

The Vanishing Biopsy: The Trend Toward Smaller Specimens

Emmy M. Fernandez, MD; Thomas Helm, MD; Michael Ioffreda, MD; Klaus F. Helm, MD

Dermatopathologists have noted an increased number of smaller biopsy specimens. Our objective was to determine whether dermatologists are changing their choice of biopsy technique and the size of biopsy specimens. We conducted a retrospective study of 500 biopsies performed by dermatologists for the purpose of diagnosis in 1988, 1993, 1998, and 2003. Our study results indicate that dermatologists are performing fewer punch biopsies and more shave biopsies. What's more, there has been a decrease in the size of shave biopsy specimens. We believe that the decreased number of punch biopsies being performed combined with the decreased size of shave biopsy specimens may affect patient care.

Cutis. 2005;76:335-339.

A skin biopsy may be performed for either therapeutic reasons or to aid in the diagnosis of cutaneous diseases. Edward Keyes¹ adapted the punch biopsy technique in 1887. During the 1930s, Buhmann² first used the shave biopsy method to acquire cutaneous samples for epidermal metabolism research; this technique was not popularized for clinical use until 1974, when Kopf and Popkin³ advocated its use. In 1995, the shave biopsy technique was modified by the introduction of a flexible, disposable, "adaptor-designed" instrument that replaced the traditional scalpel or razor blade.⁴ Due to the dynamic nature of dermatology, we wanted to evaluate trends in the dermatologists'

choice of biopsy technique and the size of the resultant biopsy specimen.

Materials and Methods

A retrospective review of pathology reports was conducted at the Pennsylvania State Milton S. Hershey Medical Center, with approval by the institutional review board. Using the CoPathPlus[®] Anatomic Pathology database and archived pathology data, we analyzed 500 pathology reports of randomly selected skin biopsies performed by academic and private practice dermatologists in 1988, 1993, 1998, and 2003. Both punch and shave biopsy specimens were included in the study; excisional specimens were excluded, as were punch and shave biopsies that were performed for therapeutic rather than diagnostic intent (eg, biopsies performed to remove indubitable seborrheic keratoses, typical nevi, or acrochordons).

A total of 500 pathology reports—125 consecutive biopsies from each of the 4 study years—were analyzed. Data were recorded regarding the year each biopsy was performed, each specimen's location on the body (ie, head, extremities, trunk, genitalia), and each patient's gender and age. Data also were compiled regarding the diagnostic clinical impression of the dermatologist, the final diagnosis of the dermatopathologist, and the type of biopsy (punch or shave). For punch biopsy specimens, we recorded the punch diameter as it was described in the pathology report. For shave biopsy specimens, the volume was calculated and recorded based on the dimensions described in the gross description in the pathology report. Comparisons were made among each of the 4 study years regarding type of biopsy performed, specimen size, specimen location on the body, and patient gender and age. Due to the presence of outliers when analyzing the size of the shave biopsy specimens, a trimmed mean was

Accepted for publication March 1, 2005.

Drs. Fernandez, Ioffreda, and K.F. Helm are from Pennsylvania State Milton S. Hershey Medical Center, Hershey. Dr. T. Helm is from the State University of New York at Buffalo.

The authors report no conflict of interest.

Reprints: Klaus F. Helm, MD, Pennsylvania State Milton S. Hershey Medical Center, 500 University Dr, Hershey, PA 17033 (e-mail: khelm@psu.edu).

employed that excluded 5% of the largest and 5% of the smallest biopsy specimens from each study year. The trimmed mean among specimens was compared for statistical significance using a 1-tailed test ($P=.05$) in all 4 study years.

Results

The Table displays the makeup of all 500 pathology reports and the distribution of these characteristics according to each of the 4 study years. Of the

total reports analyzed, 224 (44.80%) were from academic-based dermatologists, and 276 (55.20%) were from dermatologists in private practice. In all, 161 (32.20%) reports were on the punch biopsy method, and 339 (67.80%) were on the shave technique.

In 1988, 63.20% of the biopsies analyzed were punch biopsies, whereas in 2003, only 22.40% were of the punch type. Although punch biopsies were preferred in 1988, the trend in 2003 favored

Comparison of Skin Biopsies

	1988 (n=125)	1993 (n=125)	1998 (n=125)	2003 (n=125)	Total (N=500)
Type of dermatologist, n (%)					
Academic	25 (20.00)	80 (64.00)	64 (51.20)	55 (44.00)	224 (44.80)
Private practice	100 (80.00)	45 (36.00)	61 (48.80)	70 (56.00)	276 (55.20)
Type of biopsy, n (%)					
Punch	79 (63.20)	39 (31.20)	15 (12.00)	28 (22.40)	161 (32.20)
Shave	46 (36.80)	86 (68.80)	110 (88.00)	97 (77.60)	339 (67.80)
Punch biopsy size					
Mean, mm	3.58	4.08	3.33	3.43	3.67
Mode, mm	3.00	2.00	3.00	3.00	3.00
2 mm, n (%)	7 (8.86)	16 (41.03)	2 (13.33)	3 (10.71)	28 (17.39)
3 mm, n (%)	38 (48.10)	6 (15.38)	8 (53.33)	14 (50.00)	66 (40.99)
4 mm, n (%)	26 (32.91)	12 (30.77)	2 (13.33)	7 (25.00)	47 (29.19)
5 mm, n (%)	3 (3.80)	1 (2.56)	2 (13.33)	4 (14.29)	10 (6.21)
6 mm, n (%)	1 (1.27)	3 (7.69)	1 (6.67)	0	5 (3.11)
7 mm, n (%)	2 (2.53)	1 (2.56)	0	0	3 (1.86)
8 mm, n (%)	2 (2.53)	0	0	0	2 (1.24)
Trimmed mean of shave biopsy volume, mm ³					
	65.00	38.89	35.58	33.90	37.67
Body location, n (%)					
Head	50 (40.00)	61 (48.80)	68 (54.40)	59 (47.20)	238 (47.60)
Extremities	47 (37.60)	36 (28.80)	20 (16.00)	40 (32.00)	143 (28.60)
Trunk	24 (19.20)	27 (21.60)	36 (28.80)	25 (20.00)	112 (22.40)
Genitalia	4 (3.20)	1 (0.80)	1 (0.80)	1 (0.80)	7 (1.40)
Patients, n (%)					
Male	59 (47.20)	62 (49.60)	74 (59.20)	69 (55.20)	264 (52.80)
Female	66 (52.80)	63 (50.40)	51 (40.80)	56 (44.80)	236 (47.20)
Mean age±SD, y	52.22±20.63	56.68±19.65	60.80±16.69	60.11±16.53	57.46±18.72
Median age, y	58	61	65	62	62

shave biopsies (Figure 1). Biopsies performed by dermatologists in both academic and private practices followed this tendency.

The mean size of all punch biopsy specimens analyzed was 3.67 mm, with a mode of 3 mm. There was no significant change in the size of the punch biopsy specimen over the 16-year study period.

The trimmed mean of the shave biopsy specimen volume for all 339 shave biopsies analyzed was 37.67 mm³. The trimmed mean of the biopsies performed by dermatologists in academic and private practices was 35.47 mm³ and 38.33 mm³, respectively. This difference was not significant. From 1988 until 2003, the trimmed mean of shave biopsy volume declined from 65.00 mm³ to 33.90 mm³ (Figure 2). The difference between the trimmed mean of the shave biopsies performed in 1988 compared with those performed in 1993, 1998, and 2003 was significant ($P < .05$ on all comparisons). Although the size of the biopsy specimens continued to decline each year, there was no significant difference between the trimmed mean of those performed in 1993 and 1998 or in 1998 and 2003. There was no significant difference between the trimmed mean of biopsies performed by dermatologists in academic versus private practices.

In each of the 4 study years, biopsy specimens were most frequently taken from the head. There was no statistical significance between the study years regarding the number of biopsies performed for growths versus rashes.

Comment

Dermatology is an ever-changing field. As the discipline continues to evolve, certain practices will fade and others will grow. We identified a trend of increased use of the shave biopsy technique and decreased biopsy specimen size. Although we did not attempt to identify a cause for this trend, we did speculate about some of the factors that may have influenced the decrease in biopsy specimen size over the 16-year study period. Dermatology is influenced by physicians, patients, administrators, consultants, and health insurance providers. Although the physician executes the biopsy, the other parties may affect how skin biopsies are performed.

Our society is becoming increasingly conscious about aesthetics, and, in recent years, dermatology has mirrored the increased emphasis on cosmetics. The overall number of surgical and nonsurgical cosmetic procedures increased 228% from 1997 to 2002.⁵ The growing concern of patients regard-

ing their appearance may sway physicians toward obtaining smaller biopsies in an attempt to minimize scarring. Choosing to perform a shave biopsy rather than a punch biopsy also may be cosmetically driven. When introducing the shave biopsy for clinical use in 1974, Kopf and Popkin³ advocated that this method yielded "good to excellent cosmetic results" and obliterated the potential for "stitch marks" that may be left by sutured punch biopsy sites.

Pressure from administrators and health insurance providers also may be influencing dermatologists to choose the shave technique. The need to see more patients in less time may cause dermatologists to prefer faster and more efficient procedures; the shave biopsy can be performed quickly and requires less equipment than the punch method.³ Larger punch biopsy specimens may require sutures that necessitate follow-up care for suture removal. Because of the speed with which the shave biopsy can be performed and the minimal equipment required, this method allows dermatologists to practice with the efficiency that the market demands.

In general, punch biopsies should be performed when it is suspected that the pathology lies in the dermis or subcutaneous fat. A shave biopsy is adequate for diagnosis when the epidermis or superficial dermis is the locale of the disease process. Exophytic growths also may be aptly sampled by a shave biopsy.⁶

The trend toward small shave biopsy specimens may be beneficial because it provides improved cosmetic outcomes and saves time. However, does diagnostic acumen decrease as biopsy specimen sizes shrink? A 1996 study by Todd et al⁷ compared the diagnostic accuracy of a 2-mm punch biopsy with a standard elliptical excision. In 79 of the 84 cases studied, the 2-mm punch biopsy and the excision both reached the same histopathologic diagnosis. However, in 5 cases (ie, 1 squamous cell carcinoma, 1 seborrheic keratosis, 1 erythema multiforme, 2 hemangiomas), only the ellipse biopsy was diagnostic.⁷ A study by Russell et al⁸ compared the accuracy of the punch versus the shave biopsy technique in diagnosing basal cell carcinoma subtypes. The analysis of basal cell carcinoma specimens from both punch and shave biopsies had equivalent accuracy of diagnosis.⁸ Somach et al⁹ found that accurate diagnosis of melanoma on sun-damaged skin frequently was not possible with small biopsy specimens. Swanson et al¹⁰ argued that punch biopsies are not adequate in diagnosing melanoma and proposed that excisional biopsies are preferable to ensure that the base of the tumor is included.

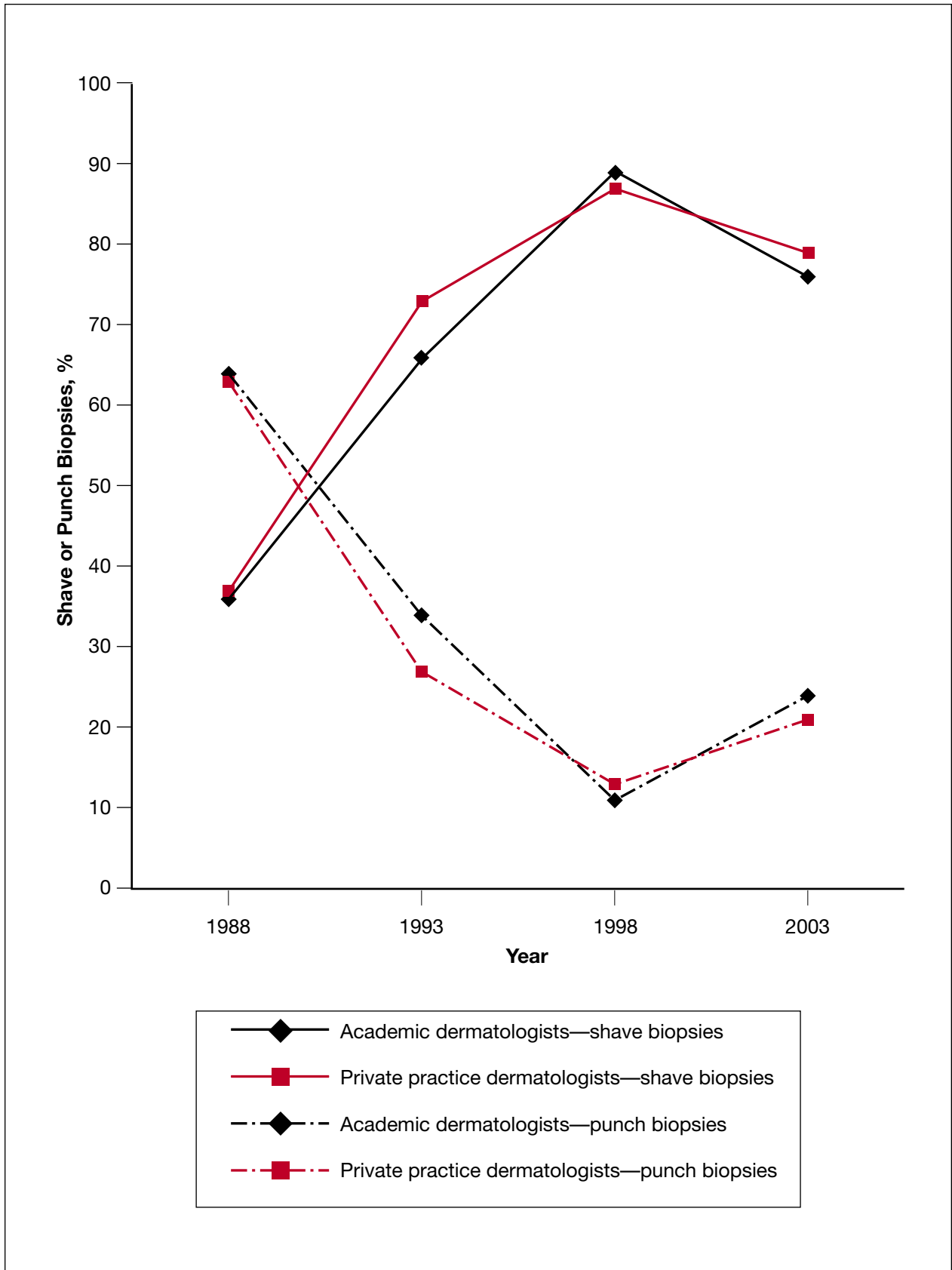


Figure 1. Percentage of punch and shave biopsies performed during the 16-year study period among dermatologists in academic and private practices.

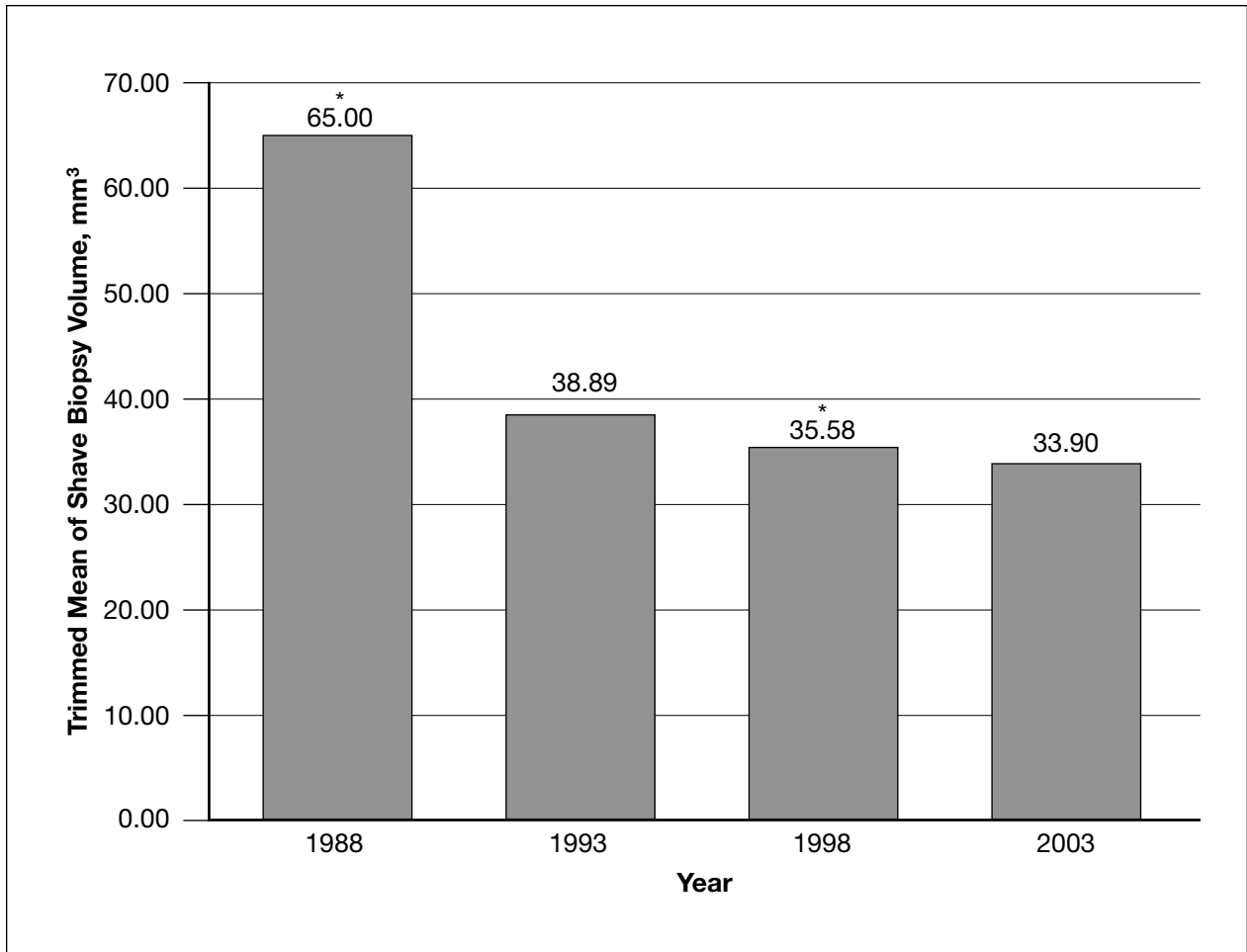


Figure 2. Trimmed mean of shave biopsy volume in specimens reported during the 16-year study period. Asterisk indicates $P < .05$ vs all other study years.

In conclusion, as dermatologists attempt to optimize the quality of patient care, the trend of decreasing biopsy specimen size should be monitored. To our knowledge, there are no published studies regarding sampling error rates in skin biopsy results. However, we suspect that definitive diagnosis may become increasingly difficult as the size of biopsy specimens continues to get smaller.

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