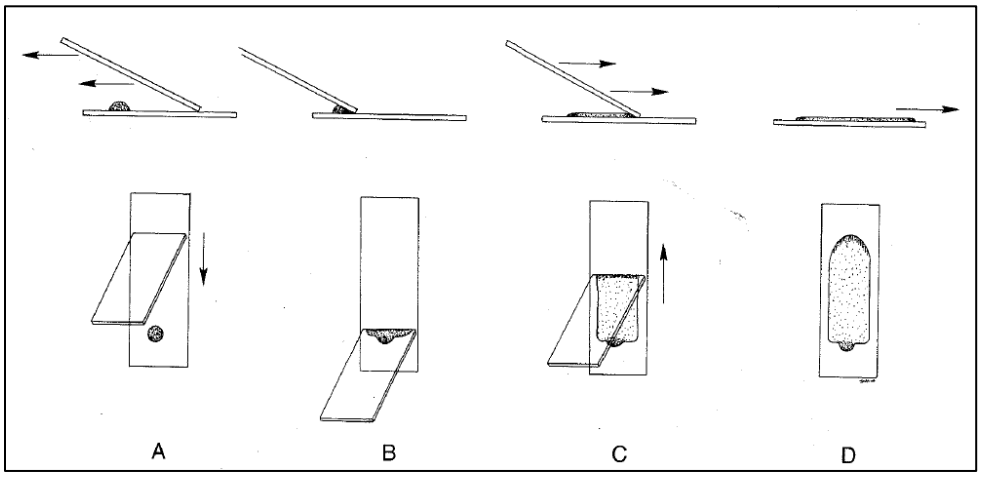
The Joint Pathology Center

A well-prepared blood smear can be a tremendous asset to the intrepid clinician. Even the most up-to-date hematology analyzers are no match for a diagnostic hematologist. Accurate differential cell counts, cell morphology abnormalities, hemoparasites, neoplastic cells, and a host of other changes can be identified using an adequate blood smear. The following guidelines have been developed to assist the clinician in proper technique, slide preparation, and sample shipping.

Slide preparation:

1. Sample should be: collected in an EDTA or heparin (preferred in some exotic species) tube, free of clots, and room temperature
2. Wipe off all slides you are going to use (including the smear slide) to remove any particles that could ruin your smear
3. Gently roll the tube between your hands or place on a rocker to mix the sample (do not shake or invert the tube)
4. Transfer the blood from the tube to the slide using a microhematocrit tube; allow blood to fill by capillary action keeping one finger over the opposite end of the tube to prevent blood from spilling out
5. Allow a 4mm drop (maximum) of blood to fall on one end of the slide (do not tap the slide with the microhematocrit tube)
6. Hold the spreader slide at a 30-45 degree angle (see figure A) and gently back it onto the drop of blood
7. Once the drop has spread along the edge of the spreader slide via capillary action, push the spreader slide forward in a smooth motion (see figures B and C)
8. Apply only enough pressure to keep the spreader slide on the glass (too much pressure will not allow for good monolayer formation)
9. A well-made blood smear (see figures D and E) looks like a thumb-print with a grossly apparent feathered edge, a monolayer (for examining blood cells), and dense body (which tends to show rouleaux and agglutination)
10. Allow the slide to air dry completely; NEVER HEAT FIX A SLIDE.



The Joint Pathology Center

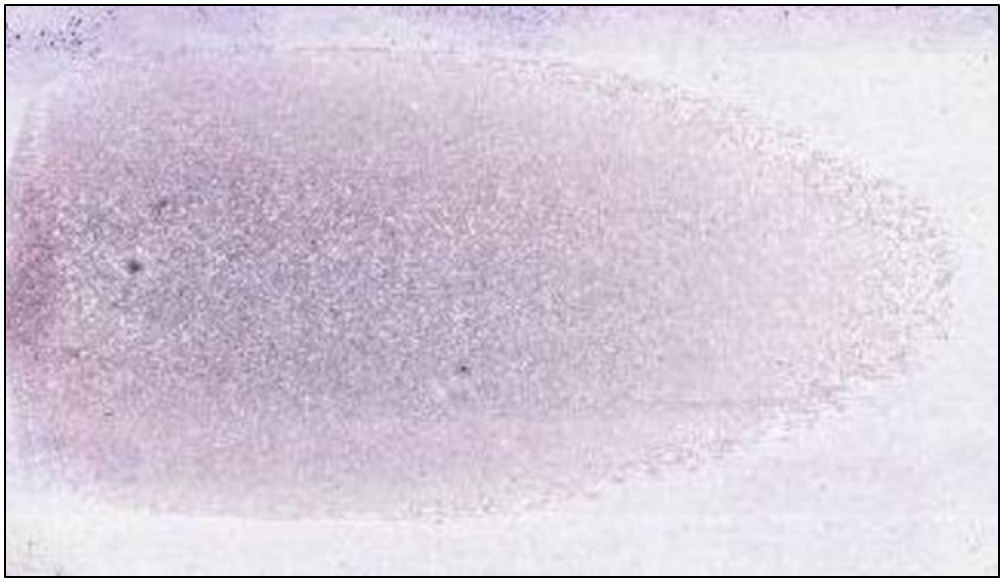


Figure E: a well-made blood smear

Evaluating the slide for quality:

1. Smear is smooth, no ripples due to jerky movement
2. Holes do not appear in the blood smear (may see holes if the sample is lipemic)
3. Extends at least 2/3's of the slide
4. Smear is spread across (side to side) both sides of the slide to the edge
5. Rainbow sheen at end of the slide (feathered edge and monolayer)
6. Smear begin 0.5 inches from the base of the slide or 4mm from the frosted edge
7. Slide is labelled with the patient identifier and type of sample (in this case, "blood film")

Sample shipping:

1. Label all slides with patient name and date (at a minimum)
2. Package slides carefully in a plastic slide box
3. Ensure there is no movement of slides during transit (pack with newspaper or paper towels)
4. Do not send cytologic specimens in the same box with formalin

Tips and tricks:

- PRACTICE, PRACTICE, PRACTICE is essential to making a good smear. Like most technical things, getting it right is very individualized (hold the base slide vs laying it on a table, getting the correct angle, practicing with anemic blood…).
- Make slides within a few hours of collection to ensure adequate cell preservation
- Only refrigerate blood if you are unable to make slides immediately
- The best slides are made from fresh (< 4 hours old) blood; **if you want JPC to review fluid slides, please prepare the slides at your clinic**

The Joint Pathology Center

References:

Blood smear basics (Dr. Jennifer A. Neel, DVM, DACVP (Clinical)). North Carolina State University CVM website. https://cvm.ncsu.edu/wp-content/uploads/2016/09/Blood-Smear-Basics-2016.pdf. Published 2016. Accessed October 28, 2019.

Meinkoth JH, Cowell RL, Tyler RD, Morton RJ. Sample collection and preparation. In: Valenciano AC, Cowell RL, eds. *Cowell and Tyler's Diagnostic Cytology and Hematology of the Dog and Cat.* 4th ed. Elsevier: St. Louis, MO; 2014:9.

Prepared by: MAJ Sarah Cudd, DVM, DACVP

18 November 2019