

The inadequacy of punch-excised melanocytic lesions: Sampling through the block for the determination of “margins”

Timothy T. Chang, MD, Stephen C. Somach, MD, Kyle Wagamon, MD, Ally-Khan Somani, MD, PhD,
Jerome Pomeranz, MD, Christine Jaworsky, MD, Jonathan Bass, MD, Harry L. Winfield, MD,
Jessica E. Sigel, MD, and Arlene S. Rosenberg, MD
Cleveland, Ohio

Background: Dermatopathologists often are asked by clinicians to report margins on punch excisions of melanocytic lesions.

Objective: We sought to determine the adequacy of surgical margins on melanocytic lesions submitted with intention of complete excision using punch removal technique.

Methods: We conducted prospective analysis of surgical margins on 266 consecutive patients who underwent attempted complete removal of 405 melanocytic nevi submitted as punch and fusiform excisions.

Results: Of 206 nonbisected punch excisions, 127 (62%) had final positive margins. Of 159 bisected punch excisions, 76 (48%) had final positive margins. Of 40 elliptical excisions, two (5%) had final positive margins.

Limitations: Information on the perilesional rim of nonpigmented skin included in the excision was not available.

Conclusions: Of punch excisions, 56% had positive margins. Importantly, 30% of these punch excised specimens were negative on initial levels but had positive margins after extensive sectioning, affirming that fusiform excisions are the preferred method to evaluate margins in melanocytic lesions. (J Am Acad Dermatol 2009;60:990-3.)

The practice of punch excising melanocytic lesions is becoming more common. In addition to the diagnostic evaluation, pathologists are sometimes being requested to provide the evaluation of “margins.” Margin evaluation of a punch specimen is hampered by the small specimen size

and cylindric nature, thus rendering an intrinsic lack of orientation as compared with fusiform excisions.

In a recent report on the management of dysplastic nevi¹ surveying 456 fellows of the American Academy of Dermatology, 86% acknowledged an intention of complete removal when performing biopsies of clinical dysplastic nevi, with a reported 30% using margins of 1.0 mm. A prior study² indicated that some dysplastic nevi have an average subclinical lateral spread of up to 1.2 mm, raising the possibility that clinicians using margins of 1.0 mm when removing dysplastic nevi are not completely excising melanocytic lesions. Sellheyer et al,³ recently reported the results of a survey of dermatopathologists, and indicated that although clinicians often request the evaluation of margins in melanocytic lesions, there is a great deal of variability in the ways that dermatopathologists report surgical margins. The reliability of reporting margins on punch excisions needs to be re-examined and compared

From the Departments of Dermatology and Pathology, Case Western Reserve University School of Medicine, MetroHealth Medical Center.

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Reprint requests: Arlene S. Rosenberg, MD, MetroHealth Medical Center, Department of Dermatology, Case Western Reserve University School of Medicine, H567, 2500 MetroHealth Dr, Cleveland, OH 44109. E-mail: arosenberg@cleveskinpath.com.

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Table I. Initial and final margins in clinically excised melanocytic lesions

Characteristics	Fusiform (elliptical) excisions (n = 40)	Nonbisected punch excisions (n = 206)	Bisected punch excisions (n = 159)	Gross punch size of ≤ 3.0 mm (n = 114)	Gross punch size of 4.0-5.0 mm (n = 189)	Gross punch size of ≥ 6.0 mm (n = 62)
Positive initial margins	0 (0%)	62 (30%)	36 (23%)	42 (37%)	47 (25%)	9 (15%)
Negative initial and positive final margins	2 (5%)	65 (32%)	40 (25%)	31 (27%)	57 (30%)	17 (27%)
Negative initial and negative final margins	38 (95%)	79 (38%)	83 (52%)	41 (36%)	85 (45%)	36 (58%)
Total positive margins	2 (5%)	127 (62%)	76 (48%)	73 (64%)	104 (55%)	26 (42%)

with the traditional practice of fusiform excisions. This study was designed to thoroughly examine the surgical margins of punch-excised melanocytic lesions and compare the rate of positive margins with fusiform (elliptical) excisions.

METHODS

The study consists of a prospective analysis of 365 consecutive punch specimens and 40 fusiform excisions of melanocytic lesions submitted for routine histologic examination between May and December 2004. This study was granted exempt status by our institutional review board committee. Informed consent was obtained per routine clinical practice for diagnostic and treatment purposes. Six board-certified dermatopathologists were involved in the interpretation of the specimens (S. C. S., J. P., C. J., J. B., J. E. S., and A. S. R.). Inclusion criteria were melanocytic lesions submitted as intact punch specimens with the indicated clinical intent of complete removal and request for surgical margins, as specified on the requisition accompanying the specimen. When the requisition was unclear (ie, request for margins but not stated as an excision), the clinician was queried on the telephone to verify that a punch excision was performed with the clinical intent of complete removal. Intradermal nevi, desmoplastic nevi, blue nevi, congenital nevi, partially sampled nevi, borderline melanocytic lesions, and melanomas were excluded. Specimens with scars and recurrent nevi were also excluded. Nevi diagnosed as junctional, compound, and atypical/dysplastic were included. Fusiform excisions (gross size ranging from $6.0 \times 3.0 \times 3.0$ mm to $26.0 \times 17.0 \times 8.0$ mm) were inked and grossed in their usual manner by transverse sectioning at 3.0-mm intervals. Punch excisions were inked and specimens greater than 4.0 mm and less than or equal to 8.0 mm were bisected. Nonbisected punches were minimally effaced to obtain an initial superficial section of the first peripheral (oblique)

edge, a representation of a tip. Bisected specimens were effaced approximately one third into the block. Thereafter, two routine step sections were obtained for the initial evaluation of margins. For both bisected and nonbisected punches, the second step section was obtained after 10 to 12 microtome turns at a 5- μ m setting. If the margins were initially negative, additional levels (15-20 microtome turns/level) were obtained to gradually and judiciously exhaust the block. It should be noted that within the early stage of setting up the study, 3 deeper levels were used in an attempt to exhaust the block. However, the histologic changes in the sections were often abrupt with loss or diminution of the melanocytic process. These cases were not included in the study. A minimum of 5 levels with no maximum number was, thus, established with discretion given to the histotechnician to conservatively exhaust the block. The slides were examined for overt transection of the nevus at inked margins or the persistence of the nevus into minute fragments of tips. In nonbisected specimens, final minute sections, representing final tangential sections, were considered tips. Attention was given to note the continued presence of ink at the margins. Tabulated results of each specimen included the gross size, surgeon, status of bisected or not, and status of the initial versus final margins.

RESULTS

Of 206 nonbisected punch excisions (Table I), 62 (30%) had positive initial margins, 65 (32%) had negative initial but final positive margins, and 79 (38%) had negative initial and final margins. Of 159 bisected punch excisions, 36 (23%) had positive initial margins, 40 (25%) had negative initial but final positive margins, and 83 (52%) had both negative initial and final margins. The determination of final positive margins of both nonbisected and bisected specimens often required extensive nonroutine deeper levels through the paraffin block (range of

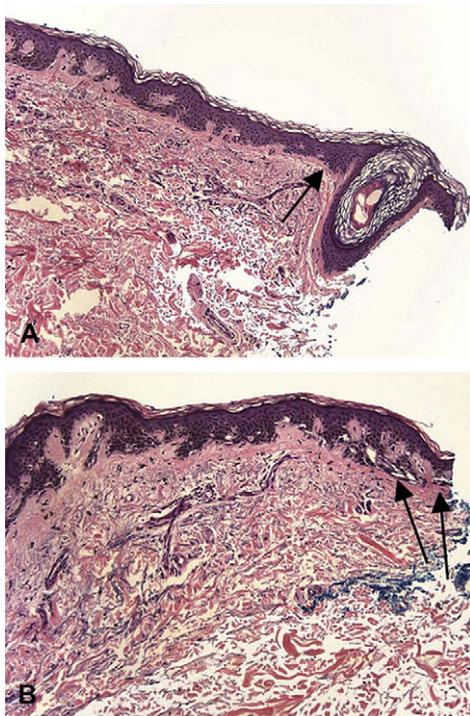


Fig 1. **A**, Nonbisected punch specimen of junctional nevus has apparently negative margins on routine deeper slide, indicated with *arrow* showing edge of melanocytic process. **B**, Additional levels (for purposes of this study) through block show that nevus does extend to peripheral edge and is transected (*arrows*). (**A** and **B**, Hematoxylin-eosin stain; original magnifications: $\times 10$.)

5-15 levels). As illustrated (Figs 1 and 2), specimens with negative initial margins unexpectedly demonstrated positive final margins. Although a minimum of 5 additional levels after routine two levels were used, often 8 to 10 additional levels were necessary to completely examine the process and reveal positive margins. Of 40 elliptical excisions, two (5%) had negative initial but final positive margins and 38 (95%) had both negative initial and final margins.

DISCUSSION

The results show a high percentage (56%) of all clinically excised punch specimens (203/365) had positive margins as compared with the fusiform excisions. Importantly, 30% of these punch-excised specimens that were negative on initial levels showed positive margins after extensive sectioning. As expected, nonbisected specimens are smaller specimens (usually <4.0 mm), and had a higher percentage of positive initial and final margins. Given the limitations of punch specimens, the results are not surprising. The circular shape of the blade used for the punch biopsy procedure creates a cylindrical specimen for which there is an infinite

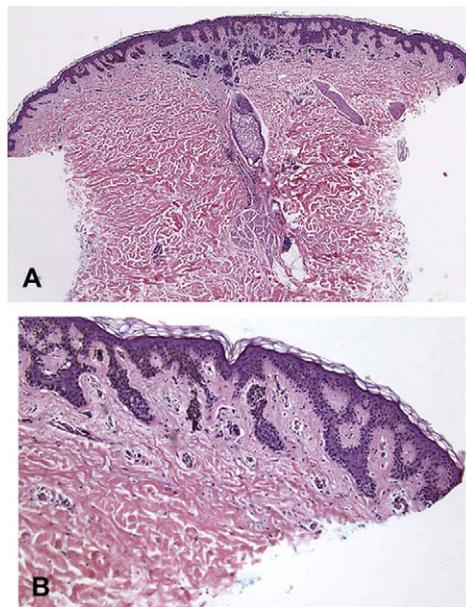


Fig 2. **A**, Nonbisected punch specimen has slightly eccentrically located compound nevus on original sections. **B**, Additional levels show transected nevus. (**A** and **B**, Hematoxylin-eosin stain; original magnifications: $\times 10$.)

number of potential planes of sectioning, thus orientation is completely arbitrary. Clinically observable pigment, although present at the time of the procedure, will fade with formalin fixation and cannot be reliably used for orientation. If there is visible pigment approaching the edge of a punch specimen, the grossing histotechnicians will judiciously bisect to facilitate examination of the melanocytic extension toward the margin. However, the true extension of the melanocytic lesion may not be pigmented and clinically apparent to the histotechnician or clinician. It is not possible to determine at the microtome on a paraffin-embedded specimen whether the pigment is near the margin (Fig 3). Current practice in most laboratories is to bisect punch specimens greater than 4.0 mm in diameter and embed in toto all smaller specimens. The procedure of facing the block with a nonbisected specimen necessitates that one third to one half of the specimen be discarded at the microtome. Hence, punch excisions with lesions that extend to the margins may not be optimally embedded to show involvement of the margin and will be potentially interpreted as "excised." Bisected specimens may offer an improved probability of uninvolved margins when a rim of nonlesional skin is included. Our results show (Table I), however, that even bisected specimens up to 8.0 mm had a significant number of positive initial margins (23%). In a recent publication based on an online survey, Sellheyer et al³ reported

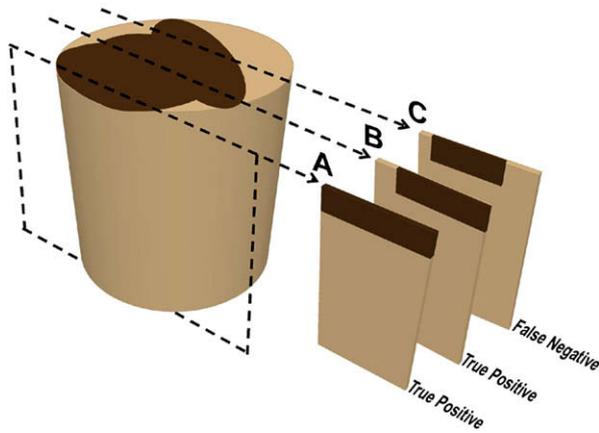


Fig 3. Parallel planes of sectioning into specimen. Non-bisected punch specimen with irregularly pigmented lesion will yield variable involvement of edges, depending on particular section viewed. Superficial section (A) will show both edges transected. Midway through punch (B), only one edge will be positive. Deepest section (C) will show excised process. Note that the plane selected for sectioning will always be a random choice in a cylindrical specimen because of the infinite number of possible tangential planes.

that 32.2% of dermatopathologists routinely comment on margins in shaved melanocytic lesions and 33.6% comment on margins in punch specimens. Although there may be a number of reasons why one will comment on margins, including that the lesion is not concerning, it is useful to know that approximately 50% of punch specimens with apparently negative margins will actually be positive on through-the-block sectioning. As shown by Sellheyer et al,³ the practice of reporting of margins on punch specimens is variable.

The acknowledged variables to this study include the individual clinician's approach to the punch excision (ie, whether only excising the pigment or including a nonpigmented margin). Although the results show that there is a slightly increased frequency of positive margins among certain clinicians, no one clinician had a perfect record of consistently

negative margins or an extremely low enough number of negative margins to be an outlier.

It must be emphasized that the amount of sectioning and number of levels necessary to determine the full extent of the lesion was time-consuming to both the histology laboratory and dermatopathology practice. Routine exhaustion of the block is impractical, orientation is arbitrary even when a specimen is bisected, and the involved margin may be unwittingly removed when the block is faced at the microtome, before obtaining sections for the slide (Fig 3). As stated earlier, greater than 5 levels (in addition to the first 3) are often required to exhaust the tissue block. Thus, many positive margins in punch-excised specimens are not observed in a routine dermatopathology practice. One may argue that if the nevus is benign, there is no harm in interpreting a margin as clear, even if exhaustive sectioning through the block might have revealed a positive margin. However, reporting a clear margin within a punch specimen falsely suggests to the clinician that it is possible to adequately evaluate margins in this type of specimen.

The results of this study are not presented with a recommendation by the authors to perform through-the-block examination. In the clinical setting, it may be difficult to perform a fusiform excision when evaluating concerning melanocytic lesions, especially given the convenience of the punch biopsy. However, the clinician should be aware that an accurate assessment of surgical margins on punch specimens is incongruous with the nature of the specimen.

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