

Gingival Enlargement: A Review Article

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Abstract

Leukocytes are the major cellular essentials of inflammatory and immune reactions of the individual. Leukocyte alterations are the consequence of a disproportion between the formation of leukocytes in the bone marrow and its exclusion by the mononuclear phagocytic system. There is also a wide range of clinical manifestations that can result from them: from very insignificant symptoms to serious conditions.

Acute leukemias are a group of neoplastic diseases that are characterized by proliferation of immature white cells in the bone marrow and/or blood and are often associated with severe leukopenia, anemia and thrombocytopenia. In some cases oral manifestations will be the first signs and it will be the dentist's responsibility to recognize the underlying disorder leading to the diagnosis of the patient's condition. Oral bleeding, gingival enlargement, ulceration and infection in patients with leukemia have been described. Leukemic infiltrates in the gingiva are commonly seen in acute leukemia. The aim of this article is to review the literature concerning the oral manifestations of patients.

Keywords: Leukemia, Oral Manifestations, Gingival Hyperplasia.

Leukemia is a cancer of the blood cells. It starts in the bone marrow, the soft tissue within most bones. Bone marrow is where blood cells are made.⁽¹⁻⁶⁾

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For some, the first signs of leukemia appear in an unexpected place: the oral cavity. In fact, a dentist may be the first to detect cancer. Leukemia, as well as subsequent chemotherapy, has a distinct effect on dental health, which means that dental hygiene should be a priority when you're fighting the disease. There are several dental symptoms to look out for when you

have leukemia, as well as ways to prevent any problems.⁽⁷⁾

How leukemia affects dental health

One of the first signs of leukemia can be gingivitis, or swelling and bleeding gums. Common oral findings in leukemia include spontaneous gingival bleeding and small petechial hemorrhages or bruising of the oral soft tissues secondary to thrombocytopenia. When a patient has gingivitis combined with feeling weak and losing weight for no apparent reason, the dentist will run blood tests for leukemia. If they are positive, he'll refer the patient to an oncologist for confirmation of the diagnosis and for treatment. It is not known exactly why leukemia affects the oral cavity this way, but some speculate that it could be due to how the disease alters the immune system. Leukemic patients are more prone to oral candidiasis, herpetic infections, and neutropenic ulceration. These ulcers are typically deep, punched-out lesions with a gray-white necrotic base. They occur most commonly after chemotherapeutics, related to mucosal trauma or opportunistic infections. Acute leukemias, particularly acute monocytic and myelogenous

subtypes, cause infiltration of leukemic cells into oral soft tissue, especially gingival tissue, resulting in swollen, boggy hyperplastic gingivitis.⁽⁷⁻¹⁴⁾

When you are healthy, your bone marrow produces:

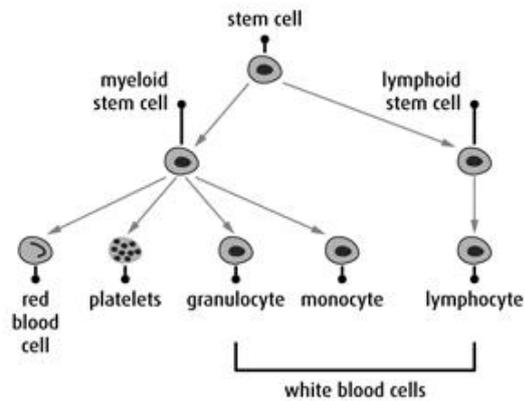
White blood cells, which help your body fight infection.

Red blood cells, which carry oxygen to all parts of your body.

platelets, which help your blood clot.⁽¹⁻⁶⁾

Understanding normal blood cells

Blood cells form in the bone marrow. Bone marrow is the soft material in the center of most bones. Immature blood cells are called stem cells and blasts. Most blood cells mature in the bone marrow and then move into the blood vessels. The main cells of the immune system are derived from the lymphoid and myeloid arms of the hematopoietic system. In the bone marrow, the myeloid arm gives rise to peripheral dendritic cells, phagocytes (neutrophils and monocytes), mast cell precursors, basophils, eosinophils, platelets, and erythrocytes. In the bone marrow, the lymphoid arm gives rise to NK cells, B cells, and T cells.⁽¹⁻⁶⁾



Understanding leukemia cells

In patients with leukemia, the bone marrow produces abnormal white blood cells, which are leukemia cells. They do not do the work of normal white blood cells, they grow faster than normal cells, and they do not stop growing when they should. At first, these cells act almost normally. Then, they may outnumber normal blood cells. This makes it hard for the white blood cells, red blood cells and platelets to carry out their functions.⁽¹⁵⁻²²⁾

Lymphoid stem cells develop into lymphocytes. Lymphocytes are another type of white blood cells that are usually found in the lymph nodes and lymphatic system, such as the spleen and the blood. Some of the T cells migrate to the site of infection, where they help other phagocytic cells. Other activated T cells remain in the lymphoid organ and help B cells respond to the microbial antigens. The activated B cells secrete antibodies that circulate in the body and coat the microbes, targeting them for efficient phagocytosis.

Over time, leukemia cells can outnumber the normal blood cells. This can lead to

serious problems such as anemia, bleeding, and infections. Leukemia cells can also spread to the lymph nodes or other organs and cause swelling or pain. Symptoms of leukemia can vary from person to person. Some patient symptoms may be very mild for a very long time until it is diagnosed by the doctor or spread and this kind of leukemia is called chronic leukemia while some other people may experience severe or acute symptoms classified as acute leukemia. Leukemia is said to affect other parts of the body and the lungs. The symptoms are the result of abnormal white cells that may gather in the brain or the spinal cord thus causing symptoms such as vomiting, headaches, unusual skin rashes, loss of muscle control and difficulty seeing. Other patients may develop sores in the eyes. People with leukemia are those whose bone marrow produces abnormal white cells called leukemia cells. Leukemias are also grouped by the type of white blood cells that are affected. Leukemia can arise in lymphoid cells or myeloid cells. Leukemia that affects lymphoid cells is called lymphocytic leukemia. Leukemia

that affects myeloid cells is called myeloid leukemia or myelogenous leukemia. Leukemia can be chronic or acute. In chronic leukemia the abnormal blood cell can still be functional and it will get worse slowly; acute leukemia will get worse quickly as the blood cells are very abnormal, resulting in difficulty carrying out their normal function.⁽²³⁻³⁵⁾

The symptoms of leukemia are fever and nocturnal sweats, feeling very tired and weak most of the time, having headaches quite often, frequent infections, pain in the bones and joints and bleeding in the gums and tiny red spots under the skins or purple patches in the skins. Most leukemia patients will find swollen lymph nodes in the neck or armpit and feel discomfort in the abdomen due to an enlarged spleen and weight loss. A doctor should be consulted if such symptoms are experienced as the doctor can diagnose the problem because such symptoms may not be leukemia and other infections might be involved.⁽²³⁻³⁵⁾

The early symptom of leukemia

Patients in the early stages of leukemia have no obvious symptoms and the symptoms do not stay very long; such patients may not have symptoms at all at the beginning. When leukemic blood cell increase with leukemia getting worse, it will result in a number of symptoms, referred to as acute leukemia. In such a case blood cells become very abnormal and cannot carry out their daily routines. Acute leukemia worsens when the number of

abnormal cells increases rapidly.⁽³⁶⁻⁴³⁾ Most of the symptoms of acute leukemia are vomiting, loss of muscle control, confusion and seizures. The cells can accumulate in the testicles causing them to swell. Leukemia also can affect the digestive tract, kidneys, lungs, or other parts of the body. Some patients develop sores in the eyes or on the skin.⁽⁴⁴⁻⁴⁸⁾

There are several different types of leukemia. In general, leukemia is grouped by how fast it develops and what kind of white blood cell it affects.

- It may be acute or chronic. Acute leukemia gets worse very fast and may make the patient feel sick right away. Chronic leukemia gets worse slowly and may not cause symptoms for years.
 - It may be lymphocytic or myelogenous. Lymphocytic (or lymphoblastic) leukemia affects white blood cells called lymphocytes. Myelogenous leukemia affects white blood cells called myelocytes.
- The four main types of leukemia are:

- Acute lymphoblastic leukemia, or ALL.
- Acute myelogenous leukemia, or AML.
- Chronic lymphocytic leukemia, or CLL.
- Chronic myelogenous leukemia, or CML.

Acute leukemias

With acute leukemia, immature white blood cells multiply quickly in the bone marrow. Over time, they outnumber healthy cells. (Patients may notice that they bleed a lot or suffer from infections as a result.) When these cells reach high

numbers, they can sometimes spread to other organs, causing damage. This is especially true in acute myeloid leukemia. The two main types of acute leukemia involve different types of blood cells:

- Acute lymphocytic leukemia (ALL) is the most common type of leukemia in children, mainly affecting those under 10. Adults sometimes develop ALL, but it is rare in people over 50. ALL occurs when primitive blood-forming cells called lymphoblasts reproduce without developing into normal blood cells. These abnormal cells outnumber healthy blood cells. They can collect in the lymph nodes and cause swelling.⁽⁴⁴⁻⁵⁰⁾

- Acute myeloid leukemia (AML) accounts for half of leukemia cases diagnosed in teenagers and in people in their twenties. AML occurs when primitive blood-forming cells called myeloblasts reproduce without developing into normal blood cells. Immature myeloblasts crowd the bone marrow and interfere with the production of normal blood cells. This leads to anemia, a condition in which a person does not have enough red blood cells. It can also lead to bleeding and bruising (due to a lack of blood platelets, which help the blood clot) and frequent infections (due to a lack of protective white blood cells).⁽⁵¹⁻⁵⁵⁾

Both ALL and AML have multiple subtypes. The treatment and prognosis may vary somewhat, depending on the subtype.⁽⁴⁴⁻⁴⁸⁾

Chronic leukemias

Chronic leukemia is when the body produces too many blood cells that are only partially developed. These cells often cannot function like mature blood cells. Chronic leukemia usually develops more slowly and is a less dramatic illness than acute leukemia. There are two main types of chronic leukemia:

- Chronic lymphocytic leukemia (CLL) is rare in people under 30. It is more likely to develop as a person ages. Most cases occur in people aged 60–70. In CLL, abnormal lymphocytes cannot fight infection as well as normal cells can. These cancerous cells live in the bone marrow, blood, spleen, and lymph nodes. They can cause swelling, which appears as swollen glands. People with CLL can live a long life, even without treatment. Most often, CLL is discovered when a person has a routine blood test that shows elevated levels of lymphocytes. Over time, this type of leukemia can require treatment, especially if the person has infections or develops a high white blood cell count.⁽⁵⁶⁻⁵⁸⁾

- Chronic myeloid leukemia (CML) occurs most often in individuals aged 25–60. In CML, the abnormal cells are a type of blood cells called myeloid cells. CML usually involves a defective string of DNA called the Philadelphia chromosome. (This disease is not inherited; the change in DNA that causes it occurs after birth.) The genetic defect results in the production

of an abnormal protein. Drugs called tyrosine kinase inhibitors block the function of this abnormal protein, improving a person's blood counts. In some cases, the abnormal genetic defect even seems to disappear. Alternatively, some cases of CML can be cured with a bone marrow transplant.⁽⁴⁴⁻⁴⁸⁾

Both CLL and CML have subtypes. They also share some characteristics with other forms of leukemia. The treatment and prognosis may vary depending on the subtype.⁽³⁶⁻⁴³⁾

Rarer forms of leukemia

Lymphatic and myelogenous leukemias are the most common forms. However, cancers of other types of bone marrow cells can develop. For example, megakaryocytic leukemia arises from megakaryocytes, cells that form platelets. (Platelets help blood to clot.) Another rare form of leukemia is erythroleukemia. It arises from cells that form red blood cells. In adults, chronic lymphocytic leukemia (CLL) and acute myelogenous leukemia (AML) are the most common leukemias. In children, the most common leukemia is acute lymphoblastic leukemia (ALL). Childhood leukemias also include acute myelogenous leukemia (AML) and other myeloid leukemias, such as chronic myelogenous leukemia (CML) and juvenile myelomonocytic leukemia (JMML). There are less common leukemias, such as hairy cell leukemia. There are also subtypes

of leukemia, such as acute promyelocytic leukemia (a subtype of AML).⁽³⁶⁻⁴⁸⁾

Experts do not know what causes leukemia. But some factors are known to increase the risk of some kinds of leukemia, which are called risk factors. An individual is more likely to get leukemia if he or she:

- Is exposed to large amounts of radiation.
- Is exposed to certain chemicals at work, such as benzene.
- Have some types of chemotherapy to treat another cancer.
- Has Down syndrome or some other genetic problems.
- Smokes.

But most people who have these risk factors do not get leukemia; and most people who get leukemia do not have any known risk factors.⁽⁵⁹⁻⁶¹⁾

What type of treatment the patient needs will depend on many factors, including what kind of leukemia he or she has, how far along it is, and age and overall health.

- If you have acute leukemia, you will need quick treatment to stop the rapid growth of leukemia cells. In many cases, treatment makes acute leukemia go into remission. Some doctors prefer the term "remission" to "cure," because there is a chance the cancer could recur.
- Chronic leukemia can rarely be cured, but treatment can help control the disease. If you have chronic lymphocytic leukemia, you may not need to be treated until you have symptoms. But chronic myelogenous

- leukemia will probably be treated right away.⁽⁶²⁻⁶⁶⁾

Treatments for leukemia include:

- Chemotherapy, which uses powerful medicines to kill cancer cells. This is the main treatment for most types of leukemia.
- Radiation treatments. Radiation therapy uses high-dose x-rays to destroy cancer cells and shrink swollen lymph nodes or an enlarged spleen. It may also be used before a stem cell transplant.
- Stem cell transplant. Stem cells can rebuild your supply of normal blood cells and boost your immune system. Before the transplant, radiation or chemotherapy may be given to destroy cells in the bone marrow and make room for the new stem cells. Or it may be given to weaken your immune system so the new stem cells can get established.
- Biological therapy. This is the use of special medicines that improve your body's natural defenses against cancer. For some people, clinical trials are a treatment option. Clinical trials are research projects to test new medicines and other treatments. Often people with leukemia take part in these studies. Some treatments for leukemia can cause side effects. Your doctor can tell you what problems are common and help you find ways to manage them.⁽⁶³⁻⁶⁹⁾

Protecting leukemia patient mouth

Once cancer treatment begins, dental problems can get worse. Chemotherapy alters the blood and makes it harder for

blood to clot, so bleeding becomes a problem. The patient's mouth may also become more sensitive, becoming more susceptible to infections due to bacteria that originate in the oral cavity. If a patient is experiencing nausea and vomiting due to chemotherapy, the acidity of the vomit in the oral cavity can cause problems with the teeth. The patient can prevent these problems with good dental hygiene, and there are some precautions to help with a sore or sensitive mouth. Here's how:

Get dental work before treatment. Because chemotherapy can cause bleeding, it is best to get any dental work you need before you start treatment. Therefore, be sure to keep your dentist informed of your diagnosis and your treatment schedule.⁽⁷⁰⁻⁸⁰⁾

At the same time, it is important to let your physician know about your dental care.

Keep up with dental appointments during treatment. Continue to see your dentist for cleanings while you have leukemia and during treatment to keep your mouth healthy.

Be diligent about brushing and flossing at home. To keep your mouth in tip-top shape, brush and floss in the morning, before bed, and after meals.

Use gentle brushes or a sponge. Your mouth will probably bleed more easily during chemotherapy, so use a gentle toothbrush and take care not to cut your gums when you floss. Chemotherapy can also cause a sore and sensitive mouth, called mucositis, which is

like having sunburn in your mouth. It usually happens about four to seven days after treatment. When your mouth becomes too sensitive for your toothbrush, try using dental sponges, which you can buy at a pharmacy, to brush your teeth.

Use rinses regularly. Silverman recommends rinsing your mouth during the day with an antiseptic mouthrinse (which you can buy over-the-counter or get through a prescription from a doctor) or with your own solution of warm water and salt or warm water and baking soda. How often you do it depends on how many problems you are having. If you are having mouth problems, you may want to rinse your mouth four times a day, including after meals.

Treat infections promptly. If you do develop an infection in your mouth, be sure to see your doctor and get treated with an antibiotic.

The health of your mouth is something to take seriously when you have leukemia, and staying on top of your dental hygiene can prevent problems like infection.⁽⁷⁰⁻⁸⁰⁾

Increase in size of the gingiva is a common feature of gingival disease. The many types of gingival enlargement can be classified according to etiologic factors and pathologic changes as follows:

- Inflammatory enlargement
- Drug-induced enlargement
- Enlargement associated with systemic disease
- Neoplastic enlargement

- False enlargement

Leukemic enlargement may be diffuse or marginal, localized or generalized. It may appear as a diffuse enlargement of gingival mucosa, an oversized extension of the marginal gingiva or a discrete tumor-like interproximal mass. In leukemic enlargement the gingiva is generally bluish red and has a shiny surface. The consistency is moderately firm, but there is a tendency toward friability and hemorrhage, occurring either spontaneously or on slight irritation. Acute painful necrotizing ulcerative inflammatory involvement sometimes occurs in the crevice formed at the junction of the enlarged gingival and the contiguous tooth surfaces.

Patients with leukemia may also have a simple chronic inflammation without the involvement of leukemic cells and may present with the same clinical and microscopic features seen in patients without the disease. Most cases reveal features of both simple chronic inflammation and a leukemic infiltrate.

True leukemic enlargement occurs commonly in acute leukemia but may also be seen in subacute leukemia. It seldom occurs in chronic leukemia.

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