



Test 213
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Gingival Enlargement Associated With Acute Myelocytic Leukemia in a Child: Case Report

This case report describes a 9-year-old female who presented with gingival enlargement after wearing an orthodontic appliance. The patient was diagnosed with acute myelocytic leukemia. This case stresses the importance of taking a thorough medical history on all patients as well as recognizing oral manifestations of systemic conditions in pediatric patients.

It is imperative for the dental practitioner to consider the possibility of a nondental origin for oral signs and symptoms; complacency in diagnosis may breed serious consequences. Gingival enlargement, for instance, is caused by myriad local and systemic factors (Table).^{1,2} During patient evaluation, a thorough review of the patient's medical history and family history should be performed before formulating differential diagnoses.

Leukemia is a hematological disorder that is caused by proliferating white blood cell-forming tissues, resulting in a marked increase in circulating immature or abnormal white blood cells. Leukemic cells multiply at the expense of normal hematopoietic cell lines, which causes marrow failure, depressed blood cell count (cytopenia), and death as a result of infection, bleeding, or both.^{3,4} Dentists may be responsible for initiating the diagnosis in 25% of patients with *acute myelogenous leukemia* (AML) and 33% of patients with *acute myelomonocytic leukemia* (an AML subtype), conditions in which the most frequently observed oral findings include mucosal bleeding and ulceration, petechiae, and gingival overgrowth.^{5,6} Oral manifestations in patients are not limited to the acute forms of the disease, however; these have been described in almost all subtypes of AML, acute lymphocytic leukemia, chronic myeloid leukemia, and chronic lymphocytic leukemia.^{7,8}

Gingival overgrowth associated with leukemia is characterized by progressive enlargement of the interdental papillae and the marginal and attached gingiva, and, in severe cases, the crowns of the teeth may be covered. Usually, the gingiva is swollen with lack of stippling and coloring that is pale red to deep purple. Mucosal hemorrhages, ulcerative gingivitis, infectious gingivitis, and odontalgia may be observed.⁹ Pallor, spontaneous hemorrhages, petechiae, and ulceration may occur more frequently in acute leukemia compared to chronic leukemia.⁷ Each subtype of leukemia has similar histologic characteristics aside from the morphologic form of the invading cells, which are characterized by abundant mitotic figures. In typical cases, the lamina propria is densely packed with leukemia cells extending from the basal cell layer of the epithelium into the gingiva, which alters the normal anatomy. The infiltrate

Dentists may be responsible for initiating the diagnosis in 25% of patients with AML....



Figures 1 to 3. A 9-year-old female presented to the dental office with significant generalized gingival enlargement.

compresses the regional blood vessels. With effective chemotherapy, the gingival enlargement usually completely resolves or, at least, partially resolves.¹⁰

This case report features gingival overgrowth due to AML—cancer that typically presents in patients with an average age of 67 years—in a 9-year-old child.¹¹

CASE REPORT

A 9-year-old female presented to the dental office with significant generalized gingival enlargement (Figures 1 to 3). The general dentist was very concerned and even accompanied the patient to our office. Her last physical exam was 2 years prior, and there were no abnormal findings at that time. The patient was not taking any medications, and she had no known drug allergies. Her blood pressure was 80/50 with a regular heartbeat. She presented with bilateral bruising of her arms, extending from her wrists to her upper arms. Her mother reported that the patient had a lack of appetite during the past week and that the patient had fainted the morning of this appointment.

Oral examination revealed generalized enlargement of maxillary and mandibular gingiva, involving the buccal, lingual, and palatal aspects. The gingiva was pale, bulbous, and lacked stippling but had focal hemorrhagic areas. Generalized moderate plaque accumulation was noted along the gingiva margins in the maxilla and mandible.

The patient had been wearing a maxillary Hawley appliance (Figure 4) for one month prior to the periodontal evaluation. A lip bumper was also placed in the mandibular arch one week prior to the visit. The patient's mother reported that the gingival overgrowth occurred once the lip bumper was placed. Minimal resolution of gingival condition was noted after the lip bumper was removed.

It was possible that the orthodontic appliances caused gingival overgrowth, which generated discomfort upon eating; pain-induced anorexia could have led to the syncopal episode. The severity and timing of mucosal enlargement, however, coupled with relatively adequate plaque control, a lack of medications, bruising, and loss of appetite suggested a systemic etiology.



Figure 4. The patient had been wearing a maxillary Hawley appliance for one month prior to the periodontal evaluation.

The patient was referred to her primary care physician and was subsequently admitted to the intensive care unit in the hospital. The patient's white blood cell count was measured at 295,000/mm³ and acute myelocytic leukemia was later confirmed. A transfusion of red blood cells and platelets, along with chemotherapy, was initiated. A report from the physician stated that the gingiva started to recede after chemotherapy. Unfortunately, the patient passed away before a suitable bone marrow donor was located.

DISCUSSION

Acute myelocytic leukemia is a clonal proliferation of immature myeloid cells, presenting with marrow failure and cytopenia. It customarily occurs in older patients with a mean age of 67 years and is rare in patients younger than 45 years.⁸ Symptoms may include fever, fatigue, pallor, mucosal bleeding, petechiae, and local infections. Diffuse, boggy gingival enlargement is especially common in the monocytic variety. The diagnosis is made by the presence of at least 30% myeloblasts in the bone marrow. Acute leukemia usually presents with bone marrow failure and associated anemia, infection, and bleeding. Symptoms are generally flu-like with bone pain, joint pain, or both, caused by malignant marrow expansion. Thrombocytopenia is manifested by petechial skin, posterior palatal hemorrhages, and gingival bleeding.¹²

Long-term survival depends on the success of consolidation high-dose chemotherapy or allogeneic bone marrow transplantation. Untreated, acute leukemia has an aggressive course, with death occurring in 6 months or less. This case highlights the magnitude of prompt referral of a dental patient to medical specialists.

Periodontal treatment is essential once the patient's diagnosis is confirmed. If possible, oral infections must be eliminated or, at least, contained prior to systemic therapy (ie, chemotherapy, head and neck radiation, and/or bone marrow transplant). No elective surgery is recommended. Control of active periodontitis, caries, endodontic lesions, and ill-fitting prostheses, as well as removal of orthodontic appliances, may be mandatory to curtail bacteremia and pain. The patient must develop superior oral

Table. Possible Diagnoses That May Induce Gingival Inflammation and Enlargement^{1,2}

- Plaque-induced gingivitis
- Puberty-associated gingivitis
- Menstrual cycle-associated gingivitis
- Pregnancy-associated gingivitis
- Pyogenic granuloma
- Drug-influenced gingival enlargements (eg, anticonvulsants, immunosuppressants, and/or calcium channel blockers)
- Ascorbic acid deficiency
- Leukemia
- Lymphoma
- Hereditary gingival fibromatosis
- Sarcoidosis
- Neurofibromatosis
- Wegener's granulomatosis
- Crohn's disease
- Primary amyloidosis
- Kaposi's sarcoma
- Acromegaly

...oral healthcare professionals play a critical role in recognizing oral manifestations of systemic diseases.

hygiene methods.⁹ For most periodontal patients, mechanical plaque control alone might be sufficient to regulate plaque and inflammation. However, since patients with leukemia are prone to have gingival bleeding induced by the disease itself and inflammation from gingival enlargement, chemical plaque control (such as alcohol-free chlorhexidine) in combination with mechanical debridement should be considered as the preferred method of therapy to achieve the optimal effect.⁸

If periodontal treatment such as scaling and root planing or other invasive procedures are necessary during active cancer treatment, it is recommended to perform such actions 7 to 10 days prior to myelosuppressive events and to avoid any dental procedures if the plate-

let count is less than 75,000/mm³ (or abnormal clotting factors are present) or if the absolute neutrophil count is less than 1,000/mm³ (unless the physician approves the use of prophylactic antibiotics).¹³ Immunosuppression for leukemia treatment may also foster oral pain and infections via induction of dry mouth and/or mucositis. Palliation for these side effects includes the use of alcohol-free chlorhexidine; custom tray-delivered fluoride gel; topical lidocaine; topical benzydamine; PTA lozenges or rinses (PTA is a combination of polymyxin E, tobramycin, and amphotericin B); and hydrating or saliva-stimulating materials, eg, water, ice chips, saliva substitutes, and sugar-free candy or gum.^{9,13} With both systemic and oral therapy, the patient may stabilize, but in the

end, the *timing* of a leukemia diagnosis may dictate his or her lifespan.

CONCLUSION

This case report demonstrates that oral health-care professionals play a critical role in recognizing oral manifestations of systemic diseases. Although AML is a rare disease, it has devastating consequences without timely diagnosis and treatments. Like many other systemic diseases, oral tissues reflect systemic changes in the body. Therefore, the dentist must be vigilant in detecting abnormal oral tissues and tissue alterations when performing oral cancer screening during initial and recall visits. Prompt referral to and collaboration with a hematologist will help ensure a positive outcome of the condition. Once the medical condition is stabilized with radiation and chemotherapy, dental and periodontal conditions can be effectively managed under the protocol mentioned in the *Discussion* section. ♦

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Continuous or Reciprocating Endodontic Rotary Files: Evidence-Based Clinical Considerations

Stephen Weeks, DDS, and James Bahcall, DMD, MS, discuss the differences and similarities between using continuous and reciprocating endodontic rotary files. This article is peer reviewed and available for 2 hours of CE credit.



To submit Continuing Education (CE) answers, use the answer sheet below. Or, use our easy online option at dentalcetoday.com. This article is available for 2 hours of CE credit. The following 5 questions were derived from "Gingival Enlargement Associated With Acute Myelocytic Leukemia in a Child: Case Report" by Michael K. Sonick, DMD, et al on pages 122 to 124.

Learning Objectives: After reading this article, the individual will learn: (1) how gingival enlargement may be associated with conditions of nondental origin, and (2) the importance of taking a thorough medical history on all dental patients.

1. The most frequently observed oral finding(s) in patients diagnosed with acute myelogenous leukemia and acute myelomonocytic leukemia is/are:
 - a. Mucosal bleeding/ulceration.
 - b. Petechiae.
 - c. Gingival overgrowth.
 - d. All of the above.
2. Leukemia-triggered gingival overgrowth is characterized by progressive enlargement of the interdental papillae as well as the marginal and attached gingiva. In the condition's most pronounced form, the crowns of the teeth may be covered.
 - a. The first statement is true, the second is false.
 - b. The first statement is false, the second is true.
 - c. Both statements are true.
 - d. Both statements are false.
3. Generally, leukemia-associated gingival enlargement resolves completely or at least partially with effective leukemia chemotherapy.
 - a. True.
 - b. False.
4. Acute myelocytic leukemia customarily occurs in older patients with a mean age of 67 years. The diagnosis is made by the presence of at least 70% myeloblasts in the bone marrow.
 - a. The first statement is true, the second is false.
 - b. The first statement is false, the second is true.
 - c. Both statements are true.
 - d. Both statements are false.
5. If scaling and root planing or other invasive dental procedures are necessary during active cancer treatment, it is recommended to perform such actions _____ prior to myelosuppressive events.
 - a. 2 to 3 days.
 - b. 3 to 4 days.
 - c. 5 to 7 days.
 - d. 7 to 10 days.

ANSWER SHEET Test 213, beginning on page 122

Complete the paper answer sheet and submit your answers for this issue's CE examination. Answer at least 4 of the 5 questions correctly to earn 2 CE credits.

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