

## Original Article

## Application of derm dotting in oral and maxillofacial surgery



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## ABSTRACT

**Purpose:** Derm dotting is a new method of marking skin biopsies, and it is used by dermatopathologists to identify most diagnostic tissues on a microscopic slide. This method uses nail varnish to mark specific lesions and suspected section planes, or to orient skin resections. The nail varnish is resistant to different tissue processes, discernible while cutting the tissue block, and easily recognizable under the microscope. We examined the effectiveness of derm dotting on intraoral tissues.

**Methods:** We used the derm-dotting technique on the intraoral tissues of nine patients who underwent resection of a squamous carcinoma. We also tested this method on frozen sections.

**Results:** In all cases of resected tissue, the nail varnish was visible under gross examination, traceable while cutting the tissue block, and clearly visible in the definitive sections. The dots were preserved in the frozen sections, but they were lost in half of the decalcified tissues.

**Conclusions:** Derm dotting is an inexpensive, simple method that can replace the stitching technique used by surgeons to orient specimens. The stitches have to be removed by the pathologist, therefore possibly creating an artifact in the biopsy. The varnish dots or lines can be used to orient the specimen. In addition, the dots can easily mark suspect borders or areas of interest to be examined by the pathologist, using different colors, if desired. With derm dotting, the pathologist receives a more representative slide enabling a more accurate clinicopathological correlation.

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### 1. Introduction

In modern medicine, biopsies are essential in making accurate treatment plans. Physicians rely on histological diagnosis to make decisions regarding surgery, chemotherapy, radiotherapy, or combinations of treatment. New technologies have been developed to help diagnose intraoral pathologies. One of the techniques for the earliest possible detection of oral precancerous lesions is direct oral microscopy, which involves obtaining biopsies according to colposcopic criteria [1,2]. When resecting a carcinoma, the surgeon has to communicate to the pathologist key information on the location, position, orientation, or width of the resection margins of the specimen. Surgeons currently use stitches to mark or orient the biopsy. When the biopsy arrives at the pathology department, technicians have to remove the stitches so that the microtome

knife is not damaged, and the removed stitches leave an artifact with loss of tissue. Other surgeons do not mark the specimen, and they make only limited comments and drawings on the application form. Thus, new methods are needed to indicate to the pathologist the relevant parts of the tissue to examine and improve the accuracy of the histological report because a pathologist only examines a random 2% of the delivered tissue [3]. Therefore, it is very important that the proper areas to be examined are identified. The ideal method would be inexpensive, safe for the specimen, practical for the pathologist, and fast and easy for surgeons to apply.

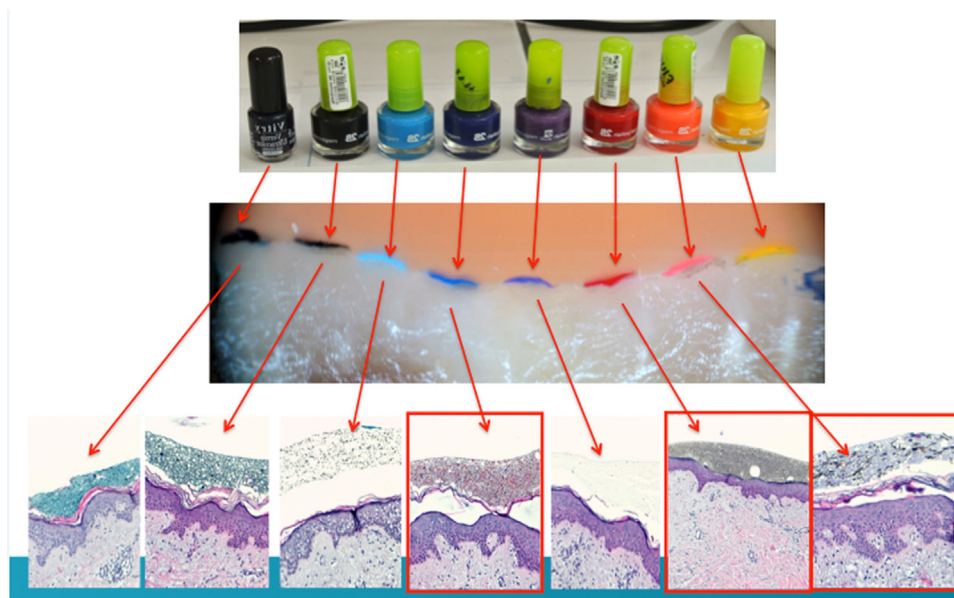
Several different marking techniques have been proposed in the literature. Artist pigments are used to mark the resection borders of breast biopsy specimens [4]. In a cone biopsy of the ectocervix–endocervix transition zone, ink can be applied to areas of interest [5]. In pneumology, the bronchoscopist injects either carmine dye or methylene blue into the place of interest before using video-assisted thoracoscopic surgery (VATS) for resection [6–8].

In 2013, Haspeslagh et al. [9] described a new method called ex vivo dermoscopy with derm dotting. They discovered that nail

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**Fig. 1.** Different types of colors can be distinguished by microscopy as different types of granular gray. In the middle, we see the different colors in the tissue block before processing (trimming).

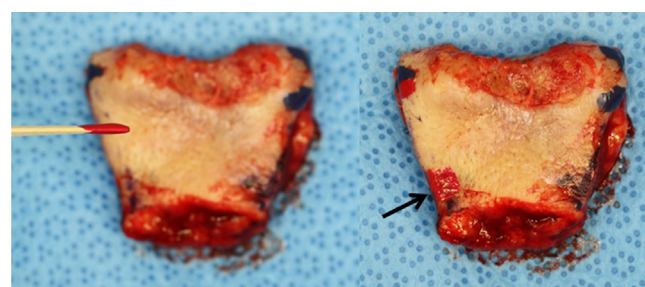
Reproduced with permission from M. Haspeslagh.

varnish adheres to skin, is resistant to tissue processing, and can be detected under the microscope. Varnish dots can be used to mark specific areas to be examined by the pathologist or for orientation of the specimen. The nail varnish does not damage the tissue, and different types of nail varnish or different colors applied on the same biopsy can be distinguished on the tissue block and under the microscope. The different varnish colors are discernible under the microscope as different granular gray areas. In this study, we examined whether this derm-dotting technique is also applicable for lesion marking or orientation after resection of intraoral lesions. Our aim was to determine whether this nail varnish method can eventually replace the current, nonoptimal method of using stitches.

**2. Materials and methods**

This experimental study was performed over a period of 3 months. The study complied with the principles laid down in the Declaration of Helsinki. The study was approved by the ethical committees of UZ-Leuven, Belgium (Ethical no: B322201319028). All nine subjects agreed and signed informed consent before being included in the study.

The method of derm dotting uses a simple, inexpensive nail varnish to mark the biopsy. In this study, we used the nail polish brand 2B Mega Colors. We used color 94 (Mat dark blue), 03 (American rose), 25 (Fluo yellow), 55 (Fluo red), and 04 (Cerise red). These colors were selected after testing many types of nail varnish on skin under a microscope (Fig. 1). Derm dotting was tested on 15 specimens of nine squamous carcinomas. Six out of the nine patients were male and the mean age was 67 years (Table 1). A primary resection with macroscopic free margins was performed in these patients. These resection specimens were placed on a surface next



**Fig. 2.** Use of derm dotting on a lower lip specimen with squamous cell carcinoma. A combination of red and blue dots, applied with a toothpick, orients the specimen. A bigger red dot marks the place where the tumor free margin was clinically smallest.

to the operation table. After completion of the surgery, the surgeon oriented the specimen using different colors of nail varnish dots for each side of the specimen. The small dots were marked on the tissue with a toothpick (Fig. 2), while the nailbrush was used for larger marks. Different colors were used to mark suspected resection borders or areas to be examined by the pathologist. After application, the nail varnish was left to dry for 3–5 min. Then, the specimen was placed in a closed biopsy tube (65 or 125 ml) with or without formal. After a maximum of 5 days, the pathologist checked whether the dots were still present on the specimen. In two patients, small fragments were taken for frozen sections, which were also marked with nail varnish for evaluation (Fig. 3). During this small study, different anatomic sites were examined, including the mucosa of the tongue, lip, cheek, uvula, mouth floor, and pharynx (Fig. 4). In addition, different types of tissue were examined, namely mucosa, fat tissue, submandibular, and sublingual gland tissue.

**Table 1**  
Study population according to age and gender.

	Enrolled patients								
Number	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9
Gender	Male	Male	Female	Male	Female	Female	Male	Male	Male
Age (mean 67 years)	59	59	57	66	78	52	73	80	79

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