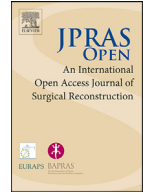




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## Assessing exposure to dermoscopy in plastic surgery training programs ☆

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### ABSTRACT

**Background:** Dermoscopy is a noninvasive tool that improves the diagnostic accuracy of melanoma and other cutaneous malignancies; yet, it is not widely used by plastic surgeons, who commonly manage skin lesions. Thus, the purpose of this study was to explore current practice patterns and knowledge of dermoscopy among plastic surgeons and postgraduate plastic surgery trainees. Additionally, interest to establish a formal dermoscopy curriculum as part of plastic surgery residency training was evaluated.

**Methods:** An online electronic questionnaire was developed and distributed through email to practicing plastic surgeons and plastic surgery trainees at two Canadian universities.

**Results:** Of the 59 potential participants, 27 (46%) responded. While the majority of participants were familiar with dermoscopy ( $n = 26$ ; 96%), only one respondent reported using dermoscopy in clinical practice. However, all respondents reported exposure to melanoma clinically ( $n = 26$ ; one participant did not provide a response). A lack of training, along with lack of access to dermatoscopes, were the most frequently cited reasons for not using der-

☆ MEETINGS: None.

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moscopy. Knowledge scores with regard to dermoscopic features were also low; coupled with a noted propensity toward diagnostic or excisional biopsy, which could raise the benign to malignant ratio. Overall, 89% (n = 24) of respondents expressed interest in dermoscopy training in plastic surgery postgraduate training.

**Conclusions:** Few responding plastic surgeons or plastic surgery residents currently use dermoscopy in training or practice but are interested in formal dermoscopy training in residency.

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## Introduction

Dermoscopy is a noninvasive technique that improves the diagnostic accuracy of both identifying melanoma and excluding non-melanoma skin cancer (NMSC).<sup>1,2</sup> Widely regarded as an important diagnostic tool, dermoscopy has become the standard of care in many countries,<sup>3</sup> yet few plastic surgeons have received dermoscopy training or use it as part of their practice.<sup>4-6</sup> As early diagnosis and surgical excision of melanoma impacts prognosis<sup>3</sup> and dermoscopy improves diagnosis, dermoscopy could improve plastic surgeons' direct impact on patient outcomes.<sup>4,5</sup>

While many surgical specialties have exposure to cutaneous malignancies, dermoscopy is not a component of surgical training programs, but rather is situated in the field of dermatology. The Royal College of Physicians and Surgeons of Canada (RCPSC) requires that plastic surgeons demonstrate knowledge in the macroscopic and microscopic anatomy of the skin," as well as the "clinical features, etiology, diagnosis, and management" of benign and malignant lesions, which include melanoma.<sup>7</sup> While the RCPSC does not specifically identify dermoscopy as a competency, dermoscopy is a natural complement to other diagnostic tools and techniques used by plastic surgeons to achieve the RCPSC objectives. By extension, exposure to formal dermoscopy training in plastic surgery residency could foreseeably enhance the ability of future plastic surgeons to acquire the competencies outlined by RCPSC and, in so doing, be better equipped to diagnose and treat skin cancer upon entry into practice.

Literature on the use of dermoscopy in plastic surgery is sparse. The purpose of this study was to assess the current exposure and practice patterns of Canadian plastic surgeons and trainees to dermoscopy. More specifically, this study sought to gain insight into the status of dermoscopy knowledge, use, and training, and to gauge interest in a formal dermoscopy curriculum as a component of plastic surgery residency training.

## Methods

Ethics approval for this study was obtained through the University of Calgary Conjoint Health Research Ethics Board (HREBA.CHC-19-0066). An online survey was developed and piloted with a small group of surgical trainees at the University of Calgary. The final survey consisted of 28 questions pertaining to current practice patterns, exposure to, and knowledge of cutaneous malignancies and dermoscopy, as well as interest in formal dermoscopy training.

Study authors have established connections at the University of Calgary and Western University. Plastic surgeons and residents at these institutions were, thus, emailed detailed information about the purpose of the study and invited to participate in a cloud-based survey administered by Survey-Monkey®. Responses were collected over a 4-week period in the fall of 2020. To maximize response rates, reminder emails were sent 2 - 3 weeks after the initial participation request. Participation was

**Table 1**  
Barriers to Dermoscopy

"If you currently do not use dermoscopy, what are the reasons why?"	
Inadequate training	22 (35%)
Lack of dermatoscopy	19 (31%)
Limited exposure to cutaneous malignancies	9 (15%)
Cost	4 (6%)
Time	4 (6%)
Biopsy-proven disease prior to presentation	2 (3%)
No interest	2 (3%)

Respondents were asked to select all barriers that applied.

voluntary, and participants did not receive any compensation for the completion of the survey. Furthermore, all responses were anonymous, and no data were collected other than that provided by respondents.

Data were exported from SurveyMonkey® to Microsoft Excel for analysis. Summary statistics were calculated for each question.

## Results

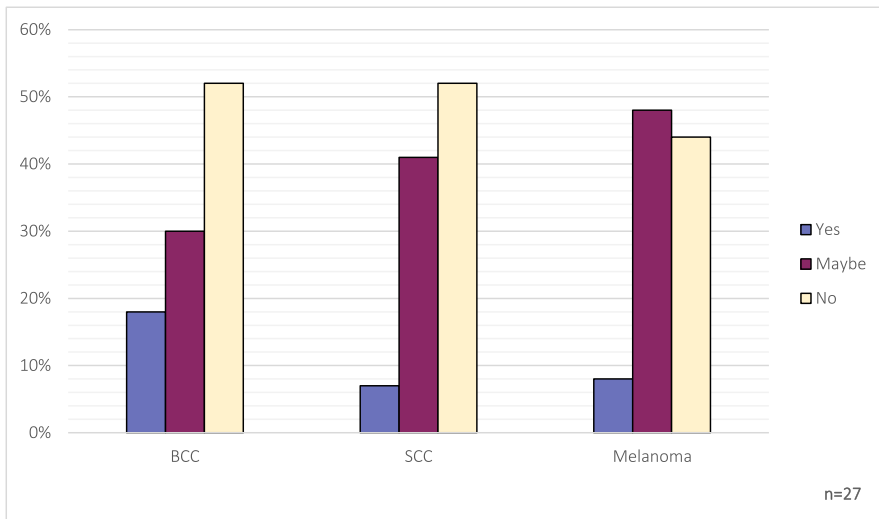
The email questionnaire was sent to 59 potential participants and a total of 27 (46%) survey responses were subsequently received. Of these, 13 were independently practicing plastic surgeons and 14 were plastic surgery residents. Among residents, five identified as junior residents (i.e., postgraduate years (PGY) 1 and 2) and nine identified as senior residents (i.e., PGY 3–5).

Regarding dermatology training, of 26 who responded, 13 had no formal training in dermatology and 13 had 1–2 month rotations in residency. In all, 75% ( $n = 12$ ) of surgeons reported dermatology training, whereas only 29% ( $n = 4$ ) of residents received training ( $p = .02$ ), indicating less exposure in contemporary residency than in the past. While 96% ( $n = 26$ ) of respondents were familiar with the term dermoscopy, only 41% ( $n = 11$ ) reported being able to define dermoscopy. Seventy-four percent ( $n = 20$ ) of respondents had no dermoscopy exposure. Of those with training, it was predominantly through reading ( $n = 5$ ; 19%), with a single respondent reporting formal training through a course ( $n = 1$ ) and another during a dermatology residency rotation ( $n = 1$ ).

The most commonly cited barriers to dermoscopy were inadequate training (35%) and lack of equipment (31%) (see [Table 1](#)). Indeed, only one respondent owned a dermatoscope and two others had access to a dermatoscope.

In contradistinction, all respondents ( $n = 27$ ) reported exposure to cutaneous malignancies. Regarding melanoma, six respondents reported "a lot" of exposure with the remainder reporting "some" ( $n = 10$ ) or "a little" ( $n = 10$ ) exposure in their practice or training. When asked to self-report skill level to identify basal cell carcinoma (BCC), squamous cell carcinoma, and melanoma under light microscopy as in a pathology lab, respondents reported a variation in skill level (see [Figure 1](#)). Notably, only 8% ( $n = 2$ ) reported being able to identify melanoma with the remainder reporting they "maybe" ( $n = 13$ ; 48%) or could not ( $n = 12$ ; 44%) identify melanoma using microscopy. Responses were comparable regarding BCC, with 18% ( $n = 5$ ) being able to identify and 52% ( $n = 14$ ) reporting they could not identify BCC. When presented with a clinical scenario involving a young Fitzpatrick 2 patient with an atypical mole (with no family history of cutaneous malignancies and no history of sunburn), surgery was a strong preference (85% biopsied or excised). Presumably due to a lack of a noninvasive method to judge banality versus dysplasia or malignancy, such as with dermoscopy, only 15% ( $n = 4$ ) of respondents elected to monitor ( $n = 4$ ). The surgical approach to uncertainty was similar among plastic surgeons ( $n = 11$ ; 85%) and residents ( $n = 12$ ; 86%; and  $p = .82$ ).

Notably, 96% ( $n = 26$ ) of respondents believed that dermoscopy would be ( $n = 10$ ) or "maybe" ( $n = 16$ ) a useful adjunct to plastic surgery training. Moreover, nearly all respondents ( $n = 24$ ; 89%) reported that plastic surgery trainees should receive formal dermoscopy training, either in residency ( $n = 19$ ; 79%) or fellowship ( $n = 5$ ; 21%).



**Figure 1.** Could you identify the following (i.e., basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and melanoma) under a microscope? The height of the columns indicates the number of respondents who provided the response “yes,” “maybe,” or “no.” **Management of Cutaneous Malignancies**

## Discussion

Elucidating clinical practice patterns and potential knowledge gaps of plastic surgeons and trainees is important given their essential role in managing cutaneous malignancies.<sup>5,6</sup> To the best of our knowledge, this is the first study to survey Canadian plastic surgeons and residents regarding dermoscopy. Given that the prevalence of skin cancer, particularly melanoma, continues to rise, understanding how best to equip plastic surgeons to manage cutaneous malignancies is vital.<sup>4</sup>

In this regard, the majority of survey respondents received little to no exposure to dermatology during their training. Although exposure to dermatology in residency might be expected to impact dermoscopy knowledge, practicing surgeons, who were more likely to have received dermatology training in residency, were not more likely to have heard of dermoscopy, be able to define it, or use dermoscopy in practice as compared to residents. The majority of respondents were familiar with dermoscopy and all reported exposure to melanoma in their clinical practice. Interestingly, a recent study suggests that even dermatology residents desire more dermoscopy training, and that 38% had no dermoscopy training in residency.<sup>8</sup>

Few respondents used dermoscopy in their clinical practice. This is in keeping with other studies suggesting that dermoscopy remains underutilized by plastic surgeons.<sup>5,6</sup> For instance, in a recent survey of plastic surgery trainees, only 53% of respondents had ever used a dermatoscope, and only one respondent ( $n = 1/19$ ) had received formal training.<sup>5</sup> Similarly, a survey of plastic and otolaryngology surgeons found that only 26% ( $n = 19/73$ ) routinely used a dermatoscope.<sup>6</sup> Of these, only two ( $n = 2/73$ ) reported using dermoscopy to assess all lesions.<sup>6</sup>

Reasons for the limited uptake of dermoscopy among surgeons are no doubt multifaceted. It is notable, however, that only two (8%) respondents to our survey cited lack of interest as a reason for not currently using dermoscopy. It then seems reasonable that other respondents would be interested in acquiring the skill if barriers to dermoscopy were adequately addressed. The most frequently cited barrier among respondents was inadequate training.

Certainly, the diagnostic accuracy of dermoscopy varies, and in the absence of training, the benefits of dermoscopy as compared to a visual inspection, may be limited.<sup>2</sup> A recently published Cochrane review of dermoscopy for the diagnosis of melanoma indicates that higher diagnostic accuracy is observed among those with greater experience, and increased training is associated with improved sen-

sitivity.<sup>1</sup> Research also suggests that dermoscopy training increases the ability of plastic surgeons to accurately diagnose melanoma and NMSC.<sup>4,9</sup> Indeed, a retrospective review involving three plastic surgery trainees with dermoscopy training found their diagnostic accuracy to be comparable to dermatologists.<sup>9</sup> Moreover, among plastic surgeons who attended a one-day dermoscopy training course, the sensitivity of diagnosing malignant skin lesions increased from 56% to 64%, with the specificity increasing from 44% to 64%.<sup>4</sup> Notwithstanding these results, dermoscopy is a tool with a steep learning curve, and proper use likely requires formal training with sustained exposure.<sup>8,10</sup>

Inadequate dermoscopy training in residency remains a barrier to proficient dermoscopy.<sup>8</sup> As such, this study sought to determine not only whether there was interest in learning dermoscopy, but also whether respondents were amenable to the inclusion of formal dermoscopy training during residency. In this regard, 89% ( $n = 24$ ) of respondents believed that plastic surgery training programs should include a dermoscopy component. Among these respondents, 79% ( $n = 19$ ) believed that dermoscopy training should occur in residency and 21% ( $n = 5$ ) indicated that this training should occur in fellowship. Given the steep learning curve, integrating dermoscopy early in plastic surgery residency training might best ensure competent identification of the clinical features, diagnosis, and management of melanoma and NMSC (i.e., RCPSC competencies) upon entry into practice.<sup>8</sup> While no set curriculum exists, the authors of a recent study of dermatology residency programs recommend that dermoscopy training includes informal didactic sessions, outside teaching modalities (e.g., conferences, courses, and web-based training), clinical exposure, and an iterative process of evaluation and revision secondary to resident feedback.<sup>8</sup> This approach could be adapted for plastic surgical trainees in residency or fellowship.

With regard to the management of an atypical mole in a Fitzpatrick 2 patient, the majority of respondents proceeded with biopsy, with similar management being reported by surgeons and residents. When used as a clinical adjunct, dermoscopy helps distinguish skin malignancies from benign lesions; thereby reducing the need for surgical biopsy and excision.<sup>1</sup> Consistent with this, one study demonstrated that following a one-day dermoscopy course, plastic surgeons nearly doubled their ability to identify benign lesions, which result in 20% fewer benign lesions being recommended for surgical excision.<sup>4</sup> By contrast, in another study, the benign to malignant ratio for biopsied pigmented lesions actually increased from 18.4:1 to 22.5:1 in the first year of dermatoscope use, followed by a marked decrease thereafter (7.9:1).<sup>10</sup>

Plastic surgeons have been shown more likely than dermatologists to proceed with surgical biopsy and excision of suspicious lesions,<sup>9,12</sup> possibly related to their underutilization of dermoscopy.<sup>13</sup> While this study was limited to plastic surgeons, only one of whom reported routine use of dermoscopy, it would be of interest to investigate whether there is a difference in management among plastic surgeons who use, and those who do not use, dermoscopy. Biopsy has an associated cost and is not without risk—scarring, particularly of cosmetically sensitive regions, patient anxiety, and increased healthcare costs as the number of excised skin lesions increases for every melanoma diagnosed.<sup>1,11</sup> One study suggested that up to 29% of patients develop wound complications after punch biopsy and 86% of patients experience anxiety while awaiting results.<sup>11</sup> Irrespective of this, biopsy or excision of a lesion that subsequently proves benign is arguably more acceptable than failing to identify a malignant lesion.<sup>1</sup> However, as a non-invasive modality, dermoscopy may benefit both patients and the healthcare system wherein the adoption of dermoscopy by plastic surgeons would presumably reduce the number of lesions inaccurately characterized as malignant, with a corresponding decrease in the need for biopsy and excision, along with the associated costs of these interventions.<sup>1</sup>

### *Strengths, limitations, and future research*

A strength of this study is that no incentives, either professional or personal, were provided for participants to complete the survey. Therefore, without undue influence, responses from the questionnaire can be interpreted as robust and reflective of individual opinions. Although the sample was small, which may be a limitation, the response rate was 46% ( $n = 27/59$ ) with a comparable number of responses received from plastic surgeons ( $n = 13$ ) and trainees ( $n = 14$ ). Even so, if only a particular fraction of plastic surgeons or trainees with awareness of dermoscopy and cutaneous malignancies responded to the survey, this would introduce a potential source of bias. In addition, while partic-

ipants were recruited from two universities, located in different provinces, the convenience sample may not be representative of the larger body of Canadian plastic surgeons and trainees.

This needs assessment is the first step toward developing a dermoscopy curriculum, with results suggesting that interest in dermoscopy training in plastic surgery residency exists. We will need to identify the best way to address the present knowledge gap, with a particular focus on fulfilling the RCPSC plastic surgery training objectives. As such, we plan to move forward, in collaboration with our academic surgery and dermatology colleagues, in developing formal dermoscopy training for plastic surgery residents. This curriculum could be piloted with residents at the two universities included in this survey, with planned pre- and post-test surveys to assess the value of training. The impact on patient care such as reducing the benign to malignant biopsy ratio and increasing early diagnosis could also be explored. Ultimately, we believe that dermoscopy training should be provided to all surgical trainees involved in the management of cutaneous malignancies, with specific focus on developing the competencies identified by the RCPSC.

### Declaration of Competing Interest

No conflicts of interest to declare.

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### Ethical approval

Ethics approval for this study was obtained through the University of Calgary Conjoint Health Research Ethics Board (HREBA.CHC-19-0066).

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