Effects of Total-Body Digital Photography on Cancer Worry in Patients With Atypical Mole Syndrome

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IMPORTANCE Cancer worry about developing melanoma in at-risk patients may affect one's quality of life and adherence to screening. Little is known about melanoma-related worry in patients with atypical mole syndrome (AMS).

OBJECTIVES To quantify levels and elucidate predictors of worry related to developing melanoma in patients with AMS and to determine whether total-body digital photography (TBDP) in pigmented lesion clinics (PLCs) reduces worry.

DESIGN, SETTING, AND PARTICIPANTS In this pretest-posttest study, patients with AMS from PLCs at 2 academic medical centers were recruited from June 1, 2005, through October 31, 2008, to answer questions about cancer worry before and after undergoing TBDP. Questionnaires used included the new melanoma and recurrent melanoma Revised Impact of Event Scale (RIES), the Melanoma Worry Scale (MWS), the Hospital Anxiety and Depression Scale, and the Life Orientation Test.

INTERVENTIONS All patients underwent TBDP.

MAIN OUTCOMES AND MEASURES Changes in the MWS and new melanoma RIES scores.

RESULTS A total of 138 patients completed baseline questionnaires; 108 patients (78.3%) completed questionnaires after TBDP. Baseline levels of worry were low and reduced further after TBDP. In patients with a personal history of melanoma, worry was reduced on all scales. In patients without a personal history of melanoma, only the new melanoma RIES score was significantly decreased. Predictors of baseline MWS scores include female sex, personal history of melanoma, and higher Hospital Anxiety and Depression Scale scores, adjusted for demographics, family history of melanoma, and Life Orientation Test scores. Adjusted predictors of the baseline new melanoma RIES score were similar but also included lower educational level and did not include sex.

CONCLUSIONS AND RELEVANCE Patients with AMS have low levels of melanoma-related worry, which is similar to data from other populations at high risk of cancers. We found that TBDP is a clinically useful tool that can be used in PLCs to help decrease worry about developing melanoma in at-risk patients.
Cancer worry is an emotional reaction to the threat of cancer.1-Worry is a “cognitive behavior aimed at reducing” anxiety.2- Controversy exists regarding whether cancer worry is beneficial or detrimental to screening behaviors. Studies have found associations between cancer worry and screening behavior, ranging from linear3 to curvilinear4 to no association.5 Several studies6-8 suggest that generalized anxiety and intrusive thoughts about cancer may interfere with cancer screening.

A meta-analysis9 found a linear association between breast cancer worry and screening behaviors, with higher levels of cancer worry promoting screening. Overall, it appears that cancer worry facilitates screening behaviors.10 Limitations of the available literature include the cross-sectional design of most studies and the fact that, in general, cancer-related worry is low, even in high-risk populations.9,10

Until recently, little was known about cancer-related worry in patients with melanoma. An Australian study9 that examined psychological distress related to melanoma in patients with a history of melanoma found that most patients perceive new or metastatic melanoma as an ongoing threat in their lives. Patients’ reported coping skills differed, but most cited regular follow-up in a pigmented lesion clinic (PLC) as a source of reassurance.

Pigmented lesion clinics are specialized clinics staffed by dermatologists with expertise in diagnosing and treating pigmented skin lesions, particularly patients at high risk of melanoma, including those with a history of melanoma and/or atypical mole syndrome (AMS). Studies11-13 have found that patients followed up in PLCs who are diagnosed as having melanoma have more in situ disease, thinner invasive melanomas, and fewer histologically negative prognostic features (eg, ulceration and mitoses) compared with other patients.

Health care professionals in PLCs typically use handheld dermatoscopes and/or total-body digital photography (TBDP) during total-body skin examination (TBSE) to evaluate clinically concerning lesions. Total body digital photography is a tool that can be used to augment TBSE by identifying new or changing nevi.14 In TBDP, photographs are taken of the entire body surface using standardized poses and professional lighting, resulting in high-resolution digital images that are provided to the physician and often to the patient when used by a trained dermatologist in a PLC, TBDP can be helpful in identifying lesions that are changing, which can result in melanomas being diagnosed at an earlier stage.15

In addition, TBDP may reduce the morbidity and cost associated with multiple biopsies of atypical nevi that are not changing.16-17 Data conflict regarding whether TBDP reduces biopsies. One study18 with a short follow-up time of 1 year did not find a difference in the number of biopsies in patients who underwent TBDP compared with similar patients who did not. Another study19 compared the rate of biopsies using serial digital epiluminescence microscopy (dermatoscopic) photography vs TBDP and found a lower biopsy rate and lower benign to malignant ratio using TBDP. These investigators also found that TBDP using TBSE is more time efficient than using multiple digital dermatoscopic images during TBSE.

In addition, data indicate that patients who receive a benign diagnosis based on their clinical examination findings have an immediate decrease in melanoma-related distress compared with patients who require biopsy.20 If TBDP reduces biopsy rates because of an improved ability to monitor atypical but nonevolving nevi, perhaps it decreases the distress associated with waiting for biopsy results. A total of 81.4% of faculty dermatologists at US training centers cite reduced patient distress as a reason for using TBDP.21 The objectives of this study were 2-fold: (1) to examine baseline levels and predictors of cancer worry in patients with AMS followed up in a PLC and (2) to determine whether TBDP in a PLC reduces cancer worry in this population.

Methods

Definitions

The words anxiety, fear, and worry are used interchangeably in the cancer screening literature.22 To distinguish between these often parallel concepts, we use the term cancer worry for the construct that reflects the emotional variable that results from melanoma screening and that may influence the likelihood of future screening efforts. We use anxiety to reflect trait anxiety and fear to indicate the emotion that accompanies screening. Our assumption, based on existing literature, is that cancer worry is influenced by trait anxiety and depression (ie, how anxious and depressed in general the patient might be)23 and trait optimism (ie, how optimistic the patient might be in general).24

Patients, Setting, and Procedures

The institutional review boards at Emory University and at the University of Arizona approved this study. Written informed consent was obtained from each patient. Inclusion criteria included patients with AMS who were scheduled to undergo TBDP. We defined AMS as 50 or more nevi with at least 1 nevus measuring 8 mm in diameter or larger and 1 atypical nevus with irregular borders and/or color variation.25,26 Exclusion criteria included the inability to read the English language or physical barriers to completing the survey. Patients were recruited to participate in this pretest-posttest study from PLCs at both universities from June 1, 2005, through October 31, 2008. Patients were recruited consecutively, without regard for equivalency in the groups with and without a history of melanoma.

After completing baseline surveys, patients with AMS underwent mole mapping (DigitalDerm Inc). Thirty-three images were taken with the patients in standardized poses with studio lighting. Patients were given a digital copy of their images to assist in self-skin examinations, and another copy of the digital images remained in the PLC to be used in conjunction with TBSE on return visits to the PLC 6 to 12 months later. Study surveys were repeated 3 to 6 months after undergoing TBDP. Such standardized follow-up was preferable to linking the posttest surveys to the variable clinical schedule in the event that cancer worry was affected by clinical follow-up. Posttest surveys were completed in person, by mail, or by telephone.
Surveys
The panel of 4 surveys addressed cancer worry, trait anxiety, trait optimism, and basic demographic information (eAppendix in the Supplement). Cancer worry was measured using the Melanoma Worry Scale (MWS) and the Revised Impact of Event Scale (RIES).

The MWS is a modified version of the Breast Cancer Worry Scale in which the term melanoma replaces the term breast cancer.7 The MWS contains 4 questions. The first question asks how frequently one worries about getting melanoma (5 levels, with 1 indicating not at all and 5 indicating almost all the time). The second and third questions ask how much that worry affects one’s mood and daily activities, and the fourth question asks about anxiety regarding results of skin examinations (4 levels, with 1 indicating none or not at all and 4 indicating a lot). Possible scores range from 4 to 17, with higher scores indicating higher levels of worry.

The RIES measures subjective stress caused by a significant life event, which was the risk of developing melanoma in this study.27 The RIES (score range, 0-75) has 15 questions and is divided into 2 subscales (intrusion and avoidance), with higher scores indicating more of a stress response to the life event. For the purposes of our analysis, patients took the RIES survey twice: the new melanoma RIES (nRIES) to determine the risk of new melanoma and, for patients with a personal history of melanoma, the recurrent melanoma RIES (rRIES) to examine the risk of recurring, spreading, or metastasizing melanoma. The RIES has been used to evaluate posttraumatic stress after a life event. Although it is not intended to make a clinical diagnosis, scores of 33 or higher are suggestive of posttraumatic stress disorder.28

The Hospital Anxiety and Depression Scale (HADS) (score range, 0-42) was used to assess generalized anxiety and depression. This scale has 14 questions. Higher scores on the anxiety and depression subscales (score range, 0-21 for each) indicate higher levels of anxiety and depression, with scores of 8 or higher indicating a clinically relevant mood disorder.29 The Life Orientation Test (LOT), which has 12 questions with a possible range of 0 to 36, measures trait optimism, with higher scores (scores >24) indicating a more optimistic outlook on life.30 Finally, patients also answered basic demographic questions related to age, educational level, income, and family and personal history of melanoma.

Statistical Analysis
If questions related to demographics were omitted, we did not include the responses to those questions in the analysis. If a patient omitted less than 25% of the questions in a given survey or a given subscale of a survey, we imputed the missing data using the mean score for the responses for the relevant questions that were completed. If a patient omitted 25% or more of the questions in a survey or in a subset of a survey, their responses for that survey were not included in the analysis.31

Categorical variables were compared using the χ² test and Fisher exact test. Continuous variables are reported as mean (SD). Variables were tested for normality. Survey results were not normally distributed, so summary statistics were reported as median and the Wilcoxon signed rank test was used, with results reported as the 50th percentile and interquartile range. The paired t test was used to evaluate changes in questionnaire scores from baseline to follow-up because changes in survey results were normally distributed.

Univariate analyses were used to explore associations between patient demographics and personal history of melanoma with cancer worry and associations between these variables and inherent depression, anxiety, and optimism levels. Multivariate analysis was performed using the general linear models procedure, sequentially eliminating variables in a stepwise manner to determine factors that contribute to baseline cancer worry. Two models were created: one using the MWS as the outcome variable and one using the nRIES as the outcome variable. Predictor variables in the model included age, sex, race, educational level, income, AMS, family and personal history of melanoma, HADS score, and LOT score. SAS statistical software, version 9.2 (SAS Institute Inc), was used for statistical analysis. A subgroup analysis using an additional set of univariate analyses was performed for rRIES for the subset of patients with a personal history of melanoma; an insufficient number of patients precluded a multivariate model.

Results
A total of 138 patients with AMS were recruited: 93 from Emory University and 45 from the University of Arizona. One patient did not answer whether he or she had a personal history of melanoma. The survey results for this patient were not included in our analysis, leaving a total of 137 patients. Sixty-eight (49.6%) of the 137 patients had a personal history of melanoma. The response rate was 94.5%. Those who declined participation cited time restraints.

The mean (SD) age was 41.6 (10.8) years (Table 1). Patients with a personal history of melanoma were nearly 10 years older than patients without a personal history of melanoma (P < .001). A total of 133 patients (97.1%) were white and most were highly educated, with 78 patients (56.9%) having attended graduate school. A total of 30 patients (29.7%) had a family history of melanoma, but the response to this question was missing for 36 patients. Baseline survey results with reported ranges of scores for our patients are as follows (Table 2): median MWS score, 8 (range, 6-11); median nRIES score, 4 (range, 0-18); median HADS score, 6 (range, 2-10); and median LOT score, 25 (range, 20-29). Median scores for each item on the MWS were as follows: 3 for item 1 (sometimes worry about getting melanoma), 2 for item 2 (worry affects mood a little), 1 for item 3 (worry affects daily activities not at all), and 2 for item 4 (a little anxiety about results of future skin examinations).

Predictors of Baseline Cancer Worry
Patients with a personal history of melanoma had significantly higher scores on the MWS and nRIES, indicating greater worry about new melanomas compared with patients without a personal history of melanoma (P < .001) (Table 2). No significant differences were found between the 2 groups in the HADS or LOT scores.
For the MWS outcome, univariate analysis revealed that higher MWS scores were associated with female sex ($r = 0.27$, $P < .001$), personal history of melanoma ($r = 0.29$, $P < .001$), and higher HADS score ($r = 0.59$, $P < .001$). Higher LOT scores were associated with lower MWS scores ($r = -0.27$, $P = .001$). In the multivariate regression model, female sex ($\beta = 1.08$, $P = .02$), personal history of melanoma ($\beta = 1.50$, $P < .001$), and higher HADS scores ($\beta = 0.26$, $P < .001$) remained independent predictors, adjusted for age, race, educational level, income, family history of melanoma, and LOT scores.

For the nRIES outcome, univariate analyses were similar to that of MWS with a few additions. Higher nRIES scores were associated with female sex ($r = 0.19$, $P = .02$), race other than white ($r = 0.18$, $P = .04$), and lower educational level ($r = 0.21$, $P = .01$) were associated with higher nRIES scores. On multivariate regression, not having attended college ($\beta = 8.53$, $P = .02$), a personal history of melanoma ($\beta = 6.55$, $P < .001$), and higher HADS score ($\beta = 1.18$, $P < .001$) remained independent predictors of higher nRIES scores, adjusted for age, sex, race, income, AMS, family history of melanoma, and LOT scores.

For the rRIES, in the patients with a personal history of melanoma, the baseline median score was 12.0 (range, 2.0-30.9). The univariate analysis of the baseline rRIES data revealed similar results as those seen with the MWS and nRIES in that higher scores on the rRIES were associated with female sex ($r = 0.386$, $P = .003$), higher HADS score ($r = 0.680$, $P < .001$).

### Table 1. Demographic Characteristics of the Study Participants*  

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All (N = 137)</th>
<th>With Personal History of Melanoma (n = 68)</th>
<th>Without History of Melanoma (n = 69)</th>
<th>P Value^b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), y</td>
<td>41.6 (10.8)</td>
<td>46.4 (9.5)</td>
<td>36.9 (9.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>82 (59.8)</td>
<td>39 (57.3)</td>
<td>43 (62.3)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>55 (40.2)</td>
<td>29 (42.7)</td>
<td>26 (37.7)</td>
<td>.55</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>133 (97.1)</td>
<td>65 (95.6)</td>
<td>68 (98.6)</td>
<td>.30</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>4 (2.9)</td>
<td>3 (4.4)</td>
<td>1 (1.4)</td>
<td></td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>9 (6.6)</td>
<td>5 (7.4)</td>
<td>4 (5.8)</td>
<td>.91</td>
</tr>
<tr>
<td>College</td>
<td>50 (36.5)</td>
<td>24 (35.3)</td>
<td>26 (37.7)</td>
<td></td>
</tr>
<tr>
<td>Graduate school</td>
<td>78 (56.9)</td>
<td>39 (57.4)</td>
<td>39 (56.5)</td>
<td></td>
</tr>
<tr>
<td>Yearly income, $</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50 000</td>
<td>24 (18.3)</td>
<td>11 (17.5)</td>
<td>13 (19.1)</td>
<td>.32</td>
</tr>
<tr>
<td>50 000-100 000</td>
<td>47 (35.9)</td>
<td>19 (30.2)</td>
<td>28 (41.2)</td>
<td></td>
</tr>
<tr>
<td>&gt;100 000</td>
<td>60 (45.8)</td>
<td>33 (52.4)</td>
<td>27 (39.7)</td>
<td></td>
</tr>
<tr>
<td>History of melanoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td>68 (49.6)</td>
<td>68 (100)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Family</td>
<td>30 (29.7)</td>
<td>11 (20.4)</td>
<td>19 (40.4)</td>
<td>.03</td>
</tr>
</tbody>
</table>

### Table 2. Baseline Survey Results  

<table>
<thead>
<tr>
<th>Survey</th>
<th>Median Score (Range)</th>
<th>With History of Melanoma (n = 68)</th>
<th>Without History of Melanoma (n = 69)</th>
<th>P Value^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWS (range, 4-17)</td>
<td>8 (6-11)</td>
<td>9 (7-12)</td>
<td>7 (6-9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>nRIES (range, 0-75)</td>
<td>4 (0-18)</td>
<td>13 (2-28)</td>
<td>2 (0-7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Avoidance subscale</td>
<td>2 (0-10)</td>
<td>6 (0-14)</td>
<td>1 (0-6)</td>
<td>.003</td>
</tr>
<tr>
<td>Intrusion subscale</td>
<td>1 (0-8)</td>
<td>5 (1-14)</td>
<td>1 (0-2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>HADS (range, 0-42)</td>
<td>6 (2-10)</td>
<td>6 (3-12)</td>
<td>5 (2-9)</td>
<td>.054</td>
</tr>
<tr>
<td>Depression subscale</td>
<td>1 (0-3)</td>
<td>1.5 (0-4)</td>
<td>0.2 (0-2)</td>
<td>.01</td>
</tr>
<tr>
<td>Anxiety subscale</td>
<td>4 (2-8)</td>
<td>5.5 (2-9)</td>
<td>4 (2-7)</td>
<td>.09</td>
</tr>
<tr>
<td>LOT (range, 0-36)</td>
<td>25 (20-29)</td>
<td>25 (19-29)</td>
<td>25 (21-29)</td>
<td>.70</td>
</tr>
</tbody>
</table>
were not correlated with higher RIES scores. Educational level, income, and family history of melanoma were not associated with higher RIES scores.

**Effect of TBDP in a PLC**

Of the 137 patients who completed the questionnaires at baseline, 108 completed questionnaires after undergoing TBDP for a follow-up rate of 78.8%. Of note, the baseline level of worry did not differ between those who were followed up and those who were not (median MWS score, 8 vs 7.5; median RIES score, 4 vs 3.5). The mean length of time to follow-up was 209 (122) days, approximately 7 months. Change in worry was calculated for each questionnaire and is presented in Table 3, with positive numbers indicating a lower score (less worry) after TBDP compared with before TBDP. Patients with a personal history of melanoma had statistically significant decreases in MWS scores, RIES scores on the intrusion subscale, and RIES scores, indicating a decrease in worry related to new and recurring melanoma. Patients without a personal history of melanoma had a significant decrease in RIES scores, indicating a decrease in worry related to a new melanoma.

Univariate analysis of change in MWS score in patients with a personal history of melanoma revealed that higher levels of baseline optimism (higher LOT score) were associated with more change in MWS scores after TBDP (r = 0.29, P = .03). Greater anxiety and depression (higher HADS score) at baseline were associated with more change in nRIES scores after TBDP in patients with a personal history of melanoma. In patients without a personal history of melanoma, having a family history of melanoma was associated with less change in MWS scores after TBDP (r = -0.38, P = .02). Higher HADS scores and lower LOT scores were associated with larger change in nRIES scores after TBDP in patients with AMS but no personal history of melanoma (HADS score: r = 0.31, P = .03; LOT score: r = -0.32, P = .02).

### Discussion

Consistent with data from other cancers, our results indicate that patients with AMS have low levels of cancer-related worry. Women, patients with a personal history of melanoma, and patients with lower educational levels and higher levels of generalized anxiety and depression are most likely to have melanoma-related worry. These factors may make up a profile of patients who need particular attention. Other research using the RIES has found that women experience more intrusive thoughts and practice more thought avoidance surrounding stressful life events than men. The use of TBDP in a PLC to monitor for new or changing nevi relieves patients of some of their melanoma-related worry regardless of whether the patient has a personal history of melanoma. In patients with a personal history of melanoma, TBDP also reduced worry regarding melanoma recurrence.

Of interest, in the subgroup analysis, patients with a personal history of melanoma have similar worry related to developing a new melanoma as they do for melanoma recurrence based on comparing results of the nRIES and RIES. This finding may reflect inadequate patient education regarding poorer prognosis of melanoma recurrence or metastasis compared with that of a new melanoma. Alternatively, similar levels of worry found in this study may result from the first melanoma influencing speculation of an experience with a hypothetical recurrence. We did not capture the stage of melanoma in our study, but no patient had metastatic disease.

Limitations of the current study include selection bias in that patients recruited had made the decision to undergo TBDP, perhaps to alleviate worry they recognized in themselves. In addition, a validated worry scale did not exist specifically for melanoma, so we adopted the Breast Cancer Worry Scale, which is validated. The scale does not provide clinical interpretation for summary scores, so although the summary scores are useful to assess associations with other variables (as in the regression models) and trends (as in the pretest-posttest TBDP analysis), interpretation of the MWS scores may be better served by analyzing individual items. Although we found that patients were sometimes worried about getting melanoma, we found that patients had a little anxiety about results of future skin examinations. This level of worry is consistent with levels of cancer worry in the general population. In retrospect, our question related to family history of melanoma was formatted poorly, likely leading many patients to leave it blank. Without that information for many patients, it was not possible to confidently determine whether family history of melanoma played a role in our patients’ worry about developing melanoma. Some of our results suggest that being white is independently associated with increased worry, which should be interpreted cautiously because more than 97%
of our study population was white. Because our study was performed at academic research institutes and has a relatively small sample size, it may be difficult to generalize our findings. Site-specific analysis may have highlighted differences in the study participants at each institution.

Effects from TBDP cannot be separated from any effects from care received in a specialized PLC and the possibility of acclimatization over time. The best way to determine the TBDP-specific effects and existence of acclimatization would be to conduct a randomized clinical trial using PLC only (without TBDP) as the control arm. Unfortunately, that study design is out of the scope of this unfunded endeavor; moreover, because so many PLCs use TBDP, it may be unethical to incorporate such an arm. Most of our PLC patients receive TBDP on entrance to the PLC, and we did not capture time from melanoma diagnosis to TBDP, so we could not use such a lag time to determine TBDP-specific effects. Despite not being able to specifically quantify the effects of TBDP separately from that of other aspects of the PLC, we view the results holistically because the provision of pigmented lesion care now incorporates the use of many adjunct diagnostic tools, including the TBDP. Finally, the follow-up interview was intended to be 3 to 6 months after the TBDP but was on average 7 months later, which could have coincided with the PLC visit for patients followed up more frequently than annually. This timing could have led to heightened worry because the patients were preparing to have their skin checked.

Despite these limitations, our results provide useful information on baseline levels of cancer worry in patients with AMS, a population at high risk of developing melanoma, and introduce an important potential benefit of use of TBDP in PLCs. Additional research is necessary, but based on our results it seems that female patients benefit most from TBDP and that the benefit is irrespective of a personal history of melanoma. In addition, it seems that patients who tend to be depressed and anxious have the greatest reduction in intrusive thoughts and melanoma thought avoidance after TBDP. This is an important finding because some studies have found that generalized anxiety may interfere with screening behaviors.

Correlates to the level of cancer worry and reduction by TBDP in PLCs are numerous. First, does the amount of cancer worry reduction translate to level of adherence to melanoma screening as in other cancers? Second, does the trajectory of worry change with additional follow-up in PLCs with TBDP? Third, is that influenced by the number of biopsies performed or use of other screening modalities, such as dermoscopy? Because we did not design the study to evaluate these correlates or to follow up patients longitudinally, additional research is necessary to explore these cancer worry questions.

Conclusions

Patients with AMS have low levels of worry about melanoma. Certain demographic and personality traits seem to characterize patients with more worry. Use of TBDP in PLCs decreases worry regarding developing melanoma in patients who are at increased risk and decreases worry about recurrence and metastasis in patients with a personal history of melanoma. These findings suggest that TBDP should not be limited to patients with a personal history of melanoma but should be offered to patients with AMS, especially those who seem to be particularly anxious or worried about developing melanoma.

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Author Contributions: Drs Moye and Chen had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: King, Rice, Seidler, Curiel-Lewandrowski, Chen. Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Moye, Rice, Veledar. Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Moye, Veledar, Chen. Administrative, technical or material support: King, Rice, DeLong.

Study supervision: King, Veledar, Curiel-Lewandrowski, Chen.

Conflict of Interest Disclosures: None reported.

Additional Contributions: Bridget Bradley, RN, and Cassidy Rolan, BA, Department of Dermatology, Emory University, Atlanta, Georgia, and Lyne Morrison, RN, Division of Dermatology, University of Arizona, Tucson, assisted with this study. As university employees, Ms Bradley and Morrison were compensated for their work. As an intern, Ms Roland was not compensated.

REFERENCES


**NOTABLE NOTES**

**The Multifarious Adirondack Chair**

Megan E. MacGillivray, MD(C)

In Northeastern New York State bordering the majestic Adirondack Mountains is the small town of Westport. In 1903, Thomas Lee, a resident of Westport, built a pine chair with a long sloping seat and wide armrests. He intended only to furnish his patio and build comfortable chairs for his family. However, he built what would eventually become the hallmark “Adirondack chair.” Lee did not know that this chair would serve as an icon of the Adirondacks for over a century, or serve a medical purpose in the years following its creation.

Phthisis (from Greek *phthisein*, to waste away), also known as “consumption,” was the most common cause of death among mankind at the end of the 19th century. This disease had afflicted humans for thousands of years, but new scientific discoveries and medical trends were changing the understanding and treatment of this disease. The cause was unknown—or thought to be hereditary—until the remarkable Robert Koch discovered the tubercle bacillus in 1882 (the name “tuberculosis” [TB] was derived from this discovery).

Concurrently, physicians in Europe were developing a greater understanding of sunlight and its use as a medical treatment. The germicidal properties of UV light were known; in fact, Koch himself demonstrated that sunlight killed the tubercle bacilli. Furthermore, Danish physician Niels Finsen invented a UV-producing lamp that cured the cutaneous form of tuberculosis; he won the Nobel Prize in Medicine for this work in 1903. The work of these and many other scientists developed a new realm of medicine: heliotherapy.

With a known infectious etiology for TB and an increasing interest in heliotherapy, the development of the sanatorium movement was quite logical, especially given that no successful treatment options for TB existed. The first TB sanatorium in North America opened in 1885 in Saranac Lake, New York, about 40 miles from Lee’s home in Westport. Originally a single cottage, the sanatorium grew to an entire town of cottages dedicated to providing crisp mountain air, sunlight, and isolation to patients. Heliotherapy required these patients to spend hours outside in the sun. To accomplish this task, a solid, easy-to-clean, comfortable chair was required. While chairs and recliners of various types were inevitably used, a very popular chair used for this purpose was none other than the Adirondack chair.

The advent of antibiotics in the 1950s rendered heliotherapy for the treatment of tuberculosis obsolete. However, the notion of light therapy—primarily in the form of UV light—has demonstrated efficacy in a number of dermatologic conditions. As far as the Adirondack chair is concerned, a quick trip to the Adirondacks will surely prove its continued popularity as a lounging chair.

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