

The Sensitivity and Specificity of Frozen-Section Histopathology in the Management of Benign Oral and Maxillofacial Lesions

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Purpose: The management of odontogenic cysts and tumors typically requires a biopsy, which may present significant challenges and prompt an additional visit to the operating room before definitive treatment. The aim of this study was to determine the validity of frozen-section diagnosis in the management of benign oral and maxillofacial lesions, allowing intraoperative diagnosis followed by definitive treatment under the same general anesthetic.

Materials and Methods: A retrospective chart review of patients treated at the University of Michigan Health System was performed. Patients of all ages who had a diagnosis of a benign maxillofacial lesion by frozen-section and permanent histopathology reports were included for analysis. Patients were identified using the *Current Procedural Terminology* code for enucleation and curettage and *International Classification of Diseases, Ninth Revision* codes for benign cysts or tumors of skull, face, or lower jaw.

Results: Of 450 patients reviewed, 214 had intraoperative frozen-section examination available for comparison with permanent histopathology. There were 121 men (56.5%) and 93 women (43.5%), with a mean age of 41 years. Compared with final permanent histopathology, the overall sensitivity of frozen sections was 92.1%. Frozen-section histopathology had a sensitivity greater than 90% and a specificity greater than 95% for the diagnosis of dentigerous cyst and keratocyst odontogenic tumor.

Conclusions: In this study of 214 patients with benign maxillofacial lesions, frozen-section histopathology was found to be a valid diagnostic modality with high sensitivity, specificity, and positive and negative predictive values. These results and analysis support the use of frozen-section histopathology for the treatment of benign maxillofacial lesions and underscore its value in the management of these lesions.

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The management of odontogenic cysts and tumors typically involves surgical treatment of these lesions in the maxillofacial region that approximate or affect adjacent vital structures.^{1,2} These structures include the facial bones, dentition, inferior alveolar nerve, maxillary sinus, nasal cavity, salivary glands, and musculature.³ There are multiple treatment options for odontogenic lesions that range from conservative tissue-preserving modalities to aggressive surgical treatments with wide resections.¹ Treatment is frequently determined by the

known biologic behavior of the lesion and recurrence rate. Naturally, this requires a biopsy to confirm the histologic diagnosis before definitive treatment.

In a cooperative adult patient, obtaining a biopsy in a clinical setting helps establish a diagnosis and guide further treatment. However, this approach presents challenges when dealing with deep-seated lesions (Fig 1), pediatric patients, and medically compromised or severely anxious patients, prompting an additional visit to the operating room for biopsy. These patients

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FIGURE 1. Deep-seated lesion in the sinus involving the orbital floor.

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are thus exposed to morbidities, including an associated delay in definitive treatment, anesthetic complications,⁴ added cost, time away from work or school, and postoperative discomfort.

A possible solution to such a scenario is the use of frozen sections. This would allow intraoperative diagnosis followed by definitive treatment under the same general anesthetic in many cases.⁵ This would be particularly helpful in the treatment of pediatric patients with a mandibular or maxillary radiolucency that may represent a dentigerous cyst versus a keratocyst odontogenic tumor (KCOT). Although a dentigerous cyst can be treated with enucleation⁶ and preservation of adjacent structures, KCOT is an aggressive³ lesion with a high recurrence rate that requires excision, including the removal of any involved dentition, and occasionally adjunctive modalities.¹

The aim of this study was to determine the validity of frozen-section diagnosis in the management of benign oral and maxillofacial lesions.

Materials and Methods

This study was approved by the institutional review board at the University of Michigan (Ann Arbor; HUM00060251). The University of Michigan billing database was searched using the *International Classification of Diseases, Ninth Revision* and *Current Procedural Terminology* codes pertaining to benign cysts or tumors of the skull and face, lower jaw bone, and enucleation and curettage (E&C). Inclusion criteria were patients of all ages who had a diagnosis of benign maxillofacial lesion for which the frozen-section and permanent histopathology were reported. Exclusion criteria were patients who had missing data on frozen-section or permanent histopathology and patients with recurrences when the initial histopathology was known. The authors identified 450 patients who were treated at the University of Michigan Section of Oral and Maxillofacial Surgery for benign maxillofacial lesions from 1999 through

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