D75   Evaluation and Selection of Touch DNA Evidence Using Decision-Making Software

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After attending this presentation, attendees will gain understanding about how touch DNA evidence is evaluated and selected using decision-making software for DNA analysis based on an effective case strategy. Case examples will be presented which explain how the approach is used in selection and analysis of different types of touch DNA evidence.

This presentation will impact the forensic science community by providing a business method to manage selecting suitable evidences for touch DNA analysis. This presentation will enable crime scene, forensic laboratory, criminal investigation, and prosecution to make the most of touch DNA evidence.

Touch evidence DNA is the widely used invisible evidence to prove the possible presence of biological material on a surface to connect a person to the crime scene. As the suspected surfaces for touch evidence could be large and numerous, this will increase analysis time, increase case backlogs, and increase the cost of the analysis which are considered to be major challenges to the forensic laboratories in the era of the current international financial crisis. In order to solve this problem, decision-making software was used to reduce the number of touch evidence cases, reducing the cost of analysis, and producing meaningful results to assist in the case investigation. The method will start by applying an effective case strategy management procedure, followed by the use of a decision-making program in order to evaluate different evidence according to certain criteria. An effective case strategy management includes identifying case requirements and needs through the main stakeholders. The requirements in each case can be categorized into two main sections, which are the identification processes of the victim or the suspect and crime scene reconstruction. The case stakeholders were identified to include all main persons, groups, or organizations which are related to the victim(s), the suspect(s), criminal investigation department, prosecution, and court. After understanding the requirement of the case, touch DNA evidence will be evaluated and selected using decision making software. The V.I.S.A® (Visual Interactive Sensitivity Analysis for multi-criteria decision-making) program was used as a decision-making tool to select the most useful touch DNA evidence for the case. Possible touch DNA evidence such as shoes, pens, cans, watches, seats, cigarette, and clothes will be evaluated in the software according to differential criteria such as contamination level, DNA damage condition, level of information gained, connection to victims, connection to suspect, connection to witnesses and location in the scene. Each criteria has its own sub criteria such as contamination level which can be low or high or without contamination. A decision tree model will be constructed for the evaluated evidence. This type of filtration process can be done in the laboratory after collecting the necessary evidences from the scene. In a case example, a body was found outside a labor camp, the deceased had a blunt force wound to his face, was fully clothed, and his mobile phone was found near him. Two people were arrested in relation to the case. Initially both denied being involved in the case. Following discussion with the main stockholder of a criminal investigation department, the identification of the suspect was considered the priority. A large number of items were received for examination. Few touch DNA possible evidence were selected and several similar evidences types were excluded from analysis after evaluation on the above criteria. The selected samples in the case were enough to connect the suspect to the victim. The approach was useful in this case to reduce the cost and time in selection touch DNA evidence. It is recommended that the forensic scientist, investigator, and prosecution apply an effective case strategy management, in addition to the use of decision-making software to select and evaluate large numbers of different touch DNA evidences. These methods also can be used in other types of forensic samples. More research is needed in the field of using business management techniques in the evaluation and selection of forensic evidence.

Touch DNA, Selection, Decision-Making