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Periodontal disease:

What nurses need to know

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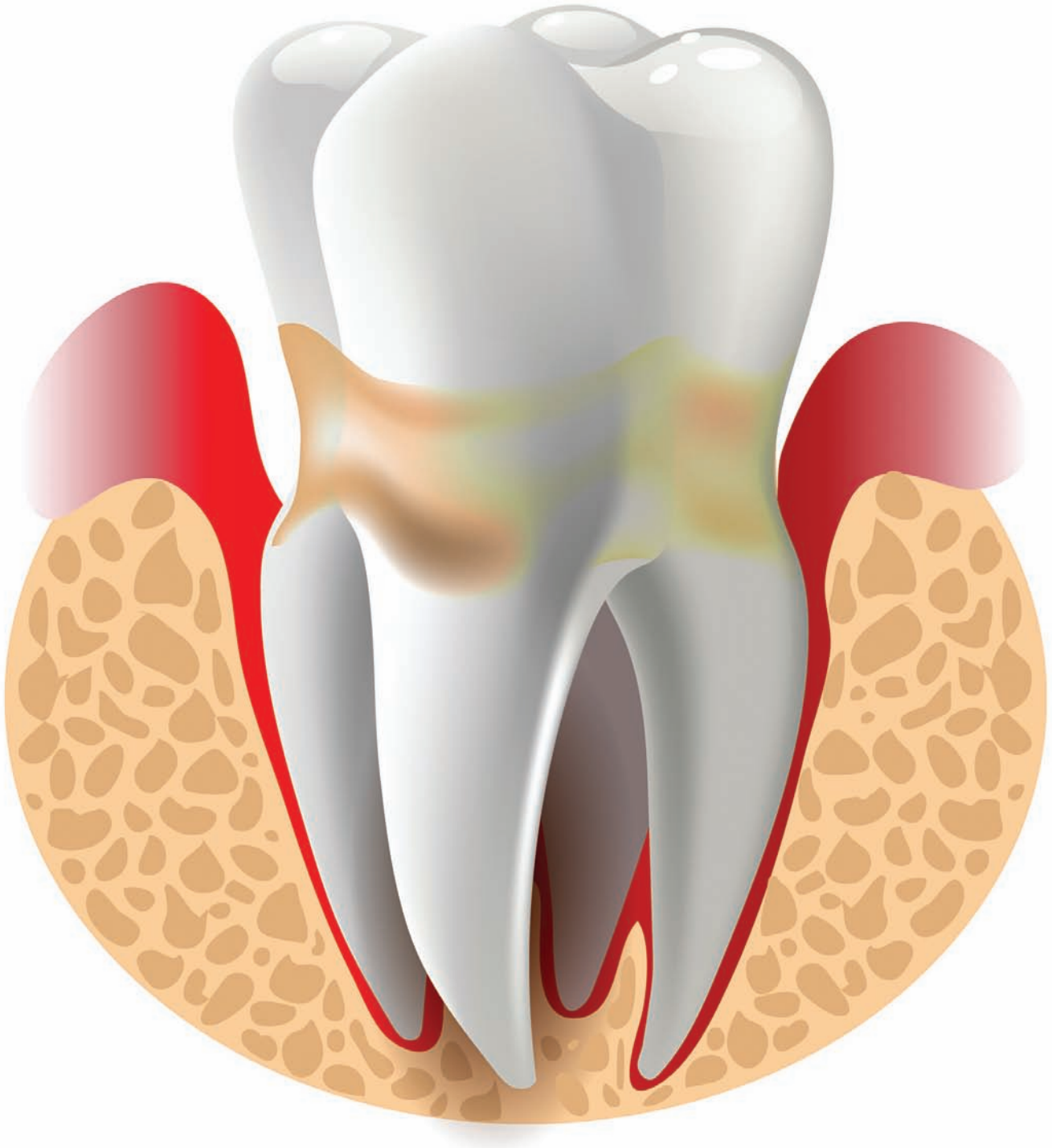
NURSES MAY ENCOUNTER patients who complain of bleeding gums or discover signs of periodontal disease, which includes gingivitis and periodontitis, during a physical assessment. Nurses need evidence-based information about periodontal disease to properly educate their patients.

This article explains periodontal disease in adults, how it may harm patients' overall health, and practical steps nurses can take to help patients treat the disease.

Incidence

Periodontal or gum disease is broadly classified as either gingivitis or periodontitis.[1] Gingivitis affects 50% to 90% of adults worldwide.[2] The incidence of periodontal disease increases with age. According to the CDC, 47.2% of adults age 30 and older have some form of periodontal disease, and 70.1% of adults age 65 and older have signs and symptoms of periodontal disease. This disease is more common in men than in women (56.4% versus 38.4%), those living below the federal poverty level (65.4%), those with less than a high school education (66.9%), and current smokers (64.2%).[3]



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Normal anatomy

The gingivae (gums) are made up of fibrous tissues covered with mucous membrane (see *Oral vestibule and gingivae*). The gingiva proper (attached gingiva) is normally pink, stippled, and keratinizing. It's firmly attached to the alveolar processes of the mandible and maxilla, as well as the necks of the teeth. The gingiva proper adjacent to the tongue is called the *superior* and *inferior labial gingivae*; the gingiva proper adjacent to the lips and cheeks is called the *maxillary* and *mandibular labial* or *buccal gingiva*, respectively.[4]

The crowns of the teeth project from the gingivae, and the roots are anchored in the tooth sockets by periodontium (periodontal membrane), made up of collagenous fibers that extend between the cement of the root and the periosteum of the alveolus. The periodontium is supplied with tactile, pressoreceptive nerve endings, lymph capillaries, and glomerular blood vessels that act as a sort of hydraulic cushion to limit axial masticatory pressure. Pressoreceptive nerve endings receive changes in pressure as stimuli. The root is fixed in the tooth socket by the periodontium; the number of roots varies.[4]

Pathophysiology

Periodontal disease, also called gum disease, commonly affects the tissues that make up the dental supporting structure: the alveolar bone, cementum, gingivae, and periodontal ligament.[1] It's classified as either gingivitis (no alveolar bone involvement) or periodontitis (alveolar bone involvement). *Gingivitis,* the most common form of periodontal disease, is inflammation of the gingiva (gum tissue) characterized by areas of redness and swelling and gingivae that tend to bleed easily.[1,5] Gingivitis is an inflammatory process that's limited to the mucosal epithelial tissue that surrounds the cervical portion of the teeth and alveolar processes.[6]

Periodontitis is a common disease that destroys deeper periodontal structures, connective tissue and alveolar bone, following inflammation secondary to infection by periodontal bacteria. The severe bone loss of periodontitis can lead to tooth mobility and tooth loss.[7] (See *Picturing gingivitis and periodontitis.*)

Periodontitis may be classified as follows:

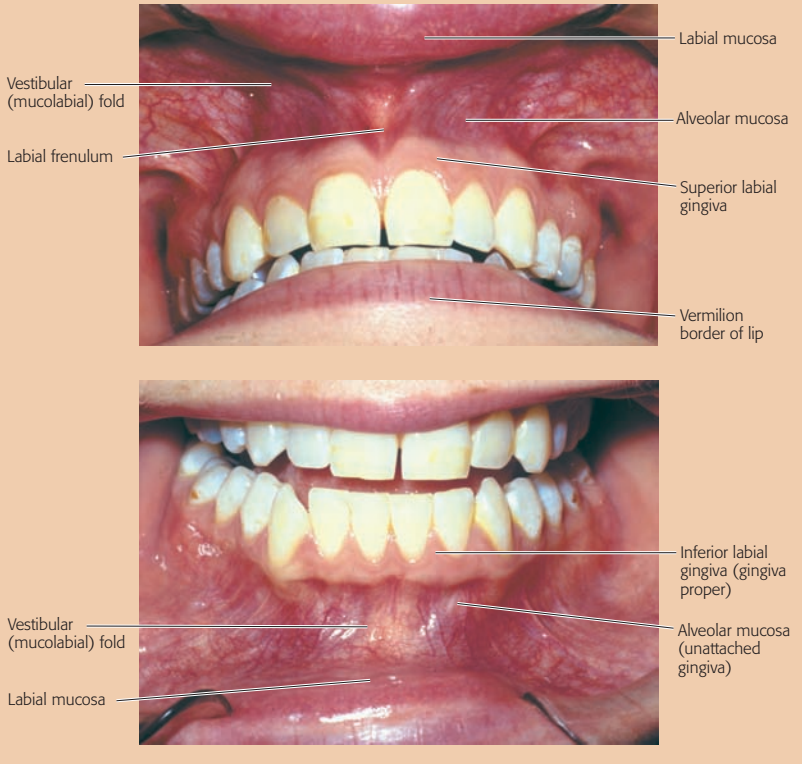
- Chronic (usually seen in adults)
- Aggressive (previously known as early onset periodontitis, rapid periodontitis, or prepubertal periodontitis; commonly seen in young individuals)
- Periodontitis as a manifestation of systemic disease (leukemia, cyclic neutropenia, Ehlers-Danlos syndrome)
- Periodontitis associated with pulpal (endodontic) infection
- Necrotizing ulcerative
- Developmental or acquired deformities (gingival recession).[1]

Risk factors

The severity of periodontal disease depends on the presence of modifiable risk factors such as smoking and nonmodifiable risk factors such as genetic susceptibility. Specific risk factors for periodontal disease include:

- tobacco use
- diabetes
- poor oral hygiene
- stress
- genetics
- crooked teeth
- underlying immune deficiencies
- defective tooth fillings
- medications that cause dry mouth
- bridges that no longer fit properly
- hormonal changes in women (pregnancy, oral contraceptive use)

Oral vestibule and gingivae



Source: Moore KL, Dailey AF, Agur AMR. *Clinically Oriented Anatomy.* 7th ed. Philadelphia, PA: Wolters Kluwer; 2014.

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- older age
- male gender
- low socioeconomic status
- plaque
- poor diet.[3,8]

Patients' genetic backgrounds influence their susceptibility to periodontal disease. Some risk factors, such as age and genetics, can't be changed or modified, but others, such as smoking and the presence of plaque, are modifiable.[8]

Clinical manifestations

Red, swollen, and bleeding gingivae are important signs of periodontal disease.[7] Other warning signs include:

- bad breath or a bad taste in the mouth that doesn't go away
- red or swollen gums
- tender or bleeding gums
- painful chewing
- loose teeth
- sensitive teeth
- gums that have pulled away from the teeth
- changes in the way teeth fit together when biting
- changes in the fit of partial dentures.[9]

Healthy People 2020, a nationwide initiative geared to improve the health of Americans, has identified oral health as a leading health indicator.[10] A growing body of evidence shows that periodontal disease is associated with certain negative systemic health consequences.[11] For example, periodontal disease can contribute to the progression of cardiovascular disease and preterm delivery of low-birthweight babies. Poorly controlled diabetes mellitus may be a risk factor to increase the severity of periodontal disease and poor response to periodontal treatment.[1] The presence of bacteria in the oral cavity and ongoing exposure to bacterial endotoxins may initiate pathologic changes in endothelial function and act as a precursor to atherosclerosis in susceptible people. Hyperglycemia promotes the development and progression of periodontitis.[12]

Periodontal disease has been associated with preterm births for reasons that are unclear. Periodontal flora may seed the fetal/placental unit and cause fetoplacental inflammation, or inflammatory mediators of periodontal origin may cause systemic inflammation. An alternative explanation is that periodontal disease is a marker of individuals who have a genetic predisposition toward an exaggerated local or systemic reaction, which leads to two separate adverse clinical events: periodontal disease and preterm births. Such individuals may hyperrespond to vaginal bacteria with enhanced productions of cytokines that lead to preterm labor or rupture of membranes. Periodontal disease and preterm labor can be epidemiologically linked but not causally related.[13]

Additional complications of periodontal disease include:

- *Effects on anesthesia*: Teeth with associated periodontal disease can present a problem for the anesthesia provider. Endotracheal intubation and extubation may dislodge teeth, calculus, and prostheses, which have the potential to act as a source of infection and/or airway obstruction. Careful presurgical screening and dental consultation may prevent these complications.
- *Hematogenous seeding*: Odontogenic infections may disseminate hematogenously to seed native or prosthetic heart valves, joints, or other devices. Antibiotic prophylaxis is essential before any invasive procedure.
- *Cancer*: Periodontitis has been associated with smoking-related cancers (lung, bladder, oropharyngeal, esophageal, kidney, stomach, liver) in nonsmoking men.
- *Dementia*: Periodontitis has been associated with an increased risk of dementia in a large prospective cohort study.[1]

Picturing gingivitis and periodontitis

Plaque-induced gingivitis in this patient has resulted in rolled gingival margins and enlarged papillae.

Aggressive periodontitis in a patient with good self-care (plaque biofilm control). In aggressive periodontitis, the disease severity typically seems exaggerated given the amount of bacterial plaque biofilm.

Source: Gehrig JS. *Fundamentals of Periodontal Instrumentation and Advanced Root Instrumentation*. 8th ed. Philadelphia, PA: Wolters Kluwer; 2017.

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Nursing assessment

For most patients, a nurse is the first member of the healthcare team they encounter. Nurses haven't traditionally performed oral assessments, but many Americans lack access to oral care and require nurses to expand their nursing role.

Obtain a focused oral health history to help determine the presence of periodontal disease by asking a few simple but important questions, including:

- Are you having any pain, bleeding, or other problems with your teeth or gums?
- When was your last dental exam?
- How often to you see your dentist?
- Do you have any loose or sensitive teeth?
- How often do you brush your teeth?
- Do you floss your teeth? If so, how often?
- Do you experience bleeding after brushing or flossing your teeth?
- Are you wearing dentures? Do they fit properly?
- Are you experiencing bad breath that won't go away?
- Have your eating patterns changed due to mouth pain or discomfort with chewing?

If patients have any new or unusual symptoms, advise them to schedule a visit with a dental professional.[10]

Perform a focused oral assessment to help identify the presence of periodontal disease. If the patient wears dentures, ask the patient to remove them so you can assess the underlying mucosa.

Inspect the patient's mouth using a good light and tongue blade. Assessment should include:

- *Oral mucosa.* Assess the oral mucosa for color and the presence of any abnormalities.
- *Gums and teeth.* Note the color of the gums, which are normally pink. Inspect the gum margins and the interdental papillae for swelling, bleeding, or ulceration. Inspect the teeth and note any missing, discolored, misshapen, or abnormally positioned teeth. Assess for loose teeth with a gloved thumb and index finger, and document halitosis if present.

Nurses should refer patients with any concerning signs and/or symptoms to a dental health professional for a more thorough evaluation.

Diagnosis

Gingivitis is characterized by gingival redness, swelling, and bleeding provoked by a periodontal probe. Lab testing isn't helpful in diagnosing gingivitis and imaging studies aren't indicated.[6]

Periodontitis is characterized by increased probing depth, bleeding on probing, and tooth mobility. Bone loss is seen on radiographs.[1]

An oral DNA saliva test can identify specific oral bacteria that cause periodontal disease. These test results can help clinicians determine appropriate antimicrobial therapy when indicated.[11]

Management

General measures for managing gingivitis include:

- removing irritating factors such as plaque calculus and faulty dentures.
- using a warm saline rinse.
- in chronic gingivitis, brushing with a fluoride toothpaste to slow disease progression and help resolution. Most electric toothbrushes have additional benefit over manual brushing. Daily flossing in addition to brushing followed by rinsing with chlorhexidine or other solutions may have even better results over brushing and flossing.
- administering nonsteroidal anti-inflammatory drugs, which have been shown to speed the resolution of inflammation when teeth are being cleaned and scaled to remove plaque.[6]

Due to the microbial specificity in various forms of periodontitis, certain types of severe periodontitis are amenable to systemic antimicrobials along with mechanical debridement (scaling and root planing). This approach has often prevented the need for radical surgical resection of periodontal tissues.[14]

Nursing implications

After the nurse has identified the need for further care with a dental professional, he or she should teach the patient about recommended dental hygiene protocols as follows:

Educate and motivate the patient to adhere to an individualized dental hygiene care plan recommended by the dentist or dental hygienist, who must carefully assess risk factors to personalize recommendations for the most effective oral hygiene care.

Regular dental hygiene visits are needed to maintain the care of the teeth and gums. Patients must maintain daily oral care and see a dental professional for a thorough checkup at least twice a year.

Personalized home care is the key to long-term oral health. A study by Van der Weijden and colleagues showed a 52% reduction in plaque in patients who'd received professional oral hygiene instructions and professional prophylaxis. Studies have shown that verbal instructions tailored for each patient and supplemented with visual aids are more effective than printed instructions.[15]

Demonstrate proper toothbrushing and flossing. The most common proper toothbrushing method is the Bass technique, which consists of directing the filaments of the toothbrush at a 45-degree angle to the long axis of the tooth. Gentle force is applied to insert bristles into the gingival sulcus; gentle but firm strokes should be used without removing the filaments from the sulcus.[16]

Patients should floss at least once a day to make sure food debris and microbes are removed from the

teeth before plaque hardens into dental calculus. Flossing done properly at least once a day takes only 2 minutes.[17] Advise patients to break off 12 to 18 in (30.5 to 45.7 cm) of floss from the spool and wrap the floss around middle fingers. Insert the floss in between teeth with a seesaw motion up and down on the sides of each tooth. Dispose of the floss and perform hand hygiene.[17] Routine oral care includes brushing after every meal and before bedtime.

Speaking up for oral health

New treatment modalities being actively explored for periodontal disease include antimicrobial therapy, host modulation therapy, laser therapy, and tissue engineering for tissue repair and regeneration.[18] The nurse's role in oral health will continue to expand concurrently with research that seeks to improve patient care. ■

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The author and planners have disclosed no potential conflicts of interest, financial or otherwise.

DOI-10.1097/01.NURSE.0000534088.56615.e4