A158 The Microscopic Characteristics of Antemortem and Postmortem Hairs at the Root End

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After attending this presentation, attendees will see how the microscopic effects various environmental conditions may have on hairs that have been removed antemortem. This presentation will also demonstrate how to microscopically distinguish these hairs from hairs that have undergone postmortem changes.

This study will benefit the forensic science community by providing information on the microscopic characteristics that may be caused by environmental exposure and how these characteristics differ from postmortem banding. Postmortem banding and putrid roots are microscopic characteristics commonly observed in hairs that have undergone postmortem changes. Based on the experience of hair examiners, postmortem banding is generally accepted throughout the forensic hair community as a reliable indication of hair removal during the postmortem process. However, few research studies have been conducted to address the possibility that these characteristics may be observed in hairs removed antemortem.

Results from a study involving 600 hairs collected from fifteen living individuals will be presented. These hairs were exposed to various environments including indoors on a windowsill, submerged in water, buried in potting soil, outdoors on the ground surface, and inside vehicles. The hairs were subsequently microscopically examined at the root end to determine the type of changes that may have occurred as a result of storage in these conditions. Any changes at the root end were then compared to hairs removed from deceased individuals.

The majority of hairs studied (97%) contained roots in the actively growing anagen phase. Hairs in the anagen phase are not completely keratinized and thus more susceptible to changes due to environmental conditions. Two-hundred and fifty hairs were stored in vehicles or indoors on a windowsill for time periods ranging between nine days and 230 days. Two-hundred and fifty hairs were stored outdoors on the ground surface in shaded and non-shaded areas for time periods ranging between seven days and 106 days. One-hundred hairs were submerged in water or buried in potting soil for time periods ranging between fifteen days and 100 days. No hairs stored indoors on the windowsill and no hairs stored in the vehicles exhibited characteristics of decomposition. Some of the hairs stored outdoors, most of the hairs submerged in water, and most of the hairs buried in potting soil exhibited characteristics of decomposition. Some of these characteristics are similar to characteristics observed in hairs removed postmortem. However, no hairs in this study exhibited characteristics of postmortem banding.

The results from a blind test on the identification of postmortem banding will be presented. The test consisted of over 200 hairs that included all hairs in the presented study with possible changes at the root end as well as hairs known to have been removed from deceased individuals. Initial analysis by the two examiners that completed the test resulted in greater than 99.5% accuracy in identifying postmortem banding. Following a confirmation process whereby each examiner reviewed the initial results, accuracy was increased to 100%.

Results from this study contribute towards the reliability that hairs exhibiting characteristics of postmortem banding are consistent with having been removed postmortem. This study also demonstrates the need for proper training and good quality assurance procedures when identifying postmortem banding.

Hair, Postmortem, Banding

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