## A Survey of Clinicians: Prioritization of Dental Treatment in Leukemia Patients Prior to Chemotherapy

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Purpose: Chronic oral and dental infections that may remain benign and asymptomatic in healthy individuals can develop into serious and life-threatening conditions when leukemia patients undergo chemotherapy. There is a general consensus that elimination of chronic dental and oral infections prior to chemotherapy reduces the risk of serious problems that may require hospitalization. The limited time available for dental treatment prior to chemotherapy forces clinicians to prioritize. The aim of this study was to determine how hospital-based clinicians who routinely see leukemia patients prioritize dental treatment prior to chemotherapy. Materials and Methods: A survey was conducted that targeted the membership of the American Academy of Maxillofacial Prosthetics because a large number of these clinicians had first-hand experience in managing leukemia patients. Results: The consensus was that apical radiolucencies and severe periodontitis must be eliminated. Opinions differed regarding whether and how mild periodontal pathology and caries lesions should be treated. Conclusion: Most of the surveyed practitioners believed that infectious processes that invade the bone pose the highest risk if left untreated prior to chemotherapy. Int J Prosthodont 2009;22:303-306.

Chemotherapy affects not only its intended target (ie, the cancer), but also healthy organs. Tissues with high cellular turnover rates are particularly susceptible, such as those in the digestive system and oral cavity. Compromised cellular turnover in the mouth leads to mucositis; the oral epithelium becomes atrophic and erythematous, and ulcerations may develop. This results in a breakdown of the protective barrier to the external environment. Furthermore, chemotherapy reduces salivary flow and its cleansing

effects. In combination, these effects significantly increase the risk of opportunistic infections, including dental caries and mucositis. Further, leukemia and its treatment, chemotherapy, interfere with the production of immune cells. The resulting immune deficit makes it more likely that chronic infections of periapical and periodontal tissues will become acute or even systemic. This can lead to life-threatening conditions that require hospitalization.<sup>1,2</sup>

The focus of this study was on the management of oral infection risk due to periodontal, pericoronal, and pulpal pathology in leukemia patients prior to chemotherapy. The general consensus was that oral and dental pathology must be eliminated prior to chemotherapy.<sup>3</sup> However, in many cases the dental treatment needs are too extensive for the short window of time available. One needs to consider that patients may no longer tolerate treatment once their immune defenses are severely compromised by the cancer or its treatment and white blood cell counts have dropped. In addition, monetary factors may make it difficult to follow the consensus guidelines when insurers refuse to recognize the medical necessity of dental treatment.<sup>4</sup> In this light, it makes sense to eliminate

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chronic infections before chemotherapy is initiated to maintain optimal oral hygiene. Unfortunately, the time available for dental treatment is limited because chemotherapy cannot be delayed. It is recommended to concentrate on chronic pathologies that have the highest risk of leading to serious complications. Preserving the patient's life is more important than preserving teeth. Therefore, in leukemia patients who will undergo chemotherapy, the dental treatment planning will have entirely different priorities from those that are typical for routine dental practice.

There is no clear scientific-based guideline as to how the limited available time prior to the initiation of chemotherapy is best used for dental treatment. There is limited clinical evidence suggesting that ignoring some oral pathologies may not necessarily lead to unacceptable risks.<sup>5</sup> Lacking a solid research basis, a survey was conceived to tap into the clinical experience of dental clinicians who frequently treat leukemia patients prior to chemotherapy. There can be little disagreement that good oral hygiene, fluoride prevention, and a diet that minimizes the oral infection risk should be part of any infection management protocol because both the disease (leukemia) and its treatment (chemotherapy) render the patient vulnerable to infection, including caries. The best approach is less obvious when it comes to deciding whether endodontically and periodontically treated teeth should be treated or extracted. Efficient use of the limited time available for reducing the risk of infection and the patient's future restorative options must be carefully balanced. The decision is based upon clinical judgments. The purpose of this survey was to find out how experienced clinicians prioritize dental treatment for leukemia patients who are scheduled to receive chemotherapy under these constraints.

## **Materials and Methods**

A survey was created with the purpose of developing a clearer understanding of practices nationwide regarding dental care provided to leukemia patients prior to chemotherapy. It was pretested at three hospitals (MD Anderson Cancer Center, Texas; Memorial Sloan-Kettering Cancer Center, New York; and Albert Einstein College of Medicine, New York) and subsequently distributed to all 132 active members of the American Academy of Maxillofacial Prosthetics. Nonresponders were approached a second and third time by mail and email after 8 and 12 weeks, respectively. This group of practitioners, although small, was chosen because its members are often active in settings where cancer patients receive dental treatment. Consequently, respondents were likely to provide an opinion based upon personal experience.

The survey first asked whether the protocol for leukemia patients prior to chemotherapy includes a dental examination. If this question was answered in the affirmative, the survey proceeded to questions focusing on the different types of oral diseases (ie, caries, gingivitis, periodontitis, and endodontic problems).

The first question asked whether the practitioner differentiates between acute and chronic dental diseases (depending on whether pain, swelling, and/or purulent drainage are present or absent). Question 2 inquired whether the institution's standard of care requires the comprehensive elimination of all diagnosed dental pathologies prior to chemotherapy. The remaining questions were limited to the management of chronic asymptomatic dental diseases. Question 3 focused on the approaches used for caries lesions and gave the following options: treatment of (a) all caries lesions, (b) only small caries lesions, or (c) only large caries lesions. The last option was (d) no restorative treatment regardless of lesion size. Question 4 focused on chronic gingivitis. The respondents were given the following choices: (a) comprehensive dental prophylaxis, (b) localized prophylaxis at affected sites, or (c) no treatment for gingivitis. Question 5 asked: "What do you believe is the correct way to treat patients with chronic periodontitis prior to chemotherapy?" The list of answers (multiple answers allowed) was (a) treatment of all sites of periodontitis with scaling and root planing, (b) treatment of sites only with severe periodontitis (defined as greater than 6 mm of bone loss) with scaling and root planing, (c) scaling and root planing of sites with mild to moderate periodontitis (defined as less than 6 mm of bone loss) and extraction of all teeth with severe periodontitis, (d) extraction of all teeth with severe periodontitis, e) extraction of all teeth with periodontitis regardless of severity, and (f) no treatment for teeth with periodontitis. Apical radiolucencies were the subject of question 6, and the choices given were (a) endodontic therapy in all cases, (b) extraction of all teeth with asymptomatic apical radiolucencies, or (c) no treatment.

Respondents who produced inconsistencies between questions were eliminated from the results. Contradictory answers that were limited to within a multiple-choice question led to the elimination of this question for the specific respondent. This led to different numbers of responses for different questions.

### Results

Eighty-six of the 132 questionnaires were returned (65% response rate). Fifty-five percent of respondents (47 of 86) indicated that their protocol included a prechemotherapy oral exam and proceeded to answering questions 1 through 6. Question 1: 95% of

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#### Table 1 Treatment of Caries (Q3)

	No. of responses	% of total responses
Total number of responses	39	100
Treat all caries lesions	19	49
Treat only large caries lesions	18	46
Do not treat caries lesions	2	5

respondents (38 of 40) differentiated between acute and chronic dental diseases. Question 2: 53% of respondents (21 of 40) recommended the treatment of all dental pathologies prior to chemotherapy. Question 3 (caries): about half of the dental providers of leukemia patients indicated that their protocol was to treat all caries lesions prior to chemotherapy, while for the other half, only large lesions qualify for treatment (Table 1). Question 4 (gingivitis): all respondents (40 of 40) advocated conducting prophylaxis on all affected sites. Question 5 (periodontitis): after eliminating contradictory answers, it was found that for severe chronic periodontitis, seven practitioners (28%) recommended scaling and root planing while 18 (72%) advocated extraction (Table 2). For chronic periodontitis that is not severe, all practitioners were in favor of limiting treatment to scaling and root planing. Question 6 (asymptomatic apical radiolucencies): the majority (76%) of respondents favored treating asymptomatic apical radiolucencies with endodontic therapy, while a small number of participants (4%) preferred extraction (Table 3).

## Discussion

It is well recognized that asymptomatic oral infections can develop into severe or even life-threatening conditions when the immune system becomes compromised by leukemia and chemotherapy. Ideally, all chronic oral infection risks should be eliminated prior to chemotherapy. However, time constraints may make it difficult to provide comprehensive dental treatment. In their responses, a majority of clinicians commented that financial and time constraints make it difficult to provide comprehensive dental treatment. This survey investigated how clinicians in practice environments where cancer patients are routinely seen prioritize the dental treatment of leukemia patients undergoing chemotherapy. In order to obtain a good yield of respondents with actual clinical experience in the dental management of leukemia patients, the survey targeted the membership of the American Academy of Maxillofacial Prosthetics. The survey focused on treatments that need to be completed prior to the

Table 2 Treatment of Severe Periodontitis (Q5)

	No. of responses	% of total responses
Total number of responses	25	100
Scaling/root planing	7	28
Extraction	18	72

# **Table 3**Treatment of Asymptomatic ApicalRadiolucencies (Q6)

	No. of responses	% of total responses
Total number of responses	33	100
Endodontic therapy	25	76
Extraction	4	12
No treatment	4	12

commencement of chemotherapy (ie, periodontal surgery, endodontic therapy, and extraction). The survey did not contain questions relating to prophylaxis based upon diet, fluoridation, and oral hygiene because these can be performed after chemotherapy has begun.

There was a unanimous agreement that a comprehensive dental and oral examination is needed in all cases. Furthermore, there was a general consensus that it is useful to differentiate between acute and chronic oral conditions. It is generally accepted that acute pathologies cannot be left untreated. Therefore, the survey was limited to chronic asymptomatic pathologies where opinions may differ regarding the prioritization of treatment. There was a wide consensus that asymptomatic endodontic radiolucencies require intervention and that teeth with severe periodontal involvements should be extracted. Opinions differed regarding how to deal with milder periodontal problems and caries lesions. At least 10 respondents commented that cancer treatment schedules often do not leave sufficient time for conservative dentistry, with the result being that the dental pathology is either left untreated or teeth that could be saved are extracted. A number of practitioners prioritize between the conservative and exodontic approach based upon the strategic importance of the teeth in question. Two institutions that routinely provide dental care to patients with oral cancer indicated in their comments that they rarely see leukemia patients because insurance carriers are least likely to recognize the medical necessity of dental care when the cancer is not in the oral cavity.

### **Conclusions**

Most of the surveyed practitioners advocated a therapeutic approach that takes into account disease severity and other factors rather than strictly following the NIH guidelines.<sup>3</sup> Outcome data collected earlier suggest that this less than comprehensive treatment strategy can be safe and effective.<sup>5</sup>

The survey results show that most respondents feel that dental treatment must be prioritized based on eliminating infection processes that invade the bone. There is a likely consensus regarding how critical it is to treat more superficial infections such as caries and gingivitis. The survey provides no data as to how successful the dental treatment strategies were in preventing serious infectious complications during chemotherapy. There is a need for outcome studies that validate the dental management strategies that are currently in use for leukemia patients.

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#### Literature Abstract

## Prospective clinical study evaluating endodontic microsurgery outcomes for cases with lesions of endodontic origin compared with cases with lesions of combined periodontal-endodontic origin

The objective of this prospective study was to evaluate the outcomes of endodontic microsurgery and compare the healing success of cases presenting with isolated endodontic lesions to cases with combined periodontal-endodontic lesions. Two hundred twentyseven patients presenting with 263 teeth that required periradicular surgery were studied. Teeth were excluded for the following: mobility class II or greater, horizontal and vertical fractures, and any signs of perforation. According to the classification system developed by Kim and Kratchman, 204 teeth were considered to be of isolated endodontic origin while 59 teeth were classified as having lesions of varying degrees of periodontal-endodontic origin. All patients received preoperative 250 mg of oral amoxicillin three times daily starting one day before surgery and continued postoperatively for 7 days. Four hundred mg Ibuprofen was administered 1 hour before surgery and after surgery for all patients as well. Three mm of root tip with a 0- to 10-degree bevel angle was sectioned and root preparations extended 3 mm into the canal space for all teeth. One of three root-end filling materials (IRM, Super EBA, ProRoot MTA) was randomly selected for use. All clinical procedures were carried out by the same operator. Patients were recalled every 6 months for 2 years and every year thereafter. Radiographs taken from two angles were evaluated independently by two examiners who were unaware of the type of root-end filling material used, using criteria of Molven et al. Clinical signs and symptoms were noted and correlated with radiographic findings. Treatment success was tabulated and analyzed with the Pearson  $\chi^2$  test at a 5% significance level. One hundred ninety-two cases out of 263 presented for the 12 month recall (73% recall rate). Four of these cases were then excluded because teeth were extracted as a result of root fracture that was undiagnosed at the time of surgery. The combined success rate of the group with isolated endodontic lesions was 95.2%, which was significantly higher than the combined success rate of the group with combined lesions of 77.5% (P < .05). The authors concluded that the presence and size of a pervious lesion do not adversely affect the clinical outcome of peri-radicular surgery, on the proviso that there is no periodontal defect. They also recommend the use of concurrent bone grafting and membrane barrier techniques in combined periodontal-endodontic lesions and use of MTA as the root-end filling material of choice in microsurgery.

Kim E, Song JS, Jung IY, Lee SJ, Kim S. *J Endod* 2008;34:546–551. **References:** 29. **Reprints:** Dr Lee Seung-Jong, Department of Conservative Dentistry, College of Dentistry, Yonsei University, 134, Shinchon-Dong, Seodaemun-Gu, Seoul 120-752, South Korea. Email: sjlee@yuhs.ac—*Elvin W.J. Leong, Singapore* 

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