



Gingivitis: The Contributing Roles of Dentist, Nursing, And Medical Documentation System-An Updated Review

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Abstract:

Background: Gingivitis is an inflammatory condition affecting the gingival tissues, primarily caused by microbial plaque accumulation, and is the most prevalent periodontal disease. It is characterized by gingival redness, swelling, and bleeding, although it is often asymptomatic in its early stages. The disease is classified into several forms, with plaque-induced gingivitis being the most common.

Aim: The purpose of this review is to examine the roles of dentists, nurses, and medical documentation systems in the management and prevention of gingivitis, with a focus on effective interventions and clinical outcomes.

Methods: A comprehensive review of the literature was conducted to evaluate the etiology, pathophysiology, clinical presentation, and treatment of gingivitis. The roles of healthcare providers, including dental professionals and nursing staff, in managing the disease were analyzed, along with the significance of accurate medical documentation systems in patient care.

Results: Gingivitis is primarily caused by bacterial plaque, although nutritional deficiencies, hormonal changes, and drug use can also contribute. Management typically involves mechanical plaque removal, oral hygiene education, and professional scaling. Nurses and dentists work collaboratively to assess symptoms, educate patients, and monitor progress. Medical documentation systems play a critical role in tracking patient history, treatment plans, and outcomes.

Conclusion: Gingivitis can be effectively managed through early intervention, proper oral hygiene, and regular dental visits. Accurate medical documentation is essential for tracking the disease's progression and ensuring appropriate treatment. The combined efforts of dentists, nursing staff, and robust documentation systems are crucial in improving patient outcomes and preventing complications.

Key words: Gingivitis, Plaque-induced gingivitis, Dental care, Nursing interventions, Medical documentation, Oral hygiene, Periodontal disease management.

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Introduction:

Gingivitis refers to an inflammatory condition affecting the gingival tissues, predominantly triggered by bacterial infections. In contrast to periodontitis, gingivitis does not involve the loss of attachment or migration of the junctional epithelium. The inflammation is confined to the soft-tissue regions of the gingival epithelium and connective tissue [1]. Gingivitis stands as the most prevalent periodontal disease. The disease manifests in various forms, classified based on clinical presentation, duration, severity, and causative factors. However, chronic plaque-induced gingivitis is considered the most common variant. Clinically, affected gingival tissues exhibit characteristics such as swelling, redness, tenderness, a shiny appearance, and bleeding upon gentle probing. Gingivitis typically does not induce spontaneous bleeding and is frequently asymptomatic, causing many patients to remain unaware of the condition and neglect seeking appropriate care [2].

Etiology

The primary cause of gingivitis is microbial plaque accumulation near the gingival sulcus. Several microorganisms are strongly implicated in the pathogenesis of gingivitis, including species from the genera *Streptococcus*, *Fusobacterium*, *Actinomyces*, *Veillonella*, and *Treponema*. Other bacteria such as *Bacteroides*, *Capnocytophaga*, and *Eikenella* may also contribute to the onset of gingivitis. Additionally, various local and systemic factors may exacerbate plaque deposition or increase the tissue's susceptibility to microbial assault [3].

Plaque-Induced Gingivitis

Plaque-induced gingivitis is the most prevalent form of gingivitis. Plaque is a thin biofilm that forms on the tooth surface due to inadequate oral hygiene. If not effectively removed, plaque can calcify, forming dental calculus. Plaque harbors a large number of bacteria, which trigger inflammatory responses in the gingival tissues. Local factors, such as dental crowding, can complicate plaque removal, increasing plaque accumulation. Misaligned teeth often necessitate orthodontic treatment, further complicating oral hygiene. Moreover, poorly fitted or inadequately finished dental prostheses can provide a surface for plaque accumulation. In children, gingivitis is commonly associated with tooth eruption, as plaque tends to accumulate around areas where primary teeth exfoliate and permanent teeth erupt. This condition is referred to as eruption gingivitis.

Nutritional Gingivitis

Nutritional deficiencies, particularly a lack of vitamin C, can lead to gingivitis. Modern dietary patterns, characterized by excessive intake of refined carbohydrates and an imbalanced omega-6 to omega-3 fatty acid ratio, have been linked to increased inflammatory processes [4]. The mechanisms through which high glycemic index carbohydrates promote inflammation involve the activation of NFκB pathways and oxidative stress [5][6].

Hormonal Gingivitis

Pregnancy induces significant hormonal changes, including increased blood vessel dilation, which predisposes the gingival tissues to an exaggerated inflammatory response, even with minimal plaque accumulation. It has been suggested that estrogen levels play a crucial role in the severity of gingival inflammation at the gingival margin in response to biofilm formation [7][8]. Additionally, puberty-related hormonal fluctuations can influence the gingiva's response to plaque accumulation, leading to what is known as puberty gingivitis. The presence of estrogen and testosterone receptors in gingival cells, particularly in the basal and spinous layers of the epithelium and in fibroblasts and endothelial cells in the connective tissue, renders the gingiva susceptible to these hormones. Adolescence typically sees earlier onset of gingivitis in females (11-13 years) compared to males (13-14 years) [9].

Drug-Induced Gingivitis

Certain systemic medications can induce gingivitis as a side effect. Drugs such as phenytoin (used for epilepsy), calcium channel blockers (used for hypertension and angina), anticoagulants, fibrinolytic agents, oral contraceptives, protease inhibitors, and vitamin A analogs can all contribute to gingival inflammation. The proposed mechanism involves drug metabolites promoting fibroblast proliferation, resulting in an imbalance between extracellular matrix synthesis and degradation. This imbalance leads to the accumulation of immature proteins, particularly collagen, contributing to gingival inflammation [10]. Other factors that influence gingivitis development include smoking, tobacco chewing, systemic health conditions, genetic predispositions (e.g., hereditary gingival fibromatosis), and local factors such as dry mouth and crowded teeth.

Epidemiology

Gingivitis is the most common periodontal disease, with a higher prevalence among males compared to females, likely due to females' generally better oral care practices. The disease is observed in both children and adults, with higher prevalence rates among individuals of lower socioeconomic status, as those with higher socioeconomic status tend to exhibit better oral hygiene practices and have greater access to healthcare. Additionally, gingivitis is more prevalent in pregnant women compared to non-pregnant women, with pregnant women also exhibiting more severe forms of the disease [11]. The most commonly observed types of gingivitis are plaque-induced, hormonal, acute ulcerative necrotizing, drug-induced, and spontaneously hyperplastic gingivitis. Among these, plaque-induced gingivitis is by far the most prevalent, accounting for a significantly higher number of cases than other variants [12].

Pathophysiology

Periodontal disease progresses through four stages, as initially described by Page and Schroeder in 1976 [13]. Gingivitis can be categorized into initial, early, and established stages, with periodontitis considered the advanced stage of the disease.

Initial Lesion

The initial lesion represents an acute exudative inflammatory response, characterized by increased gingival fluid flow and neutrophil migration from subgingival blood vessels to the gingival sulcus. The matrix of the connective tissue surrounding these vessels undergoes alterations, leading to fibrin accumulation. This lesion appears within four days of plaque accumulation. Collagen degradation occurs due to the action of collagenase and other enzymes released by neutrophils. In this stage, the inflammatory infiltrate occupies 5% to 10% of the connective tissue [12].

Early Lesion

The early lesion is typically associated with delayed hypersensitivity and becomes evident around one week after plaque deposition. Clinical signs such as gingival redness and bleeding emerge. Lymphocytes are the predominant cells, comprising approximately 75% of the total inflammatory cells, with macrophages also present. A small number of plasma cells may be observed. Inflammatory infiltration affects 5% to 15% of the gingival connective tissue, and collagen loss in the affected areas can reach 60% to 70%. Additionally, fibroblasts undergo pathological changes, and gingival fluid flow, along with leukocyte migration, continues to increase. Neutrophils and mononuclear cells are also elevated in the junctional epithelium. The duration of the early lesion remains undetermined, and it may persist longer than initially expected [12].

Established Lesion

The established lesion is marked by enhanced collagenolytic activity and an increase in macrophages, plasma cells, and both T and B lymphocytes, with plasma cells and B lymphocytes being the predominant cell types. At this stage, a small gingival pocket forms, lined by a pocket epithelium. The lesion exhibits a high degree of organization, and severity correlates with an increase in B cells and plasma cells,

while T cell numbers decline. This stage may either remain stable for an extended period or progress to a more destructive lesion, potentially due to changes in microbial flora or gingival infection. Effective periodontal therapy can reverse this stage, with an increase in health-associated microorganisms and a reduction in plasma cells and lymphocytes [12].

Advanced Lesion

The advanced lesion represents the transition to periodontitis, characterized by irreversible attachment loss. Inflammatory changes and bacterial infections begin to affect the supporting tissues of the teeth, including the gingiva, periodontal ligament, and alveolar bone, ultimately leading to their destruction and, potentially, tooth loss [14][15].

History and Physical

Healthy gingival tissue typically appears pink, though it may exhibit pigmentation in individuals with darker skin. It should be firm, free of signs of redness or swelling, and show no bleeding when a periodontal probe is gently passed along the gingival crevice. Upon periodontal probing, healthy gingiva presents with a crevice of less than 3 mm, and there is no evidence of bone loss on radiographs. In many cases, gingivitis remains asymptomatic, with patients often unaware of its presence. However, when symptoms do occur, patients commonly report bleeding from the gums during brushing, flossing, or consuming particularly hard foods, along with persistent halitosis despite regular oral hygiene. A physical examination typically reveals inflamed and tender gingiva, which may bleed upon gentle probing. Healthy gingival margins, characterized by a knife-edge appearance and stippled surface, are often replaced by rounded, shiny tissue. Significant plaque and calculus deposits are frequently observed. In chronic gingivitis, the gingival tissue may show an increase in size towards the incisal due to edema or hyperplasia, leading to probing depths exceeding 3 mm; however, there is no attachment loss, resulting in what are known as false pockets. The severity of gingival swelling can be categorized into four grades:

- **Grade 0:** No signs of gingival swelling.
- **Grade I:** Swelling confined to the interdental papilla region.
- **Grade II:** Swelling involving both the interdental papilla and marginal gingiva.
- **Grade III:** Swelling covering three-fourths or more of the crown structure.

The Gingival Index (GI)

The Gingival Index (GI) serves as a measure to assess the quality of gingival tissue, distinguishing the severity of lesions and identifying alterations in the four areas of the marginal gingiva's perimeter. The index focuses on qualitative changes in the gingiva. A score ranging from 0 to 3 is assigned to each area of the tooth—mesial, distal, vestibular, palatine, or lingual—and is used to determine the GI for that area. The GI score for an individual tooth is calculated by summing the scores from all four areas and dividing the total by four. To determine the overall GI for a subject, the indices for all examined teeth are added together and divided by the number of teeth evaluated [16].

The criteria for the gingival index system are as follows:

- **0:** Normal gingiva.
- **1:** Mild inflammation—slight color change, slight edema, no bleeding upon probing.
- **2:** Moderate inflammation—redness, edema, and glazing, with bleeding upon probing.
- **3:** Severe inflammation—marked redness and edema, ulceration, and a tendency for spontaneous bleeding [16].

Classification of Gingivitis

The 2017 International Workshop for the Classification of Periodontal Diseases and Conditions categorized gingival diseases as follows:

- **Dental biofilm-induced gingivitis:** This type is associated solely with dental biofilm and can be influenced by systemic or local risk factors. Additionally, it includes drug-induced gingival enlargement.
- **Non-dental biofilm-induced gingival diseases:** These include gingivitis resulting from genetic or developmental disorders, specific infections, inflammatory and immune conditions, reactive processes, neoplasms, endocrine, nutritional, and metabolic diseases, traumatic lesions, and gingival pigmentation [17].

Evaluation

Since gingivitis primarily affects soft tissue, radiographic evaluations are typically unnecessary. However, in some cases, radiographs may assist in distinguishing between gingivitis and periodontitis. Laboratory investigations are generally not required for the diagnosis of gingivitis.

Treatment / Management

The primary objective in treating gingivitis is to reduce inflammation, which is typically accomplished through the removal of dental plaque using various instruments [18]. In its early stages, gingivitis can be effectively managed if the patient adheres to a proper oral hygiene regimen, including regular tooth brushing with the appropriate technique and interproximal cleaning, such as dental flossing or the use of interdental brushes. Professional removal of plaque and calculus through scaling and root planning is also recommended, depending on the severity of the condition. In cases of drug-induced gingival overgrowth, switching medications may enhance treatment outcomes. For gingivitis caused by nutritional deficiencies, supplements can be prescribed. Chlorhexidine-based antiseptic mouthwashes are often prescribed alongside mechanical plaque removal. Research suggests that the use of chlorhexidine mouthwash, in combination with routine toothbrushing and interproximal cleaning, significantly reduces the accumulation of dental biofilm. The concentration of chlorhexidine rinse does not appear to influence its efficacy [19]. Recent studies have also explored the use of medicinal or herbal plants in managing gingivitis. These plants, such as pomegranate, tea, and chamomile, exert their effects due to their anti-inflammatory properties. Flavonoids and tannins present in these plants are potent anti-inflammatory and astringent compounds, aiding in the resolution of both gingival bleeding and inflammation [20]. Some studies have indicated that these herbal treatments, when used in conjunction with conventional mechanical plaque removal, such as scaling, may exhibit a synergistic effect [21].

Differential Diagnosis

Gingivitis can be differentiated from periodontitis primarily by the absence of attachment loss in gingivitis, a condition that is detectable through periodontal probing [22]. In gingivitis, there is inflammation of the gingiva, but the connective tissue attachment to the tooth remains intact, and no bone loss is observed. Conversely, periodontitis is characterized by the destruction of the supporting structures of the teeth, including the periodontal ligament and alveolar bone, resulting in attachment loss and potential pocket formation. Radiographically, periodontitis shows evidence of bone loss, which is not present in gingivitis. Additionally, gingivitis does not involve the deeper structures of the periodontium, unlike periodontitis, which affects both soft and hard tissues. Histological examination also reveals key differences; gingivitis shows primarily inflammatory changes in the gingival epithelium, while periodontitis shows a more advanced inflammatory response that involves the underlying connective tissue and bone. This distinction is critical for determining the appropriate treatment and management strategy. Furthermore, gingivitis can be treated and reversed with proper oral hygiene, while periodontitis requires more intensive therapeutic interventions, including scaling, root planing, and possibly surgical procedures.

Prognosis

The prognosis for gingivitis is favorable when the condition is identified early and appropriate treatment is implemented. With the removal of the dental biofilm through improved oral hygiene practices, including regular brushing, flossing, and professional cleaning, the gingival tissues can return to their

normal, healthy state. Gingivitis is fully reversible, and the gums regain their pink color, firmness, and health once inflammation subsides. If untreated, however, gingivitis can progress to periodontitis, a more severe condition that involves irreversible damage to the supporting structures of the teeth, including connective tissue attachment loss and bone destruction. Periodontitis can lead to tooth mobility and eventual tooth loss if not managed effectively. Thus, early intervention is crucial in preventing the progression of gingivitis. Additionally, maintaining good oral hygiene habits and seeking professional care regularly can prevent gingivitis from progressing to periodontitis. Overall, the long-term outlook for gingivitis is positive with proper treatment, but without intervention, the disease can lead to more severe periodontal complications.

Complications

The most frequent complication associated with chronic gingivitis is its potential progression into periodontitis. In chronic gingivitis, ongoing inflammation may extend into the deeper periodontal tissues, including the periodontal ligament and alveolar bone, leading to periodontitis. This condition is characterized by more severe tissue destruction, including loss of connective tissue attachment and bone support, which can result in tooth mobility and, if left untreated, tooth loss. However, not all cases of gingivitis progress to periodontitis. Gingivitis, particularly when addressed promptly, can be fully reversible, with no lasting effects on the underlying structures. The key factor in preventing the transition to periodontitis is the timely resolution of inflammation through effective plaque control and professional dental treatment. While gingivitis itself does not usually cause irreversible damage, its persistence without intervention significantly increases the risk of developing periodontitis. Therefore, early diagnosis and treatment are essential in preventing the potential progression to more serious periodontal diseases. Regular dental check-ups and adherence to proper oral hygiene practices are vital in managing gingivitis and avoiding complications that may arise from the disease's advancement.

Patient Education

Effective patient education plays a crucial role in the prevention and management of gingivitis. Patients must be informed about the significance of maintaining optimal oral hygiene to prevent plaque accumulation, a key factor in the development of gingivitis. Educating patients on the correct brushing technique tailored to their specific needs is essential, as improper brushing can fail to remove plaque effectively and contribute to gum disease. The frequency of brushing, typically at least twice daily, should be emphasized to ensure plaque removal before it can harden into calculus. Additionally, the use of interproximal hygiene methods, such as flossing or interproximal brushes, is necessary to address plaque accumulation between teeth, areas that are often neglected during brushing. Regular dental visits for professional cleanings and check-ups should be stressed, as they allow for early detection of gingivitis and the opportunity for professional intervention, including scaling and root planing. In some cases, the use of antimicrobial mouthwash, such as those containing chlorhexidine, may be recommended as an adjunct to mechanical cleaning. This helps in reducing plaque and controlling inflammation. Overall, patient education is key to empowering individuals to take an active role in their oral health, ensuring both the prevention and effective management of gingivitis. By following these recommendations, patients can significantly reduce their risk of developing more severe periodontal diseases [23] [24].

Enhancing Healthcare Team Outcomes

To optimize the treatment outcomes for gingivitis, an interprofessional approach is essential. A collaborative effort between dental professionals and other healthcare providers is needed to address the underlying causes of gingivitis and intervene at an early stage. Understanding the multifactorial nature of gingivitis, including its association with plaque accumulation, systemic conditions, and lifestyle factors, enables healthcare teams to provide more comprehensive care. Additionally, a thorough knowledge of the epidemiological patterns of gingivitis is important for planning effective public health strategies, as plaque-induced gingivitis can affect individuals of all ages and across diverse populations. The interprofessional approach also involves integrating awareness of the broader implications of periodontal diseases, as they are not confined to the oral cavity. Gingivitis and its progression to periodontitis have been linked to systemic conditions, such as diabetes mellitus, cardiovascular disease, and complications like preterm birth

or low birth weight (PLBW). Dentists and physicians should recognize these connections, as periodontal health directly impacts overall health outcomes. A coordinated approach allows for more effective management of gingivitis and its potential systemic effects, fostering better patient care. Collaborative efforts in research, education, and treatment can lead to improved health outcomes for individuals affected by periodontal diseases, demonstrating the importance of an integrated healthcare team in managing oral and systemic health [25] [26] [27] [28].

Nursing Interventions and Medical secretary Documentation:

Nursing interventions for gingivitis focus on both preventive care and the management of existing conditions. One of the primary goals of nursing care is to educate patients about the importance of oral hygiene practices to prevent gingivitis. Nurses should teach patients the proper brushing technique, stressing the importance of brushing at least twice a day with fluoride toothpaste, and encourage the use of interdental cleaning methods such as dental floss or interproximal brushes. Nurses should also advise patients on maintaining a healthy diet and managing risk factors such as smoking or poor nutrition, which contribute to the development and progression of gingivitis. Regular dental visits are a key component of prevention, and nurses should reinforce the need for professional cleanings to remove plaque and calculus that cannot be eliminated through home care alone. In cases where gingivitis is already present, nurses are responsible for monitoring the progression of the condition. This includes assessing the severity of the gingival inflammation, noting any bleeding or tenderness upon probing, and providing appropriate interventions, such as administering prescribed medications like antiseptic mouthwashes. Nurses may also assist in scheduling follow-up appointments and ensuring that patients adhere to their oral care regimens. In addition to nursing interventions, medical secretaries play an essential role in documentation. Accurate and comprehensive record-keeping is crucial for tracking patient progress and coordinating care. Medical secretaries must ensure that all relevant patient information, including medical history, treatment plans, and follow-up appointments, is properly documented. This includes the recording of nursing interventions, patient education provided, and any referrals made to dental professionals. Proper documentation facilitates communication among healthcare providers, ensuring continuity of care and enhancing treatment outcomes. It also ensures that the patient's progress is tracked, and any changes in their condition are promptly addressed. Effective documentation is integral to delivering high-quality, patient-centered care and fostering collaboration across the healthcare team.

Conclusion:

Gingivitis remains a widespread oral health issue, with its most common form being plaque-induced gingivitis. Although it is often asymptomatic, early signs such as redness, swelling, and bleeding upon gentle probing can indicate the onset of the disease. Effective management relies on early detection and the removal of plaque through regular oral hygiene practices, including tooth brushing, flossing, and professional dental care. Furthermore, nutritional and hormonal factors, along with certain medications, can exacerbate gingival inflammation, highlighting the importance of addressing these underlying causes in treatment plans. The roles of dentists and nurses are crucial in the successful management of gingivitis. Dentists provide the necessary clinical treatments, such as scaling and root planing, to remove plaque and calculus, while nurses assist in educating patients about proper oral hygiene techniques and the importance of maintaining good oral health practices. Both professions collaborate to monitor the progression of the disease and adjust treatment strategies as needed. Nurses play a vital role in patient education, ensuring that individuals understand the impact of their lifestyle choices, such as smoking and diet, on their oral health. In addition, medical documentation systems serve a critical role in the management of gingivitis by tracking patient progress, recording treatment plans, and ensuring effective communication between healthcare providers. The use of accurate and updated documentation facilitates the timely identification of any changes in the patient's condition, leading to more effective interventions and better overall care outcomes. In conclusion, gingivitis is a preventable and treatable condition that requires a coordinated approach involving dental and nursing care, along with accurate medical documentation. A holistic approach to managing gingivitis, which includes proper patient education, routine dental visits, and comprehensive documentation, is essential in reducing the prevalence of this condition and improving

patient outcomes. By addressing the multifactorial nature of gingivitis and promoting collaborative care, the dental and medical community can significantly enhance the management of this prevalent disease.

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التهاب اللثة: الأدوار المساهمة لطبيب الأسنان، التمريض، ونظام التوثيق الطبي - مراجعة محدثة

الملخص:

الخلفية: التهاب اللثة هو حالة التهابية تؤثر على الأنسجة اللثوية، وتتسبب بشكل رئيسي في تراكم اللويحة الميكروبية، وهو أكثر أمراض اللثة شيوعًا. يتميز هذا المرض باحمرار اللثة، تورمها، ونزيفها، على الرغم من أنه غالبًا ما يكون بدون أعراض في مراحله المبكرة. يتم تصنيف المرض إلى عدة أشكال. حيث يعتبر التهاب اللثة الناتج عن اللويحة هو الأكثر شيوعًا.

الهدف: الهدف من هذه المراجعة هو دراسة أدوار أطباء الأسنان، المرضيين، وأنظمة التوثيق الطبي في إدارة والوقاية من التهاب اللثة، مع التركيز على التدخلات الفعالة والنتائج السريرية.

الطرق: تم إجراء مراجعة شاملة للأدبيات لتقييم الأسباب، والفسولوجيا المرضية، والعرض السريري، وعلاج التهاب اللثة. تم تحليل أدوار مقدمي الرعاية الصحية، بما في ذلك المتخصصين في الأسنان وطواقم التمريض، في إدارة المرض، بالإضافة إلى أهمية أنظمة التوثيق الطبي الدقيقة في رعاية المرضى.

النتائج: يحدث التهاب اللثة بشكل رئيسي بسبب اللويحة البكتيرية، على الرغم من أن نقص التغذية، والتغيرات الهرمونية، واستخدام الأدوية يمكن أن تساهم أيضًا. عادة ما يتضمن العلاج إزالة اللويحة الميكانيكية، وتنظيف المرضى حول نظافة الفم، وتنظيف الأسنان المحترف. يعمل الممرضون وأطباء الأسنان بشكل تعاوني لتقييم الأعراض، وتنظيف المرضى، ومراقبة التقدم. تلعب أنظمة التوثيق الطبي دورًا حيويًا في تتبع تاريخ المرضى، خطط العلاج، والنتائج.

الخلاصة: يمكن إدارة التهاب اللثة بشكل فعال من خلال التدخل المبكر، والنظافة الفموية المناسبة، وزيارات الأسنان المنتظمة. يعتبر التوثيق الطبي الدقيق أمرًا أساسيًا لتتبع تقدم المرض وضمان العلاج المناسب. تعد الجهود المشتركة من أطباء الأسنان، وطواقم التمريض، وأنظمة التوثيق القوية ضرورية لتحسين نتائج المرضى ومنع المضاعفات.

الكلمات الرئيسية: التهاب اللثة، التهاب اللثة الناتج عن اللويحة، رعاية الأسنان، التدخلات التمريضية، التوثيق الطبي، نظافة الفم، إدارة أمراض اللثة.