



### A144 Punch-Out: An Evaluation of Six Collection Devices for Databasing

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The goal of this presentation is to provide a comparison of six buccal collection devices currently used for DNA databasing.

This presentation will impact the forensic science community by providing important details on the robustness and ability of each collection device to collect and preserve DNA for forensic testing and convicted offender databasing.

Uploading convicted offender DNA information into criminal databases is an increasingly important and useful aspect of forensic DNA casework. Many times important new leads are generated in “cold cases” and other scenarios when a DNA profile from a crime scene produces a “hit” when searched against a database of convicted offender DNA profiles. DNA isolated from oral buccal cells is the most widely used material employed to generate offender genotype profiles. A diverse range of commercial devices are available to collect convicted offender samples and capture the DNA on solid support matrices and many contain proprietary chemical formulas that assist in lysing cells, denaturing proteins, or otherwise preserving the DNA sample until it can be processed in the lab. Along with the wide variety of commercial devices available that can be utilized to obtain these samples, there is significant variability in the procedures used to collect and store them. Additional sample variation can result from the disparate capabilities and level of training of those who collect convicted offender samples. Because the samples themselves are usually high quality, single source material, various automated methodologies are employed to process them. As a result, it is imperative that the device used to collect convicted offender samples be able to obtain enough DNA to overcome the variability not only in the “shedding” characteristics of the donor but in sample collection techniques as well. It must also be able to preserve the DNA through different storage conditions, be amenable to various processing techniques, and release enough of the DNA to generate a good quality profile. This presentation describes a study comparing the quantity and quality of DNA obtained under various conditions from the Whatman EasiCollect, Bode Buccal Collector, foam applicator with FTA cards, foam applicator with 903 cards, OmniSwabs, and Puritan cotton swab collection devices. The study examined variability of total DNA yield in replicate samplings from the same donors over several days and reproducibility of those yields from each device. Each device was also evaluated in its ability to generate a suitable DNA profile that meets applicable CODIS Database loading criteria (FBI QAS, NDIS Guidelines, etc.) using traditional organic extraction, quantification, and STR amplification methods as well as direct STR amplification and “punch in” techniques. Known samples were collected using each device from 30 different donors to evaluate the ability to generate suitable DNA profiles from a variety of donor ‘types’. Furthermore, in an attempt to simulate some of the variability encountered in normal storage, DNA quantity and quality from each device were examined after allowing the devices to air dry for various lengths of time before processing as well as storage for different time periods. Devices were subjected to accelerated aging conditions to simulate long term storage and UV exposure to measure resistance to DNA damage. In this study all DNA yields were determined using the Applied Biosystems (AB) Quantifiler™ Human real time PCR chemistry and profiles were generated using the AB Identifier™ or Identifier Direct STR amplification kits. This study provides important details on the robustness and ability of various commercial devices to collect and preserve DNA for forensic testing and convicted offender databasing and may assist laboratories in their evaluation of a collection device to employ in their databasing efforts.

#### **DNA, Database, Collection**