Impact of Delayed Diagnosis of Oral Cancer

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Introduction

Oral cancers are malignant tumors that develop in the mucosal lining of the lips, oral cavity, and back of the throat (Nicolau et al., 2024). They rank among the ten most prevalent types of cancers in the world, representing a major public health concern due to their high mortality and morbidity (Lima et al., 2021). Early detection enables less invasive treatment and significantly improves survival (Swaminathan et al., 2024). Yet, for many patients, diagnosis comes too late, with over 50% presenting with advanced disease that requires aggressive treatment and substantially lowers chances of survival (Swaminathan et al., 2024).Delayed diagnosis of oral cancer constitutes a diagnostic error, which the National Academy of Medicine defines as the failure to accurately and promptly determine a patient's conditions or to effectively communicate that determination to the patient (Institute of Medicine, 2015). Routine dental visits provide a platform for opportunistic screening of potentially malignant oral lesions. However, delayed diagnosis continues to occur in everyday practice, representing a critical failure point in preventive care (Gonzalez-Moles et al., 2022). This paper examines patient- and clinician-level factors contributing to delayed diagnosis of oral cancer and explores strategies to improve early detection and patient outcomes.

Contributing Factors

Delays in diagnosing oral cancer arise from a combination of patient-, clinician-, and system-level factors. At the patient level, limited awareness of early symptoms, fear of cancer diagnosis, and attributing symptoms to minor dental problems may lead to a delay in seeking help (Lima et al., 2021). Patient delays could also be exacerbated by system-level factors, such as limited dental service availability, financial barriers, and reduced access to dental care (Gonzalez-Moles et al., 2022). Although some patient-related behaviors are beyond the clinician's control, lack of symptom awareness is a preventable factor that clinicians can address. Research shows that 77% of patients had little or no knowledge of oral cancer, and only 9.9% of dentists discuss risk factors of oral cancer with all patients (Awojobi et al., 2012; Mavedatnia et al., 2023). However, Awojobi et al. (2012) also noted that while patients are often unaware that oral cancer screening is conducted during dental visits they are receptive to being informed and welcome support from their dentist to reduce their risk.

At the clinician level, delayed diagnosis of oral cancer is multifactorial, including incomplete or poor practice of oral examinations, cognitive biases, limited use of biopsies, and gaps in diagnostic competence. Poor oral examination practices are a significant contributing factor. Some dentists may not perform oral examinations at all, while others conduct them inadequately, leading to lesions being missed or misdiagnosed as benign conditions (Mavedatnia et al., 2023). This may result from a lack of knowledge regarding early signs and symptoms, insufficient training, time constraints, or inattention and disregard (Gonzalez-Moles et al., 2022; Mavedatnia et al., 2023). Research indicates that nearly all patients diagnosed with advanced oral cancer reported poor practice of the oral mucosa routine examination during dental and medical visits

(Swaminathan et al., 2024). These findings highlight the need to standardize oral examination practices to prevent missed or misdiagnosed lesions.

Cognitive biases can further influence diagnostic decision-making. More specifically, anchoring bias may lead clinicians to assume a lesion is benign, particularly in younger patients or non-smokers (Bhattacharya et al., 2025; Nicolau et al., 2024). This is problematic given the rising incidence of oral cancer in younger populations associated with Human Papillomavirus (HPV), which makes traditional assumptions about "low-risk" patients unreliable (Nicolau et al., 2024). As a result, suspicious lesions may be dismissed or attributed to less serious conditions simply because the patient does not fit the typical risk profile (Bhattacharya et al., 2025). This underscores the need for careful, systematic oral examinations for all patients, regardless of age or perceived risk factors.

Limited use of biopsies and gaps in diagnostic competence are also important contributing factors. Although performing a biopsy on suspicious oral lesions can aid in early detection, oral biopsies are not that common in general dental practice, with only 7% to 32% of general dentists performing them, depending on the country (Gonzalez-Moles et al., 2022). This may result from limited skills, unfamiliarity with the biopsy technique, or the misconception that it is a predominantly specialist procedure (Gonzalez-Moles et al., 2022). Most biopsies are instead performed by oral surgeons or specialists, although the procedure is described as relatively simple and may also be carried out by general dentists, which may reduce referral delays and facilitate earlier treatment (Gonzalez-Moles et al., 2022). Research also shows that 32.1% of general dentists were unable to reach an accurate oral cancer diagnosis, compared to 81.7% of specialists who correctly identified the condition (Schiavo-Di Flaviano et al., 2025). The disparity highlights gaps in knowledge and diagnostic competence within general practice. Without addressing these shortcomings, general dentists may opt to refer patients instead of performing a biopsy themselves, which may further delay diagnosis (Gonzalez-Moles et al., 2022).

Real-World Example

Dr. Pooya Beigi introduced the term mismedicine to describe any medical act that causes harm, creates inefficiency, or falls short of the standard of care (Blissy, 2024). This concept is illustrated in real-world examples of oral cancer misdiagnosis. For instance, Daniel & Rogers (2022) report a case of a middle-aged patient with a history of long-term smoking and alcohol use who experienced several months of jaw and ear pain, difficulty eating, and a sensation of a locked jaw. The patient was initially diagnosed with temporomandibular joint disorder (TMJD), treated with antibiotics, and referred non-urgently to secondary care. Months later, the patient presented with persistent swelling, trismus, and weight loss, and imaging revealed advanced squamous cell carcinoma. The patient was transferred to hospice care for ongoing support. This case illustrates mismedicine, in which early signs were misidentified, risk factors were ignored, and the patient was not referred on an urgent basis, leading to late detection and limited treatment options.

Consequences

Mismedicine in oral cancer can have serious and far-reaching consequences. Clinically, advanced stage detection often leads to more aggressive treatment, poorer functional outcomes, higher morbidity, and lower survival rates (Swaminathan et al., 2024). Legally, failing to detect oral cancer in a timely manner can expose dental professionals to medical malpractice claims (Daniel & Rogers, 2022). Ethically, delays may violate obligations to provide timely, competent care and fully inform patients (American Dental Association, 2025). Psychologically, delayed diagnoses heighten the distress of patients, including fear of death, anxiety, and loss of trust in medical professionals (Kassirian et al., 2020). Clinicians, in turn, may experience guilt, anxiety, and professional distress (Helo & Moulton, 2017).

Current Solutions & Prevention

The standard of care for oral cancer involves reviewing patient history, conducting systematic oral examinations, using optional adjunctive visual tools, and either performing timely biopsies of suspicious lesions or referring patients to specialists (BC Cancer Agency, 2008). Despite these protocols, the persistently high incidence of oral cancer highlights gaps in current preventive measures. While patients' ability to seek help early is often beyond the dentist's control, diagnostic delays caused by clinicians can be addressed.

To combat oral cancer, people first need to be aware of it. Education and awareness efforts have been shown to improve oral cancer prevention behaviors (Rai et al., 2023). Routine oral examinations provide an important opportunity not only to conduct thorough examinations but also to actively educate patients about key risk factors and early warning signs, thereby improving early detection and prognosis.

Cognitive debiasing strategies can improve decision-making in dentistry. These strategies include slowing down, using formal checklists, and engaging in group discussion (Bhattacharya et al., 2025). Such approaches can reduce overreliance on pattern recognition and encourage more thorough examinations of oral lesions.

A study found that the most common presentation of oral cancer, a non-healing ulcer, was correctly identified by only 55.6% of dentists, and just 47.5% felt their knowledge of oral cancer was up to date (Mavedatnia et al., 2023). Such limitations may also help explain the low rate of oral biopsies performed by general dentists. The findings emphasize the need for adequate training in biopsy techniques, ongoing education, and the support of AI-based diagnostic tools to improve accuracy and reduce unnecessary referral delays (Kapoor et al., 2024; Mavedatnia et al., 2023).

Conclusion

Delayed diagnosis of oral cancer is a persistent problem influenced by lack of patient awareness, poor oral examination practices, cognitive biases, limited use of biopsies, and gaps in diagnostic competence. These delays contribute to advanced disease at diagnosis, more aggressive treatment, and preventable harm. Addressing these issues requires patient engagement, the use of cognitive debiasing strategies, ongoing clinical education, and improved biopsy training. By prioritizing early detection, healthcare systems are better equipped to reduce misdiagnosis, improve patient outcomes, and take a crucial step toward a more effective, equitable, and accountable oral healthcare system.

Q&A: Understanding Delayed Diagnosis of Oral Cancer

What constitutes a delayed diagnosis in oral cancer, and why is it considered a diag

A delayed diagnosis of oral cancer occurs when signs of malignancy are not recognized or clearly communicated as early as they should be, consistent with the National Academy of Medicine's definition of diagnostic error (Institute of Medicine, 2015). It is considered a failure in preventative care because routine dental visits provide repeated opportunities for early detection through opportunistic screening. When these opportunities are missed due to clinician, patient, or system-level factors, disease progression continues unchecked, often leading to a diagnosis at a much later stage (Swaminathan et al., 2024).

Why is early detection of oral cancer particularly difficult in clinical practice?

In its early stages, oral cancer is often asymptomatic and presents with subtle, nonspecific signs. As a result, it can progress without causing pain or may resemble benign conditions, which can make it challenging to diagnose (Monteiro et al., 2025). Additionally, lesions may develop in less visible areas of the oral cavity, whereas cancers in more visible areas are more likely to be diagnosed earlier (Morelatto et al., 2007). Together, these factors reinforce the need for thorough and systematic oral examinations, which may be omitted or rushed in routine practice (Mavedatnia et al., 2023).

How could future research improve outcomes related to delayed diagnosis?

Future research could evaluate the effectiveness of emerging technologies, such as AI-assisted diagnostic tools, in improving diagnostic accuracy and addressing time constraints in clinical practice. Studies could also investigate the most effective ways to educate both patients and clinicians, including community outreach, awareness campaigns, cognitive debiasing strategies, or mandatory training programs.

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