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Identification of Human Remains Using DNA Isolated from Bones Stored under Various Conditions and for Different Post Mortem Times

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Aim. To study the influence of different post mortem intervals and various storage conditions on the quality of DNA isolated from unidentified human bones for the purpose of personal identification.
Methods. Bone material stayed under different conditions (soil, air, sea water) for various post mortem intervals (two months and four years). The bones were cleaned, and DNA extracted and amplified using polymerase chain reaction (PCR). PCR products were analyzed by polyacrylamide gel electrophoresis, and visualized by silver staining.
Results. The DNA obtained from the bones of individuals killed in an artillery shell explosion two months prior to the study were of good quality and available in amounts sufficient for analysis in various detection systems. The same was true for bone samples stored in sea water for 3 weeks. In contrast, the DNA isolated from bones four years post mortem was partly degraded and could only be recovered in a very low quantity. Therefore, we chose three short tandem repeat (STR) loci – HumTH01, HumVWA and HumF13B – to identify the source of isolated DNA.
Conclusion. The analysis of DNA from human bones was successful in the case of short postmortem times (up to 2 months), even if the material had been stored in sea water. However, the isolation of DNA from war victims killed four years earlier presented serious difficulties.

Key words: bone and bones; DNA polymerases; forensic medicine; postmortem changes