Bladder Swabs as a Suitable Source of DNA from Incinerated Deceased Persons – Our Preliminary Findings

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In the State of Victoria, Australia, the Coroners Court of Victoria (CCoV) is required by statute (Coroners Act 2008) to investigate any reportable deaths, including all sudden, unexpected and unnatural deaths. In Victoria, it is also a requirement that identification must be established to enable the legal interment of the deceased. The Victorian Institue of Forensic Medicine (VIFM) is a purpose built facility providing forensic medical services to the State of Victoria. This includes the provision of a medica-legal autopsy service, as well as the provision of scientific evidence for the indentificationof deceased persons who cannot be visually identified.

Using DNA analysis, the post-mortem (PM) identification of deceased persons relies on the retieval of a suitable PM sample, as well as a reference sample from a known relative. The DNA profiles obtained from the PM and reference sample are then compared to determine if the kinship relationship is supported by the DNA evidence. Depending on the condition of the body, the PM sample collect for DNA analysis will vary – usually blood, muscle or bone are taken. Some cases, however, can prove difficult; these include cases of severe decomposition or incineration, which may require multiple sample types by collected for analysis. The identification of incinerated bodies can be particularly challenging, as bones may become brittle or be severely affected in their ability to yield DNA for analysis. This was evident during the Disaster Victim Identification (DVI) response to the 2009 Victorian Bushfires[1].

Recently, VIFM staff were part of the DVI response deployed to Papua New Guinea for a plane crash in which there was a fire and 28 individuals lost their lives. For the purposes of identification using DNA analysis, staff were instructed to collect bladder swabs. These swabs were transferred to the laboratories of the Australian Federal Police (AFP) in Canberra and were subsequently profiled. Complete DNA profiles were obtained from all the bladder swabs collected in the field.

As a result of the successful DNA analysis of the bladder samples collected as part of the Papua New Guinea DVI response, the VIFM commenced a research project to evaluate the use of bladder swabs for coronial investigation involving victims of fire[2]. With the aim that if the bladder swabs proved to be an effective source of DNA from victims of fire compared to the conventional sample collected (usually bone), then the VIFM would recommend the collection of bladder swabs for these cases involving fire. The collection of bladder swabs is less invasive and less time consuming than retrieving traditional samples (such as tissue or bone). In addition, swabs are a common sample type used for DNA analysis, and require less processing compared to other sample type, such as bone, which require sample pre-treatment before DNA analysis can commence. This paper will discuss our preliminary findings of the use of bladder swabs as a primary identification sample at the VIFM.

[1] Hartmann, D., Drummer, O., Eckhoff, C., Scheffer, J.W., and Stringer, P. “The contribution of DNA to the disaster victim identification (DVI) effort” FSI, 205:52-58.
[2] “Investigation of the use of bladder swabs as samples for the DNA identification of incinerated deceased persons” VIFM Ethics Approval No: EC 3/2012.