A novel, minimally invasive approach to managing mild epithelial dysplasia

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

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 healthcare, 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.5 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
patient was informed that a suspi-
cious 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 screen-
ing 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 inci-
sional biopsy was performed. Follow-
ing adequate local anesthesia using
lidocaine with 1:100,000 epineph-
rine, a tissue sample was collected
surgically from the center of the ques-
tionable area (Fig. 3) identified by
the VELscope according to accepted
protocol.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
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.
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 years, proactive measures are indicated to improve the prognosis of oral cancer. 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
BD Diagnostics, Burlington, NC
866.874.7284, www.bd.com
LED Dental Inc., White Rock, BC, Canada
888.541.4614, www.leddental.com

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