CASE STUDY: COMPLEXITIES OF BONE AND TISSUE ISOLATION AND DNA TYPING IN HUMAN FORENSICS

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Human identification increasingly relies on the isolation and analysis of DNA to identify individuals involved in crimes, natural disasters, terrorist attacks, and other unfortunate events. In addition to natural decomposition processes, numerous challenges arise when remains have been subjected to harsh environmental conditions such as extremes in temperature, exposure to ultraviolet radiation, and humidity. Two similar cases shall be described wherein the remains of the deceased individuals were severely compromised: portions of bone and tissue from two individuals recovered from a train wreck and the unidentified remains of a body discovered in a field.

Although both cases involved similar tissue types, consideration of the environmental conditions from which each set of remains were recovered was critical in order to maximize the potential of obtaining amplifiable DNA for downstream analyses. Recovered DNA was characterized using a highly sensitive quantification system (Investigator Quantiplex HYres), a 24-locus autosomal multiplex for human identification (PowerPlex® Fusion) and a bi-allelic, small amplicon DNA typing system (InnoTyper™ 21). This workflow has resulted in the successful in identification of all of the victims from both cases.