B24 Investigation Into DNA Transfer Through Forceful Contact

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After attending this presentation attendees will find out whether offender DNA can be detected in sites of forceful contact and how the profiles observed vary between different types of force. This may be an important tool in those investigating physical abuse in men, women, and children.

This presentation will impact the forensic science community by providing an important tool in those investigating physical abuse in men, women, and children. DNA will be deposited after a punch or slap, although the quantity/quality will vary depending on the force applied.

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The British Crime Survey of 2001 found that approximately 45% of women and 26% of men aged 16 to 59 had experienced at least one incident of inter-personal violence in their lifetimes. In Britain every year three million children are victims of abuse. Many victims are too terrified to tell the authorities what has happened, and without their testimony or the evidence of witnesses it may be impossible to identify the perpetrator and prosecute them.

A number of studies including those by van Oorschot *et al*. (1997), Lowe *et al*. (2002) and Ladd *et al*. (1999) have shown that it is possible to obtain a DNA profile from objects, touched even for only a few seconds. As yet, the only investigation into the transfer of DNA through forceful contact is that by Rutty (2002). This study showed that during simulated manual strangulation 7 out of 19 test swabs showed victim and offender DNA profiles, with the offender profile being observed up to 6 hours after contact. 12 out of the 19 showed victim only DNA profiles. No other study, as yet, has investigated different forms of forceful contact. It is hypothesized, therefore, that when an individual hits another some of the offenders DNA will be transferred onto that person's skin and vice versa.

This investigation follows on from the preliminary study performed by our group last year. Fifteen individuals were recruited and requested to wash their hands 15 minutes prior to sampling. They were then asked to slap and punch an acetate sheet attached to a focus pad. The sheets were swabbed with moistened, sterile, cotton swabs before and after contact. Later the experiment was repeated with a one hour gap between hand washing and sampling. A third experiment consisted of each individual punching and slapping the sheets three times in succession one hour after hand washing.

DNA was extracted from the swabs using the Qiagen QIAamp DNA mini kit and was quantified using the Quantifiler human DNA quantification kit. DNA was amplified and analysed using AmpF*l*STR® SGM Plus® PCR Amplification kit, ABI 3130 genetic analyzer and Genemapper ID®. Amplification was carried out using 28 and 34 (Low Copy Number) cycles of PCR, with the LCN PCR being performed in duplicate.

After amplification at 28 cycles few individuals exhibited transfer of DNA to the acetate sheets, mostly seen as single alleles at different loci. The increase in cycles to 34 (consensus results analysed) did result in an increase in the number of alleles observed. No full profiles were generated from any samples taken post punch, with only two full profiles seen after application of slap, one 15 minutes post wash and one 1 hour post wash (both single slaps and from different individuals). Fifteen minutes post wash 8 out of 15 volunteers transferred partial profiles after a single punch. One hour post wash 11 out of 15 (single punch) and 13 out of 15 (3 punches) exhibited partial profiles. After slapping the acetate sheet, under all 3 situations, all samples from all volunteers resulted in partial profiles – the only exceptions being the two full profiles already mentioned.

Overall little difference was seen between the samples taken 15 minutes post hand wash and those taken one hour post wash. Equally, little difference was observed between single and multiple punches. However there may be an increased difference if more punches/slaps are applied although it is unlikely that larger numbers of punches or slaps will be applied to the same area of the body. More identifiable profiles were observed from slaps than punches but the profiles observed do show some difference between the volunteers.

DNA, Force, Physical Abuse

 ** Presenting Author*