

The Severe Skin Cancer Consequences of Extended Tanning Bed Use, A Case Report

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ABSTRACT

Introduction: Tanning bed use has been directly correlated with increased risk of melanoma and non-melanoma skin cancers with greater duration and frequency of use. Despite this, complete bans for minors accessing indoor tanning devices are active in less than half of the states in the United States.

Case Presentation: A 65-year-old female presented to our Mohs surgery clinic with a history of left temporal T2a melanoma, multiple untreated advanced keratinocyte carcinomas, and innumerable smaller untreated keratinocyte carcinomas on her legs, arms, and back after more than 40 years of weekly tanning bed use.

Discussion: Reports from the literature indicate that first exposure under age 35 to tanning devices increases the risk for melanoma and non-melanoma skin cancers. Several programs currently focus on prevention, education, and legislative change surrounding this topic.

Conclusions: Highlighting such severe cases may provide an effective form of education for the public regarding the potential disease burden that results from indoor tanning.

surveys have shown that approximately 1 in 5 female high school students in the state have used an indoor tanning device at least once in the past year.⁷ Motivations for tanning bed use include cosmetic concerns, mood enhancement, and enjoyment of the tanning experience.⁸ Further, these positive associations with the process of using a tanning bed have been shown to meet criteria for substance abuse and dependence, placing indoor tanning on the spectrum of addictive behaviors.⁹ The risks of indoor tanning devices should be shared with the public to showcase the direct link between their use and the potential severity of skin cancer disease outcomes.

INTRODUCTION

In 1997, France was the first country to ban tanning bed use among minors.¹ Since then, the mechanisms of ultraviolet (UV)-induced melanoma and non-melanoma skin cancers have been thoroughly elucidated.^{2,3} By 2009, the World Health Organization classified UV-emitting devices as a group 1 carcinogen, putting them in the same category as tobacco and asbestos.^{4,5} Despite this abundance of knowledge, complete bans for minors accessing indoor tanning devices are active in less than half of US states.⁶ In Wisconsin, tanning bed use is banned for minors under the age of 16. However,

CASE PRESENTATION

A 65-year-old immunocompetent female with Fitzpatrick skin type II and a 40-year history of weekly tanning bed use presented to the Froedtert Mohs Surgery Clinic with a history of a facial T2a melanoma and numerous untreated advanced basal cell carcinomas and squamous cell carcinomas on her body. She presented for diagnosis and treatment of her enlarging skin cancers, which had ulcerated on her bilateral lower extremities. Since age 18, she had used tanning beds on a weekly basis at minimum, equating to over 2000 lifetime exposures. She subsequently stopped using tanning beds in 2016 and had since avoided sun exposure. Prior to age 18, there was no documentation of burns or blistering sunburns in childhood. Additionally, there was no family history of melanoma or keratinocyte carcinomas.

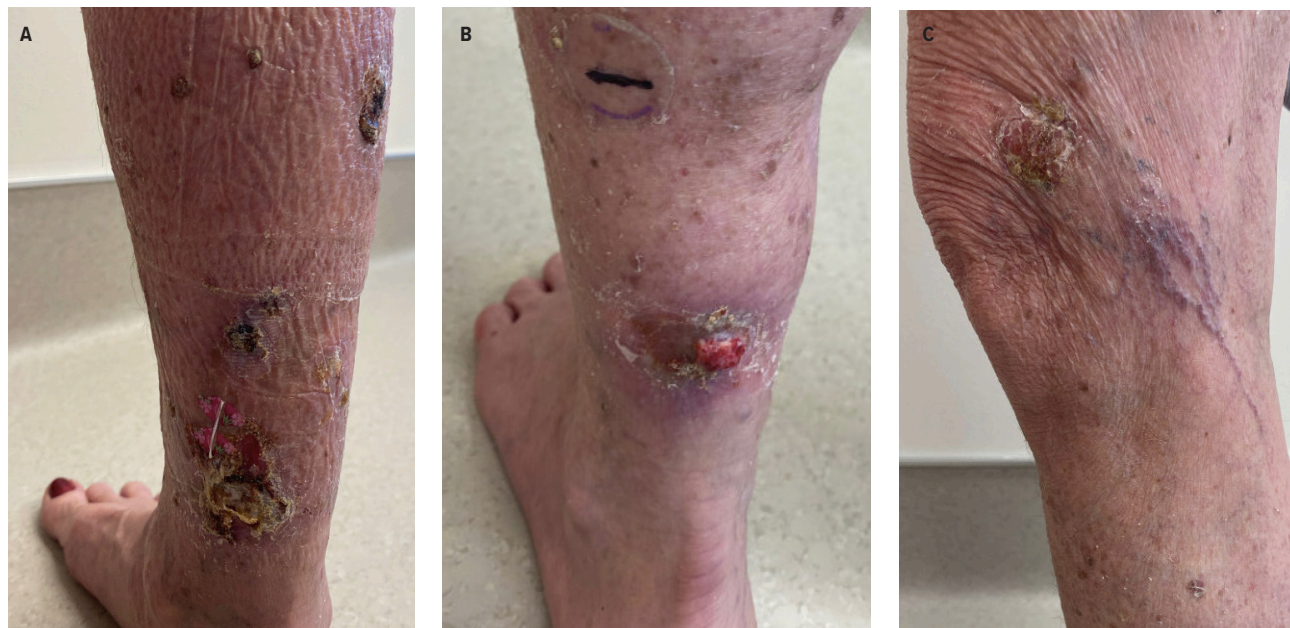
The most concerning tumors were biopsied in July 2022 and were most notable for a 4 cm ulcerated basal cell carcinoma on the right ankle, a 1.5 cm T1 squamous cell carcinoma on the right calf, a 2 cm ulcerated basal cell carcinoma on the right calf, a 3 cm

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Figure. Prebiopsy Photos



A) 4x2.5 cm Ulcerated Basal Cell Carcinoma (distal) and 1.5x1.5 T1 squamous cell carcinoma (proximal) of right medial calf.

B) 3x1.5cm T2 moderately differentiated squamous cell carcinoma of the posterior left ankle.

C) 2x2cm in-situ squamous cell carcinoma of the left lateral knee.

T2 moderately differentiated squamous cell carcinoma on the left ankle, a 1.5 cm T1 squamous cell carcinoma of the right upper arm, and a 2 cm in-situ squamous cell carcinoma of the left knee (Figure). She also had innumerable smaller scaly pink papules and plaques concerning for keratinocyte carcinoma on her arms, legs, and back that had not yet been biopsied. Her clinical lymph node examination was benign. A computed tomography scan and positron emission tomography scan showed no radiographic evidence of nodal metastasis.

The patient was presented at a multidisciplinary tumor board and was scheduled to undergo wide local excision of the T1 and T2 squamous cell carcinomas on her arms and legs with surgical oncology. She will likely undergo definitive radiation for the advanced basal cell carcinomas on her right lower leg. Once her most advanced keratinocyte carcinomas have been treated, she will follow up with dermatology for surveillance, additional biopsies, and consideration of systemic chemoprevention, additional surgery, and/or field treatment for the innumerable smaller keratinocyte carcinomas.

DISCUSSION

Tanning bed use remains popular in today's society, particularly in younger populations. First exposure to tanning devices prior to age 35 significantly increases the risk for melanoma.¹⁰ Younger age at first exposure also has been shown to increase the risk of developing squamous cell carcinoma and basal cell carcinoma by 20% and 10%, respectively.¹¹

The risks of tanning bed use are widely recognized worldwide.^{12,13} Despite knowledge of these potentially severe consequences, tanning salons remain largely unregulated in the United States. In 2003, a study of 50 tanning beds in the United States found that, on average, the tanning devices studied emitted UVA rays fourfold greater and UVB rays twofold greater than midday sunlight in the summer.^{14,15} Furthermore, a reported 95% of patrons exceeded the Food and Drug Administration-recommended time limit in tanning beds, raising additional concerns for adherence to national regulations at tanning salons.¹⁴ Multiple reviews of the literature on tanning devices and their association with the development of melanoma and non-melanoma skin cancers supports a complete ban of indoor tanning. Physicians play a critical role for primary prevention of this common practice. It remains imperative for dermatologists and primary care physicians to educate patients—particularly young females at greatest risk—on the potential severe skin cancer consequences of both indoor tanning and natural sun exposure.

CONCLUSIONS

Tanning beds can have catastrophic effects on skin health. This case highlights a severe case of melanoma and keratinocyte carcinoma burden in a patient with extensive history of tanning bed use. A shift from secondary to primary prevention of skin cancer is imperative—particularly for young populations.⁵ Several organizations currently are focused on educating American youth about

the dangers of tanning beds and advocating for legislative change surrounding this topic.^{5,6} In addition to these impactful programs, highlighting patient presentations of the severity of skin cancer that can result from chronic tanning device use provides an avenue to convey the significant negative consequences of this addictive behavior.

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