

# Margin Size for Unique Skin Tumors Treated With Mohs Micrographic Surgery: A Survey of Practice Patterns

Frances M. Walocko, MD, MEng; Christian Carr, MPH; Divya Srivastava, MD; Rajiv I. Nijhawan, MD

## PRACTICE POINTS

- It is common for initial margin size for uncommon skin tumors to be larger than the 1 to 3 mm commonly used in Mohs surgery for basal cell carcinomas and less aggressive squamous cell carcinomas.
- Mohs surgeons commonly take larger starting and subsequent margins for uncommon skin tumors treated on the trunk and extremities compared with the head and neck.

Mohs micrographic surgery (MMS) has shown lower recurrence rates for unique skin tumors compared with wide local excision, but there is a lack of standardization on margin size. We aimed to assess MMS practice patterns of margin sizes for unique skin tumors. A survey was distributed to members of the American College of Mohs Surgery (ACMS). Demographic information on participants was collected in addition to initial/subsequent MMS margin size for unique skin tumors, including dermatofibrosarcoma protuberans (DFSP), atypical fibroxanthoma (AFX), melanoma, sebaceous carcinoma, microcystic adnexal carcinoma (MAC), poorly differentiated squamous cell carcinoma (SCC), and Merkel cell carcinoma. Eighty-seven respondents completed the survey (response rate <10%). Given that no guidelines exist on MMS margins for less commonly treated skin tumors, this study helps give Mohs surgeons perspective on current practice patterns for margin sizes. Mohs surgeons are more likely to take larger initial margins for these common skin tumors compared with BCCs or SCCs.

*Cutis.* 2022;110:E21-E24.

Mohs micrographic surgery (MMS) is most commonly used for the surgical management of squamous cell carcinomas (SCCs) and basal cell carcinomas (BCCs) in high-risk locations. The ability for 100% margin evaluation with MMS also has shown lower recurrence rates compared with wide local excision for less common and/or more aggressive tumors. However, there is a lack of standardization on initial and subsequent margin size when treating these less common skin tumors, such as dermatofibrosarcoma protuberans (DFSP), atypical fibroxanthoma (AFX), and sebaceous carcinoma.

Because Mohs surgeons must balance normal tissue preservation with the importance of tumor clearance in the context of comprehensive margin control, we aimed to assess the practice patterns of Mohs surgeons regarding margin size for these unique tumors. The average margin size for each Mohs layer has been reported to be 1 to 3 mm for BCC compared with 3 to 6 mm or larger for other skin cancers, such as melanoma in situ (MIS).<sup>1-3</sup> We hypothesized that the initial margin size would vary among surgeons and likely be greater for more aggressive and rarer malignancies as well as for lesions on the trunk and extremities.

## Methods

A descriptive survey was created using SurveyMonkey and distributed to members of the American College of Mohs Surgery (ACMS). Survey participants and their responses were anonymous. Demographic information on survey participants was collected in addition to initial

From the Department of Dermatology, The University of Texas Southwestern Medical Center, Dallas.

The authors report no conflict of interest.

Correspondence: Rajiv I. Nijhawan, MD, Department of Dermatology, The University of Texas Southwestern Medical Center, 5939 Harry Hines Blvd, Ste 400, Dallas, TX 75390 (Rajiv.Nijhawan@utsouthwestern.edu).

doi:10.12788/cutis.0633

**Most Common Initial and Subsequent Mohs Margin Sizes for Unique Skin Tumors**

Tumor type	Initial tumor margin on head and neck <sup>a</sup>		Subsequent tumor margin on head and neck <sup>a</sup>		Initial tumor margin on trunk and extremities <sup>b</sup>		Subsequent tumor margin on trunk and extremities <sup>b</sup>	
	Most common	Second most common	Most common	Second most common	Most common	Second most common	Most common	Second most common
DFSP								
Margin, mm	>9	4-6	4-6	1-3	>9	4-6	4-6	>9
No. of respondents (%)	22 (39.2)	21 (37.5)	30 (54.5)	16 (29.1)	25 (53.2)	13 (27.7)	26 (54.2)	12 (25.0)
AFX								
Margin, mm	1-3	4-6	1-3	4-6	4-6	1-3	4-6	1-3
No. of respondents (%)	36 (54.5)	21 (31.8)	46 (70.8)	18 (27.7)	27 (60.0)	10 (22.2)	23 (51.1)	19 (42.2)
MIS								
Margin, mm	4-6	7-9	1-3	4-6	4-6	7-9	4-6	1-3
No. of respondents (%)	36 (76.6)	8 (17.0)	26 (56.5)	20 (43.5)	20 (69.0)	7 (24.1)	16 (57.1)	10 (31.6)
Melanoma ≤1.0-mm deep <sup>c</sup>								
Margin, mm	>9	4-6	4-6	1-3	>9	7-9	NA <sup>d</sup>	NA <sup>d</sup>
No. of respondents (%)	17 (53.1)	9 (28.1)	15 (53.6)	9 (32.1)	15 (71.4)	15 (14.3)	NA <sup>d</sup>	NA <sup>d</sup>
Melanoma 1.01-2-mm deep <sup>c</sup>								
Margin, mm	>9	7-9	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>
No. of respondents (%)	13 (68.4)	4 (21.1)	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>
Sebaceous carcinoma								
Margin, mm	1-3	4-6	1-3	4-6	4-6	1-3	4-6	1-3
No. of respondents (%)	37 (56.9)	24 (36.9)	49 (77.8)	14 (22.2)	20 (47.6)	13 (31.0)	22 (55.0)	16 (40.0)
MAC								
Margin, mm	1-3	4-6	1-3	4-6	4-6	1-3	4-6	1-3
No. of respondents (%)	27 (45.8)	27 (45.8)	39 (68.4)	17 (29.8)	21 (55.3)	9 (23.7)	21 (53.9)	15 (38.5)

TABLE CONTINUED

TABLE (continued)

Tumor type	Initial tumor margin on head and neck <sup>a</sup>		Subsequent tumor margin on head and neck <sup>a</sup>		Initial tumor margin on trunk and extremities <sup>b</sup>		Subsequent tumor margin on trunk and extremities <sup>b</sup>	
	Most common	Second most common	Most common	Second most common	Most common	Second most common	Most common	Second most common
Poorly differentiated SCC								
Margin, mm	4-6	1-3	1-3	4-6	4-6	1-3	4-6	1-3
No. of respondents (%)	37 (55.2)	23 (34.3)	38 (57.6)	26 (39.4)	30 (61.2)	8 (16.3)	26 (55.3)	16 (34.0)
Merkel cell carcinoma <sup>c</sup>								
Margin, mm	4-6	>9	4-6	1-3	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>
No. of respondents (%)	14 (50.0)	9 (32.1)	13 (46.4)	11 (39.3)	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>	NA <sup>d</sup>
EMPD								
Margin, mm	4-6 <sup>c</sup>	1-3 and >9 <sup>c</sup>	1-3 <sup>c</sup>	4-6 <sup>c</sup>	4-6	>9	4-6	1-3
No. of respondents (%)	18 (58.1) <sup>c</sup>	5 (7.35) and 5 (7.35) <sup>c</sup>	18 (54.6) <sup>c</sup>	10 (30.3) <sup>c</sup>	16 (57.1)	5 (46.2)	11 (40.7)	8 (29.6)
Leiomyosarcoma <sup>c</sup>								
Margin, mm	4-6	1-3	1-3 and 4-6	4-6	4-6	7-9 and >9	4-6	1-3
No. of respondents (%)	18 (54.5)	7 (21.2)	16 (48.5) and 16 (48.5)	10 (28.6)	13 (52.0)	5 (20.0) and 5 (20.0)	11 (47.8)	8 (34.8)
EMPSGC								
Margin, mm	1-3	4-6	1-3	4-6	4-6 <sup>c</sup>	7-9 <sup>c</sup>	4-6 <sup>c</sup>	1-3 <sup>c</sup>
No. of respondents (%)	15 (42.9)	14 (40.0)	14 (68.6)	10 (28.6)	12 (48.0) <sup>c</sup>	5 (20.0) <sup>c</sup>	13 (52.0) <sup>c</sup>	10 (40.0) <sup>c</sup>

Abbreviations: AFX, atypical fibroxanthoma; DFSP, dermatofibrosarcoma protuberans; EMPD, extramammary Paget disease; EMPSGC, endocrine mucin-producing sweat gland carcinoma; MAC, microcystic adnexal carcinoma; MIS, melanoma in situ; SOC, squamous cell carcinoma.

<sup>a</sup>N=68 for margin size on head and neck. The denominator of each tumor may be different because the number of surgeons who treated each cancer was variable by tumor type, location, and initial/subsequent margin.

<sup>b</sup>N=52 for margin size on trunk and extremities. The denominator of each tumor may be different because the number of surgeons who treated each cancer was variable by tumor type, location, and initial/subsequent margin.

<sup>c</sup>Less than 50% total respondents for the specific tumor (EMPD only head and neck; EMPSGC only trunk and extremities).

<sup>d</sup>Fewer than 10 respondents.

and subsequent MMS margin size for DFSP, AFX, MIS, invasive melanoma, sebaceous carcinoma, microcystic adnexal carcinoma (MAC), poorly differentiated SCC, Merkel cell carcinoma, extramammary Paget disease, leiomyosarcoma, and endocrine mucin-producing sweat gland carcinoma. Survey participants were asked to choose from a range of margin sizes: 1 to 3 mm, 4 to 6 mm, 7 to 9 mm, and greater than 9 mm. This study was approved by the University of Texas Southwest Medical Center (Dallas, Texas) institutional review board.

## Results

Eighty-seven respondents from the ACMS listserv completed the survey (response rate <10%). Of these, 58 respondents (66.7%) reported practicing for more than 5 years, and 58 (66.7%) were male. Practice setting was primarily private/community (71.3% [62/87]), and survey respondents were located across the United States. More than 50% of survey respondents treated the following tumors on the head and neck in their respective practices: DFSP (80.9% [55/68]), AFX (95.6% [65/68]), MIS (67.7% [46/68]), sebaceous carcinoma (92.7% [63/68]), MAC (83.8% [57/68]), poorly differentiated SCC (97.1% [66/68]), and endocrine mucin-producing sweat gland carcinoma (51.5% [35/68]). More than 50% of survey respondents treated the following tumors on the trunk and extremities: DFSP (90.3% [47/52]), AFX (86.4% [45/52]), MIS (55.8% [29/52]), sebaceous carcinoma (80.8% [42/52]), MAC (73.1% [38/52]), poorly differentiated SCC (94.2% [49/52]), and extramammary Paget disease (53.9% [28/52]). Invasive melanoma, Merkel cell carcinoma, and leiomyosarcoma were overall less commonly treated.

In general, respondent Mohs surgeons were more likely to take larger initial and subsequent margins for tumors treated on the trunk and extremities compared with the head and neck (Table). In addition, initial margin size often was larger than the 1- to 3-mm margin commonly used in Mohs surgery for BCCs and less aggressive SCCs (Table). A larger initial margin size (>9 mm) and subsequent margin size (4–6 mm) was more commonly reported for certain tumors known to be more aggressive

and/or have extensive subclinical extension, such as DFSP and invasive melanoma. Of note, most respondents performed 4- to 6-mm margins (37/67 [55.2%]) for poorly differentiated SCC. Overall, there was a high range of margin size variability among Mohs surgeons for these unique and/or more aggressive skin tumors.

## Comment

Given that no guidelines exist on margins with MMS for less commonly treated skin tumors, this study helps give Mohs surgeons perspective on current practice patterns for both initial and subsequent Mohs margin sizes. High margin-size variability among Mohs surgeons is expected, as surgeons also need to account for high-risk features of the tumor or specific locations where tissue sparing is critical. Overall, Mohs surgeons are more likely to take larger initial margins for these less common skin tumors compared with BCCs or SCCs. Initial margin size was consistently larger on the trunk and extremities where tissue sparing often is less critical.

Our survey was limited by a small sample size and incomplete response of the ACMS membership. In addition, most respondents practiced in a private/community setting, which may have led to bias, as academic centers may manage rare malignancies more commonly and/or have increased access to immunostains and multispecialty care. Future registries for rare skin malignancies will hopefully be developed that will allow for further consensus on standardized margins. Additional studies on the average number of stages required to clear these less common tumors also are warranted.

## REFERENCES

1. Muller FM, Dawe RS, Moseley H, et al. Randomized comparison of Mohs micrographic surgery and surgical excision for small nodular basal cell carcinoma: tissue-sparing outcome. *Dermatol Surg.* 2009;35:1349-1354.
2. van Loo E, Mosterd K, Krekels GA, et al. Surgical excision versus Mohs' micrographic surgery for basal cell carcinoma of the face: a randomised clinical trial with 10 year follow-up. *Eur J Cancer.* 2014;50:3011-3020.
3. Ellison PM, Zitelli JA, Brodland DG. Mohs micrographic surgery for melanoma: a prospective multicenter study. *J Am Acad Dermatol.* 2019;81:767-774.