TOENAILS AS AN ALTERNATIVE SOURCE MATERIAL FOR THE EXTRACTION OF DNA FROM DECOMPOSED HUMAN REMAINS

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The DNA identification of decomposed human remains for coronial investigations at the Victorian Institute of Forensic Medicine (Melbourne, Victoria, Australia), routinely requires the retrieval and processing of a bone samples obtained from deceased individuals. Despite the success of bone as a primary sample type for decomposed cases, its retrieval and processing for DNA identifications purposed has some associated issues including; the invasiveness of the surgical procedure to remove the bone from the deceased; the occupational health and safety (OH&S) risks to staff when using saws to retrieve and sample the bone; the time taken to prepare and sample the bone; and the requirement for refrigerated storage of the sample. In an attempt to negate the issues posed by bone as a source of DNA from decomposed cases, a DNA extraction method utilising toenails as an alternate source material was optimised and trialled.

Two DNA extraction methods were optimised for digestion of toenail material, with the method utilizing the QIAGEN DNA Investigator Kit selected for a casework trial. Single source DNA profiles, matching those of the conventional samples taken, were obtained for toenail samples collected from 28 of 30 coronial cases available for this study. Of these, 26 toenail samples produced full profiles. Although the overall DNA profile quality from the toenails was less than that of the conventional sample, the profiles from toenails met the reporting requirements for identification. Based on the results obtained, the Victorian Institute of Forensic Medicine will be implementing toenails as the primary sample type for collection from decomposed remains when blood is not a suitable sample type. This paper will discuss our findings for the use of toenail samples as a primary identification sample for decomposed cases.