



## Review Article

## Dental care of pediatric cancer patient

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## ABSTRACT

In spite of the fact that the rate for child malignancy has remained moderately stable for as long as 2 decades, there have been radical decreases in mortality because of early finding and upgrades in treatment. Presently over 75% of kids determined to have malignancy endure more than 5 years. The pediatric dental expert assumes a significant job in the counteraction, adjustment, and treatment of oral and dental issues that can bargain the childrens wellbeing and personal satisfaction previously, during, and after the malignancy treatment.

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## 1. Introduction

Despite the fact that youth malignancy represents <1% of disease analyze every year in the United States, it is the second driving reason for death in children.<sup>1,2</sup> The American Cancer Society evaluated that 10,590 youngsters younger than 15 in the United States were determined to have disease in 2018.<sup>1</sup> The conclusion of a youth threat prompts initiation of oncology treatment before long. These youngsters may get chemotherapeutic specialists, radiation treatment, immunotherapy, medical procedure, as well as hematopoietic cell transplantation (HCT) to treat the basic threat. The long haul endurance of kids rewarded for malignancies is improving, with over 80% of youngsters enduring 5 years or on the other hand more.<sup>1</sup> Appraisal of the oral pit and the board of dental intricacies is significant for all youngsters however especially for youngsters with malignant growth. Dental and oral consideration related issues emerge in these youngsters at different periods of malignancy treatment and after fulfillment of malignant growth treatment. From a dental viewpoint, the

pediatric patient experiencing oncology treatment may.<sup>1</sup> have previous untreated dental caries, periodontal illness, and additionally pathologic injuries of the oral hard and delicate tissues;<sup>2</sup> have oral indications of the malignant growth;<sup>3</sup> create oral intricacies because of malignant growth treatments; and<sup>4</sup> grow long haul dental and orofacial intricacies after culmination of disease treatments.

## 1.1. Oral Examination

Current rules suggest that youngsters ought to have an oral assessment preceding inception of malignant growth therapy.<sup>3</sup> A pretreatment assessment encourages foundation of a dental specialist youngster relationship before the beginning of malignancy treatment–related oral difficulties. The assessment includes a clinical and radiographic assessment of the oral pit, empowering the pediatric dental specialist to set up caries anticipation methodologies and to give expectant direction dependent on the youngster’s clinical finding and up and coming treatments.<sup>3</sup> The dental specialist should report the youngster’s dental and oral wellbeing status to the oncology team.<sup>3</sup> This correspondence ought to incorporate the seriousness of

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dental caries, the intrusiveness of proposed dental treatment, and the nearness of pathologic sores, assuming any. On the off chance that dental caries, periodontal ailment, or pathologic oral lesions<sup>4,5</sup> are analyzed before inception of malignant growth treatments, the important dental treatment ought to be given inside the wellbeing net of clinical clearances and immediately to malignant growth treatment.

#### Oral complications in cancer treatment

##### 1.2. Mucositis

Oral mucositis is probably going to create in 40% of youngsters getting standard-portion chemotherapy and in 80% of patients getting radiation treatment for head and neck cancers.<sup>6–8</sup> Oral mucositis happens in 75% of patients experiencing bone marrow transplantation.<sup>9,10</sup> Oral mucositis is evaluated as mellow, moderate, or serious dependent on the patient's indications and clinical introduction. Diverse rating scales can be utilized to evaluate and follow malignant growth treatment-actuated mucositis.<sup>11</sup> The World Health Organization Oral Toxicity Scale is one such evaluating apparatus.<sup>12</sup> On this scale, grade 3 and grade 4 mucositis are viewed as serious. Oral mucositis meddles with understanding working and resilience for malignant growth therapy.<sup>13</sup> Patients report it as the most incapacitating reaction of disease treatment.<sup>9</sup> The backbone of the executives of oral mucositis is palliative care.<sup>9</sup> Maintaining great oral cleanliness is critical to forestall just as to diminish the seriousness of oral mucositis.<sup>14,15</sup> Mellowing toothbrush bristles in warm water for a couple of moments might be important to encourage comfort during brushing. Patients who have serious mucositis and can't endure a toothbrush can utilize froth brushes. Oral cryotherapy, recombinant human keratinocyte development factor-1, low-level laser treatment, sodium bicarbonate flushes, and benzydamine mouthwash have proof based help for the board of oral mucositis in patients with cancer.<sup>16</sup> Analgesic drugs can be utilized to treat torment related with oral mucositis.<sup>3,9</sup> Topical sedatives obtund torment for a brief span however, don't treat the mucositis.

##### 1.3. Oral infections

Youngsters accepting malignant growth treatment create pioneering oral diseases (parasitic, bacterial and viral).<sup>14</sup> The clinical signs of these contaminations might be atypical in light of the fact that of neutropenia.<sup>17</sup> Oral candidiasis and herpetic contaminations are frequently found in these children.<sup>17</sup> Prophylactic nystatin is inadequate in forestalling oral candidiasis.<sup>16</sup> When oral candidiasis is analyzed in kids accepting malignancy treatment, nystatin is the principal line of prescription to be attempted, in spite of the fact that it may not generally resolve the disease. Fundamental antifungal operators, for example,

amphotericin B might be necessary.<sup>16</sup> When nystatin is utilized, clinicians must remember that the sugar substance of the oral suspension is high and can expand caries susceptibility.

##### 1.4. Pain

Youngsters who get plant alkaloid chemotherapeutic operators, for example, vincristine and vinblastine may create neuropathic torment that typically influences mandibular teeth. These youngsters whine of profound torment in the jaw and teeth in the nonattendance of an odontogenic well-spring of pain.<sup>3,7,17</sup> Such neuropathic torment is typically transient in youngsters and decreases or then again settle after fulfillment of chemotherapy.<sup>3</sup> without an authoritative remedy for chemotherapy-prompted neuropathic torment, palliative consideration might be furnished with over-the-counter prescriptions.

##### 1.5. Xerostomia

Youngsters who get malignancy chemotherapy as well as head furthermore, neck radiation treatment create xerostomia during and past the treatment phase.<sup>3,17,18</sup> Xerostomia increments caries chance and intensifies mucositis. Use of sugarfree gum, sans sugar mints and capsules, spit substitutes, liquor free mouthrinses, and oral creams lightens xerostomia.

## 2. Dental Management

At the point when dental caries is analyzed in a kid who is going to begin malignant growth treatment, the pediatric dental specialist and oncology group must build up clear correspondence with respect to the capacity of the patient to endure dental treatment.<sup>3,19</sup> Some key clinical contemplations for the sheltered conveyance of dental treatment (helpful treatment, periodontal treatment, and extractions) are outright neutrophil tally (ANC), platelet check, what's more, coagulopathies auxiliary to malignant growth or treatment.<sup>20–22</sup> At the point when the ANC is  $>2,000/\text{mm}^3$ , anti-infection prophylaxis is not showed. An ANC of  $1,000\text{--}2,000/\text{mm}^3$  warrants a discussion with the pediatric oncologist to find out the need for anti-infection inclusion. On the off chance that the ANC is  $<1,000/\text{mm}^3$ , dental treatment ought to be conceded until the ANC is higher. For rising dental treatment, the youngster may require prophylactic anti-toxins and hospitalization.<sup>23,24</sup> Realizing the platelet check is significant regardless of whether dental extractions are not arranged due to the danger of dying as well as hematoma from intraoral sedative infusions. Draining isn't a worry when the platelet tally is  $>75,000/\text{mm}^3$ .

On the off chance that the youngster's platelet tally is  $<75,000/\text{mm}^3$ , meeting with the pediatric oncologist is important to discover the requirement for platelet

transfusions and organize hospitalization for delayed monitoring.<sup>23,24</sup> The pediatric dental specialist needs to settle on choices about the subtleties of dental treatment, for example, the decision of helpful materials and treatment strategies, realizing that the youngster is probably going to be immunosuppressed sooner rather than later.

Feelings vary among pediatric dental specialists with respect to the utilization of helpful pulpotomy to treat crucial essential teeth with reversible pulpitis,<sup>25,26</sup> without proof based proposals for crucial mash treatment in immunocompromised kids, pediatric dental specialists will in general kindness giving authoritative treatment as extraction of the essential tooth to maintain a strategic distance from complexities in the up and coming immunosuppressed state.<sup>27</sup>

If recently rewarded essential teeth are clinically and radiographically stable, extraction isn't indicated.<sup>3,18</sup> Root waterway treatment ought to be performed for perpetual teeth when shown, if they are restorable.<sup>27</sup> Ideally, pull waterway treatment for perpetual teeth ought to be finished in any event multi week before commencement of disease treatment to guarantee mending of the periapical periodontal tissue. In the event that this planning isn't achievable, extraction ought to be thought of. On account of advances in glue dentistry, little carious injuries can be dealt with minimalistically. Vulnerable notches what's more, gaps ought to be fixed to forestall carious injuries on sound tooth surfaces.<sup>27</sup> A strategy for capturing carious sores is the utilization of silver diamine fluoride. Clinical achievement in capturing tooth rot in youngsters has been accounted for with rehashed uses of silver diamine fluoride.<sup>28</sup> However, application brings about dark staining of the tooth surface and ought to along these lines be unmistakably examined with the patient and the parents.<sup>28</sup> Topical use of silver diamine fluoride permits the chance of capturing rot with a noninvasive technique.<sup>18</sup> A few youngsters may have existing orthodontic machines or then again space maintainers. Intraoral machines ought to be evacuated in the event that they can possibly cause oral disturbance, if the malignant growth treatment can possibly make moderate serious mucositis, or if oral cleanliness is poor.<sup>17,29</sup> Removable apparatuses can be worn as long as the patient can endure them and can keep up great oral hygiene.<sup>17</sup> Appliances with metal parts ought to be expelled from kids who require different attractive reverberation pictures (X-rays) of the head and neck area, (for example, kids with intracranial tumors) to forestall disperse and ancient rarities on the X-rays. In the event that the patient is experiencing orthodontic treatment at the hour of malignancy determination, a judicious course is to quickly expel the orthodontic machine and give the understanding with removable orthodontic retainers.<sup>7,8</sup> Orthodontic treatment might be continued following a 2-year occasion free endurance period. Essential teeth

in exfoliative stages ought to be permitted to normally exfoliate. Infected teeth, non restorable teeth, root tips, and periodontally undermined teeth ought to be removed 14 days preceding inception of malignancy treatment to permit time for healing.<sup>3</sup>

### 2.1. Diet consideration

Routine oral consideration is imperative to diminish the occurrence and seriousness of oral sequelae of the treatment convention, in this manner forceful oral cleanliness ought to be done all through the whole oncology treatment, paying little mind to the kid's hematological status<sup>30–35</sup> Many dental and clinical experts still mistakenly accept that tooth-brushing builds the danger of bacteremia and dying, and backer the stopping of oral cleanliness with a customary toothbrush when the kid is thrombocytopenic as well as neutropenic. Thrombocytopenia ought not be the sole determinant of oral cleanliness, as patients can brush without seeping at broadly various degrees of platelet count. Above all, there is proof that patients who do concentrated oral consideration have a diminished danger of creating moderate/serious mucositis, without causing an expansion in septicemia and contaminations in the oral cavity.<sup>36,37</sup> A normal delicate toothbrush or an oscillating brush utilized in any event twice every day is the most effective intends to decrease the danger of noteworthy draining and contamination in the gingiva. Wipes, froth brushes, and supersoft brushes can't give viable mechanical purifying because of their non-abrasiveness; in this way, they ought to be utilized possibly in instances of extreme mucositis when the patient can't endure an ordinary brush.

Brushes ought to be air dried among utilizes and a toothpaste without substantial seasoning operators ought to be considered on the grounds that they can disturb the tissues. During neutropenic periods, the utilization of toothpicks and water-flooding gadgets ought to be maintained a strategic distance from on the grounds that they may break the uprightness of the tissues, making ports of passage for microorganism colonization and dying. Ultrasonic brushes and dental floss can be utilized if the patient is appropriately trained. Patients who present poor oral cleanliness or periodontal malady can utilize chlorhexidine washes day by day until the gingival wellbeing has been reestablished or until the mucosa gives indications of the underlying phases of mucositis. By then, flushes containing liquor ought to be stayed away from in light of the fact that they can dry the mucosa and carry distress to the patient. Periodontal contamination is a significant concern in light of the fact that colonizing living beings have been appeared to prompt bacteremias.

### 3. Conclusion

The way to accomplishment in keeping up a solid oral cavity during disease treatment shows restraint consistence. Subsequently, it is crucial to teach the guardian and kid about the significance of oral consideration to limit uneasiness and expand the chances for a fruitful result. Conversation ought to likewise incorporate the harmful impacts of reveling the kid with undesirable nourishments, the potential cariogenicity of pediatric prescriptions and healthful enhancements, and late impacts of the molding routine on the craniofacial development.

### 4. Source of Funding

None.

### 5. Conflict of Interest

None.

### References

1. Cancer facts & figures 2016. American Cancer Society; 2016.
2. Childhood cancers. National Cancer Institute; 2018.
3. Guideline on dental management of pediatric patients receiving chemotherapy, hematopoietic cell transplantation, and/or radiation therapy. *Pediatr Dent*. 2016;38:334–42.
4. Genc A, Atalay T, Gedikoglu G, Zulfikar B, Kullu S. Leukemic children: clinical and histopathological gingival lesions. *J Clin Pediatr Dent*. 1998;22(3):253–6.
5. Valéra MC, Noirrit-Esclassan E, Pasquet M, Vaysse F. Oral complications and dental care in children with acute lymphoblastic leukaemia. *J Oral Pathol Med*. 2015;44(7):483–9.
6. Ponce-Torres E, del Socorro Ruíz-Rodríguez M, Alejo-González F, Hernández-Sierra JF, de Pozos-Guillén A. Oral Manifestations in Pediatric Patients Receiving Chemotherapy for Acute Lymphoblastic Leukemia. *J Clin Pediatr Dent*. 2010;34(3):275–9.
7. Curra M, Junior LAVS, Martins MD, da Silva Santos PS. Chemotherapy protocols and incidence of oral mucositis. An integrative review. *Einstein (São Paulo)*. 2018;16:ERW4007.
8. Peterson DE, Bensadoun RJ, Roila F. ESMO Guidelines Working Group. Management of oral and gastrointestinal mucositis: ESMO clinical practice guidelines. *Ann Oncol*. 2011;6(7):78–84.
9. Chaudhry HM, Bruce AJ, Wolf RC, Litzow MR, Hogan WJ, Patnaik MS, et al. The Incidence and Severity of Oral Mucositis among Allogeneic Hematopoietic Stem Cell Transplantation Patients: A Systematic Review. *Biol Blood Marrow Transplant*. 2016;22(4):605–16.
10. Jaroneski LA. The Importance of Assessment Rating Scales for Chemotherapy-Induced Oral Mucositis. *Oncol Nurs Forum*. 2006;33(6):1085–90.
11. World Health Organization handbook for reporting results of cancer treatment. World Health Organization. Geneva, Switzerland; 1979. Available from: [who.int/iris/bitstream/handle/10665/37200/WHO.OFFSET\\_48.pdf?sequence=1&isAllowed=y](http://who.int/iris/bitstream/handle/10665/37200/WHO.OFFSET_48.pdf?sequence=1&isAllowed=y).
12. Staudenmaier T, Cenzer I, Crispin A, Ostermann H, Berger K. Burden of oral mucositis in stem cell transplant patients—the patients' perspective. *Support Care Cancer*. 2018;26:1577–84.
13. Glenny AM, Gibson F, Auld E. Children's Cancer and Leukaemia Group (CCLG)/Paediatric Oncology Nurses Forum's (CCLG-PONF) Mouth Care Group. The development of evidence-based guidelines on mouth care for children, teenagers and young adults treated for cancer. *Eur J Cancer*. 2010;46(8):1399–1412.
14. Velten DB, de Barros Miotto MH M. Prevalence of oral manifestations in children and adolescents with cancer submitted to chemotherapy. *BMC Oral Health*. 2017;17(1):49.
15. Morgan JE, Hassan H, Cockle JV, Lethaby C, James B, Phillips RS, et al. Critical review of current clinical practice guidelines for antifungal therapy in paediatric haematology and oncology. *Supportive Care Cancer*. 2017;25:221–8.
16. Clark SA, Vinson LA, Eckert G, Gregory RL. Effect of Commonly Prescribed Liquid Medications on Streptococcus mutans Biofilm. Anin vitro study. *J Clin Pediatr Dent*. 2017;41(2):141–6.
17. Sheller B, Williams B. Orthodontic management of patients with hematologic malignancies. *Am J Orthod Dentofacial Orthop*. 1996;109(6):575–80.
18. Halperson E, Moss D, Tickotsky N, Weintraub M, Moskovitz M. Dental pulp therapy for primary teeth in children undergoing cancer therapy. *Pediatr Blood Cancer*. 2014;61:2297–2301.
19. Policy on early childhood caries (ECC): unique challenges and treatment options. *Pediatr Dent*. 2017;39(6):62–3.
20. Fleming P. Dental management of the pediatric oncology patient. *Curr Opin Dent*. 1991;1(5):577–82.
21. Farsi DJ. Children Undergoing Chemotherapy: Is It Too Late for Dental Rehabilitation? *J Clin Pediatr Dent*. 2016;40(6):503–5.
22. Hong CH. Considerations in the pediatric population with cancer. *Dent Clin North Am*. 2008;52(1):155–81.
23. Hartnett E, Krainovich-Miller B. Preventive Dental Care: An Educational Program to Integrate Oral Care Into Pediatric Oncology. *Clin J Oncol Nurs*. 2017;21(5):611–6.
24. Cubukçu CE, Güneş AM. Caries experience of leukemic children during intensive course of chemotherapy. *J Clin Pediatr Dent*. 2008;32(2):155–8.
25. Guideline on caries-risk assessment and management for infants, children, and adolescents. *Pediatr Dent*. 2016;38:142–9.
26. Katz J, Peretz B. Trismus in a 6 year old child: a manifestation of leukemia? *J Clin Pediatr Dent*. 2002;26(4):337–9.
27. Wang CJ, Huang EY, Hsu HC, Chen HC, Fang FM, Hsiung CY, et al. The degree and time-course assessment of radiation-induced trismus occurring after radiotherapy for nasopharyngeal cancer. *Laryngoscope*. 2005;115(8):1458–60.
28. Rapidis AD, Dijkstra PU, Roodenburg JLN, Rodrigo JP, Rinaldo A, Strojjan P, et al. Trismus in patients with head and neck cancer: etiopathogenesis, diagnosis and management. *Clin Otolaryngol*. 2015;40(6):516–26.
29. Chibinski AC, Wambier LM, Feltrin J, Loguercio AD, Wambier DS, Reis A, et al. Silver Diamine Fluoride Has Efficacy in Controlling Caries Progression in Primary Teeth: A Systematic Review and Meta-Analysis. *Caries Res*. 2017;51(5):527–41.
30. Schubert MM, Epstein JB, Peterson DE. Oral complications of cancer therapy. In: JA Y, EA N, FJD, editors. *Pharmacology and Therapeutics for Dentistry*. Mosby-Year Book Inc; 1998. p. 644–55.
31. Greenberg MS, Cohen SG, McKittrick JC, Cassileth PA. The oral flora as a source of septicemia in patients with acute leukemia. *Oral Surg Oral Med Oral Pathol*. 1982;53:32–6.
32. Toth BB, Martin JW, Fleming TJ. Oral and dental care associated with cancer therapy. *Cancer Bull*. 1991;43:397–402.
33. Ransier A, Epstein JB, Lunn R, Spinelli J. A combined analysis of a toothbrush, foam brush, and a chlorhexidine-soaked foam brush in maintaining oral hygiene. *Cancer Nurs*. 1995;18(5):393–6.
34. Epstein J, Schubert M. Oral mucositis in myelosuppressive cancer therapy. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1999;88:273–6.
35. Borowski B, Benhamou E, Pico JL, Laplanche A, Margainaud JP, Hayat M, et al. Prevention of oral mucositis in patients treated with high-dose chemotherapy and bone marrow transplantation: A randomised controlled trial comparing two protocols of dental care. *Eur J Cancer Part B: Oral Oncol*. 1994;30(2):93–7.
36. Nci/Nih, Page. 39.NCI/NIH resources page. NCI Cancer Information web site; 2003. Available from: [www.nci.nih.gov/cancerinfo/pdgs/supportivecare/oralcomplications/healthprofessional/#section28](http://www.nci.nih.gov/cancerinfo/pdgs/supportivecare/oralcomplications/healthprofessional/#section28). Accessed.
37. Semba SE, Mealy BL, Hallmon WW. Dentistry and the cancer patient: Part 2-oral health management of the chemotherapy patient.

*Compendium*. 1994;15:1378–87.

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