



## Pathology/Biology Section - 2013

### G44 Oblique Lighting Applications in Forensic Sciences

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The goal of this presentation is to demonstrate the effective use of oblique light to enhance surface texture and illuminate subtle features in a forensic setting.

After this presentation, attendees will have a better understanding of when and how to use the oblique lighting technique during a forensic examination.

Photographic documentation of autopsy findings is of particular importance, especially in cases which could result in judicial proceedings. When in court, expert witnesses use these visuals to present what was initially observed during the examination; therefore, documenting accurate images are vital for this process. Typical photography technique used during autopsy examinations for documentation involves perpendicular direct light on the region of interest. Oblique lighting is commonly used to reduce glare that may obscure the subject matter. This presentation discusses the use of oblique lighting to highlight subtle features and traumatic injuries so that detailed visual documentation is available. This technique was used in three different types of examinations in a medical examiner setting: pathology, neuropathology, and anthropology.

The study was conducted during a three-month Forensic Photography Internship Program at the Harris County Institute of Forensic Science (HCIFS), Houston, TX. Photographs of 15 cases were taken as part of the autopsy using the standard operating procedures defined by the Forensic Imaging Division. Photographs were taken using a digital SLR camera fitted with a 35-70mm lens as well as a 105mm macro lens. The camera also included a digital SLR off-camera Through the Lens (TTL) flash and a digital SLR TTL off-camera flash cord. The cases photographed required one or multiple types of examinations including pathology, neuropathology, and anthropology; therefore, the subject matter included both soft and hard tissue. Photographs were taken at the request of the forensic pathologist as needed during the autopsy for each case. Neuropathology photographs were taken after the brain and eye samples were formalin-fixed and dissected for examination. Anthropology photographs included cases recently exhumed as part of the HCIFS Unidentified Decedent Review. Photographs were taken prior to processing the exhumed remains as well as after the remains were processed for anthropology analyses. All the cases photographed for this study used direct perpendicular light and oblique lighting to demonstrate the efficacy of oblique light when surface texture details are required.

Results show that when oblique lighting is applied the amount of detail being documented is increased. In pathology examinations, soft tissue impressions were highlighted when oblique light was used. The lighting was best used in cases of motor-vehicle accidents to emphasize the presence or absence of seatbelt injuries; in cases of gunshot wounds where the presence of Gunshot Residue (GSR) needed to be recorded; and in cases of hanging/strangulation where the details of the ligature furrow needed enhancing. To document neuropathology examinations, oblique lighting was used to illuminate the eye to visualize retinal hemorrhages as well as to reduce the glare caused by vitreous fluid. These types of hemorrhages are particularly important in suspected child abuse cases. With photographs of the brain, oblique light reduced the glare typically encountered with direct perpendicular light. In anthropology examinations, oblique light successfully captured billowing on the surfaces of the pubic symphyses as well as epiphyses from the long bones of young individuals. These features are particularly important in estimating age. Furthermore, oblique lighting was best suited to document cases of subtle perimortem injury, in particular sharp force trauma, when present on bone.

This study demonstrates the usefulness of oblique lighting for photographic documentation of subtle surfaces details acquired during examinations in a medicolegal setting. These details play a vital role in assessing cause and manner of death and are especially important in cases where this information will be presented in court.

**Forensic Photography, Oblique Lighting, Technique**