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Standing on the Shoulders of Giants

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Overview

"If I have seen further, it is by standing on the shoulders of Giants." – Sir Isaac Newton, 1675 As an Associate Professor of Surgery, I have enjoyed the opportunity to share my medical and forensic experience with the Campbell University medical students in North Carolina. I try to instill in them the basics of the scientific method and the recognition of scientific opportunity.

Five years ago, I and my co-authors, had the honor and privilege to publish an original forensic research study in the Journal of Forensic Research: "Contact Lens Burial Simulation Study", Charles S Zwerling*, Katherine Kirby-Parker, Autumn Wright and Micah E Lee, Goldsboro Eye Clinic, 2709 Medical Office Place, Goldsboro, North Carolina 27534, USA, Zwerling et al., J Forensic Res 2016, 7:5 DOI: 10.4172/2157-7145.100034.

The study was a critical part of forensic verification of evidence found in the murder case of Janet Abaroa, in Durham, North Carolina. In 2010, contact lens remnants were retrieved from the exhumed body of the murder victim Janet Abaroa. This pivotal piece of evidence refuted the story that her husband, Raven Abaroa, told the police. He said that Janet had gone to bed wearing glasses the night she was murdered. When taking inventory of the victim's possessions, detectives noted that Janet's contact lenses were not in their contact lens case.Prosecutors petitioned the court to exhume the body and attempt to locate the missing contact lenses. The defense for Raven Abaroa argued against the exhumation based upon a lack of scientific protocol concerning contact lenses examination after an exhumation. Finally, after obtaining a court order, Janet Abaroa's body was exhumed five years post-burial, and her missing contact lens remnants were identified, which contradicted her husband's testimony.

With no scientific precedent for the exhumation and evaluation of contact lenses from a corpse, a burial simulation study was performed to explain the changes observed in the contact lens remnants that were used in the Abaroa murder case. Up until this point, contact lenses had rarely been relevant in criminal investigations and/or trials. Furthermore, there were no established protocols for the forensic evaluation of contact lenses in a criminal case. The pig eyeballs that were used in the simulation study were freshly harvested and exhibited the classic somatic changes of early death: loss of corneal transparency, changes in vasculature color, and fixed semi-dilated pupils. The sets of various contact lenses used in the experiment were placed on the corneas within two hours of pig death and then the pig eyes were buried following North Carolina burial protocol procedures. Over the course of the two-year experiment, the exhumations of the globes demonstrated different levels of decomposition. Protein and/or lipid materials were identified that created a biofilm and deposits within the contact lens. This biofilm of deposits results in the contact lens losing its ocular properties and transparency and assuming a yellow color. This yellow color or lens spoilage was the result of the diffusion of proteins and lipid into the contact lens substrate during tissue saponification and lipid degradation. Thus, we were able to re-create the same contact lens degradation and the yellow discoloration patterns noted on the material evidence that was identified in the Abaroa murder case. A finalized protocol for the forensic analysis of contact lenses in a criminal case was presented to assist future investigators.

In science we are presented with many opportunities to explore and research our existence. We can seize these chances or in most cases ignore them. If we decide to become involved in something new and unexplored, we must remember those great individuals who have come before us and established our current scientific protocols and methods. In the case of the contact lens burial simulation study, I was motivated by the work of Margaret Cox, Ph.D., a forensic archeologist, who postulated in her 2005 book, Forensic Archaeology: Advances in Theory and Practice, that contact lenses could be used as a forensic tool to identify unknown corpses that are retrieved at unmarked grave sites. Using well established scientific method guidelines, we were able to create a new scientific based protocol for the examination of contact lenses in a criminal case.

I am pleased to announce that one of my co-authors, Ms. Micah Lee was just accepted to the Brody School of Medicine at East Carolina University in North Carolina to pursue a medical career. As a physician/educator I feel a great sense of fulfillment in passing the baton of knowledge to the next generation. May she and her fellow colleagues continue this legacy and stand on our shoulders.

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