphs and visual reports to provide a clearer perspective on the evolution of patients' periodontal health. These tools can help the dentist identify trends and evaluate the effectiveness of the treatment.

Ease of patient management: Periodontal Chart Online facilitates the organization of patients' data and provides quick access to relevant information. This can help the dentist to follow the periodontal history of patients and establish personalized treatment plans.

Information Sync and Sharing: Some software allows data synchronization with cloud servers or other devices, allowing dentists to access patient information on multiple devices and share data with teammates.

Precise measurements and increased efficiency: Using periodontal data recording software can increase the accuracy of measurements and reduce scoring errors.

We also did the descaling with the help of the side dish and the curettage, the plating in the periodontal bags. Xylitol was used in periodontal bags [15-17].

Results and discussion

Periodontal treatment is used to stabilize periodontal disease in those patients who suffer from periodontitis and who have not been present at the dentist for a long time, which have accumulated an excessive amount of tartar and plaque above and below the gums.

The periodontal treatment of choice consists in a first phase in which it is performed. Diagnosis consisting of pre-intervention photos, periodontal recordings and radiographic status that allow us to analyze and study the specific case of the patient in the best possible way to know where and how to intervene in the best possible way good way possible.

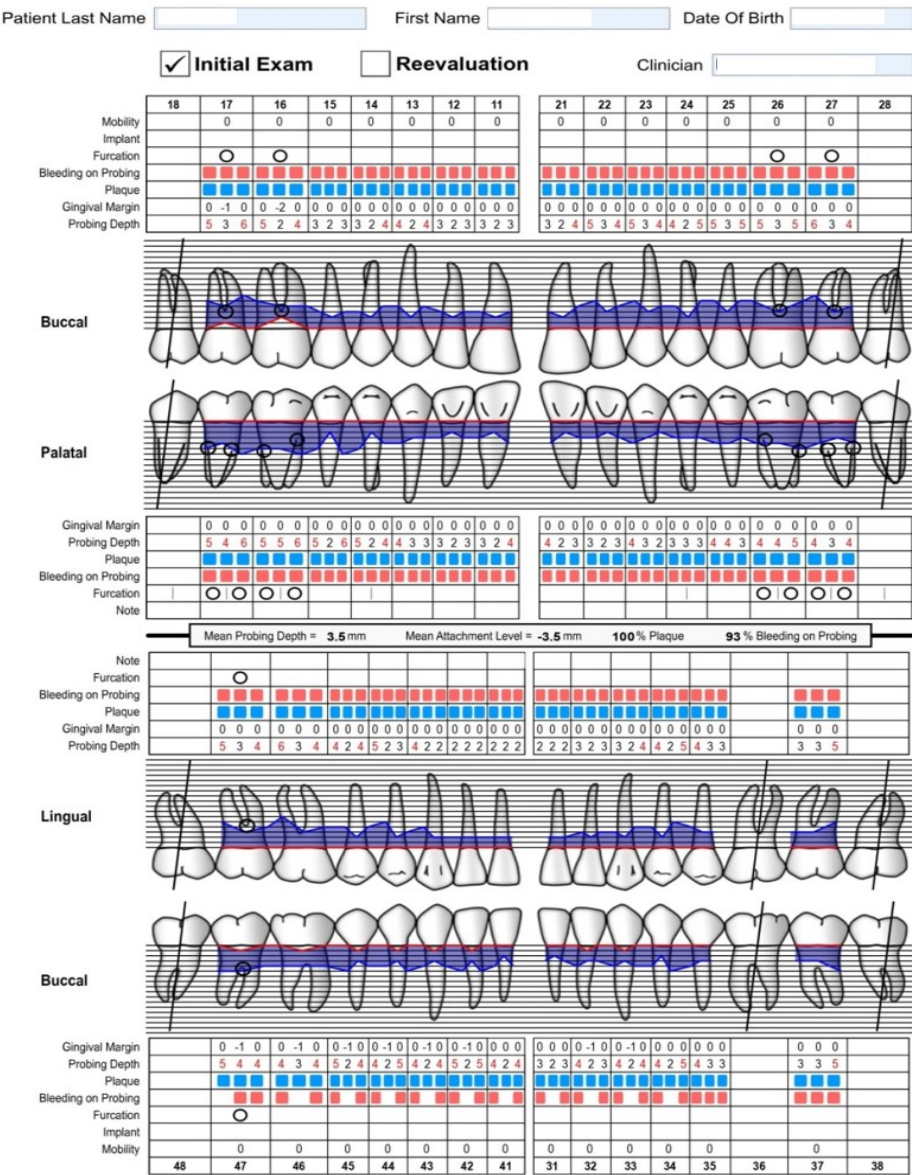


Fig. 1. Initial exam periodontal chart.



Fig. 2. Photographs carried out in prevention: a – front norm, b - Vestibulare sextante 2 and 5, c – vestibular 2 sextant, d – vestibular sextant 5, e – oral sextant 2, f - oral sextant 5, g - Upper occlusal, h – lower occlusal, i - Webular sextant 1 and 6, j - Webular sextant 3 and 4, k – oral sextant 6 and m – oral 4 sextant

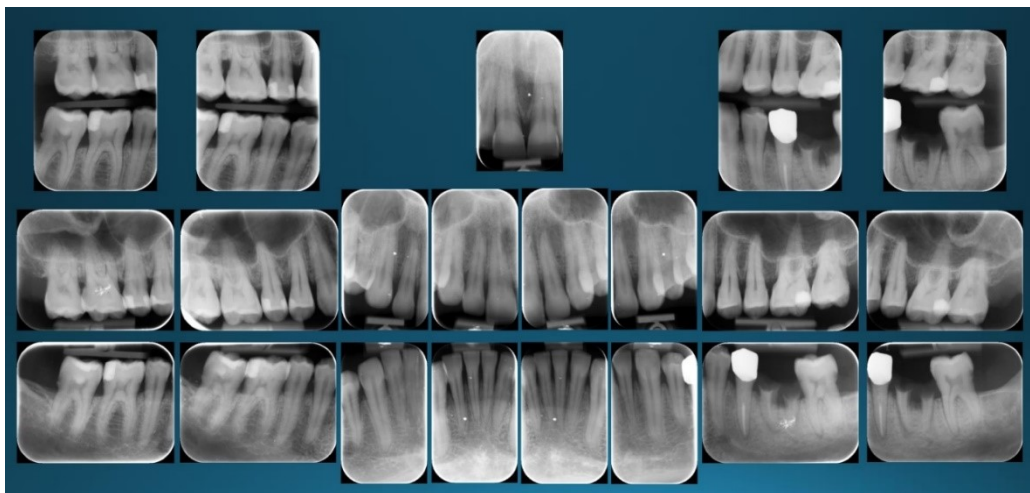


Fig. 3. Retroalveolar serial radiographs

Once the diagnostic phase is completed and the case is studied, we move to the complete disinfection session of the mouth where, with the help of air flow with erythritol-based powders, we initially remove the bacterial biofilm above and below the gums (up to 4 mm), then use the piezo ultrasound descaling device only where the hard tartar deposits remain both above, as well as under the gums.

Erythritol also has a disinfection function, as it is scientifically proven to decrease the reform of bacteria, including mutant streptococcus.

Patient Last Name First Name Date Of Birth

☐ Initial Exam ☒ Reevaluation Clinician

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Mobility																
Implant																
Furcation																
Bleeding on Probing																
Plaque																
Gingival Margin	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Probing Depth	3	2	3	3	2	3	3	2	2	2	2	3	3	2	3	4

Buccal

Palatal

	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gingival Margin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Probing Depth	3	2	4	3	3	3	3	2	3	3	2	3	2	4	3	2
Plaque																
Bleeding on Probing																
Furcation																
Note																

Mean Probing Depth = 2.5 mm Mean Attachment Level = -2.6 mm 49% Plaque 10% Bleeding on Probing

Note

	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gingival Margin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Probing Depth	4	2	3	4	3	2	3	2	2	3	2	2	2	2	2	3
Plaque																
Bleeding on Probing																
Furcation																
Implant																
Mobility																

Lingual

Buccal

	0	-1	0	0	-1	0	0	-1	0	0	-1	0	0	0	0	0
Gingival Margin	0	-1	0	0	-1	0	0	-1	0	0	-1	0	0	0	0	0
Probing Depth	4	2	3	3	2	3	3	2	2	3	3	1	3	4	1	3
Plaque																
Bleeding on Probing																
Furcation																
Implant																
Mobility																

48 47 46 45 44 43 42 41 31 32 33 34 35 36 37 38

Fig. 4. Reevaluation periodontal chart.

In the initial periodontal diagram we can highlight a strong inflammation with bleeding in proportion of 93% and the presence of plaque 100%. We have 76 active periodontal bags ≥ 4 mm in 162 seats. The deepest pocket is 6 mm distal and 4.6 mouth, 1.7 mesh and mouthpiece, 1.6 and 1.5 mouth and mouth 2.7. It has grade 1 mobility at 4.2, 4.1, 3.1, 3.2 and 3.5.

Two months after Full Mouth Disinfection, postoperative re-evaluation is performed by taking postoperative photos and periodontal control sheet. It is performed after two months because periodontal tissues are given physiological time to stabilize and regenerate.

During the two months before the reassessment, three checks are performed every two weeks to assess the patient's oral hygiene and modify it by motivating him and showing them again, if necessary, areas where there is more bacterial plaque to help the patient improve. oral hygiene at home, teaching him the right brushing techniques, use of interdental brushes and dental floss.



Fig. 5. Photographs on reevaluation: a – front norm, b - Vestibulare sextante 2 and 5, c – vestibular 2 sextant, d – vestibular 5 sextant, e – oral 2 sextant, f - oral sextant 5, g - Upper occlusal norm, h – lower occlusal norm, i - Webular sextant 1 and 6, j - Webular sextant 3 and 4, k – oral sextant 6 and m – oral sextant 2

In the periodontal re-evaluation file, we can see how the inflammation has completely resolved, bringing the bleeding index to 10%, while the presence of the plate is still high at 49%, for this reason, the patient will have to follow carefully the withdrawals to ensure the stability of the disease.

With periodontal treatment we managed to close 64 active periodontal bags, leaving only 12 still active, starting from 76 assets initially out of a total of 162 seats available. We also managed to recover type 1 mobility on teeth 4.2, 4.1, 3.1, 3.2, and 3.5. We have reached optimal periodontal stability.

After the revaluation, a decision is made according to the number of still active sites, therefore, depending on how many periodontal bags we still find active, it is decided whether the patient is sent to maintenance therapy or a periodontal retraction is performed.

In this case, the patient will follow an initial periodontal maintenance plan close once every 3-4 months until adequate oral hygiene is achieved at home to guarantee the periodontal stability obtained.

Conclusions

The use of xylitol in periodontal diseases has been the subject of a significant number of studies and research. Xylitol is a natural sweetener that has beneficial effects on oral health.

Below are some important conclusions from the studies carried out so far: Reduction of bacterial plaque formation: Xylitol has demonstrated the ability to inhibit the formation of bacterial plaque, especially cariogenic bacteria such as *Streptococcus* mutants. By reducing plaque formation, xylitol can help prevent the onset and progression of periodontal disease.

Antibacterial and anti-inflammatory effects: Xylitol has antibacterial properties, helping to combat the growth of pathogenic bacteria in the oral cavity. Xylitol has also been observed to have anti-inflammatory effects, reducing gingival inflammation associated with periodontal disease.

Remineralization and protection of dental enamel: Regular consumption of xylitol can contribute to the remineralization of dental enamel and increase its resistance to the action of acid. By protecting the enamel, xylitol can help prevent cavities and dental injuries that can aggravate periodontal disorders.

Beneficial effects on oral microbial flora: The use of xylitol has been associated with positive changes in the composition of oral microbial flora. A reduction in the number of pathogenic bacteria and an increase in the number of bacteria beneficial for oral health was observed. This can help maintain a healthy microbial balance in the oral cavity and reduce the risk of periodontal disease.

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Received: January 09, 2023

Accepted: June 10, 2023