



Comparison between one-needle technique versus two-needle technique for bone marrow procedure

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Introduction

The traditional method for obtaining a bone marrow specimen involves using two needles and two separate sites for aspirate and biopsy collection. Anecdotal observations and trials have suggested though that utilizing a single-needle and a single site technique may offer procedural simplicity and minimize patient's discomfort. However, there is concern that the one-needle technique may yield a suboptimal bone marrow specimen. The present study evaluates the quality of biopsy specimens obtained by the two sampling techniques. If the one-needle technique yields a bone marrow specimen quality comparable to the one obtained from the two-needle technique, it may be considered a more desirable collection method.

MATERIALS AND METHODS

The two-needle technique is performed as previously described. In the one-needle technique, the biopsy is collected by advancing the same needle used in aspiration by another 1.00 cm. We retrospectively compared 20 bone marrow specimens (core biopsies and clot sections of the aspirate) obtained with one-needle technique to 20 biopsies done with two-needle technique. We measured the length and cellularity of bone marrow biopsy, cellularity of aspirate clot, and evaluated the overall morphological quality of biopsy. The impact of the specimen quality on final diagnosis was assessed as present or absent. Results of each measure and evaluation were then compared between two sets of cases.

RESULTS

Bone marrow biopsies obtained by the single-needle technique were similar in length (mean 0.99 cm) to biopsies obtained by the two-needle technique (mean 1.16 cm). The difference in clot cellularity and biopsy cellularity was also similar, mean 11.65%, by the single-needle technique versus 10.6% by the two-needle technique. There is no statistically significant difference between the biopsy and clot cellularity of both sets of cases. There was also no significant difference in overall morphological quality of biopsies. Although minimal crush and aspiration artifact was occasionally noted in biopsies obtained by the one-needle technique, no impact on final diagnosis was found in any case.



Fig.1

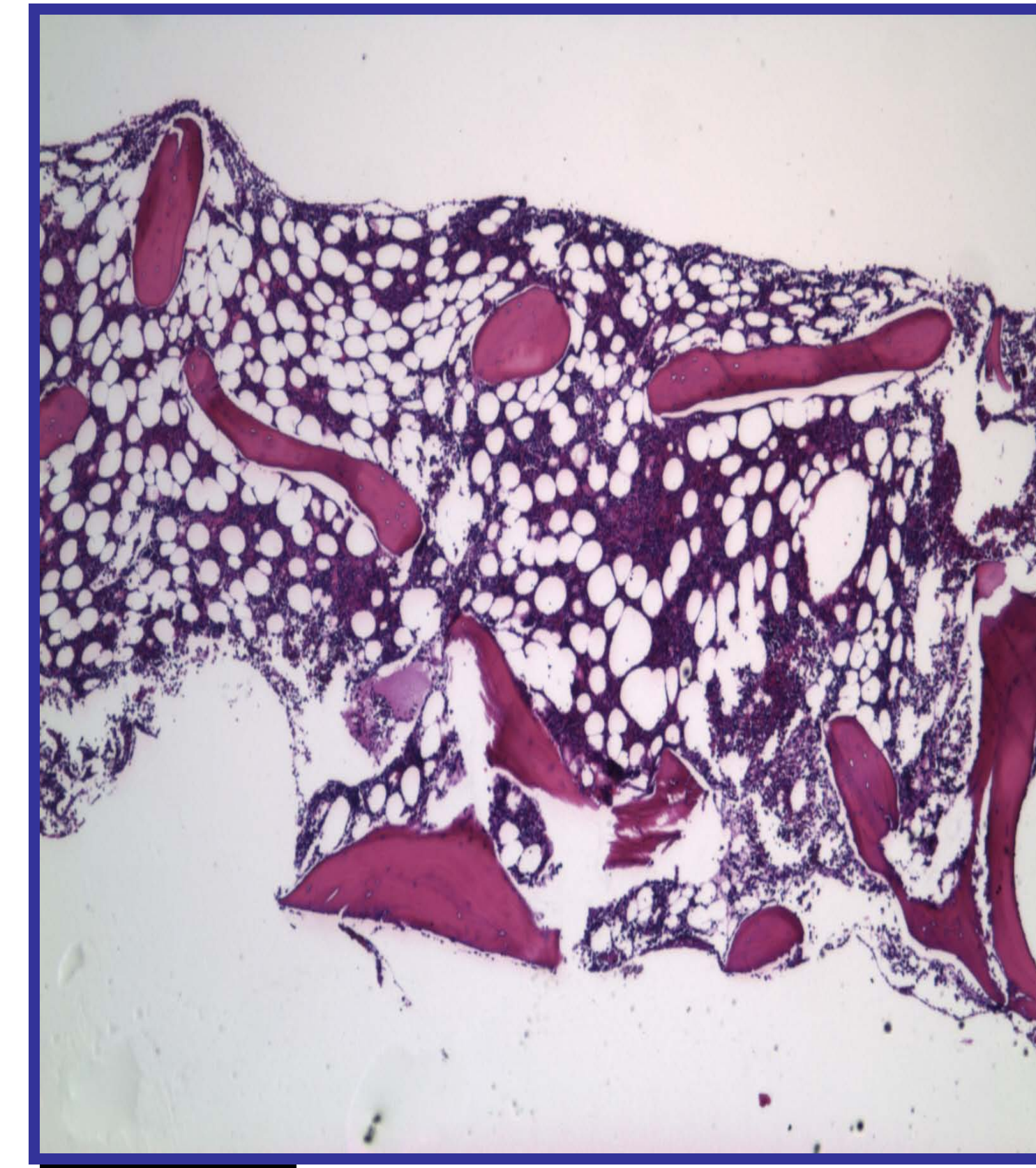


Fig.2A

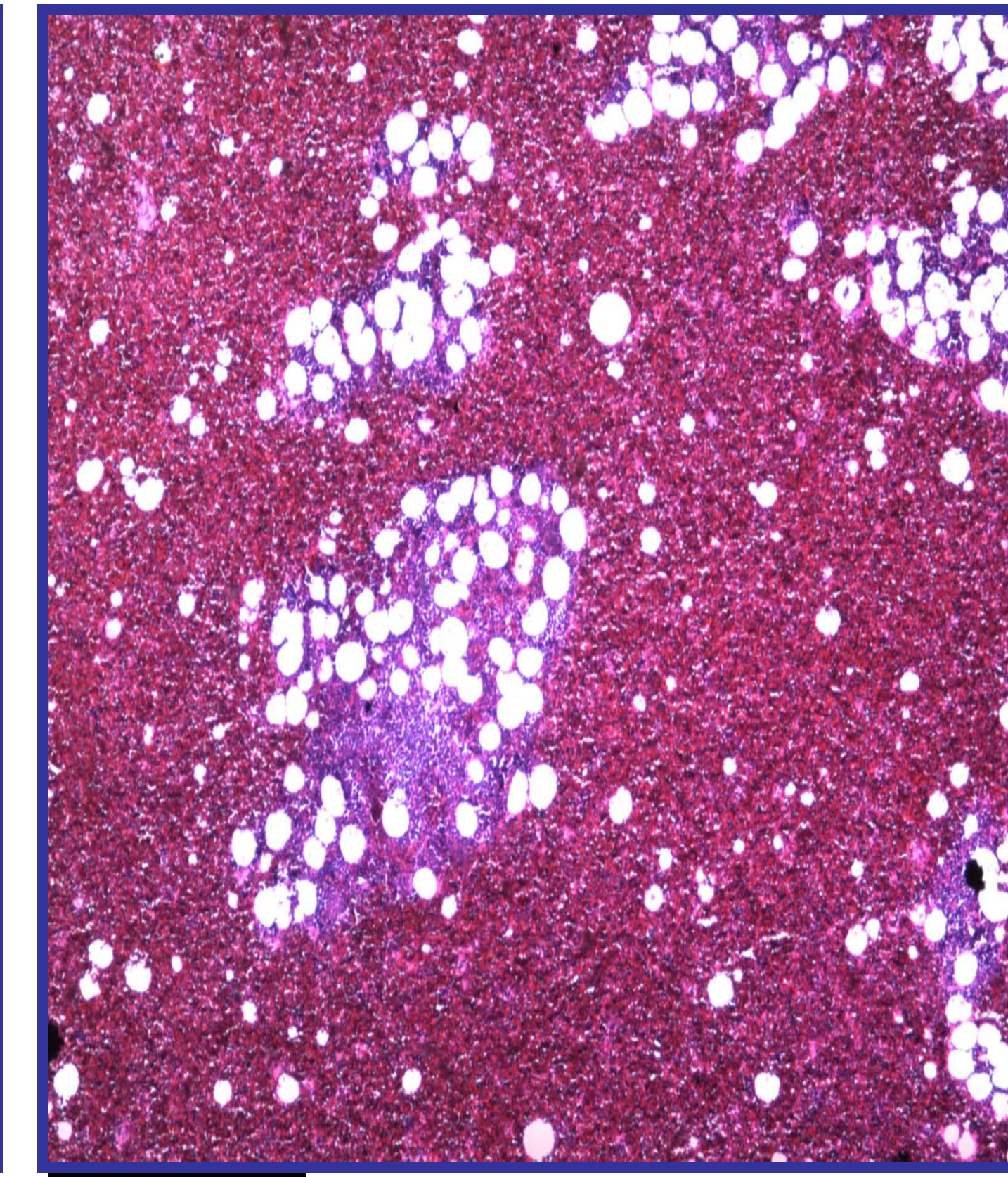


Fig. 2B

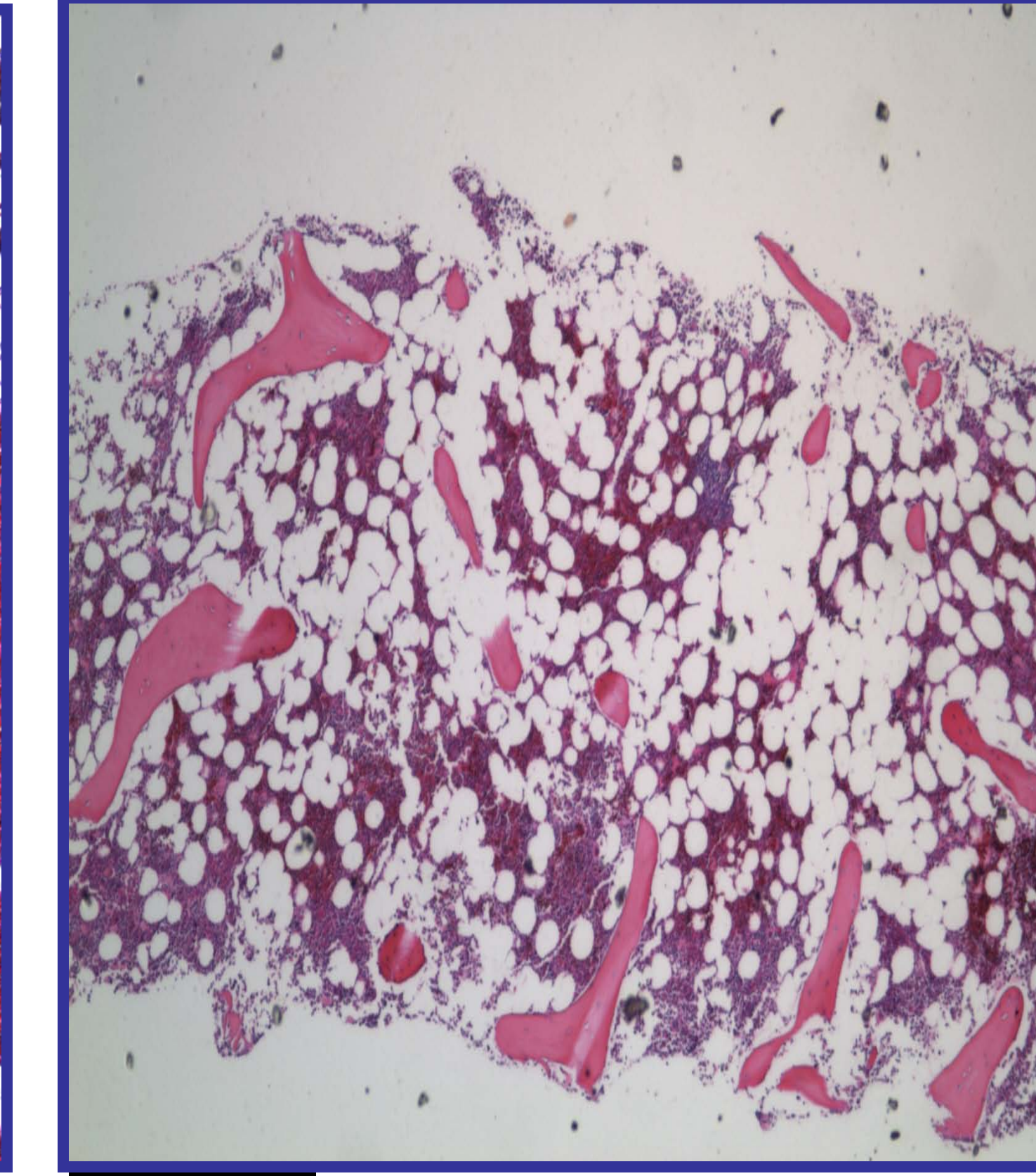


Fig. 3A

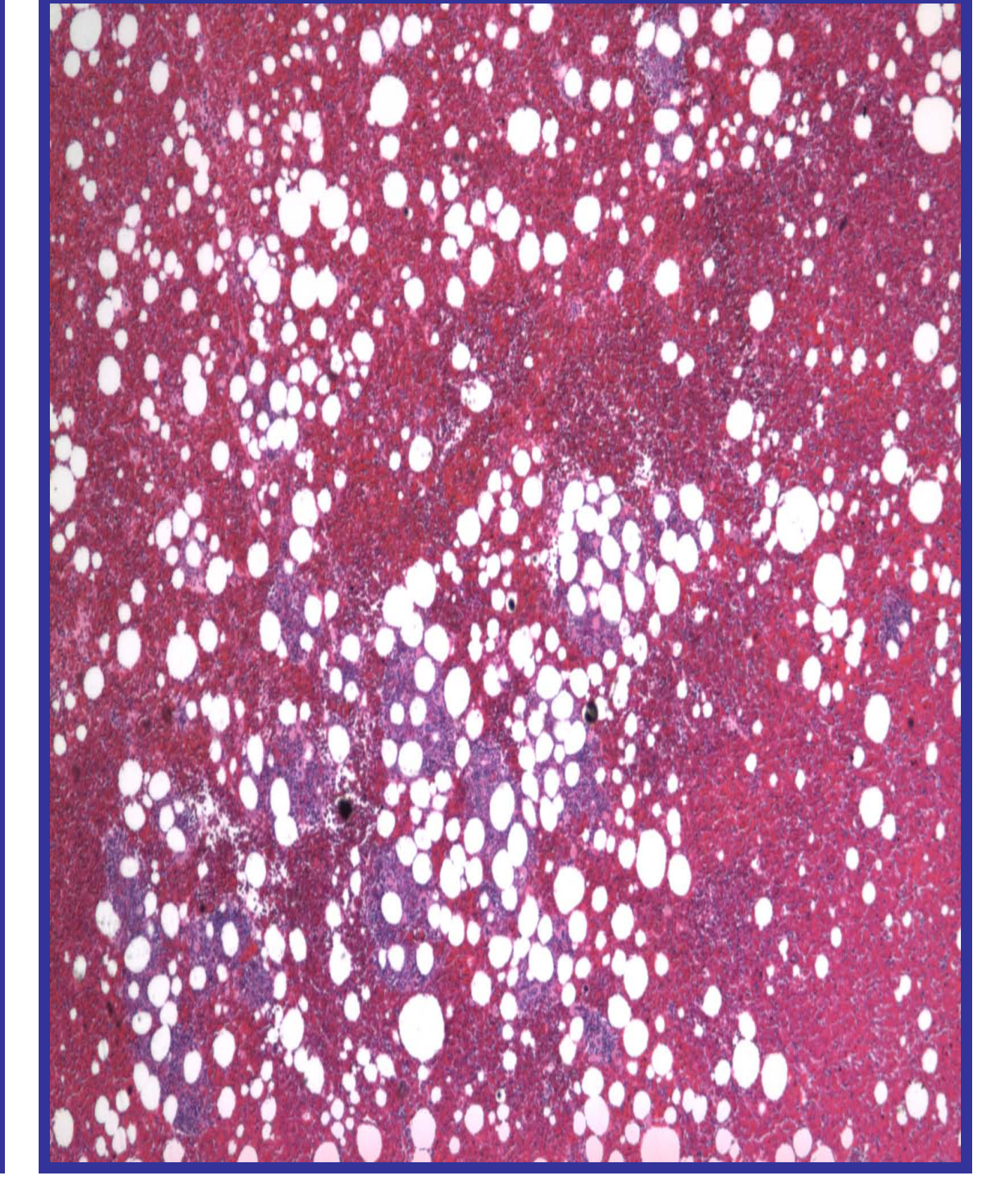


Fig.3B

Fig 1: Bone marrow biopsy/aspiration needle kit. **Fig.2 A:** Light microscope examination of a core bone marrow biopsy obtained with a single-needle technique (hematoxylin and eosin stain; 4X). **Fig. 2B:** Light microscope examination of a clot aspirate section obtained with a single-needle technique (hematoxylin and eosin stain; 5X). **Fig.3A:** Light microscope examination of a core bone marrow biopsy obtained with a two-needle technique (hematoxylin and eosin stain; 5X). **Fig.3B:** Light microscope examination of a clot with a two-needle technique (hematoxylin and eosin stain; 5X).

STATISTICAL ANALYSIS

	Mean difference in cellularity between clot and core biopsy (%)	Standard deviation of the difference in cellularity	The mean of the length of the core biopsy (cm)	Standard deviation of the length of the core biopsy
Single-needle technique	11.65	9.99	0.99	0.31
Two-needle technique	10.60	12.20	1.17	0.45

Table 1 : The mean and standard deviation of “Difference in cellularity between clot and core biopsy” and “Length of core biopsy”) in both techniques. Further t-tests show that there is no statistically significant difference between the two sets of bone marrows for each of these two parameters (2-tailed t-test, p< 0.001).

CONCLUSIONS

To our knowledge, this is the first systematic comparison study of multiple parameters of marrow specimens obtained by the traditional two-needle technique for bone marrow collection versus the one-needle technique. The latter yielded bone marrow biopsy and aspirate with comparable measurements and similar quality to those obtained by the traditional method. These findings, together with potential reduction in duration of the procedure, less amount of injury to the bone cortex, and decreased patient's discomfort, make the single-needle technique a more preferable bone marrow collection method.

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