

A novel, minimally invasive approach to managing mild epithelial dysplasia

Kevin D. Huff, DDS, MAGD ▪ Kurt C. Garren, MD ▪ Marlene S. Huff, RN, MSN, PhD

Conventional oral cancer screening examinations can be enhanced by direct tissue fluorescence visualization. Early dysplastic lesions detected during screening examinations often are monitored for progression or changes in appearance. Aggressive surgical intervention usually is contraindicated for mild epithelial dysplasia. As epithelial dysplasia progresses from mild to severe, the likelihood of it developing into carcinoma increases. Minimally invasive tissue management procedures should be considered as

a possible method of early intervention to reduce the occurrence of oral cancer. This case report describes a novel approach to managing mild epithelial dysplasia when therapy is indicated (due to a high risk for oral cancer) but aggressive surgical management is contraindicated (due to a potential loss of function and increased morbidity).

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Classically, epithelial dysplasia appears as subtle tissue changes that may be erythroplakic, leukoplakic, or erythroleukoplakic.¹ However, pre-neoplastic lesions may be undetectable when conventional oral cancer screening is performed under white lighting. It has been reported that adding direct tissue fluorescence visualization technology (VELscope, LED Dental Inc.) to a conventional oral cancer screening protocol is useful in identifying lesions that had not been detected on the same patients by conventional screening alone. In a 2009 study, 83% of those lesions detected with adjunctive technology were dysplastic, although they were occult.²

Twelve percent of dysplasias will become carcinoma *in situ* within five years, and 73% of those will likely progress to metastatic carcinoma. Mild dysplasia may take 58 months to convert to carcinoma, while severe dysplasias can become cancer within one year.³ Unfortunately, there is no documented correlation between the clinical appearance and the grade of dysplasia; for such cases, a surgical biopsy is required for a definitive

diagnosis.⁴ Clearly, overall survival and patient morbidity is improved following early diagnosis and appropriate intervention and treatment.⁵

There is controversy as to whether mild epithelial dysplasia should be treated or monitored. The argument for observation without surgical intervention is based on the fact that the majority of dysplasias do not become cancer and that surgical intervention may cause unnecessary tissue injury and potential dysfunction.³ The argument for surgical intervention may be that high-risk lesions should be radically excised to minimize the risk of carcinogenesis. As with all aspects of health care, there are multiple approaches to the management of any given situation, and the choice of care should be driven by a professional code of ethics.⁶

Early dysplasia in cervical tissues has been treated conservatively by using cryotherapy with liquid nitrogen.⁷ Since the histological compositions of cervical tissues and oral mucosa are similar, it is plausible that cryotherapy may be useful for conservatively managing early dysplasias or pre-neoplastic lesions

intraorally. The following case report illustrates how a case of mild epithelial dysplasia in a high-risk site was managed via cryotherapy.¹

Case report

A 67-year-old man sought treatment for a broken mandibular right first molar. He was healthy and ambulatory with no significant medical history; specifically, he had no history of intraoral or extraoral cancer. He denied the use of alcohol, but he reported that he previously had a long-term habit (approximately 40 years) of chewing long tobacco. He claimed to have stopped chewing tobacco several years earlier.

As part of a comprehensive oral evaluation, a conventional oral cancer screening examination was conducted according to standard technique.⁸ In addition, direct tissue fluorescence visualization imaging with the VELscope was employed as an adjunctive visual screening tool. An expansive loss of fluorescence did not blanch when blunt pressure was applied with the side of a periodontal probe, which indicated increased metabolic activity of epithelial cells (Fig. 1 and 2). The



Fig. 1. A conventional oral cancer examination indicates trauma from the fractured mandibular molar to the buccal mucosa.



Fig. 2. Direct tissue fluorescence imaging reveals an expansive loss of fluorescence distal to the mandibular molar and extending distobuccally and distolingually around the retromolar pad.



Fig. 3. An incisional biopsy was taken at the center of the lesion, which is outlined in indelible ink.



Fig. 4. Liquid nitrogen was applied to the lesion using the dip-stick application method.

patient was informed that a suspicious lesion had been discovered that required re-evaluation in two weeks, and the fractured tooth was restored to eliminate the obvious source of potential trauma.

After two weeks, the lesion was still present. Liquid-based cytology was utilized as a secondary screening measure to confirm that the questionable area discovered during the initial examination was, in fact, abnormal tissue. A tissue sample was collected using a brushing technique and the entire sample (including the brush) was placed into SurePath

solution (BD Diagnostics) and processed according to SurePath protocol. A board-certified oral pathologist reported that the sample was "suspicious for mild epithelial dysplasia" and recommended conducting a surgical biopsy of any persistent lesion.

Immediately following receipt of the positive cytology report, an incisional biopsy was performed. Following adequate local anesthesia using lidocaine with 1:100,000 epinephrine, a tissue sample was collected surgically from the center of the questionable area (Fig. 3) identified by

the VELscope according to accepted protocol.^{4,9} The biopsy specimen was placed in formalin and submitted for processing and diagnosis by a board-certified oral pathologist, who reported a diagnosis of mild epithelial dysplasia and recommended excising any persistent lesion.

The VELscope was used to help identify the margins of the lesion as described by Poh *et al.*⁹ Liquid nitrogen was applied to the lesion and approximately 5 mm beyond the margin using the dip-stick applicator method described by Orengo and Salasche (Fig. 4).¹⁰



Fig. 5. The patient three months post-treatment, demonstrating a generalized loss of fluorescence that blanches with diascopic pressure, which is indicative of inflammation and tissue maturation.

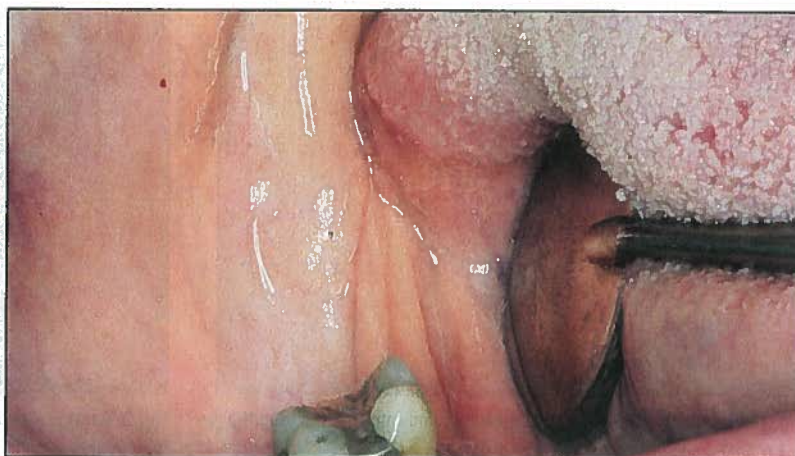


Fig. 6. The tissues appear healthy one year after treatment.

The patient returned for follow-up appointments and re-evaluation (consisting of oral cancer screening examination and direct tissue fluorescence visualization with the VELscope) every three months for one year (Fig. 5 and 6); during that time, tissue healing occurred uneventfully. At one year, direct tissue fluorescence imaging indicated no loss of fluorescence, suggesting that the tissues were healthy (Fig. 7). Throughout the course of therapy, the patient reported no pain, paresthesia, or morbidity.

Discussion

This case represents an example of utilizing minimally invasive ablation for the management of mild epithelial dysplasia. Conventional radical excision in the retromylohyoid region carries an elevated risk of injury to the lingual nerve that may result in permanent paresthesia and loss of taste. Scar tissue formation may lower the quality of life by complicating the swallowing and agglutination functions of the tongue. Therefore, avoiding surgical insult was desirable and

in the patient's best interest. Laser ablation was considered; however, the authors anticipated a higher degree of postoperative discomfort following laser ablation. The patient reported no postoperative pain following cryotherapy, although he did complain that the tissues felt "leathery" for approximately one week.

Cryotherapy has not been documented for intraoral use as of this writing, and the patient was advised that this therapy was unconventional. He agreed to

follow-up visits on a three-month basis. The tissues appeared to be normal after one year of close observation; at that time, the patient opted for semi-annual re-evaluation. Cytology was not repeated because a surgical biopsy was the only way to definitively confirm the presence of healthy or dysplastic tissues at follow-up visits. The authors and the patient felt that additional biopsies would be an unnecessary surgical insult to a site that appears to have responded favorably to treatment.

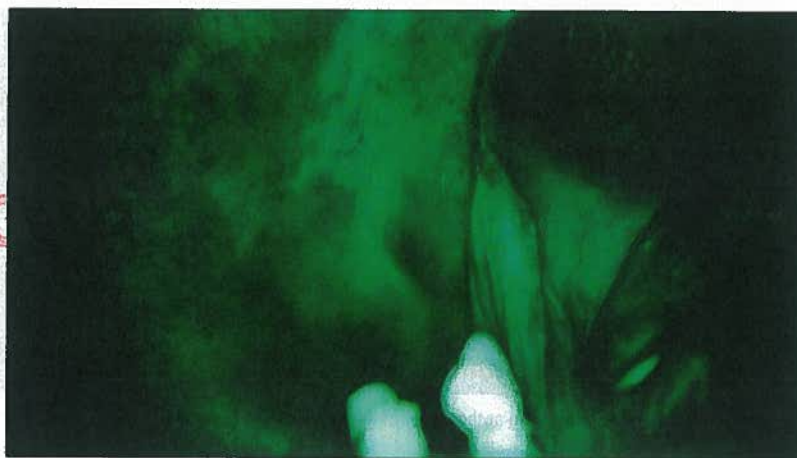


Fig. 7. Normal fluorescence indicates that the dysplastic tissue in the right retromolar and retromylohyoid areas has resolved completely.

However, the patient has been faithful with regular re-evaluation since the initial submission of this report, with no apparent change in the healthy appearance of the treated tissues.

Summary

Since survival rates for oral cancer patients have not changed significantly over the past 30 year proactive measures are indicated to improve the prognosis of oral cancer.⁹ Minimally invasive measures that can manage early, potentially premalignant oral lesions should be seriously considered. Based on the results of the present case, cryotherapy is a novel and effective approach to appropriately managing mild epithelial dysplasia.

Author information

Dr. Kevin Huff is a clinical instructor, Case School of Dental Medicine, Cleveland, Ohio, and

director of Oral Mucosal Screening for the Mercy Medical Center General Dental Practice Residency in Canton, OH. Dr. Garren is an otolaryngologist practicing in New Philadelphia, OH. Dr. Marlene Huff is an associate professor, University of Akron College of Nursing in Ohio.

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Manufacturers

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