

# Oral Manifestations of Cancer Treatment in Children: A Review of the Literature

**Gabrielle Allen, Richard Logan, BDS, MDS, PhD, FFOP(RCPA),  
and Sam Gue, BDS, MDSc, FRACDS, FRACDS (Paed), FICD**

In Western countries, rising incidence and survival rates in childhood cancer have led to increased patient morbidity, including short- and long-term oral effects. Some acute oral complications occur three times more commonly in children than adults. This literature review sourced material from medical databases to discuss the acute and chronic oral complications of oncology treatment in children. The article explores caries, gingivitis, oral infections, and oral mucositis, as well as available tools for measuring their incidence, prevention, and treatment in children. Many tools and interventions appear to be available to prevent and treat oral complications of cancer treatment in children; however, they lack reliable and consistent research. Future research should use larger samples to report the incidence of oral complications, which would allow identification of children at increased risk. In addition, larger studies would provide baseline information to enable the construction of appropriate randomized clinical trials to test methods of prevention and proposed interventions for oral complications of cancer treatment in children.

Childhood cancer incidence is rising in Western countries, with 1 in 500–600 children affected prior to age 15 (Fadda, Campus, & Luglie, 2006). Survival rates in childhood cancer also are increasing (Wogelius et al., 2008), with long-term survival rates approaching 80% (National Cancer Institute [NCI], 2009; O’Leary, Krailo, Anderson, & Reaman, 2008). The recent improvement in treatment can be attributed largely to dose intensification and combination chemotherapy (Cheng, Molassiotis, & Chang, 2002). However, increased survival rates consequently result in patient morbidity (Gibson et al., 2006) and are accompanied by concerns of potential short- and long-term side effects (Wogelius et al., 2008). Therefore, medical treatment received by children with cancer is not aimed exclusively at treatment of the malignant disease but also involves preventing and managing the many possible complications of the treatment itself (Cabrerizo-Merino & Onate-Sanchez, 2005).

Acute oral complications such as mucositis, xerostomia, bleeding, and infections occur three times more commonly in children than in adults (Alberth et al., 2006). Such complications can interrupt treatment (Cabrerizo-Merino & Onate-Sanchez, 2005). According to the American Academy of Pediatric Dentistry ([AAPD], 2008), “The most frequently documented source of sepsis in the immunosuppressed cancer patient is the mouth” (p. 1). Oral mucositis, gingivitis, herpetic stomatitis, and candidiasis are potential sources of systemic infections in patients receiving cancer chemotherapy (Rojas de Morales et al., 2001).

Table 1 shows dentition in healthy children. The entire population exhibits considerable amounts of variation in dental development. If an oncology professional is concerned about the eruption

## At a Glance

- ◆ The mouth has been documented as the most common source of sepsis in immunosuppressed patients with cancer.
- ◆ Strategies for preventing and managing oral complications in adults have not been evaluated adequately in children.
- ◆ Implementation of a universally accepted standardized oral mucositis scale for pediatric patients is needed to improve patient care and advance clinical research.

timing or sequence of a patient’s dentition, a dental referral may be recommended for assessment. Dental lamina, the tissue from which teeth are derived, is evident from days 35–37 of embryonic life (Nery, Kraus, & Croup, 1970). Primary teeth begin calcification

Gabrielle Allen is a bachelor of dental surgery and concurrent honors student and Richard Logan, BDS, MDS, PhD, FFOP(RCPA), is an associate professor in oral pathology, head of the Discipline of Oral Diagnostic Sciences, and assistant dean of student affairs, both in the School of Dentistry at the University of Adelaide in South Australia; and Sam Gue, BDS, MDSc, FRACDS, FRACDS (Paed), FICD, is an associate professor of pediatric dentistry in the School of Dentistry at the University of Adelaide and head of the Department of Pediatric Dentistry at the Women’s and Children’s Hospital in Adelaide. (First submission October 2009. Revision submitted January 2010. Accepted for publication January 23, 2010.)

Digital Object Identifier:10.1188/10.CJON.481-490