



Physical Anthropology Section - 2014

H133 Assessment of Hair Lesions Due to Sharp Force Wounds and Entomological Activity: An Experimental Study

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After attending this presentation, attendees will gain knowledge concerning the importance of an accurate analysis of hair in forensic cases to highlight possible signs of lesions which may provide information on the *modus operandi* of a criminal.

This presentation will impact the forensic science community by providing a new perspective concerning the assessment of sharp force lesions on hair and the differential diagnosis with taphonomical artifacts and blunt force trauma.

The analysis of hair from human remains is rarely performed but may provide useful information for the correct evaluation of forensic cases. In detail, hair can be affected by lesions which may be caused by trauma or insects. In addition, finding signs of sharp weapons on hair may provide important information for the reconstruction of the manner of death or may suggest fetiscist practise. This study stemmed from an actual judicial case where the correct interpretation of hair lesions on locks found on human skeletal remains was crucial for attributing the crime to a specific person who used to cut the hair of his victims (in this case, the defense sustained that the hair lesions present were due to taphonomical or entomological activity).

To study the manner in which hair reacts to blunt, sharp and taphonomical trauma, two different experiments were performed: locks of hair taken from living individuals of different ages underwent lesions by blunt and sharp trauma (both scissors and knife) to verify the morphology of lesions in comparison with those produced by two species of insects (*Tineola Bisselliella* Lepidoptera, Tineidae and *Anthrenus sp.* Coleoptera, Dermestida). Furthermore, dry degraded hair locks from 2- to 6-year-old forensic cases and from ancient 16th-century skeletons were subjected to mechanical trauma in order to verify how degraded hair breaks and whether it can mimic clean cuts. Both locks and single hair, particularly the cut or broken margin, were examined from a macroscopical and microscopical point of view by using stereomicroscopy and scanning electron microscopy.

Results showed the enormous amount of information which can be retrieved from the microscopic analysis of hair: sharp force trauma produces lesions with sharp and regular edges or with broken but “exploded” margins which are still distinguishable from blunt trauma, whereas insects leave single concave lesions. Hair cut with scissors can frequently be distinguished from hair cut with a knife. Dry, brittle hair, on the other hand, breaks with different patterns and is frequently empty inside. This study highlights the enormous amount of information that can be gained from hair found in the context of human remains.

Forensic Anthropology, Hair Analysis, Trauma