H27 The Influence of Penetrative Trauma on the Rate of Decomposition

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The goal of this presentation is to aid a better understanding of the influence that penetrative trauma has on the process and rate of decompo- sition. This will assist in the more accurate assessment of postmortem interval (PMI).

This presentation will impact the forensic science community by presenting research that suggests that penetrating trauma cannot be considered a major factor in the rate of decomposition and time to skeleti- sation of a gunshot trauma victim. It also supports other work that suggests disturbance may be an influential factor in decomposition (Adlam, 2005; Adlam and Simmons 2007).

Forensic Anthropologists utilise their knowledge of the processes of decomposition to estimate postmortem interval (PMI). An understanding of the factors that affect these processes and the degree to which factors, such as temperature, pH, and trauma influence the rate of decomposition is important for the accurate estimation of PMI.

Previous work by Mann *et al.* (1990), Vass *et al.* (1992) and Campobasso (2001) suggest that penetrating trauma may accelerate decom- position. Although a more recent experimental PhD study (Kelly, 2006) found no such influence, it is generally accepted that penetrating trauma may accelerate decomposition and time to skeletisation.

An experimental study was carried out in the North West of England using the domestic pig (*Sus scrofa).* Two experimental groups, one having gunshot trauma to the head, body and limbs and the other without trauma were left to decompose on the ground surface. A further control group of pigs with gunshot trauma were used to assess the effect of investigator distur- bance. Decomposition was measured by using weight loss, total body score (Megyesi, 2005) and changes in soil pH as indicators of soft tissue destruction. The attraction of arthropods to the carcases and sites of ovipo- sition and maggot activity was also observed and recorded.

Diptera were preferentially attracted to natural orifices, particularly those of the head in both groups. Attraction to and oviposition followed at the gunshot entrance wounds. However, in both groups oviposition also occurred at skin creases, such as those found between both fore and hind legs, simultaneously with that occurring at trauma sites. Although maggot masses were observed to become established more quickly in areas of trauma, other maggot masses at the non-trauma sites followed. No difference was found in time to skeletisation. No significant difference was found in weight loss between the two groups with p=0.544. Likewise, with total body score (p=0.8237) and changes in soil pH (p=0.6838), no significant differ- ences were found. The effect of investigator disturbance was significant to weight loss (p=<0.000) with undisturbed pigs losing weight more rapidly than disturbed pigs. This may be due to a disruption of insect activity each time data is collected.

During the later stages of this study (post 300 ADD), the experimental site experienced unusually high levels of rainfall. This impacted on the activity of arthropods, particularly *Coloeoptera*, which were highly active at this point. Time to skeletisation occurred beyond our estimate of 642 ADD. This suggests that heavy rainfall and its effect on arthropod activity may increase time to skeletisation.

Forensic Anthropology, Decomposition, Trauma

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