

After 10 years of storage, significantly fewer artifacts are seen in Film-coverslipped slides versus glass coverslipped slides

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Introduction

Common practices among U.S. clinical hospitals and reference laboratories is that slides have to be stored for a minimum of 10 years so they can be retrospectively reviewed any time, on-demand. While glass was traditionally used for coverslipping, over 3 billion slides have been coverslipped in the U.S. with Tissue-Tek[®] Coverslipping Film (Film). Based on the storage conditions of slides, artifacts may appear over time for either slides coverslipped with glass or Film, including lifting, diffusion of eosin or yellowing. Reasons for artifacts are also discussed as are methods to prevent them.

Materials & methods

- Two randomly drawn boxes with 3,294 slides in total, 1,648 slides coverslipped with Film and 1,646 slides coverslipped with glass coverslips
- The slide boxes contained a range of tissue types typical for a high-volume general reference laboratory
- Slides were stored at the laboratory's off-site storage facility, maintained at typical room temperature
- Slide review criteria included:
 - Lifting of coverslip or bubbles in the area of the tissue
 - Diffusion of eosin outside of the tissue
 - Yellowing of the stained tissue
- Specimens were coverslipped on Tissue-Tek[®] SCA[™] and Tissue-Tek Film[®] Automated Coverslippers

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Results

Glass-coverslipped slides showed significantly more artifacts than Film coverslipped slides for 2 out of the 3 review criteria, while no slides in both groups showed yellowing.



The difference in artifact occurrence between Film and Glass using Chi-Square test is significant at p = 1.5 x 10⁻⁴⁴



The difference in eosin diffusion between Film and Glass using Fisher's Exact Test is significant at p = 0.031. Fisher's Exact Test was chosen for this analysis in consideration of expected counts < 5 in some cells of the 2x2 contingency table.

Conclusions

- 99.8% (1,645 of 1,648) of Film-coverslipped slides showed no artifacts.
- More than 12% (198 of 1,646) of glass-coverslipped slides showed some form of artifact, either lifting, bubble formation or eosin diffusion.
- Stored under normal conditions, Film-coverslipped slides have significantly fewer artifacts than glass coverslipped slides after 10 years.
- It is important to ensure slide staining protocols include an adequate amount of time for dehydration and clearing before coverslipping to prevent artifacts like those observed.
- These results show that following the manufacturer's recommended storage and operating guidelines minimizes artifacts when using Film (22°C ± 3°C, relative humidity < 50%).

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