Use of Alternate Light Sources and Negative-Invert Filters
Response to Webinar Chat Questions

Thank you again to SPEX Forensics for partnering with EVAWI and sponsoring this webinar. SPEX Forensics is a manufacturer of world-class forensics products.

Can you tell the cause of petechiae? Is it strangulation vs. blunt force trauma?

Petechiae are caused by pressure, which leads to capillary rupture as evidenced by small dot-like red marks. The etiology of these can be widely varying (e.g., diving, childbirth, excessive vomiting, asphyxia, strangulation, etc.).

Strangulation is a form of blunt force trauma (not sharp force). In this instance, the instrument used to cause the petechiae hemorrhages are the hands, with compression on the neck.

What are the scientific references that support the assertion that unconsciousness occurs in 10 seconds with just jugular vein compression?

This is the specific assertion: Only 11 pounds of pressure applied to both carotid arteries for ten seconds leads to unconsciousness, and applied for 4-5 minutes, causes brain death (McCance & Huether, 2010; Strack & McClane, 1999). The sources are listed below.


What software is used for the negative-invert filters? Are there any brands of software that you recommend for negative-invert filters?

Two of the presenters, Diana Faugno and Rachell Ekroos, use the imaging software that is part of the SDFI-TeleMedicine system, which provides customized shortcut keys to achieve the negative-invert filter process. However, they note the following:

It is our understanding that many digital imaging software programs have the capability of creating and applying these types of filters. The key is determining what steps are needed to achieve this type of filtered image and figuring out what
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terms are used by your software package to describe each step. There are a few short articles on this topic, however most address only one of the steps and then go into a discussion of additional post-production “tweaking” for the image; but this is beyond what most forensic clinicians wish to get into. We wish we could recommend a specific brand of software, but we are not familiar with how the filters work in the myriad of digital imaging software programs available.

*Is there a way in SDFI to bring up the images side by side? We have SDFI software.*

Yes, and it is quite easy to do! Please contact the SDFI customer support team and they can assist you further. They can be reached at 1-310-492-5372 or support@sdfi.com.

*Will the negative-invert filter be helpful for all skin tones? Can you talk about various skin colors and filters?*

This is a tricky question because the response depends on the level of contrast between the colors (e.g. tones, hues). This is an area that needs further research.

Colleagues have sent us images to see how the filters would work, and sometimes they work amazingly well, while others do not work as well. Currently, we cannot say whether the success (versus lack of success) has to do with skin tones, type/depth of injury, quality of the image, etc. However, we look forward to learning the answers over the next year and sharing the information with everyone! As with any research, time and funds are critical, and we all want the information as soon as possible so we can best serve our patients and communities.

*Is there a disadvantage to having the hot mirror removed from a Digital Single Lens Reflex (DSLR) camera?*

This question refers to the process of removing the low-pass filter (“hot mirror”) and replacing it with a clear filter. It is important to remember, however, that you will still want something in place to help protect the sensor.

We highly recommend that this is done by a professional company that can do conversions in a dust-free environment. After the conversion, you will have a full-spectrum camera and you can apply different filters to narrow the sensitivity to a certain range – the filter choice will depend on the ALS spectrum being used.
This also means you will need a filter on the camera, even for “normal” photo-documentation. Some professionals consider this to be a disadvantage, because they always have to have a filter on (i.e., there are more steps involved in the procedure).

It is also important to remember that the autofocus feature will not work when applying ALS photo documentation, regardless of whether the DSLR has been converted or not.

Another consideration with ALS is that it takes place in a dark environment, so the shutter remains open longer when taking a picture. This is why we recommend using a camera stand with a remote. It is also a good idea to have the patient hold their breath, in order to stabilize the image while the picture is being taken – as long as this is not contraindicated, of course.

At this point, until there is more research, we recommend having one camera set up to use for ALS photodocumentation and a separate camera for regular photodocumentation.

**How do you document injuries seen with a negative-invert filter? Do you add it as an addendum to the exam documentation?**

This is an excellent question. The answer is that we document the examination in the same way we always have – on the basis of what the patient tells us as well as our own physical assessment/evaluation. The filters simply provide us another way to “see” what might be difficult to observe with the naked eye. Or more often, the filters allow us to visualize and document those light hues (e.g., focal redness) that we can see during the exam but cannot seem to capture in the image.

Remember, the negative-invert filters simply allow us to better visualize and document what is already there. For example, we might document excoriated or friable tissue, or numerous lacerations less than (x)mm in length. With the use of filters, however, we may be better able to visualize the extent of those injuries. Forensic examiners often understand the problem: How many times have you documented an injury on your body diagram, and then tried to capture an image, only to end up documenting that you were unable to accurately capture the injury you documented on your diagram? This process of applying negative-invert filters simply adds a step you can use for better visualization and documentation of the area captured in the image.
Do the ‘strangulation symptoms’ refer to symptoms experienced at the time of strangulation, or at the time of the exam?

Both. Patients may be able to tell you about symptoms they experienced at the time of the strangulation, as well as those present at the time of the exam (e.g., headache). In addition, forensic examiners will document the signs they observe during the exam (e.g., a bruise on the head).

In the original strangulation documentation form developed by Diana Faugno, it did not differentiate when the symptoms presented or whether they had resolved. For that reason Deb Holbrook redesigned this form, with Diana’s permission, to include two columns. (Refer to the two forms at the end of this document.) The first column now asks about symptoms experienced at the time of assault, while the second one is used for documenting symptoms present at the time of the exam. This has clarified the issue and created a better assessment tool and stronger documentation for future research.

Some of the symptoms most commonly associated with strangulation include the following:

- 71.7% neck pain
- 54.2% headaches
- 39.3% painful swallowing
- 30.3% difficulty swallowing
- 22.9% difficulty breathing

Physical signs most frequently observed include:

- 35.9% eye findings (petechiae, sclera hemorrhage)
- 33.6% ecchymosis of neck
- 26.4% ecchymosis of chest and shoulder
- 19% scratches on face


See also: Special Collection/Domestic Violence and Health Care offered by VAWnet, the National Online Resource Center on Violence Against Women at: http://www.vawnet.org/special-collections/DVHealthcare.php#202.
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What’s the oldest injury that you’ve been able to detect with an ALS?

We cannot answer this question, because we do not date bruises during a medical forensic examination. Our task is simply to identify and document any bruises observed. However, based on the history that a patient gives us, we have seen bruises that were described as the result of injuries sustained 5-7 days prior to the medical forensic exam.

Can you tell us more about Frye Reed hearings?

This question refers to hearings designed to determine whether an expert is qualified to testify at trial. There are actually a variety of procedures and standards used across the country, so this topic is more detailed than what we can respond to in this format. However, it is an excellent idea for a future webinar or training bulletin to be developed by EVAWI in partnership with experts in the prosecution of sexual assault and domestic violence.

Is there any use for the old "black light?”

In general, we believe the “black light” (also known as a Wood’s lamp) is an antiquated technology with no clinical relevance for injury detection. However, some examiners believe it still has a place for basic fluorescence in order to identify findings and for swabbing purposes.