

Analysis of dermoscopy teaching modalities in United States dermatology residency programs

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ABSTRACT The use of dermoscopy in dermatology residency programs is on the rise (over 94% of chief residents reported using a dermatoscope in 2013) [1]. Despite increased use (100% of our surveyed residents reported using a dermatoscope), dermoscopy training is one of the aspects of United States dermatology residency training with the lowest resident satisfaction [2]. Diagnostic accuracy with dermoscopy is highly correlated with the amount of dermoscopy training the user has undertaken [3]. We sought to analyze dermoscopy use in US Dermatology residencies to better understand resident dermoscopy utilization and teaching modalities. We found residents learn dermoscopy via multiple teaching modalities. The most commonly reported dermoscopy teaching modality was didactic lectures, followed by time in clinic with a dermoscopy expert. Of the different teaching modalities, time in the clinic with a dermoscopy expert was reported to be the most effective. We also found that the majority of dermatology residents receive didactic dermoscopy lectures and clinical dermoscopy training on the differentiation of benign nevi from melanoma using dermoscopy, the detection of basal cell carcinoma, and the identification of seborrheic keratosis. However, few residents receive dedicated training on the use of dermoscopy in the evaluation of inflammatory dermatoses and skin infections despite dermoscopy's demonstrated value in both areas [4-7].

Background

Dermoscopy is an *in vivo*, non-invasive technique utilized when examining the skin. A dermatoscope is a handheld device, which allows illumination and 10-14 times magnification of the area being analyzed. The dermatoscope allows clinicians to not only magnify skin lesions, but also helps visu-

alize subsurface features. Dermoscopy is effective in evaluation of both melanocytic and non-melanocytic skin lesions, as well as rashes and infectious dermatoses [4-7]. Dermoscopy improves the diagnostic accuracy for melanoma detection by up to 50% in comparison to unaided visual inspection, but only in examiners experienced with the use of dermoscopy [6,8]. For some non-melanocytic neoplasms, visualization of

dermatoscopic structures is 100% specific (i.e. spoke wheels seen in pigmented basal cell carcinoma) [9]. Additionally, there are dermatoscopic structures with a very high specificity for psoriasis [10].

Despite its demonstrated value, dermoscopy is not uniformly being taught to dermatology residents. In 2002, 50% of US dermatology residents were using dermoscopy for melanocytic lesion evaluation [11]. By 2011, 88% of chief residents in US dermatology programs were using dermoscopy to aid in melanoma detection [12], and by 2013, 94% of chief residents were doing so [1]. Despite the increase in use, dermoscopy training was one of the aspects of US dermatology residency training with the lowest resident satisfaction [2]. Furthermore, while there is an abundance of literature addressing the use and education of dermoscopy in the diagnosis of melanocytic lesions, to our knowledge, there has been no published study investigating whether dermoscopy is being utilized and taught in US dermatology residency programs for evaluation of non-melanocytic neoplasms, skin infections, or inflammatory dermatoses.

Objective

The goal of this study is to analyze current dermoscopy training modalities in US dermatology residency programs and to determine if dermoscopy is being taught for purposes other than evaluation of melanocytic growths, such as non-melanocytic neoplasms, skin infections, and inflammatory dermatoses.

Methods

Institutional Review Board approval was obtained from the Penn State Hershey Medical Center (STUDY00002833). Anonymous surveys were sent to all US dermatology residency program directors as identified by the Association of Professors of Dermatology (APD) listserv on August 17, 2015. The survey was administered through SurveyMonkey® and dispensed to dermatology residency program directors, who were asked to dispense the survey link to all the dermatology residents at their institution, regardless of post-graduate year. The survey link was resent to program directors on three separate occasions to elicit more responses. The survey was closed on October 1, 2015. Informed consent was obtained by survey responder's acceptance of participation as elicited on the cover letter of the survey. Questions regarding dermoscopy training within the responder's current residency program addressed: (1) quantity of dermoscopy education and training, (2) dermoscopy teaching modalities, (3) topics addressed in dermoscopy lectures, (4) aspects of clinical dermoscopy training, (5) effectiveness of dermoscopy teaching modalities, (6) deficiencies within the dermoscopy

curriculum, (7) the analytical methods used when performing dermoscopy, and (8) opinion regarding inclusion of dermoscopy as an Accredited Council for Graduate Medical Education (ACGME) dermatology core competency (Table 1).

Descriptive statistics, such as frequency distribution and percentages, were calculated to quantify the survey responses.

Results

Study Participants

Forty dermatology residents from 16 different US dermatology residency programs completed the survey. Seventy-seven different US dermatology residency programs were asked to participate, thereby yielding a 21% representation rate of all the US dermatology residency programs as identified by APD as being receptive to receiving surveys.

Use of dermoscopy in resident clinical practice

All surveyed residents reported using dermoscopy in their clinical practice. The top three reported reasons for using dermoscopy were: (1) helps detect melanoma (97%), (2) helps detect basal cell carcinoma, squamous cell carcinoma, and/or actinic keratoses (87%), and (3) leads to fewer biopsies and reduces patient anxiety (79%). The majority of respondents believed that dermoscopy is useful in: (1) diagnosis of melanoma (85%), (2) evaluation of patients with clinically atypical/dysplastic nevi (77%), and (3) diagnosis of basal cell carcinoma (72%). While the majority of respondents believed that dermoscopy was not useful in: (1) evaluation of inflammatory dermatoses (85%), (2) diagnosis of actinic keratosis (77%), (3) evaluation of skin infections (74%), and (4) diagnosis of squamous cell carcinoma (72%).

Dermoscopy Education and Training

The most commonly reported dermoscopy teaching modality was didactic lecture: 88% of respondents reported having dermoscopy lectures as part of their residency curriculum. An average of two hours of dermoscopy lectures per academic year were reported. The most common topics discussed in lectures were: (1) differentiation of benign nevi from melanoma, (2) detection of basal cell carcinoma, and (3) detection of seborrheic keratosis, angiomas, or angiokeratomas. Lectures on the use of dermoscopy in the evaluation of inflammatory dermatoses and skin infections were rare. Dermoscopy teaching also occurred in a clinical setting: 59% of the residents reported working with a dermoscopy expert in clinic. The average time spent with the expert was four hours per week. Similarly to dermoscopy lectures, inflammatory dermatoses and skin infections were not topics commonly addressed in clinical dermoscopy training, while differentiation of benign nevi from melanoma and detection of basal cell carcinoma were frequently taught (Figure 1).

TABLE 1. Survey questions and possible responses. [Copyright: ©2017 Chen et al.]

Do you use dermoscopy in your clinical practice?
<input type="radio"/> Yes
<input type="radio"/> No
What are your reasons for dermoscopy use? (Check all that apply)
<input type="radio"/> Helps detect melanoma
<input type="radio"/> Helps detect BCC, SCC, and/or AK
<input type="radio"/> Helps differentiate between inflammatory dermatoses and skin growths
<input type="radio"/> Helps with evaluation of infectious skin conditions (i.e. scabies, molluscum)
<input type="radio"/> Leads to fewer biopsies
<input type="radio"/> Reduces cost of care through early diagnosis
<input type="radio"/> Reduces patient anxiety
<input type="radio"/> Documentation for medical liability
Do you believe dermoscopy is useful in: (Check all that apply)
<input type="radio"/> Diagnosis of melanoma
<input type="radio"/> Patients with clinically atypical/dysplastic nevi
<input type="radio"/> Diagnosis of BCC
<input type="radio"/> Diagnosis of SCC
<input type="radio"/> Diagnosis of AK
<input type="radio"/> Evaluation of inflammatory dermatoses
<input type="radio"/> Evaluation of skin infections
Are dermoscopy lectures part of your resident education curriculum?
<input type="radio"/> Yes
<input type="radio"/> No
Do your dermoscopy lectures address: (Check all that apply)
<input type="radio"/> Differentiation of benign nevi from melanoma
<input type="radio"/> Detection of BCC
<input type="radio"/> Detection of SCC
<input type="radio"/> Detection of AK
<input type="radio"/> Detection of SK
<input type="radio"/> Detection of angiomas or angiokeratomas
<input type="radio"/> Evaluation of inflammatory dermatoses
<input type="radio"/> Evaluation of skin infections
Approximately how many hours of dermoscopy lectures does your department provide during an academic year? (Please specify)
Do you have dermoscopy “unknown” sessions?
<input type="radio"/> Yes
<input type="radio"/> No
Do you utilize other dermoscopy training resources?
<input type="radio"/> Yes
<input type="radio"/> No
What are these other resources? (Check all that apply)
<input type="radio"/> Online dermatology lectures
<input type="radio"/> Online dermoscopy quizzes
<input type="radio"/> Dermatology textbooks
Have you attended a dermoscopy conference at a regional or national dermatology meeting?
<input type="radio"/> Yes
<input type="radio"/> No

(Continued next page)

TABLE 1. Survey questions and possible responses. (continued)

Did your institution/residency program provide you with a dermatoscope?
<input type="radio"/> Yes
<input type="radio"/> No
What analytic method(s) do you use when performing dermoscopy? (Check all that applies)
<input type="radio"/> Pattern analysis or revised pattern analysis
<input type="radio"/> ABCD Rule of Dermoscopy
<input type="radio"/> Menzies method
<input type="radio"/> 7-point score or checklist
<input type="radio"/> CASH algorithm (i.e. Colors Architecture Symmetry Homogeneity)
Do you work with a dermoscopy expert in a clinical setting?
<input type="radio"/> Yes
<input type="radio"/> No
Approximately how many hours per week do you work with a dermoscopy expert in a clinical setting? (Please specify)
In a clinical setting, are you taught how to use dermoscopy for: (Check all that apply)
<input type="radio"/> Differentiation of benign nevi from melanoma
<input type="radio"/> Detection of BCC
<input type="radio"/> Detection of SCC
<input type="radio"/> Detection of AK
<input type="radio"/> Detection of SK
<input type="radio"/> Detection of angiomas or angiokeratomas
<input type="radio"/> Evaluation of inflammatory dermatoses
<input type="radio"/> Evaluation of skin infections
Which method of teaching dermoscopy do you find most effective? (Check all that applies)
<input type="radio"/> Structured lectures
<input type="radio"/> “Unknown” sessions
<input type="radio"/> Time in clinic with a dermoscopy expert
Are you satisfied with the dermoscopy education you receive as part of your residency program?
<input type="radio"/> Yes
<input type="radio"/> No
Do you feel dermoscopy training should be an ACGME (Accreditation Council for Graduate Medical Education) dermatology core competency?
<input type="radio"/> Yes
<input type="radio"/> No

*BCC=basal cell carcinoma, SCC=squamous cell carcinoma, AK=actinic keratosis, SK=seborrheic keratoses

Other reported forms of dermoscopy education were: attending dermoscopy conferences (15% of respondents) and dermoscopy “unknown sessions (23% of respondents). Fifty-four percent of respondents supplement with other dermoscopy training resources, with dermatology textbooks being the most commonly utilized other resource. Of the different dermoscopy teaching modalities, time in clinic with a dermoscopy expert was reported to be the most effective modality for learning dermoscopy (72% of respondents reported this method to be effective), followed by structured lectures (61%), and “unknown” sessions (36%). Eighty-nine percent of the residents were taught pattern analysis, which has the highest

diagnostic accuracy for detecting melanoma [8], as the main analytical approach when using dermatoscopes, followed by 53% who were also taught the ABCD Rule of Dermoscopy. Forty-two percent of residents felt dissatisfied with the dermoscopy training they receive in their residency program. Lastly, the majority (78%) of the respondents felt dermoscopy training should be an ACGME dermatology core competency.

Conclusions

Dermoscopy is widely used in US dermatology residency programs (100% dermoscopy use in our study). In 2010,

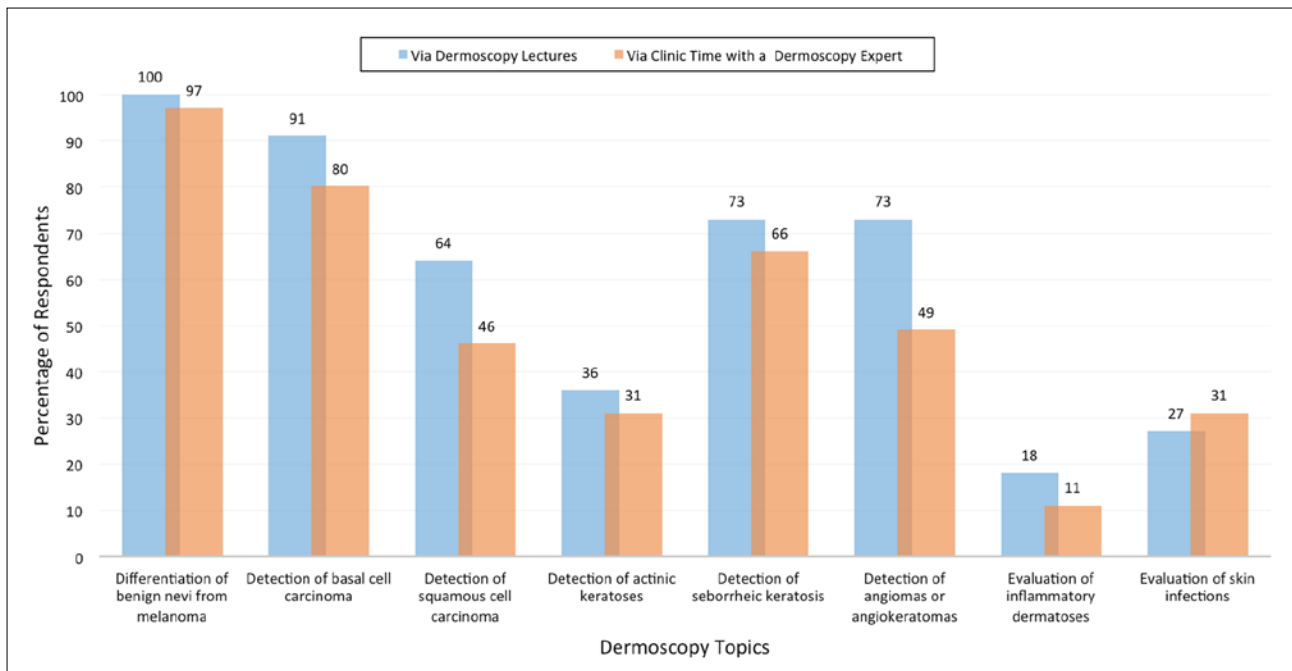


Figure 1. Dermoscopy topics addressed. [Copyright: ©2017 Chen et al.]

despite high rates of use by US dermatology residents, only 48% of practicing US dermatologists were using dermoscopy. The main reason reported by the practicing US dermatologists for not using a dermatoscope was lack of training [13]. European literature has shown that resident dermoscopy training is highly correlated with dermoscopy use for melanoma detection [14]. Little is published on European dermoscopy teaching modalities for residents. In our US-based study, we found that residents learn dermoscopy through a variety of teaching modalities. Of these, the most common dermoscopy teaching modality is didactic lecture, followed by clinic time with a dermoscopy expert. Time in clinic with a dedicated dermoscopy expert was reported to be the most effective way residents learn dermoscopy. However, only 59% of the residents in our study had the opportunity to work with a dermoscopy expert in a clinical setting. Prior research supports this finding: dedicated time in clinic with a “pigmented lesion specialist” is one of the most effective ways to learn dermoscopy [1]. Therefore, program directors should strive to have residents spend more time in clinic with a dermoscopy expert.

Structured lectures were reported to be the second most effective modality for learning dermoscopy. While 88% of residents in our study reported having formal dermoscopy lectures, making it the most commonly reported modality for learning dermoscopy, the residents only receive an average of two hours of dermoscopy lectures per year. Of the residents who had dermoscopy lectures, all of them received lectures addressing dermoscopy in the differentiation of benign nevi from melanoma, but only 27% and 18% received lectures on using dermoscopy to evaluate skin infections and inflammatory dermatoses, respectively. The same pattern was

found in dermoscopy training in the clinical setting (with a dermoscopy expert): 97% of residents reported being taught how to differentiate benign nevi from melanoma with a dermatoscope, but only 31% and 11% were taught how to use dermoscopy in the evaluation of skin infections and inflammatory dermatoses, respectively (Figure 1).

Lack of training in the full capacity of dermoscopy might account for the following: while the majority (85%) of our participants considered dermoscopy useful in the diagnosis of melanoma, the majority (85%) did not consider dermoscopy to be useful in the evaluation of inflammatory dermatoses, diagnosis of actinic keratosis (77%), evaluation of skin infections (74%), and diagnosis of squamous cell carcinoma (72%). The benefits of dermoscopy for detection of melanoma are well documented; however, there is an expanding body of literature supporting dermoscopy use in evaluating non-melanocytic tumors, skin infections, and inflammatory dermatoses [5,7,9,10]. An increased number of hours of structured dermoscopy lectures and increased clinic time with a dermoscopy expert may allow for more dermoscopy topics to be addressed in resident education. Additionally, inclusion of dermoscopy as an ACGME dermatology core competency, which 78% of the surveyed residents favored, might allow for standardization of resident dermoscopy education.

In summary, resident satisfaction with their dermoscopy training is low and resident dermoscopy teaching is limited mostly to the evaluation of skin neoplasms, specifically melanoma and basal cell carcinoma. Increased resident clinic time with a dermoscopy expert, more structured dermoscopy lectures, and inclusion of dermoscopy as a dermatology ACGME core competency has the potential to increase dermoscopy

use for non-melanocytic conditions, including inflammatory dermatoses and skin infections, and increase resident satisfaction with their dermoscopy training.

Limitations

Our study was limited by our number of responses: this data represents 21% of the US dermatology residency programs as identified by APD as being receptive to receiving surveys. We used the APD listserv to identify program directors and asked the program directors to distribute the survey to their residents. Distribution of the survey using a different modality, targeting individual residents as opposed to program directors, may have allowed for inclusion of more US dermatology residents and programs.

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