A191 Design and Development of the Human Scent Collection Device

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After attending this presentation, attendees will have learned how the human scent collection device was designed to be a scientifically validated means by which to collect human scent evidence.

This presentation will impact the forensic science community by showing how a scientifically designed human scent collection device represents a critical step towards gaining acceptance, within the scientific and legal communities, of the process by which human scent evidence is collected and stored for future use.

The ability of trained canine teams to locate contraband substances and explosives or to track fleeing suspects and missing persons is generally well accepted by the American public and law enforcement community due to clear successes in the field. When trained canine teams use human scent to indicate that a person may have been present at a crime scene, however, widespread acceptance is weak. Conversely, many European countries have been using scent-discriminating canines in criminal investigations for decades with strong success. One important step towards the use of scent evidence in U.S. courts is to gain credibility for the process by which human scent is collected from evidence and stored for future use.

The Technical Support Working Group (TSWG) sought to address the need for a rugged, reliable, and compact human scent collection device, yet also one that has a scientific basis, for canine handlers to collect human scent for future use. When held over an item, such a device pulls air across a cotton gauze pad to collect a volatile's profile onto the pad from the item. The resulting "scent pad" can then be presented to a canine trained in human scent detection to identify or trail the person matching the volatile's profile.

Laboratory testing verified that the principle of operation used in such a device was capable of allowing the transfer of a human scent compound to a cotton gauze pad. A mockup device was exposed to a low concentration (< 1 ppm) of dodecane, a common constituent of human scent, and scent pads were generated under the same procedures as would be used in the field. The gauze pads were stored in glass jars, where the headspace vapor was captured with solid phase microextraction (SPME) fibers. SPME fibers were analyzed via gas chromatography/ mass spectrometry to determine if the gauze pads had retained dodecane. The laboratory evaluation was also used to evaluate the efficacy of the cleaning procedure, as the potential cross-contamination of scent pads must also be addressed in the design of a scent collection system.

Initial field tests with a mockup device were conducted with canines trained in human scent detection to determine some of the key design specifications of a human scent collection device, including the fan flow rate, collection time, and efficacy of the cleaning procedure. Specifically, the ability of the canine to initiate trailing in the direction of the target trail was observed when presented with a positive scent pad, and the response to being presented with negative or blank scent pads was also observed. Similar field tests were conducted with a fabricated human scent collection device to demonstrate the performance of the device. Volunteer targets provided articles of clothing to be used as sources of human scent. Targets walked specific paths in normal operational environments, including residential neighborhoods and parking lots. Canines trained in human scent detection were presented the scent pads and evaluated for their ability to begin trailing the appropriate target path.

Tests were also conducted to evaluate the ability of such a device to withstand high temperature exposures and mechanical shock.

Canine, Human Scent, Scent Transfer

 ** Presenting Author*